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Maternal Mortality Rates among Im/Migrant Populations in the United States

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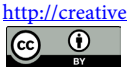

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Abstract

Introduction: Maternal mortality rates have more than doubled in the U.S over the last two decades, making it one of the few places in the world where maternal mortality is increasing. Differences in maternal mortality among certain races and ethnicities are known but few studies examine maternal mortality among immigrants. Since immigrants represent 13.7% of the U.S. population, it is essential to examine immigrant subsets to understand maternal mortality among this vulnerable population. Methods: A literature search identified 318 articles on maternal mortality and immigrants, with 12 articles from the U.S. The keywords included maternal mortality, United States, migrants, asylum seekers, immigrants, and disparities. Maternal mortality statistics were obtained from the World Health Organization and Center for Disease Control. Results: Studies analyzed in this review found an overall lower maternal mortality rate among immigrant women compared to U.S.-born women, except for Hispanic immigrant women. Black women had the highest maternal mortality rate, regardless of immigration status. Conclusion: Although the literature points to lower maternal mortality among immigrants, the data is still somewhat mixed, making it challenging to draw comprehensive conclusions. Additional research examining maternal mortality among Im/migrants in the U.S. is needed to guide future training among healthcare professionals and policymakers.

Keywords

Maternal Mortality, Im/Migrant Reproductive Health, United States

1. Introduction

The World Health Organization (WHO) defines maternal mortality as the death of a woman from pregnancy-related causes during pregnancy or within 42 days of termination of pregnancy, irrespective of the cause of death [1]. Pregnancy-related mortality is maternal death during pregnancy or within 1 year after the termination of pregnancy. The WHO estimates that between 2000 and 2020, the global maternal mortality rate has declined by 34.3%, with an annual reduction rate of 2.1% [2]. Although maternal mortality is trending downward worldwide, approximately 287,000 women in 2020 died during or following pregnancy. Deaths are especially high in lower income countries, particularly in sub-Saharan Africa, which accounted for 70% of maternal deaths in 2020 [3]. Despite the global decline in maternal mortality, some countries did experience an increase between 2000 and 2020, including the United States [2]. The National Center for Health Statistics reported that, in the United States, a total of 1205 women died of maternal causes in 2021, compared to 861 in 2020 and 754 in 2019 [4].

1.1. Background

Maternal mortality has trended upward in the United States for the past forty years, and the reasons are multifactorial. There may be an artificial increase in maternal mortality due to the introduction of the pregnancy checkbox on the death certificate in 2003, allowing for improved surveillance of maternal mortality [5]. Women are becoming pregnant and having children later in life, and advanced maternal age is associated with increased rates of maternal mortality [4] [6]. In 2021, the maternal mortality rate for women over 40 was 6.8 times higher than the maternal mortality rate for women under 25 years of age [4]. Cesarean delivery rates increased from 20.7% to 32.1% for all pregnancies between 1996 and 2021, and maternal mortality and morbidity after cesarean section was reportedly nearly five times higher compared to vaginal birth [7]. Adverse events of cesarean sections included postpartum hemorrhage, thromboembolism, complications from anesthesia, and postpartum infections [7] [8].

According to the Maternal Mortality Review Committee (MMRC), approximately 84% of pregnancy-related deaths in 2020 in the United States were preventable [9]. Data from MMRC examining underlying causes of maternal death in 2020 determined mental health conditions (such as suicide and overdose/poisoning related to substance use disorder) accounted for most deaths (22.5%), followed by cardiovascular conditions (cardiomyopathy, pulmonary hypertension and other cardiovascular conditions such as coronary artery disease) (16.6%), infections (16.4%), hemorrhage (11.2%), embolism (8.6%), and hypertensive disorders of pregnancy (7.1%). Interestingly, the cause of death varied among different racial and ethnic groups. In Hispanic women, infection was the most common cause of maternal mortality (31.7%), followed by mental health conditions (15.8%) and hemorrhage (13.9%). In non-Hispanic Black women, cardiovascular conditions were the most common cause of maternal

mortality (23%), followed by infection (19.1%) and embolism (13.8%). The most common underlying cause in non-Hispanic White women was mental health conditions (36.4%), followed by cardiovascular conditions (15.2%) and hemorrhage (13.4%) [9].

