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Evaluation of Maternal Mortality in the United States Using a Socio-Ecological Model

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EVALUATION OF MATERNAL MORTALITY IN THE UNITED STATES USING A SOCIO-ECOLOGICAL MODEL

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Introduction

Of the developed countries, the United States has the most alarming rates of maternal mortality (MM). The heightened rates of MM are a current issue that should be addressed. MM is described as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes" (WHO, n.d.). Severe maternal morbidity is described as short-term or long-term complications of health that arise from delivery (CDC, 2019). An important factor to discuss with maternal issues and delivery is the racial disparities between African-American women and white women; the CDC states that pregnancy-related deaths for African-American women are three to four times higher than white women. As Taylor et al. (2019, p. 6) states, “acknowledging racism as the underlying cause of maternal and infant deaths is critical to finding policy solutions that can effectively eliminate racial disparities”. Institutional racism and implicit bias are important factors when discussing African-American patients and healthcare providers in medicine.

The focus of the paper will examine current solutions to reduce MM in the United States through a Socio-Ecological Model (SEM), as well as discuss the racial disparities that exist in medicine and propose new solutions and methods that have proved to be viable in other regions of the world. The SEM allows solutions to be multi-faceted, and institutions to work with communities and individuals to solve the issues of MM.

It is also important to note that not all pregnant people identify as women. There are also others who have pregnant-abled bodies, such as those who identify as transgender or nonbinary. For the purpose of this paper, the focus will be on “women” and the existing literature on MM

and women. Many other authors suggest that there is not enough research on experiences of people who identify as transgender, nonbinary or intersex and MM (Taylor et al., 2019, p. 5).

Background

The United States is ahead of many countries in terms of medical technology, treatment and research. It is important to grasp the issue at hand; maternal death in the United States has risen dramatically in the last few decades (ACOG, 2018), as the death rates amongst women per 100,000 births rose from 17 deaths per 100,000 births to 26 deaths per 100,000 births in 2014 (MHTF, 2019). During the year 2000, the United Nations (UN, n.d.) announced a goal to decrease MM worldwide (WHO, n.d.). While the United States has seen an increase, other countries around the world have seen decreases in MM. Globally, we can see patterns with countries and the rates of maternal death. Developed countries such as the United Kingdom, Canada, Finland, Denmark, France, Germany, and others have all seen a large decrease in MM, as shown in Fig. 1.

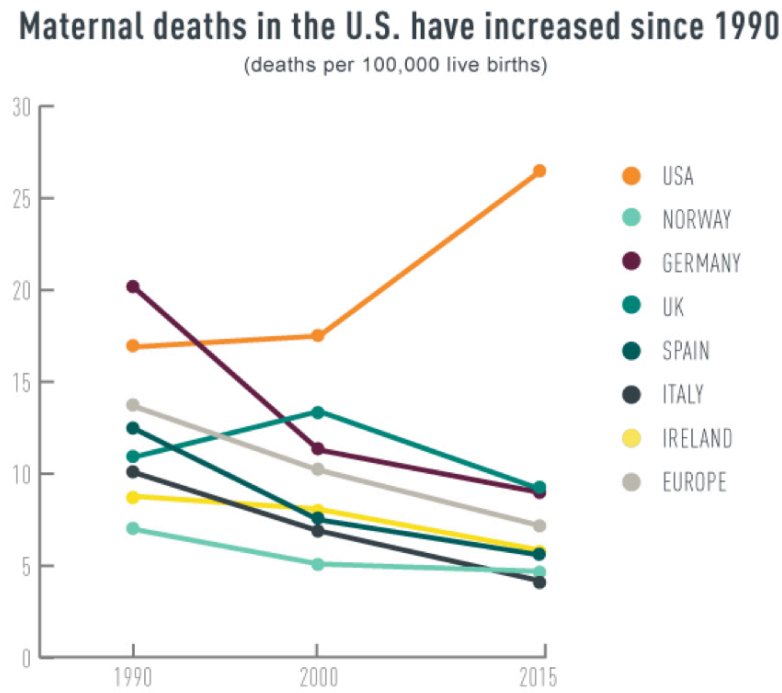

Figure 1. *Graph of Maternal Mortality rates per 100,000 live births in various countries (Merck for Mothers, n.d.)*

Women who give birth in countries such as China and Saudi Arabia have a lower chance of dying from pregnancy-related complications than women in the United States (Neggers, 2016, p. 72). As one of the countries that spend the largest amount of money on healthcare, it is surprising to see that our rates of MM are this high. The United States spends $86 billion a year on healthcare. If the problem does not lie with a lack of money, the cause is likely tied to other factors (Bingham et al., 2011, p. 189). Though it is hard to pinpoint the exact reason for the cause of the rise in MM, several ideas will be studied and explored throughout this paper.

In understanding the issue of MM in the United States, let's take a look at the main causes of death among women giving birth. While the percentages range depending on the source, the top causes of death of MM include infection, hemorrhage, cardiovascular disease,

and more, as shown in Fig. 2 (CDC, 2019). While it's important to note these, the more indirect causes such as structural inequality, racism, quality of care, hospital access and more affects the outcome of a woman's pregnancy will be the focus of this paper.

