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A literary analysis on maternal mortality rates of African Americans

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A LITERARY ANALYSIS ON MATERNAL MORTALITY RATES OF AFRICAN AMERICANS

by

JAYDA HINDS

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Approved By

First Reader

Gwynneth D. Offner, Ph.D.
Assistant Dean of Admissions
Associate Professor of Medicine

Second Reader

Karen Symes, Ph.D.
Associate Professor of Biochemistry

DEDICATION

I would like to dedicate this work to my lovely family and my amazing friends.

Thank you for always supporting and motivating me.

ACKNOWLEDGMENTS

I would like to thank all of my professors for inspiring me every day to dive deeper into my studies. I would also like to thank my readers for all of their support in this endeavor.

A LITERARY ANALYSIS ON MATERNAL MORTALITY RATES OF AFRICAN AMERICANS

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ABSTRACT

The purpose of this study is to drive deeper into women's health especially as it pertains to the mortality rate of African American women. In the following thesis the researchers hope to learn more about the intersection between pregnancy and heart disease in black women. Prior to being pregnant black women were more ask risk for developing a cardio vasculature. This health disparity has been researched but no large conclusion has been made. The research points to the fact that black people have more of the health issues that put them at a greater risk for heart disease. In addition to having pre-existing conditions, women are at risk of developing many heart related illnesses while pregnant such as preeclampsia, pulmonary embolism, and sepsis. These risks are magnified when the patient is African American.

In addition to exploring the medical discrepancies, the aim of this thesis is also to look at the implicit bias that are present in the medical field and how eliminating those would decrease the mortality incidences of African American women.

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LIST OF ABBREVIATIONS

AHA	American Heart Association
BP	Blood Pressure
CAD	Coronary Artery Disease
CDH	Coronary Heart Disease
CVD	Cardiovascular Disease
ISO	International Standards Organization
LDL	Low Density Lipoprotein
OBGYN	Obstetrician / Gynecologist.
SES	Socioeconomic status

INTRODUCTION

In America today, the uprising of the Black Lives Matter has triggered conversations about police brutality and the general value that society places on the lives of black and brown people. In parallel to this growing conversation, within the medical community, there is a growing discussion surrounding the increasing maternal mortality of African American women. While the disparity in the health outcome has been clear for years, recent data states that concordance between the race of the doctor and the race of the patient is positivity correlated to the survival of the baby (Greenwood et al., 2020). This finding is a major development in identifying potential ways to rectify these health disparities because it provides evidence towards establishing a root cause to a problem that has been attributed to many factors and behaviors. Not only has this finding prompted more investigation on the mortality rate of black babies, it has also prompted more researchers that looks into the mortality rate of black pregnant women in America.

In the following thesis, the factors that contribute to the maternal mortality rate of African American women will be explored. The discussion surrounding why black women in America are more likely to die during childbirth has many nuances.

Those in the public health field point to disparities in access to healthy food which in turn increases the chances that the woman is in poor health prior to

giving birth. They also would blame the participation of daily activity for decreased health of the patient. Other researchers point to the stress that experienced racism has to the health of the body (Taylor, 2020)

Researchers who see the disparity through the lens of a medical doctor would blame the presence of heart disease, preeclampsia and blood clotting deficiency as the root causes of death related to childbirth (Gelson et al., 2009).

HISTORY OF HEART DISEASE

In the United States, heart disease is the leading cause of death, taking responsibility for 1 in every 4 deaths, yet some researchers have found that heart disease is fairly preventable, the steps necessary for prevention include creating better lifestyle choice such eating healthier and not participating in smoking (CDC, 2020).

While we might consider atherosclerosis to be more of a modern-day problem due to the nature of our food, in 2009 researchers in Florida gathered in and observed a 3,500 old Egyptian mummy that also had atherosclerosis (*Egyptian Princess Mummy Had Oldest Known Heart Disease*, 2011).

In 1915, researchers put more effort into understanding heart disease by creating the aAsociation for the Prevention and Relief of Heart Disease in New York City and in 1924 the American heart association was established. In 1960's and 70's doctor treated heart disease by using a bypass surgery. In the 1980's doctors began to use stents which increased survival rate.

REVIEW OF THE HEART STRUCTURE AND FUNCTION

The heart is a muscular organ located in the center of the chest. It is a part of the circulatory system and it pumps blood and circulates nutrients throughout the body. Its main job is to pump blood to the body by contracting its muscles. The heart is composed of four main chambers as diagrammed below in figure 1.