Maternal mortality rates are higher among specific racial and ethnic populations within the United States, most notably among Black women [10]. The maternal mortality rate for non-Hispanic Black women was 2.6 times higher than non-Hispanic White women in 2021, with 69.9 and 26.6 deaths per 100,000 live births, respectively [11]. The maternal mortality rate for Black women was also significantly higher than for Hispanic women [4]. One contributing factor is the increased risk of comorbid conditions during pregnancy, such as cardiovascular disease, diabetes, and obesity [10]. Black women have the highest rate of cardiovascular disease compared to other ethnic groups, with 47.3% of Black women experiencing this disease burden [12]. In addition to cardiovascular disease, Black women have a higher prevalence of stroke, cancer, diabetes, and obesity [13]. The higher disease burden among Black women greatly contributes to the increased pregnancy risk and maternal mortality [14].

Structural and social determinants of health and systemic racism influence rates of disease among Black women. They experience both gender and racial discrimination which contributes to a high allostatic load in response to states of chronic stress [15]. Allostatic load refers to chronic and cumulative stress from the challenges of life events. In a review of 267 studies, allostatic load was associated with poorer health outcomes in general [16]. The prospective observation cohort study, Nulliparous Pregnancy Outcomes study, analyzed 4266 pregnant individuals of which 34.7% had a high allostatic load [17]. High allostatic load was significantly associated with adverse pregnancy outcomes from hypertensive disorders of pregnancy but not preterm birth [17].

The Weathering Hypothesis predicts deteriorating health outcomes in response to cumulative socioeconomic disadvantage among older Black women [18]. Black infants and teenage mothers experience lower fetal and maternal mortality rates compared to older mothers, suggesting cumulative stress resulting from systemic racism contributes to increased maternal mortality among Black women as they age. Since chronic stress is associated with increased risk of development of health conditions such as hypertension, Black women enter a cycle which perpetuates inequalities ultimately contributing to increased maternal mortality [15].

1.2. Immigrant Demographics

According to the United States Census Bureau, more than 45 million people living in the United States as of July 2023 are immigrants, accounting for 13.7% of the total population [19] [20]. Approximately 77% of the immigrant population in the United States are considered lawful citizens (35.2 million). The remaining 23% are unauthorized (10.5 million) and account for 3.2% of the total popula-

tion. Immigrants and their children are projected to contribute to 88% of the U.S. population growth through 2065. Mexico accounts for the largest immigrant population in the United States (25%), followed by China (6%), India (6%), the Philippines (4%), and El Salvador (3%) [19].

1.3. Purpose

While research shows clear evidence of increased maternal mortality rates among specific racial and ethnic groups, limited data exists examining maternal mortality rates among immigrant women, especially in the United States. Maternal mortality among immigrant women has been analyzed and reported on throughout Europe [21] [22]. In contrast, only a few studies in the United States have conducted similar surveys to determine if immigrant women are at an increased risk of maternal mortality. The objective of this review is to examine the published literature to better understand the incidence of maternal mortality among immigrants in the United States and identify potential improvement opportunities and strategies from an individualized and policy-based level.

2. Methods

A literature search identified 318 articles on maternal mortality and immigrants, with 12 articles from the United States. The keywords included maternal mortality, United States, migrants, asylum seekers, immigrants, and disparities. Maternal mortality statistics were obtained from the World Health Organization and Center for Disease Control. Articles included in this review focused on pregnancy-related and maternal mortality rates among immigrants in the United States. Five articles fit this description and were utilized in this literature review. **Figure 1** summarizes the Prisma diagram of the literature search [23].

3. Results

Maternal Mortality Among Immigrants in the United States

Table 1 summarizes the findings of five studies that focused on comparing the maternal or pregnancy-related mortality between U.S.-born and immigrant women. A 1999 study examined pregnancy-related mortality among immigrants compared to U.S.-born women between 1987 and 1992 [24]. During this period, immigrant Hispanic women overall had a higher pregnancy-related mortality than U.S.-born Hispanic women. Immigrant and U.S.-born Hispanic women with an "other/unknown" status had pregnancy-related mortality rates of 8.5 and 22.5, respectively (**Figure 2**).