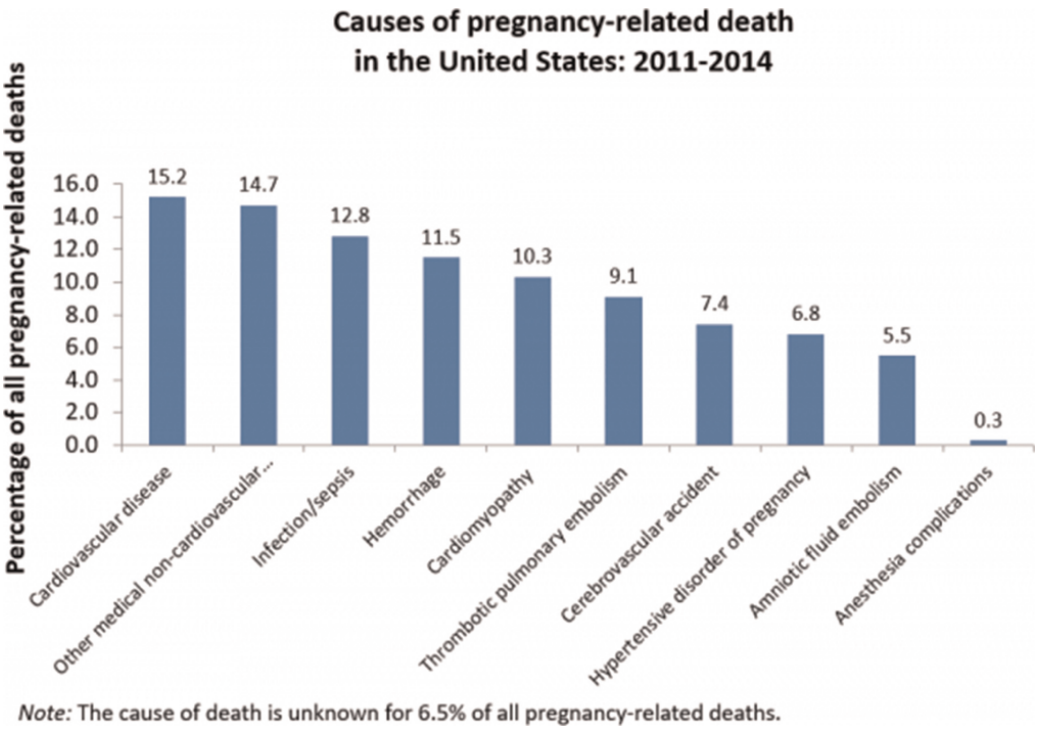

***Figure 2**. Causes of Maternal Mortality in the United States (CDC, n.d.)*

Currently, there is no national database in place to track MM, making it much harder to solve the issue. In some states, there are death certificates that include a code for MM following the World Health Organization's International Classification of Disease (ICD) (Neggers, 2016, p. 73). The new International Classification of Diseases (ICD-11) accounts for MM though it has yet to be adopted by all states. It is possible that part of the rise is MM is due to use of the new death-certificate-coding system (Neggers, 2016, p. 74). So, there's a possibility that perhaps there is

not a current increase in MM, only that we are starting to develop the tools to collect information. It's possible that the United States has always had high rates of MM. Either way, the elevated rate of MM in the United States is an issue that needs to be addressed.

Across the globe, countries with lower rates of MM such as Poland, Finland and Sweden have procedures and tools to make sure the rates of MM remain low. These are just a few countries that focus on the use of midwives along with doctors, giving them both equal responsibility in the process. Other than the use of midwives, the countries with the lowest rates of MM often have national policies on maternal care, as well as universal healthcare (Högberg, 2004, p. 1313). Healthcare access to all allows women to have quality care at all stages of their pregnancy. Even prior to pregnancy, universal healthcare allows people to take care of themselves and their health conditions. There are risks associated with health conditions and pregnancy which will be discussed further. The United States does not operate this way; there are many women who can't afford health insurance. This often leads to neglecting their own health due to socioeconomic factors. Therefore, it is not shocking that countries with available care have better health outcomes. The use of midwives is important as well: "Both doula services and midwifery care are key to promoting birthing choice and reproductive autonomy for low-income women and women of color" (Taylor et al. 2019 p. 15). A doula is a pregnancy coach and a midwife can deliver babies (The Bump, n.d.). In the United States, a woman can choose between having either a physician who specializes in obstetrics and gynecology or a midwife. The role of midwives varies from state to state. In some states, rules are much stricter than others, limiting the roles of midwives (Martin, 2018, p.1). Often times, it's the doula or the midwives who spend more time with the patient. The patients can directly communicate their wants and needs to them, and they provide reassurance, although it can be dependent on the dynamic between patient and

provider. These interventions have been shown to be especially beneficial to low-income women and women of color (Taylor et al. 2019 p. 15).