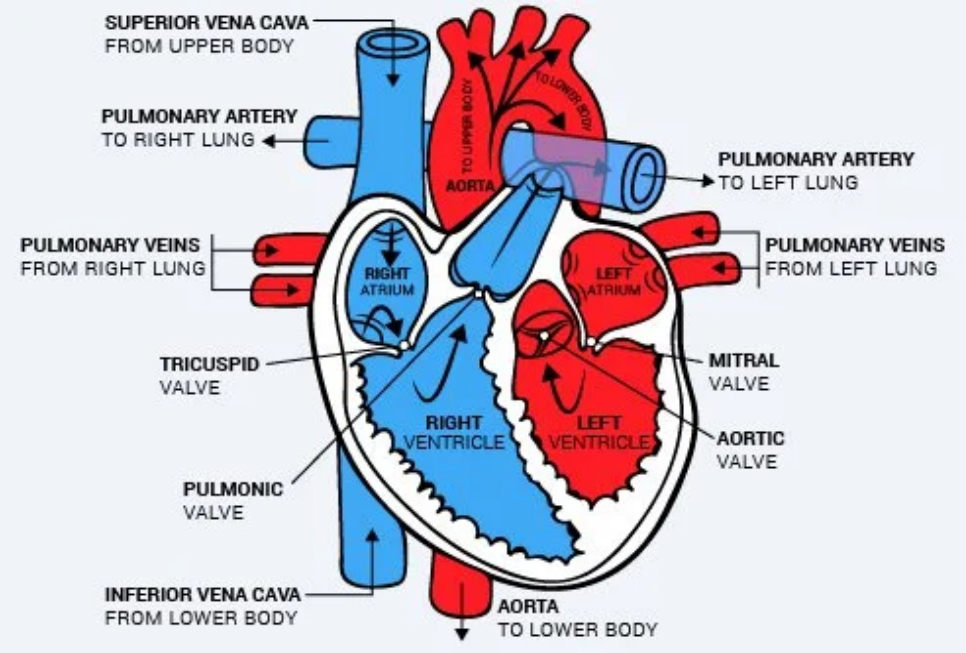

Figure 1: Diagram of the heart. This figure illustrates a basic diagram of the human heart (*How the Heart Works: Diagram, Anatomy, Blood Flow*, n.d.)

The blood travels through the body after contraction of the left ventricle via the aorta supplying the body with oxygen. The de-oxygenated blood from the body re-enters the heart using the superior and inferior vena cava. The average heart beats 60-100 beats per minute and having a lower heart rate at rest is

indicative of a more efficient heart function. Lower heart rates or often found the athletes due to their physical fitness (*Heart Rate: What's Normal? - Mayo Clinic*, n.d.).

REVIEW OF CARDIOVASCULAR DISEASE

Cardiovascular disease is an umbrella term for all for many types of problems that can have a negative effect on the heart and or the blood vessels. The term heart disease is commonly mentioned when referring to coronary artery disease which is the most common form of heart disease. CAD is a decrease in blood flow to various parts of the body due to plaque builds ups that cause blockages. In addition of the decrease in oxygen delivery, this blockage produces symptoms such as shortness of breath, chest pain, weakness, numbness or can cause the arms and legs to become cold.

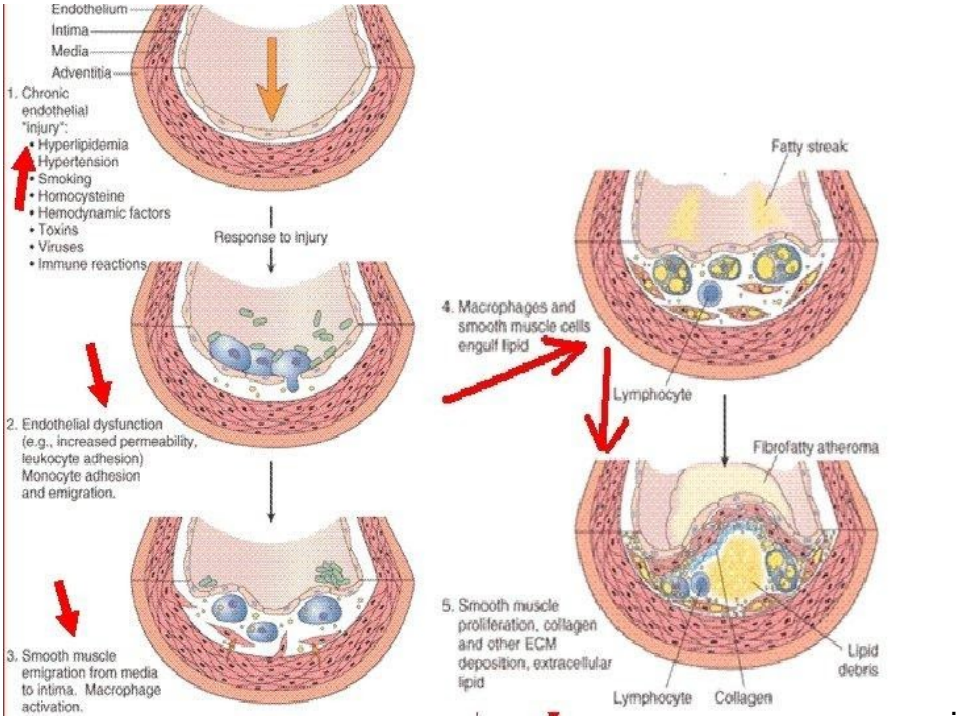

Figure 2: Illustration of the formation of an atheroma and clots in a blood vessel (*ATHEROSCLEROSIS Atherosclerosis Is a Specific Form of Arteriosclerosis*, n.d.)