Pregnancy-related mortality rates were analyzed between 1993 and 2006 by Creanga *et al.*, 2012 (**Table 1** and **Figure 3**) [25]. Pregnancy-related mortality rates were 9.6 and 11.6 per 100,000 live births among U.S.-born and immigrant Hispanic women, respectively (RR = 1.21, 95% CI = 1.07 - 1.36). Language barriers, concern regarding documentation status, and general unfamiliarity with the U.S. healthcare system could deter Hispanic immigrant women from seeking

adequate care and contribute to increased pregnancy-related mortality rates. In contrast, pregnancy-related mortality rates were 9.1 and 7.5 per 100,000 live births among U.S-born and immigrant White women, respectively (RR = 0.83, 95% CI = 0.69 - 0.98). Maternal mortality rates were considerably higher among U.S. and immigrant Black women (35.2 and 32.3 per 100,000 live births, respectively) compared to Hispanic and White U.S.-born and immigrant women. As evidenced by this study, Black women are at an increased risk for maternal mortality regardless of immigration status [25]. Gender and racial disparities, high allostatic load in response to chronic stress, increased likelihood of living in poverty (compared to other races) and lower educational attainment contribute to the higher maternal mortality in Black women overall [26]. After age adjustments, Creanga *et al.*, 2012 determined that only immigrant White women have a lower risk of pregnancy-related mortality compared to their U.S.-born counterparts [25]. When compared to other immigrant women, White immigrant women may have higher education and income levels, and further, may be more inclined to seek access to healthcare earlier in pregnancy, thus reducing rates of maternal mortality.

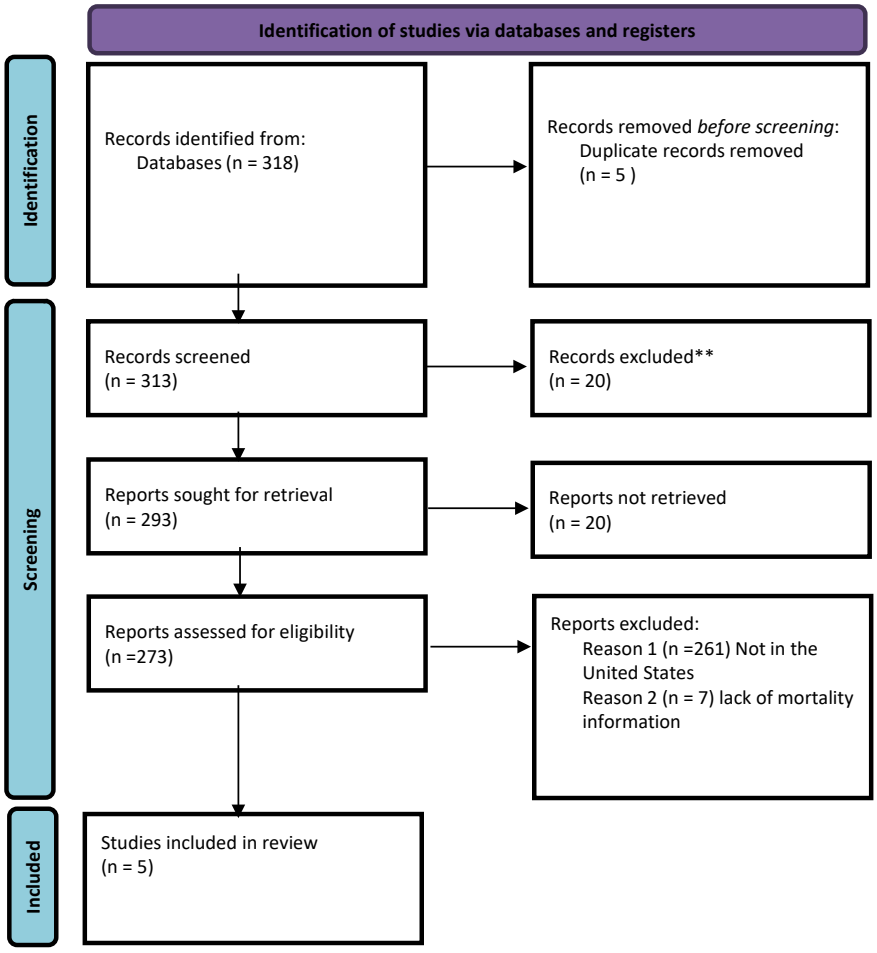

Figure 1. Prisma diagram of literature search of publications on maternal mortality among immigrants in the United States.