There are current solutions in place that are working towards lowering MM in the United States, such as Maternal Mortality Review Councils (MMRCs). MMRCs are composed of professionals such as obstetricians-gynecologists, nurses, social workers, and psychologists, and they work to continue research, collect data, and assess the problems occurring in hospitals (ACOG, 2018). The American College of Obstetricians and Gynecologists states that there are currently 33 states within the United States with MMRCs, meaning that there are still up to 17 states without these councils. A recent report states that many of these pregnancy-related deaths are preventable (Report from Nine MMRCs, 2018). The Preventing Maternal Deaths Act was first proposed in 2017 and is currently in the process of approval; it seeks to allocate a large sum of money to finance MMRCs in every state (ACOG, 2018). This would allow every state to work towards eradicating MM and would benefit the United States as a whole. Another new proposed data collection tool is called Maternity Mortality Review Information Application (MMRIA or "Maria"), which allows standardized data collection for MMRCs to use (MMRIA). There are also implicit bias trainings at hospitals to prevent racially biased interactions between providers and patients; more information on the effectiveness of implicit bias training will be discussed below.

Because the current solutions are new, such as the MMRCs and MMRIA, it is difficult to assess the results and effectiveness of these proposed programs at this time. The issue of MM in the United States is complex, and thus requires a complex solution model. The SEM allows us to pose solutions in a multi-level manner (CDC, 2019).

Socio-Ecological Model (SEM)

While fairly new, the SEM has been adopted as a potential solution for several issues around the world. Conceived of by Urie Bronfenbrenner in the 1970s, it was later developed as a theory in the 1980s (Kilanowski, 2017, p. 295). The SEM usually consists of four to five levels, all connected in layers, and is easily understood through a diagram (Fig. 3). For the purpose of this paper, adaptions have been made to the levels after thorough research of the application of the SEM (Alio et al., 2009 p. 558). Other problems to which the SEM has been applied as a solution model include violence, intimate partner violence, and maternal health care in general around the world, not specifically MM (CDC, n.d.).

The four levels discussed will include:

(1) the mother and the family, which includes the pregnant woman, the father, and relationships to close family and friends

(2) community and society; this includes the neighborhood, the region, and socio-economic class

(3) the healthcare system; this includes insurance, medical policy, and quality of care

(4) the historical context of racism, which is inclusive of both structural and institutionalized racism due to the history of slavery in the United States.

The mother and the family exist as a small circle within community and society, surrounded by the healthcare system, and is embedded in the larger circle of the broader contexts; one of these is the historical context of racism, seen in Figure 3 on the next page. The levels exist almost like the layers of an onion, layered and complex.

In this model of the SEM, the levels can be imagined having interdependent relationships. One level will affect the functionality of the other levels. If there are issues in one level, it will

bleed into and affect other parts of the SEM. Therefore, in order to solve issues using the SEM, solutions must be acted on in each level simultaneously (CDC, 2019).

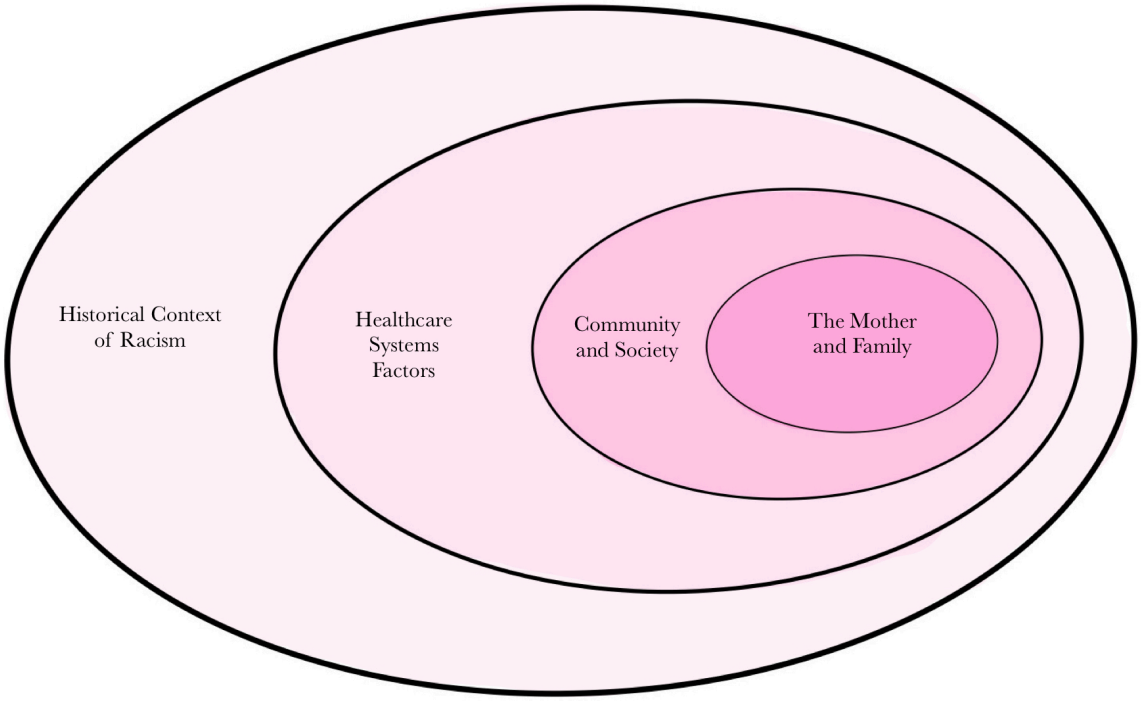

Figure 3. *Adapted Socio-Ecological Model (SEM) as a solution framework for Maternal Mortality in the United States*