The build-up of plaque is a gradual biological process that take place over time which is illustrated in above. This complex, stepwise process starts with damage to the endothelium of the artery. This damage causes the vessel to be easily penetrated by low density lipoproteins or LDL's. The LDL penetrate the intima and free radicals in the intima oxidize the LDL. The LDL particles allow the monocytes to enter the intima where they are changed to macrophages. The macrophages then take up the LDL and are converted to foam cells. The foam cells cause the smooth muscle cells to proliferate and move into the intima. The

foam cells come together to make a fatty streak and the smooth muscle form a fibrous cap that will cover the fatty streak. Collagen will make the lesion stronger, and the vessel now has a plaque known as an atheroma. This atheroma will slow the flow of blood by decreasing the radius of vessel and could eventually burst causing a blood clot (Rafieian-Kopaei et al., 2014).

CLINICAL REVIEW OF PREECLAMPSIA

Preeclampsia is a very common complication that occurs during pregnancy and it come with a high morbidity implication for both mother and baby. (Pijuan Domènech & Gatzoulis, 2006). Preeclampsia is a rise in blood pressure that is experienced by the mother during the gestational period. Additionally, preeclampsia can appear up to 6 weeks after birth.

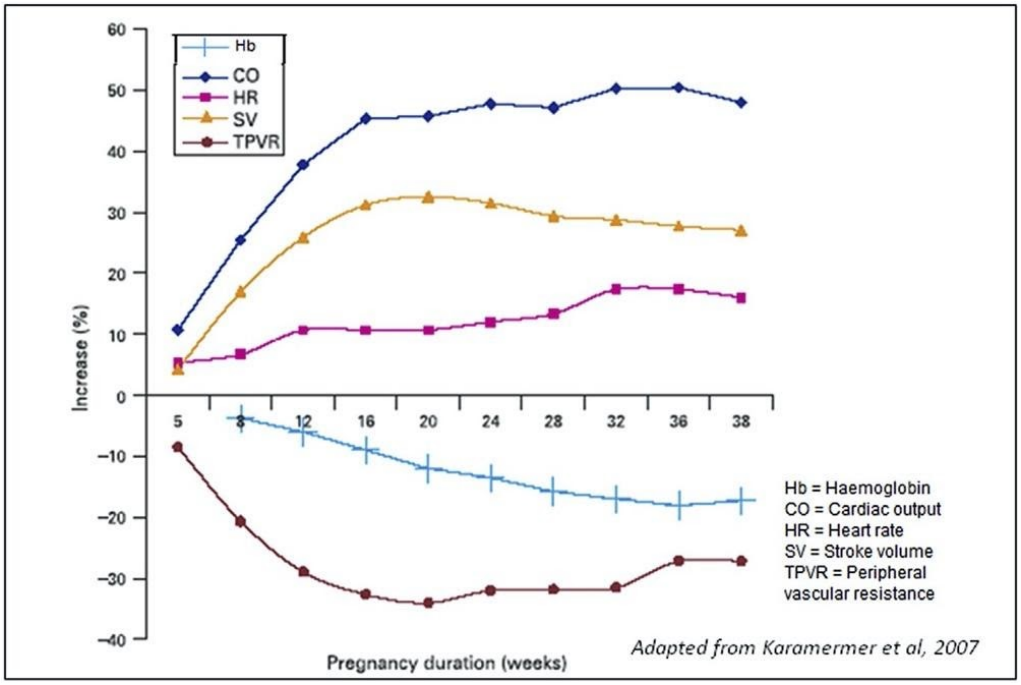

Figure 3: hemodynamic changes that occur during pregnancy (Emmanuel & Thorne, 2015)

Preeclampsia is thought to be caused by the placenta not functioning correctly due to not having enough blood flow (*Preeclampsia During Pregnancy | American Pregnancy Association*, n.d.). As seen in figure 3, illustrated by the dark blue line, research has shown that during pregnancy, the patient's overall blood volume increases in order to send blood through the placenta to the baby; however, if the placentas is not functioning properly, the baby receives less blood and nutrients and the blood pressure for the mother's circulation blood is increased.

Preeclampsia can cause pulmonary edema, an erupted placenta, liver failure and coagulation inside of the vasculature (*Preeclampsia During Pregnancy | American Pregnancy Association*, n.d.). In a preeclampsia situation, doctors are hesitant to provide the patient with antihypertensive because studies have not shown that this is an efficient treatment (*Preeclampsia During Pregnancy | American Pregnancy Association*, n.d.). Also, due to the shared blood supply between mom and the baby it is important to be cautious regarding all medications administered to the mother so as to not cause a harm to the baby. Instead, preeclampsia is treated using bedrest and magnesium sulfate. A mother diagnosed with preeclampsia will have her blood pressure monitored and kept at an appropriate level throughout the pregnancy. Also, she may be administered corticoid to increase the baby's lung development (Pijuan

Domènech & Gatzoulis, 2006). To avoid preeclampsia, it is recommended that patient avoids salt and increased daily water intake. Overall, a healthy diet and regular periods of activity can also lower the chances of getting preeclampsia

As will be discussed later in this thesis, there are many other factors that could lead to in increased chance of getting preeclampsia. These risks include: first pregnancy, the occurrence of preeclampsia in a prior pregnancy, a women having a BMI over 30 and a mothers carrying multiple babies at once (*Preeclampsia During Pregnancy | American Pregnancy Association*, n.d.).