Table 1. Summary results of studies examining maternal and pregnancy-related mortality among immigrant women in the United States.

Authors and publication year	Study aims	Study period	Summary of results
Hopkins *et al.*, 1999 (ref [24])	Pregnancy-related mortality comparison between U.S.-born and immigrant Hispanic women	1987-1992	Pregnancy-related mortality among U.S.-born women Hispanic (overall): 8.2 Mexican: 8.1 Puerto Rican: 8.7 Cuban: 7.2 Central/South American: NA Other/unknown: 8.5 Pregnancy-related mortality among immigrant women Hispanic (overall): 10.5 Mexican: 9.9 Puerto Rican: 13.5 Cuban: 9.6 Central/South American: 9.4 Other/unknown: 22.9
Creanga *et al.*, 2012 (ref [25])	Pregnancy-related mortality comparison between U.S.-born and immigrant women	1993-2006	Pregnancy-related mortality rate among U.S.-born women White women: 9.1 Hispanic women: 9.6 Black women: 35.2 Asian or Pacific Islander: NA Maternal mortality rate among immigrant women White women: 7.5 Hispanic women: 11.5 Black women: 32.3 Asian or Pacific Islander: 11.9
Guendelman *et al.*, 2006 (ref [27])	Maternal mortality comparison between Mexican American and Mexican-born women	1996-1998	Maternal mortality rate Mexican American women: 7.8* Mexican-born women: 8.5*
Singh, 2021 (ref [6])	Maternal mortality comparison between U.S.-born and immigrant women	2013-2017	Maternal mortality rate among U.S.-born women All races: 20.79 Non-Hispanic White: 16.36 Non-Hispanic Black: 46.45 Maternal mortality rate among immigrant women All women: 12.63 Non-Hispanic White: 11.01 Non-Hispanic Black: 23.64
Singh & Lee, 2021 (ref [28])	Maternal mortality comparison between U.S.-born and immigrant women due to indirect obstetric causes	2013-2017	Maternal mortality rate among U.S.-born women All women: 6.36 White women: 5.79 Black women: 12.00 Hispanic women: 2.83* Maternal mortality rate among immigrant women All women: 3.53 White women: 3.67 Black women: 4.20 Hispanic women: 3.64*

*Differences not statistically significant.

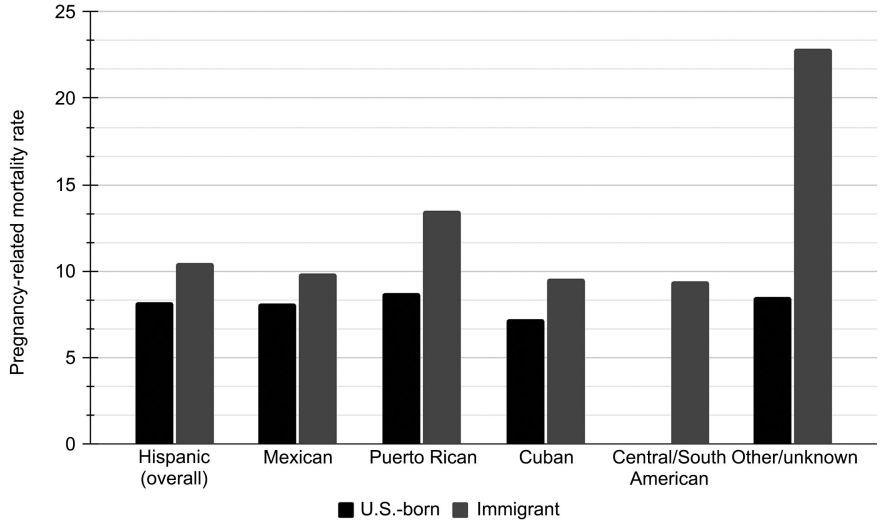

Figure 2. Pregnancy-related mortality rate in Hispanic U.S.-born and immigrant women between 1987-1992 by Hopkins *et al.*, 1999 (ref [24]).