The Mother & Family Characteristics

At the center of the SEM, we have the mother and family characteristics. It is important to note that MM not only affects the person who is pregnant; it also can affect others, such as the father and family members as well. Therefore, it is vital that mothers and loved ones are aware of potential risks that may arise. Before the discussion of pregnancy, it is important to discuss pre-pregnancy factors; one of the first things to highlight is contraception. There is a large percentage of women who have unintended pregnancies, which are at higher risks for complications (Tsui et al., 2010, p.152). This means that one of the first steps in providing adequate care for women in general means we must advocate for affordable and available contraceptive options for all women and pregnancy-abled bodies. Through the use of these measures, the number of unwanted pregnancies could possibly decrease, leading to lowered rates of complications and MM for mothers. It is important to keep in mind that the solutions proposed are not meant to put the responsibility entirely on the individual, as the issues of MM are interdependent at all four SEM levels.

Focusing more on the woman with regard to the pregnancy, it's important to note that there are certain risk factors for MM, such as existing health conditions, age, stress, and more (Healthline, 2019). Existing health conditions such as cardiovascular disease, diabetes, high blood pressure can be harmful and pose risks to a pregnant woman. Some of these health conditions can be mitigated or prevented if given quality care and access to education. In the United States, unfortunately, some of these health conditions are not rare: 4 out of 10 Americans have heart disease, cancer, chronic lung disease, stroke, Alzheimer's, diabetes or chronic kidney disease (CDC, 2019). Education about potential risk factors during pregnancy should be discussed with the pregnant woman and her close family. A larger effort towards treating or

controlling the existing condition should be explored. With the use of medication, other alternative natural methods such as exercise and healthy eating have been proven to aid in many cardiovascular issues and other health complications such as high blood pressure or high cholesterol (AHA, 2019). Of course, there are limitations to interventions and to preventing complications, but we should try to improve the overall health of each individual. Age also affects pregnancy risks; women under 20 or over 35 have higher risks with pregnancy and birth-related complications (Healthline, 2019). Education on risks of age are already in place, but better intervention and information on how to have a successful healthy pregnancy regardless of age should be provided for all people pregnant. For example, more education on reducing stress, managing pre-existing health conditions, and exercise to maintain and work towards a healthy pregnancy. Adopting these behaviors can be challenging for a woman who immersed in a context that doesn't provide resources.

It has even been shown that simply being a woman is already an internal stressor and can have effects on a woman, and being a Black woman causes this "double pressure" effect on women (Jackson et al., 2005, p. 594). These effects usually result in anxiety and stress for the woman. The pressure caused by being a woman of color, added with the stressor of being a woman. Stress is harmful to pregnancy and can often manifest harmful outcomes for the pregnancy and the development of the fetus (Coussons-Read, 2013, p. 52). Stress can vary from traumatic events, moderate stress, and even everyday stressors such as work and family. Efforts should be made to intervene before issues regarding mental health and stress become dangerous to a pregnant woman.

We see that mental health and general wellbeing plays a large role in pregnancy, a mother's perception of maternal care also is vital in having a safe pregnancy and birth (Health

Direct, n.d.). Perception of maternal care relates to other levels of SEM, such as quality of healthcare and availability of services.

Studies have shown that higher rates of using patient decision aids, which allow the patient to have more say in their care, have been shown to reduce anxiety in mothers (Say et al., 2011, p.1). Although we can't say for sure, it is possible that low-decision making in their own pregnancy negatively affects their mindset during their own pregnancy.

It's important to discuss the race disparities in MM since Black women are up to four times more likely to die giving birth (CDC, 2019). At the outermost level is the historical context of racism, which inadvertently has an effect on all of the other levels. In the mother, it affects the pregnant woman herself, causing internalized racism. "Internalized racism is defined as acceptance by members of the stigmatized races of negative messages about their own abilities and intrinsic worth" (Wielunski, 2018). There are also studies that show that internalized racism has an effect on cardiovascular health, depression and mental health disorders (Wielunski, 2018; Chae et al., 2010, p. 1182; Mouzon & Mclean, 2017, p. 36). Internalized racism is believed to be learned and can, therefore, be unlearned through racial identity development (Blakesley, 2016, p. 25). There is little literature on the concept of unlearning internalized racism, more research in this area is needed to support this as a proposed solution. There are some existing programs available for unlearning racism. For example, the People's Institute for Survival and Beyond has a specific program called "Undoing Racism", which focuses on anti-racist efforts in communities. They do this "through dialogue, reflection, role-playing, strategic planning and presentations, this intensive process challenges participants to analyze the structures of power and privilege that hinder social equity and prepares them to be effective organizers for justice" (PISAB, n.d.).