REVIEW OF POST-PARTUM HEMORRHAGE

Post-partum hemorrhage is a rare but very dangerous side effect of having a baby. It can start one day after having a baby or its onset can as late as 12-week post-partum (Fowler, n.d.). It is normal to have blood loss after having a baby vaginally and even more blood loss is to be expected after having a cesarean. Blood loss that is greater than the expected values, 500 milliliters for vaginal birth and 1,000 milliliters for a cesarean birth, would be considered a hemorrhage. A hemorrhage causes a substantial drop in your blood pressure. Ultimately, hemorrhage can put the body into a state of shock and can lead to death. In addition to low blood pressure, early signs of hemorrhaging include dizziness, pale skin and nausea.

REVIEW OF SEPSIS

Sepsis which is an infection that causes issues both on a physiologically and pathological fronts. (Singer et al., 2016). Researchers wanted to clearly defined sepsis and septic shock and stated that when the body fails to regulate a response to an infection then the patient will go into sepsis causing the a decrease in the efficiently of the internal organs (Singer et al., 2016). Septic shock on the other had is defined by the need for a vasopressor to maintain the arterial blood pressure, essentially shock is when there is a decrease of blood perfusion to the organs caused by sepsis (Singer et al., 2016).

General symptoms of sepsis include fever, increase in breathing rate, and an increased heart rate (*Mayo Clinic Q and A*, n.d.). Normally the body will fight outside invaders such as viruses of bacteria; however, in the case of sepsis, body will stop fighting the invader and will actually start to damage healthy parts of the body (Lever & Mackenzie, 2007).

The Sepsis Alliance, which focuses on providing information regarding's the risks of sepsis, the possible treatments, and signs to recognize if patient is experiencing sepsis. In the figure below is a tool that can be used to quickly determine whether action need to be taken.

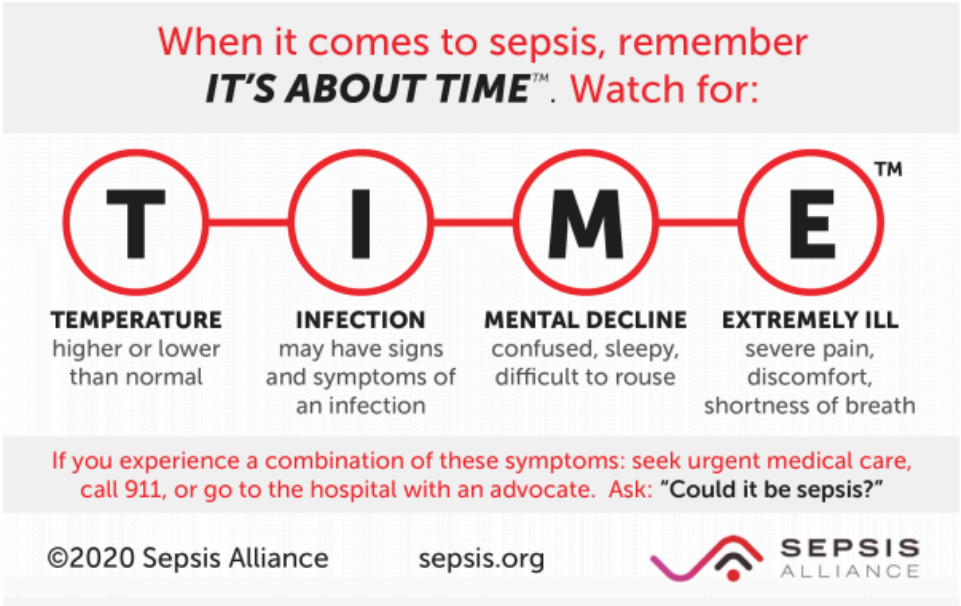

Figure 4: Mnemonic used to quickly asses the more common symptoms of sepsis to asses needed treatment (*What Is Sepsis | Sepsis Alliance*, n.d.)

GENERAL RISK FACTORS FOR SEPSIS

While some believed that pregnant women are at low risk for sepsis due to the average age that women conceive babies, some researchers would argue that the recognition of sepsis are just different than what you would expect in an older patient (Cordioli et al., 2013). In this journal notes that even though the presence of the fetus might alter how sepsis is treated, the general goals to increase blood perfusion and control oxygen levels remain the same (Cordioli et al., 2013)

Sepsis is becoming a more common diagnosis and the number of incidences per year increases by 9% each year. Sepsis is responsible for the bulk of deaths that occurs in the ICU specifically.

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SPECIFIC AIMS:

The aim of this literature research review is to better understand the root causes of the disproportionally high maternal mortality of African American women. This thesis will specially look at the correlation between poor cardiac health, both present prior to birth and also deteriorated by the pregnancy itself, and poor health outcomes. This thesis will also examine other factors that increase the maternal mortality of African American women by examining the effects of hemorrhaging, septic shock, obesity, access to care, and access to insurance

The review will also dive deeper into the history of distrust and abuse between medical professionals and the African American community as a whole and look for possible ways that rebuild trust and better serve pregnant women in the black community.