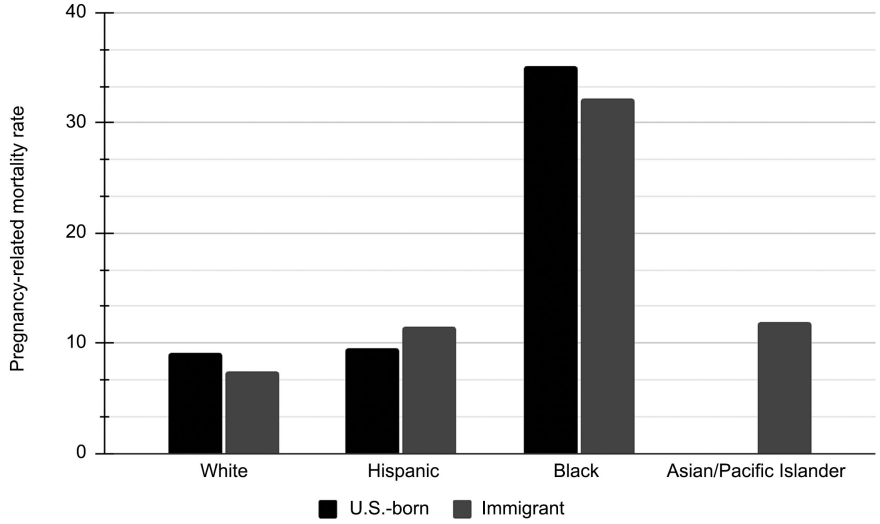

Figure 3. Pregnancy-related mortality rate in U.S.-born and immigrant women in the United States between 1993-2006 by Creanga *et al.*, 2012 [25].

Guendelman *et al.*, 2006 examined maternal mortality rates between 1996 and 1998 of Mexican-born California women and Mexican American women (**Table 1**) [27]. Maternal mortality rates between 1996 and 1998 were not significantly different between these two populations: Mexican-born women had a mortality rate of 8.5 per 100,000 deliveries (95% CI 4.6, 10.9) and Mexican American women had a mortality rate of 7.8 per 100,000 deliveries (95% CI 4.6, 11.0). Interestingly, this study did find that Mexican-born women were less likely to experience any maternal morbidity compared to American born women (**Figure 4**) [27].

All cause maternal mortality rates in the United States between 2013 and 2017 were analyzed by Signh (2021) (**Table 1**) [6]. The leading causes of maternal deaths during this time were hemorrhage, pregnancy-related hypertension, em-

bolism, infection, and chronic conditions. The maternal mortality rates for non-Hispanic White U.S.-born and immigrant women were 16.39 and 11.01, respectively (RR = 0.67, 95% CI = 0.52 - 0.82), and for non-Hispanic Black U.S.-born and immigrant women were 46.45 and 23.64, respectively (RR = 0.51, 95% CI = 0.41 - 0.61) (**Figure 5**). Immigrant Black women were reported to have a 33% lower maternal mortality rate than U.S.-born Black women, and immigrant White women had a 49% lower maternal mortality rate than U.S.-born White women [6].

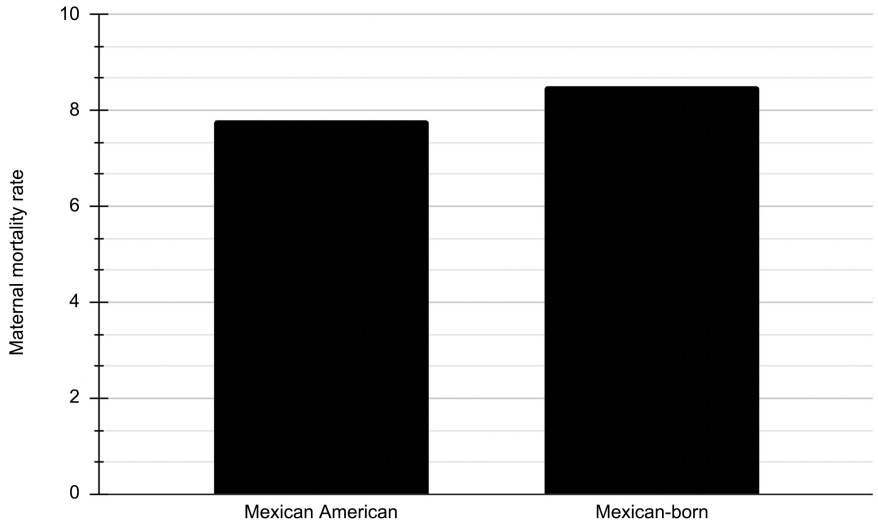

Figure 4. Maternal mortality rate in Mexican American and Mexican-born women in California between 1996-1998 from Guendelman *et al.*, 2006 [27].