Another education route is birth options and preparations that can be given directly to the mother and family. Prenatal care is important to have a successful childbirth experience, "Too few women get adequate prenatal care. In the past decade or so, care options—such as testing for pregnancy complications or pain relief options in labor—have become much more complex. Fewer women are taking prenatal education classes and more women are experiencing high-risk or complicated pregnancies" (OBOS Pregnancy & Birth Contributors, 2014). Something just as important as prenatal care is postpartum care: "Traditional postpartum care in the United States consists of daily hospital visits for two to four days and a follow-up visit with a provider six weeks later… Other countries are known to provide considerably more postpartum support to women and their families" (Groff, 2011, p. 1). The countries with the lowest rates of MM tend to have better access to quality care and oftentimes are given more visits from healthcare providers. In Holland, women are assigned a professional maternity nurse for the first week to ten days postpartum. The nurse aids in care for the mother and her recovery as well as the infant (Acosta, 2015). In France, nurses make home visits to give medication and monitor the mother as well as pelvic floor exercises for healing (Baker, n.d.). In Finland, every infant leaves with a baby box that is equipped with a bed, clothing, books, and more (Baker, n.d.). These are just a few examples of policies and care in other countries around the world.

The main factors to focus on for the mother are health conditions and mental health, possible solutions include providing pregnancy mental health courses, therapy, education on health conditions that pose risks to pregnancy, and healthy stress outlets. Since the solution focuses on the individual, each plan will vary from person to person depending on their pregnancy case.

Community & Society

There are many factors in community and society that negatively affect MM, factors such as poverty, neighborhood and community, as well as safety are risks for MM. Mothers who come from areas with higher rates of poverty are more likely to die from MM, regardless of race (Singh, 2010, p. 3). This makes sense; areas of higher poverty likely have less access to resources due to economic constraints. This in turn directly affects the inner circle of the SEM, the mother, by reducing the quality and accessibility of care. Wherever the mother and family lives define their surroundings and community. This is a physical restriction, where you live determines your access to hospitals and clinics. This is another example of the interconnectedness and interdependencies of the SEM and the levels. An obvious solution is to provide these high poverty areas with more access and higher quality of care, but that solution is rather costly. Another route is to try to make use of the low resources already available through community-based care. There is no perfect solution that would work for all neighborhoods around the United States, they vary depending on each community and the resources and people there. Some examples of community-based care include home-based care, community-operated clinics, and health campaigns (Lassi et al., 2016, p. 264). We have seen through the use of community-based programs in other low-income communities in less developed countries, there has been a reduction of both maternal and infant mortality (Ricca et al., 2016, p. 204). Sometimes it's the community volunteering at local clinics, or support-based groups for mothers and families. There is a wide range of options for programs, and the programs are usually built based on the needs of that community. When we strengthen communities, we strengthen the connections between people. Empowering communities inevitably affects the individuals who live in the community positively. Community empowerment "refers to the process of enabling

communities to increase control over their lives… 'Empowerment' refers to the process by which people gain control over the factors and decisions that shape their lives" (WHO, n.d.).

The surrounding neighborhood and community affect the woman and family as well; issues that arise from the historical context of racism can play a role in neighborhoods and communities. Racism will be discussed later, but it is important to highlight the effects of racism due to the United States' history with slavery. Neighborhood or residential segregation and the oppression of Black communities still continue to this day decades after the abolition of slavery: "Limited access to housing in stable, middle-class neighborhoods, analysts say, has had a negative impact on everything from the quality of education Black children receive to the health and longevity of their parents" (Williams, 2018). These issues are not new; in fact, there have been many solutions to try to reduce neighborhood segregation, such as the Fair Housing Act of 1968. The act was meant to bridge the gap of neighborhood segregation, but studies have shown that this segregation still exists in the United States (Williams 2018). Often, this means that Black and other minority families are restricted to living in low-income or low-cost housing. Research has shown that there may be a strong connection between low-income or low socioeconomic status and bad health: "Impoverished adults live seven to eight years less than those who have incomes four or more times the federal poverty level" (Goodman & Conway 2016). Therefore, those who are restricted to live in low-income communities, who are often people of color, are more at risk for bad health.

We see now that neighborhood has an impact on health and lifespan of an individual, so mothers coming from low-income or low-cost neighborhoods most likely have more health conditions and tend to be at higher risk for other health conditions that may arise. "Minority neighborhoods tend to have higher rates of mortality, morbidity, and health risk factors

compared with white neighborhoods, even after accounting for economic and other characteristics" (Gee et al., 2004, p. 1645) Gee et al. also argue "that residential segregation leads to differential experiences of community stress, exposure to pollutants, and access to community resources". Not only can stressors of the neighborhood affect the individual mother, they affect the community. What solutions, in addition to current solutions, could be proposed to help disadvantaged communities with regard to stressors and health?