Lastly this literature review will look at the aspects of this topic that are related to matters of public health in order to provide a well-rounded view of aspects that affect maternal rates.

PREEXISTING CARDIOVASCULAR RISKS

Heart disease present prior to become pregnant places the health of the overall pregnancy at a great disadvantage. Worldwide, it has been established that the majority of poor birth outcomes are linked to cardiac related complications (Parsonage et al., 2021). These trends are seen in many places around the world and first world countries are not exempt.

In a publication released by the American Heart Association stated that 217.1 per 100,000 had deaths related to cardiovascular problems (*2021_heart_disease_and_stroke_statistics_update_whats_new.Pdf*, n.d.). Prior to becoming pregnant there are many risk factors that a person may encounter as well as choices that they might make that put them at a higher chance of developing heart diseases. As mentioned previously, coronary disease and heart disease are very closely related but not the same. Both of these topics are heavily monitored by the AHA and while the prevalence of both has decreased in America during various time periods, currently the prevalence of both are increasing.

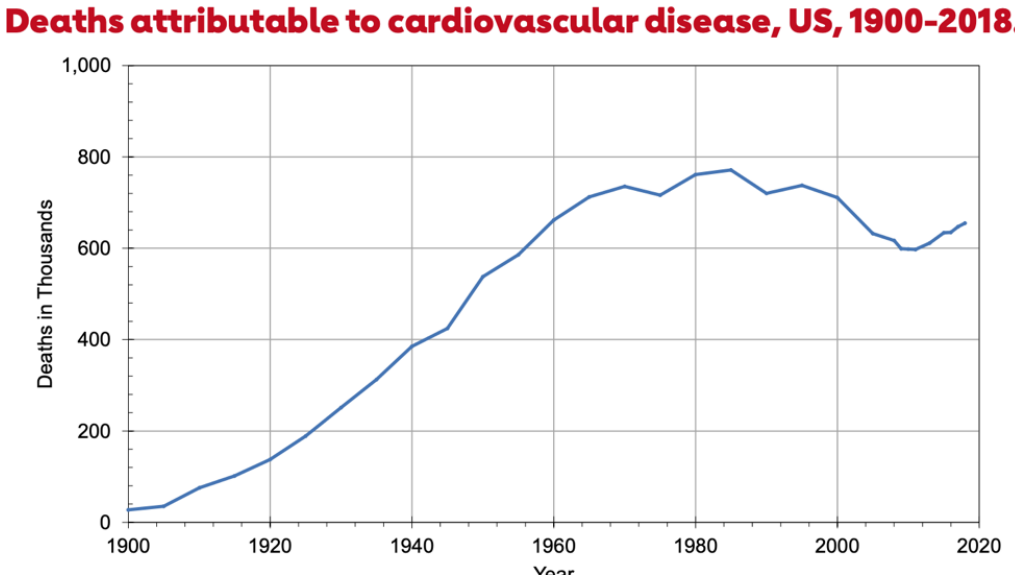


Figure 5. This chart from the AHA shows the current trends of cardiovascular disease in America between the years of 1900 and 2018 (*2021_heart_disease_and_stroke_statistics_update_whats_new.Pdf*, n.d.)

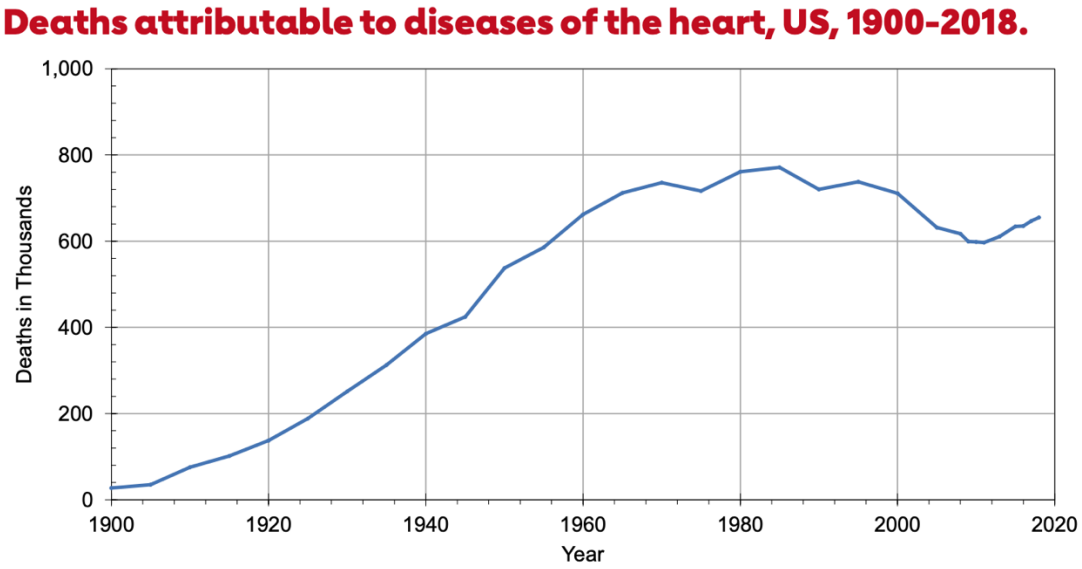


Figure 6. This chart shows the prevalence of heart disease in America between the years of 1900 and 2018 (*2021_heart_disease_and_stroke_statistics_update_whats_new.Pdf*, n.d.)