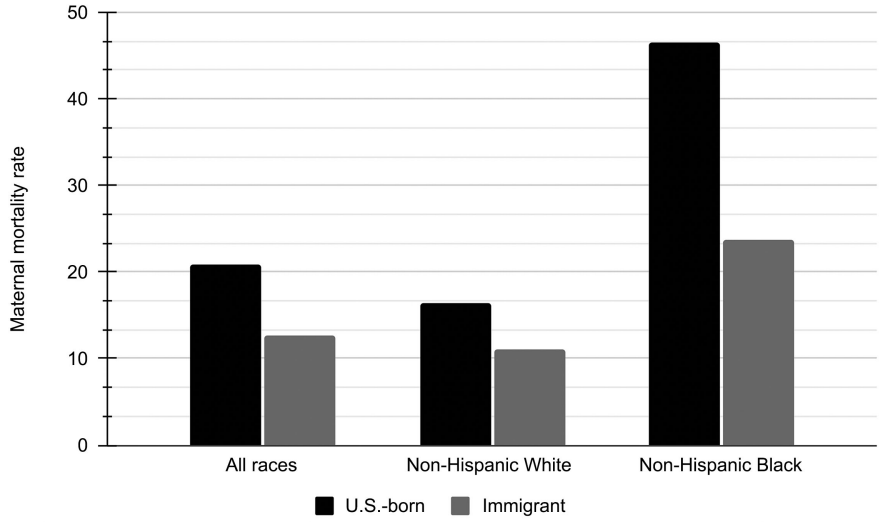

Figure 5. Maternal mortality rate in U.S.-born and immigrant women from 2013-2017 from Singh, 2021 [6].

Maternal mortality due to indirect obstetric causes between 1997 and 2017 was examined by Singh & Lee, 2021 (**Table 1**) [28]. Indirect obstetric causes of maternal mortality include maternal infections and chronic diseases (cardiovas-

cular disease, respiratory disease, mental health conditions, and metabolic disorders). Maternal mortality rates due to indirect obstetric causes were further evaluated by sociodemographic factors, including immigration status, between 2013 and 2017. The all-races maternal mortality rate for U.S.-born and immigrant women were 6.36 and 3.53, respectively (RR = 0.56, 95% CI = 0.46 - 0.65), indicating that, overall, immigrant women have a lower maternal mortality rate due to indirect obstetric causes than their U.S.-born counterparts (**Figure 6**) [28]. Non-Hispanic White U.S.-born and immigrant women had maternal mortality rates of 5.79 and 3.67, respectively (RR = 0.63, 95% CI = 0.38 - 0.88), and non-Hispanic Black U.S.-born and immigrant women had maternal mortality rates of 12.00 and 4.20, respectively (RR = 0.35, 95% CI = 0.19 - 0.51). Comparatively, U.S.-born and immigrant Hispanic women had a maternal mortality rate of 2.83 and 3.64, respectively (RR = 1.29, 95% CI = 0.87 - 1.70), indicating no statistical significance between U.S.-born and immigrant Hispanic women due to indirect obstetric causes (**Figure 5**). Additional factors examined in this study demonstrated that being unmarried, residing in a rural area, and having a lower educational attainment were associated with higher maternal mortality from indirect causes [28].