There have been many proposed solutions; the issues regarding community and neighborhood health are not new, but there are areas of research that are still lacking in finding the direct link between neighborhoods and health (Cubbin et al., 2008, p. 7). We are just aware that there is a link, and those who reside in minority neighborhoods tend to have worse health outcomes. Some of the proposed solutions include: bringing retail food markets into the communities, community organization, reducing residential segregation (Cubbin et al., 2008, p. 8). Some of the solutions don't directly affect health, but can help reduce access to resources, such as food markets. Food markets would allow for more availability of healthy food options to communities.

While improving neighborhoods or communities might not seem like a solution directly solving MM, working towards a better community environment for vulnerable populations will have a positive result in overall health. Sometimes it doesn't require a lot of money, so the solution towards strengthening communities could start immediately. Making use of existing structures will help; one example is the Tacoma-Pierce County Health Department. They have connections with local African-American churches to provide information and education to mothers and families who are in need. With a goal to increase healthy births, they rely on a Health Ministry model, which includes churches, community groups, pastors, health ministers

and public health nurses. These health ministers meet with families one-on-one to provide social support and basic needs such as facilitating housing food, transportation, clothing and baby items (TPCHD, n.d.). This is an example of a local effort to reduce MM as well as promote healthy births. Creating community trust and support is vital in providing mothers and their families with the necessary information for a healthy pregnancy.

Health System Factors

The availability and quality of services are factors of the community and society as well as the health system, so they interact on both levels of the SEM. Depending on where the mother lives, the availability of hospitals and clinics are restricted. If she lives in a more rural area, there will likely be fewer options compared to living in an urban area. Some communities might be closer to higher quality providers than others.

The availability of medical services for a mother depends a lot on the type of insurance she has or whether she has insurance at all. A simple solution is to provide medical care to all women; that way all women have equal access to the care needed. This would positively affect mortality rates and complications could potentially be eradicated before delivery since more than half of all MM cases are preventable (ACOG, 2018). Unfortunately, proposing universal healthcare as a solution to MM in the United States opens up a whole different discussion of whether or not healthcare should be provided to all. While working towards universal healthcare could be the ultimate goal, a simple solution would be keeping current healthcare financing structure in place. The issue is that lawmakers are trying to repeal the Affordable Care Act (ACA), which provides healthcare access for many women in the United States. A section of the ACA, in summary, states that women's wellbeing, including preventive visits and prenatal care,

is covered (Fogel, 2013). If the ACA is somehow repealed, a lot of people, including pregnant women, will lose access to prenatal and pregnancy care. This would be a regressive move for the United States, which is likely to raise MM rates as well as other health complications. If women can't have access to healthcare, this could lead to undiagnosed diseases, health conditions, and poor overall health.

To work towards affordable healthcare for all, since healthcare should be viewed as a human right. It is important that we try to build from existing structures, such as the ACA. "The World Health Organization (WHO) Constitution of 1946 declared that the 'enjoyment of the highest attainable standard of health'—defined as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'—'is one of the fundamental rights of every human being'" (Christopher, 2015, p. 958). The statement above suggests that without the highest standard of health, there is a potential violation of human rights. Then if there are not enough adequate resources to provide every individual with healthcare, the United States is violating human rights.

Another important aspect of care is quality of care. The WHO (2006, p. 9-10) defines high-quality care as:

> "Safe—delivering health care which minimizes risks and harm to service users, including avoiding preventable injuries and reducing medical errors
>
> Effective—providing services based on scientific knowledge and evidence-based guidelines
>
> Timely—reducing delays in providing and receiving health care
>
> Efficient—delivering health care in a manner that maximizes resource use and avoids waste

> Equitable—delivering health care that does not vary in quality because of personal characteristics such as gender, race, ethnicity, geographical location or socioeconomic status
>
> People-centered—providing care which takes into account the preferences and aspirations of individual service users and the cultures of their communities"

The Maternal Health Task Force from the Harvard School of Public Health also discusses the limitations of trying to improve care, and is trying to find a way to objectively measure the quality of care. Some elements include patient surveys, healthcare providers' training, provider-patient relationships, supplies and infrastructure (MHTF, 2019). Since many of these factors directly affect the patients, quality of care plays an important role in MM. To be sure that mothers are receiving adequate-quality care, the problem is that some mothers are not receiving quality care. A solution that would require hospitals and clinics to treat patients with quality care, as listed above, should be implemented.