The key factor to notice in each of these figures is the trend that the prevalence of both of the issues is currently on the rise and has been for approximately the last 10 years.

GENERAL INTERVENTIONS FOR CVD'S

Researchers who were searching to find a common thread between people who experience heart related diseases found four main criteria (Khot et al., 2003). This includes hyperlipidemia, hypertension, cigarette smoking and diabetes (Khot et al., 2003). Analyses found that 84.6% of people with heart diseases had at least 1 of theses 4 predictors.

One group of researchers who specialize in integrated pharmacy looked specially into the how pharmacist intervention has and can continuity to support those at risk of cardiovascular diseases (McNamara et al., 2019). They stated that the worldwide, 13 million people die from CVD; their work is aimed at finding the cause in the epidemiology (McNamara et al., 2019). They stated that the increased in CVD in developed countries is in part because of what they call the "epidemiological transition". This is the idea that in developing countries, there is a shift away from people contracting viral diseases and towards the development

of more pronounced heart conditions. These heart conditions result from the changes in lifestyle that occur when a country becomes more developed. More people travel by car rather than walking and more people work jobs that require them to be more sedentary by sitting at a desk (Mc Namara et al., 2019).

McNamara and his pharmacist colleagues have proposed some interventions that they and other pharmacists can participate in to decrease the incidence of CVD in developed counties (McNamara et al., 2019). They stated they could encourage clients to: lose weight, quit smoking and help control their BP and lipid levels. They found that they could help by assisting with general patient knowledge, encouraging medication adherence and helping to encourage good overall healthy behaviors (Mc Namara et al., 2019). Lastly this study highlights the convenience of using pharmacists to participate in more CDV's intervention due to the fact that they are by nature currently already interacting with many people who are at higher risk for CVD's. This initiative is being promoted in order to decrease the gaps in care that are currently present.

One factor that puts a person at a higher risk for having cardiovascular diseases is the choice to smoke or inhaling an abundance of smoke second hand. According to the NIH, tobacco chemicals can cause harm to blood cells and the structure and function of the blood vessels (Gallucci et al., 2020). This damage can lead to increased atherosclerosis and even ischemic heart diseases. Smoking also put s an individual at risk of another cardiovascular

disease called peripheral artery disease. This is where plaque builds up in the arteries that lead to the head, limbs and organs, this disease can lead to stokes

The NIH also stated that all of these risk factors are still present in those who engage in light smoking. They strongly warn against second hand smoke because the same chemicals are emitted into the air and inhaled by those who might be around the primary smokers(*Smoking and Your Heart | NHLBI, NIH*, n.d.)..

In a literature review conducted on the effects of second hand smoke inhalation compared to directly smoking, researchers found that second hand smoke inhalers have very similar short term effects as the primary smokers (Barnoya & Glantz, 2005). Specifically, researchers found that second hand smoke increase the risk of developing heart disease even despite the fact that the primary smoker experiences a dose that is 100 time more than the second hand smoker (Barnoya & Glantz, 2005). Lastly the researchers conducted a geographical analysis and found that countries that have a ban on smoking in public places have less people per year admitted into the hospital with acute myocardial infarction (Barnoya & Glantz, 2005).

For current smokers, quitting will reduce the risk of dying from heart disease or developing atherosclerosis or blood clots. For smokers who already have heart disease, quitting will lower their chances of dying from sudden cardiac

death or having an additional heart attack (*Smoking and Your Heart | NHLBI, NIH*, n.d.).

In addition to the development of Atherosclerosis, studies have found that smoking cigarettes can be linked to lower HDL and that low HDL is directly correlated to the development of cardiovascular disease (He et al., 2013). Not only do cigarettes lower HDL, researchers also found that HDL is susceptible to modified by oxidation caused by cigarette smoke meaning that the remaining, HDL is low functioning and no longer protecting that body from developing arthrosclerosis (He et al., 2013). Both of these findings mean that cigarette smokers are at higher risk for cardiovascular diseases.

One group of researchers in Australia found that smokers were almost 3 times as likely to die from a CVD then nonsmokers (*3.1 Smoking and Cardiovascular Disease - Tobacco in Australia*, n.d., p. 1). They attributed this finding to the fact that smoke from a cigarette causes the heart rates and blood pressure to increase and causes the heart contractility to decrease. The body then has increase in demand for oxygen while having a greater concentration of carbon monoxide. These researchers also outlined the relationship of smoking and specific types of CVDs