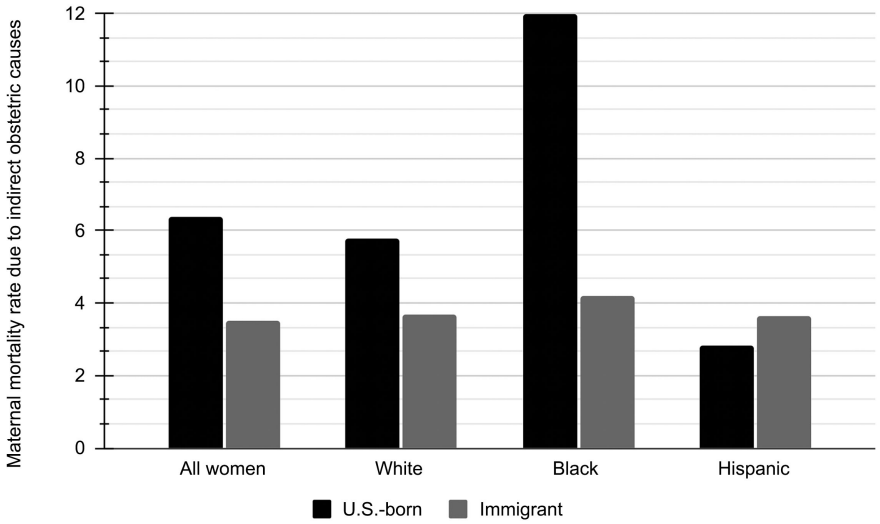

Figure 6. Maternal mortality rate in U.S.-born and immigrant women from 2013-2017 due to indirect obstetric causes from Singh & Lee, 2021 [28].

4. Discussion

Maternal mortality is exceptionally high in the United States, especially compared to other high income and industrialized countries [2]. While several studies have attempted to identify risk factors of maternal mortality, such as race and ethnicity, educational attainment and standard of care, few studies examine maternal mortality with respect to immigration status [9]. Since the immigrant population in the United States is expected to increase considerably over the next fifty years, examining maternal mortality among this population is critical.

The current lack of data investigating maternal mortality among immigrant women makes it challenging to draw conclusions regarding their role in the maternal mortality crisis in the United States.

Five published studies were identified which investigated pregnancy-related or maternal mortality among immigrant women in the United States. Hopkins *et al.*, 1999 found an overall higher pregnancy-related mortality rate among Hispanic immigrants compared to their U.S.-born counterparts [24]. Creanga *et al.*, 2012 also identified a higher pregnancy-related mortality among Hispanic immigrant women compared to their U.S.-born counterparts [25]. White and Black immigrants, however, had a lower pregnancy-related mortality than their U.S.-born counterparts. Black women had a higher pregnancy-related mortality rate compared to White and Hispanic women regardless of immigration status [25]. Guendelman *et al.*, 2006 examined maternal mortality among Mexican women living in California and found a higher maternal mortality rate among Mexican-born compared to Mexican American women, although these differences were not statistically significant [27]. Singh (2021) identified a higher maternal mortality rate among U.S.-born women overall compared to immigrant women—both non-Hispanic White and non-Hispanic Black immigrant women had lower maternal mortality rates than their U.S.-born counterparts [6]. Singh & Lee, 2021 found an overall higher maternal mortality rate due to indirect obstetric causes among U.S.-born compared to immigrant women [28]. Both Black and White U.S.-born women had a higher maternal mortality rate compared to immigrant women. Interestingly, however, Hispanic immigrant women had a higher maternal mortality than their U.S.-counterparts [28].

Although few studies have investigated maternal mortality among immigrant women in the United States, there are some consistencies identified in this literature review. Hispanic immigrant women have a higher pregnancy-related/ maternal mortality compared to their U.S.-born counterparts. Since the highest percentage of immigrants in the United States are from Mexico, the high maternal mortality among Hispanic immigrant women compared to their U.S.-born counterparts cannot be overlooked. Language barriers, decreased access to healthcare services, and poor health-literacy are possible contributing factors which increase the risk of maternal mortality among this population [29].

In addition to identifying the vulnerability of Hispanic immigrant women experiencing pregnancy-related/maternal mortality, it is evident that Black women consistently have the highest maternal mortality, regardless of immigration status. While trends described in this literature review show maternal mortality is lower for immigrant Black women compared to their U.S-born counterparts, the maternal mortality rate is remarkably higher than other groups. Similar contributing factors causing an increase in maternal mortality among Hispanic women are experienced by Black women as well. In addition, the burden of high allostatic load and systemic racism woven into both social determinants of health as well as the healthcare system greatly contribute to this disparity. Population level

risk factors for maternal death include chronic hypertension, older age, lower education level, race, poverty, lack of healthcare insurance, and lack of prenatal care [30]. Addressing the needs of these vulnerable populations is crucial to ending the maternal mortality crisis in the United States.