A more specific proposed solution for this level of the SEM is the creation of hospital protocols, these can vary from hospital to hospital depending on the location and complications that may arise. One example could be a specific protocol for an at-risk patient who is pregnant. A protocol is something all providers can refer to properly treat and assess the patient. One example of one successful state within the United States that has lowered its MM nearly 50% is California; one innovation is a toolkit specifically tailored to maternal emergencies (Montagne, 2018). This includes "things like a checklist, an IV line, oxygen masks, a special speculum and a Bakri balloon, which, when inserted into the uterus, puts pressure on blood vessels", sponges and pads are used for measuring blood loss rather than simply "eye-balling" it (Montagne, 2018). It is believed that the use of this toolkit has played a large role in lowering MM rates in the state of

California. These are also likely tools that hospitals already have; the act of making the toolkit and potentially spending a little extra money is all hospitals would have to do.

An interesting concept to reduce MM through the healthcare system is to reduce the number of unnecessary cesarean sections (C-sections) performed in hospitals. "Women are three times more likely to die during Caesarean delivery than a vaginal birth, due mostly to blood clots, infections and complications from anesthesia" (Nierenberg, 2018). This makes sense as the C-section procedure is much more invasive in comparison to natural birth. Since it is more invasive, the surgical procedure could lead to health complications and eventually, death. The United States has an interesting connection to C-sections: “women in the United States are giving birth by Caesarean section far more often than is necessary to keep maternal and neonatal mortality rates low… about one in three births happen by C-section, a rate that has risen dramatically over the past few decades" (Thielking, 2015). It doesn’t make sense that women in the U.S. are having these procedures often unless there is a higher rate of natural birth complications. C-sections pose a higher risk of MM or maternal morbidity. It is also true that some C-sections are not necessary. The U.S. is much more dependent on the use of this procedure compared to other developed countries and another possible solution to MM is trying to lower the number of C-sections performed. Perhaps encouraging hospitals and providers to minimize the use of unnecessary C-sections in order to prevent complications that may arise. Doing so can possibly lower the rates of complications since women are three times more likely to die from C-sections (Nierenberg, 2018).

As we can see, the healthcare system has the potential to provide many immediate solutions. Solutions such as toolkits, which have been proven useful in the state of California, or having hospitals try to lower the number of unnecessary C-sections. More training needs to be

provided on the quality of care for all patients, making sure to follow all the requirements placed by the WHO. Other solutions which would take more time and money would include healthcare access and availability. It is important to work towards access to healthcare for all, but it is vital that we keep existing structures such as the ACA in place so those who have healthcare access continue having it. This would ensure that all women, regardless of race or socioeconomic class have access to safe, quality care.

Historical Context of Racism

The United States has a complex relationship with racism, due to a history of slavery and the process on which the country was built. Racism is a complex issue in the United States; solutions will be proposed in this paper, but it's important to keep in mind that these solutions are only a small part, and there needs to be much more work to dismantle the racism embedded in the country. Before the discussion of the historical context of racism, it is also important to address and define both structural racism and institutionalized racism. Structural racism is defined as "A system in which public policies, institutional practices, cultural representations, and other norms work in various, often reinforcing ways to perpetuate racial group inequity" (The Aspen Institute, n.d.). Institutionalized racism is defined as "the policies and practices within and across institutions that, intentionally or not, produce outcomes that chronically favor, or put a racial group at a disadvantage" (The Aspen Institute, n.d.). Internalized racism is another aspect of racism and was discussed earlier in relation to the individual's experience as well as possible solutions.

In respect to the United States, structural racism is the system on which the United States is built and in which it operates. While structural and institutional racism seem almost synonymous, structural racism is more defined as "a system of hierarchy and inequity, primarily

characterized by white supremacy – the preferential treatment, privilege and power for white people at the expense of Black, Latino, Asian, Pacific Islander, Native American, Arab and other racially oppressed people" and institutionalized racism is "within or between institutions" (Terrance & Keleher, 2004, p.1). The solution to structural racism is complicated but there have been several frameworks proposed to try to solve these issues. One framework is universalism, which is a framework that works towards a specific or ultimate goal; this would allow policies made to focus on the disadvantaged populations while simultaneously focusing on all the general population (Taylor et al., 2019, p. 6). For example, since it is a very goal-oriented framework, smaller goals would be made for each population. There would exist different solutions for African-American communities compared to the Hispanic community, but as a whole the goal would be the same. The goal could be anything, such as better healthcare access and quality care for all.

There are currently other solutions in place for both institutional and structural racism in medicine. These include training for health care providers, such as implicit bias training. Interestingly, there are studies on the effectiveness of implicit bias training, "In one particularly informative study, Dr. Calvin Lai and colleagues investigated seventeen different interventions that sought to reduce implicit racial preferences… They found that eight of the seventeen interventions generally reduced implicit preferences (for Whites, as compared to Blacks)" (FJC, n.d.). It is impossible to eradicate all implicit bias that may exist, but there are still studies being done to find the best method of implicit bias training that is viable and most effective. Solutions should work towards supporting implicit bias training in finding the most efficient method of training.