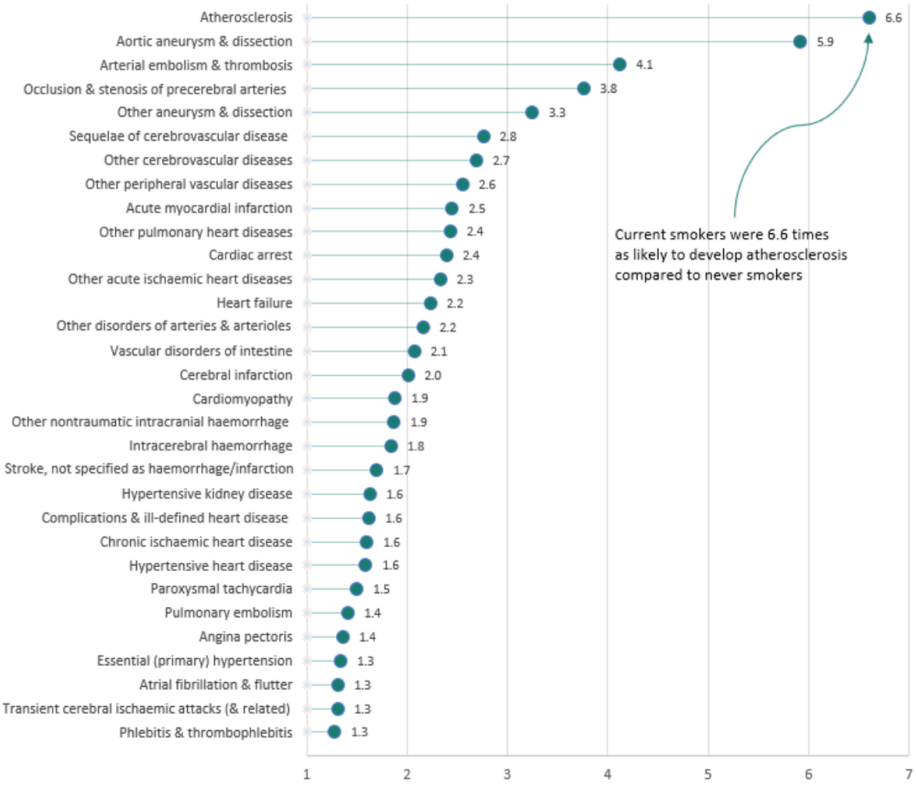


Figure 7. Outlined the relative risk of various subtyped of CVD ((*3.1 Smoking and Cardiovascular Disease - Tobacco in Australia*, n.d., p. 1).

HEART DISEASE IN AFRICAN AMERICANS

In addition to the high risk that any person has of developing heart disease by living in America, many studies have shown that African Americans are at an increased risk of developing heart diseases (Winham & Jones, 2011). Heart disease is the leading cause of death among black people and CVD is of reason that the black mortality rate in America is much higher than it is for white Americans

(Rosenberg et al., 1999). The American Journal of Epidemiology states that there has been more effort put towards studying the risk factors for CHD (Heart disease) in White male then for African American men or women Americans (Rosenberg et al., 1999).

In a case study approach, Lynn Rosenberg and her colleagues studied 64,530 African American women to find the risk factors that they commonly faced when it came to developing CHD Americans (Rosenberg et al., 1999). They concluded that even though black people are more likely to experience heart disease, the risk factors themselves where the same. Risk factors included: Diabetes Mellitus, heart attack, high cholesterol hypertension and high body mass index (Rosenberg et al., 1999).

In a study aimed at addressing specifically why African Americans have higher incidence of the risk factors that lead to CVD, Dr. Clark cited the lack of care received as the cause (Clark, 1999). He found that African Americans are less likely to receive cardio protective drugs and less likely to have a coronary catheterization, angioplasty or bypass surgery. While the direct reason for the lack of care is unknown the article suggests that it could be attributed to differences in patient knowledge, difference in sociocultural norms, a difference in how the medical professional make decisions for people of different races or differences in SES (Clark, 1999).

Another article agreed with the aforementioned risk factors that lead to CVD and the fact that the risk factors remain true across races; however, they stated that African Americans are 1.5 times more likely to have more than one of the risk factor which puts them at higher risk overall (Clark & Emerole, 1995). They stated that the best interventions are weight reduction using diet and exercise and cessation of smoking (Clark & Emerole, 1995).

Lastly, some researchers state that a person's neighborhood can be an independent predictor of his or her health outcomes (Diez Roux et al., 2001). In a 9-year study, researchers found that both race and SES played important role in the health outcomes of those who experience CVD. People who live in a disadvantaged community have a higher incidence of coronary diseases. Additionally, in chart 5 below shows that even within the same income bracket, Black Americans still have more incidences than white Americans.