Assessing policies in place to protect vulnerable populations is an important step in addressing the maternal mortality crisis. In the United States, immigrants with qualified immigration status, such as lawful permanent residents, refugees, and asylum seekers, are eligible for Medicaid and/or the Children's Health Insurance Program (CHIP) [31]. The purpose of CHIP is to provide low-cost health insurance for those who earn too much to qualify for Medicaid [32]. To become eligible for Medicaid/CHIP, pregnant women must have qualified immigration status for at least five years. States do have the opportunity to waive the five-year waiting period for pregnant immigrants allowing complete pregnancy-related coverage with Medicaid/CHIP [31]. As of May 2024, thirty states and Washington D.C. have opted to waive the five-year waiting period for pregnant immigrants [33]. The next step is a nationwide waiver of this five-year waiting period, which would provide qualified immigrants the opportunity for pregnancy-related coverage if otherwise not available. Women who do not have qualified immigration status (or are within the five-year waiting period) are eligible for emergency Medicaid coverage. Unfortunately, this covers only labor and delivery costs [31]. Providing complete Medicaid/CHIP to pregnant women without qualified immigration status beyond labor and delivery could improve morbidity and mortality for immigrant pregnant women. In addition, some states have the opportunity to adopt the so-called "unborn child" option through CHIP, allowing the state to consider the "unborn child" as "targeted low-income children" regardless of immigration status [31] [32]. This policy allows states to provide pregnancy-related care to those without authorized immigration status. Improving pregnancy-related outcomes and reducing maternal mortality among immigrant women can be partially accomplished through the nationwide dissolution of the five-year waiting period for Medicaid/CHIP and comprehensively covering those who do not have qualified immigration status throughout the entire course of their pregnancy and postpartum period.

While expanding access to Medicaid/CHIP would reduce pregnancy-related/maternal morbidity and mortality, improving postpartum care for pregnant patients is also important. Approximately 47% of maternal mortality deaths occur in the postpartum period between 7 and 365 days, and 27% of maternal mortality deaths occur in the postpartum period between 43 and 365 days [9]. This emphasizes how crucial postpartum care is in preventing maternal mortality. United States Federal law currently requires pregnancy Medicaid coverage through 60 days postpartum [34]. In an attempt to combat the high maternal mortality rate in the United States, the American Rescue Plan Act of 2021 provided states the option to make postpartum coverage through Medicaid available for 12 months [35]. As of 2024, almost all states have adopted the 12-month

postpartum extension, except for Idaho and Iowa, which are planning to implement a 12-month extension. Wisconsin currently has an extension coverage period limited to 90 days [34]. Improving postpartum care is important for promoting management of chronic medical conditions, identification and management of postpartum depression, and improving maternal and child health outcomes. Since postpartum care should increase since the implementation of the American Rescue Plan Act [35], the upcoming years should hopefully see a decline in postpartum maternal mortality.

On the more individualized level, competency-based training among physicians and healthcare professionals across a wide array of medical fields is essential for the medical treatment of immigrant patients [36]. Poor communication and information exchange due to the lack of native language interpreters is another element leading to medical errors and poor health outcomes [37]. Healthcare providers should utilize translation services to allow for clear communication between parties [25]. They should attempt to understand how the patient became an immigrant or refugee and ensure the medical community will be a safe place for them and their family. Healthcare providers should self-educate on current and evolving federal and state policy surrounding immigrants and should be encouraged to advocate for programs which benefit patients, regardless of immigration status. Additionally, systemic racism and implicit bias in medicine must be identified and addressed to reduce its influence on high allostatic load and poorer health outcomes among Black women in the United States [16].

5. Conclusion

The paucity of data examining maternal mortality among immigrant women in the United States makes it difficult to draw conclusions on their contribution to the ongoing maternal mortality crisis. The studies analyzed in this literature review found an overall lower maternal mortality rate among immigrants compared to U.S.-born women overall, apart from Hispanic immigrant women, who consistently had higher maternal mortality compared to their U.S.-born counterparts. Black women had higher maternal mortality rates compared to White and Hispanic women regardless of immigration status. Additional research investigating maternal mortality among immigrant women is needed to affirm the results from these studies and provide further research required to institute meaningful change to combat the maternal mortality crisis in the United States.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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