Taylor et al. (2019) states that it is important to recognize that racism affects MM and disproportionately affects women and people of color in medicine: "acknowledging racism as the underlying cause of maternal and infant deaths is critical to finding policy solutions that can effectively eliminate racial disparities" (Taylor et al., 2019, p. 6). One example of how racism might play a role in patient care is through microaggressions. There are limited studies on how microaggressions directly affect patient care, but the little literature evidence suggests that it limits adequate care for the patient (Cruz et al., 2019, p. 1). Microaggressions are "a comment or action that subtly and often unconsciously or unintentionally expresses a prejudiced attitude toward a member of a marginalized group (such as a racial minority)" (Merriam-Webster, n.d.). This includes small minor comments with regard to race and even more derogatory terms.

There is an example of a safe way to address microaggressions in situations proposed by Cheung et al. (2016). The proposed method is to use the A.C.T.I.O.N. acronym:

> *"Ask:* clarifying questions to assist with understanding the microaggressor's intentions.
>
> *Carefully listen:* if they disagree with your paraphrase, you could end the conversation or make a statement about their initial comment. If they agree with your paraphrase, explore their intention further.
>
> *Tell others:* what you observed as problematic in a factual manner.
>
> *Impact consideration:* ask for or state the potential impact of such a statement or action on others.
>
> *Own your response:* own your own thoughts and feelings around the impact using the first-person language.
>
> *Next steps:* request appropriate action be taken and check in with the target of the microaggression"

Using and introducing A.C.T.I.O.N. during medical training such as in medical school, nursing school, residency, or other healthcare provider training will be most beneficial. This is just one example of a way to work towards lessening the effect of racism in medicine and healthcare. Implicit bias training is another route of combating the effects of racism on the care of patients. While some hospitals already implement implicit bias training, there should be more training available to all healthcare workers.

Policies should be made to make implicit bias training for healthcare providers required and perhaps lengthening the course when needed. It is important for healthcare providers and those who play a role in patient care be aware of their own bias. Otherwise, neglecting one's own biases will only perpetuate implicit bias, microaggressions and racism in the United States healthcare system.

Limitations

Current solutions of MM include MMRC's and MMRIA, or "Maria" as described earlier. One of the limitations to the solutions is that they are not available to all states and hospitals or clinics. There are currently 17 states without MMRC's, and those with MMRC's are usually centralized at larger hospitals (ACOG, 2018). This means that smaller, more rural areas lack the preventive measures for MM. This can be seen as a limitation to the current solutions, there is simply not enough resources and money set by the policymakers in order to fund more MMRC's and provide every hospital and clinic access to MMRC's. One possibility is partnering with other local hospitals and clinics to build an MMRC. This usually requires more funding set aside, which means more money needs towards lowering MM. A more immediate goal for MMRCs could include reaching out to vulnerable communities, low-income and minority communities. Communication and connection with these communities relate affect the other levels of the SEM

positively as well. Branching out to make connections between hospital and communities could make a big impact on that community. Currently MMRCs are just trying to address the issue of MM within each hospital region, but in the future, they could look towards more preventive measures.

Another limitation is the tracking system of MM, in the United States, there is currently no consistent way of tracking MM. Since MM can occur during pregnancy, delivery, after delivery (up to 6 weeks) it is difficult to keep track of how many women are actually dying due to pregnancy-related complications. It often gets trickier because a woman might be giving birth at a certain hospital but is then brought to another hospital due to complications related to pregnancy and delivery when she dies. The death certificate in some states do not have a portion for MM, and some hospitals might not recognize that death is related to MM at all. One possible solution could be to create a nation-wide universal system that all hospitals are required to use, and certain protocols for women who enter the hospital with a history of pregnancy within the last year.

It is also important to discuss the limitations of the proposed solutions using SEM. At its core, the efficiency of the SEM is based on interaction at all levels. This could be difficult because it means making sure that there are structures at all four levels that are willing to work on the issue. It requires not only the individual, but the family, community, hospitals, healthcare providers, law and policy makers, and the public. The problem will not be getting people to care, but rather getting the information and education out to all levels. The issue of MM in the United States is not well-known so part of the solution will be getting the information out to the public and to the policy and lawmakers. Providers, policymakers, and others who are trying to address MM will have to have knowledge of the SEM in order to work towards building a solution. This

will require time, effort and money. While this is a limitation, the SEM also proposes a lot of positive change in regard to issues of MM. It is also important to note that other frameworks can be used simultaneously; the SEM doesn't have to be the only model used towards trying to lower rates of MM. Any and all efforts should be made to reduce MM rates in the United States.

Conclusions

The solutions to MM are multi-faceted and occur across several levels of the SEM. The SEM provides a framework through which we can understand the various interventions aimed at solving the issue of MM in the United States. The SEM explains that the four levels (1) the mother and family (2) community and society (3) healthcare system and (4) the historical context of racism all affect each other (Fig. 3). MM is an issue that holds global relevance. As one of the leading nations in the world, the United States should have better rates of MM. The United Nations has set a goal of reducing preventable MM by the year 2030 with about a decade to go more solutions should be implemented soon. We also see that the levels of the SEM exhibit interdependent relationships; each level affects the function of the nearby levels. Therefore, in order to use the SEM as a solution model towards the issue of MM in the United States requires all levels to work together.

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