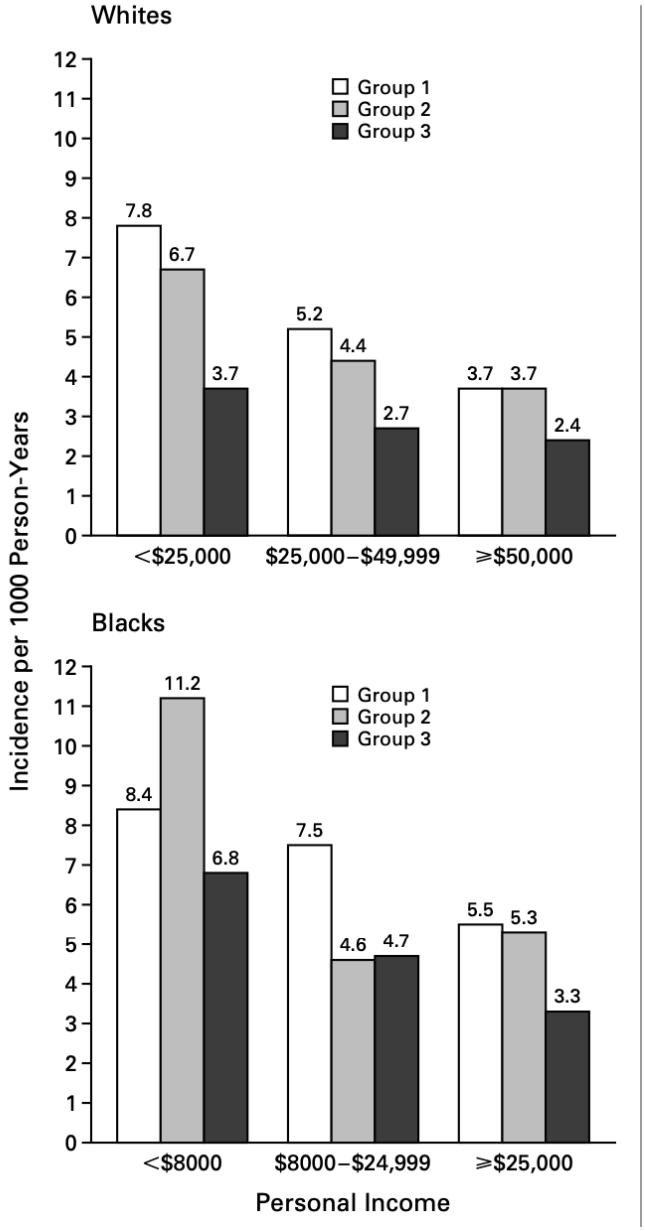


Figure 8. Incidence rates of Heart Diseases grouped by race and income (Diez Roux et al., 2001)

One of the driving factors for the high levels of heart disease is the lack of nutritious foods in the lower income communities specifically in African American communities (Kelli et al., 2019). A food desert is a community with little access to healthy foods typically due to the lower gross income of the families that live in that community (Kelli et al., 2019). In a study conducted at the Emory Cardiovascular biobank, researchers studied a cohort of almost 5000 subject who had to undergo cardiac catheterization and they found that those in the study who did not have access to healthy food were more at risk for experiencing a serious cardiovascular event and coronary artery disease (Kelli et al., 2019).

As we know from previously discussed research; African American People are more likely to have heart disease or coronary artery disease from many different causes. Research also tell us that black communities are more likely to fall under the category of a food deserts then white communities (Hilmers et al., 2012). Hilmersand her associates also stated that convenience stores and bodegas were more commonly found in places with a high concentration of African American people (Hilmers et al., 2012). Thus, they concluded that the low access to stores with fresh and healthy foods mixed with the high access to processed connivance store food increase the risk of obesity for the minorities in that community (Hilmers et al., 2012).

A study that looked at food deserts and pregnancy specifically used a retrospective observational study method to link demographics, accesses to health

food and pregnancy outcomes. This study specially looked at gestational diabetes, gestational hypertension, preeclampsia, gestational diabetes, fetal growth restrictions, preterm labor and preterm labor membrane rupture. The researchers at Loyola University Medical Center found that pregnant women living in food deserts were more likely to have at least one pregnancy related morbidity compared to women living outside of food desserts (Tipton et al., 2020). The researchers also grouped their data based on race and found that women were likely to be negatively affected by the repercussions of a food desert her were likely to black women as seen in the table below

	Food Desert (0.5 Miles)			
	Total (N=1,001)	Yes (n=195)	No (n=806)	*P*
Age (y)	29.5±6.1	27.7±5.9	29.9±6.0	**<.001**
BMI (kg/m^2)	33.1±7.0	33.4±7.8	32.9±6.9	.469
Income ($)	6,2603.8±2,3390.1	4,4694.8±10,798.4	67,005. ±23,555.5	**<.001**
Hospital stay (d)	3.7±3.9	3.8±3.8	3.7±3.9	.626
Gestational age at delivery (wk)	37.5±3.6	36.9±3.8	37.6±3.5	**.015**
Race				**<.001**
White	520 (52.9)	62 (32.1)	458 (57.9)	
Black	216 (21.9)	85 (44.0)	132 (16.6)	
Others	247 (25.1)	46 (23.8)	201 (25.4)	
Ethnicity				.586
Hispanic	317 (32.7)	59 (31.1)	258 (33.1)	
Non-Hispanic	652 (67.3)	131 (68.9)	521 (66.9)	
Medical insurance class				**<.001**
Private insurance	507 (50.7)	59 (30.3)	448 (55.6)	
Medicaid	461 (46.1)	123 (63.1)	338 (41.9)	
Other	33 (3.30)	13 (6.7)	20 (02.5)	

BMI, body mass index.
Data are mean±SD or n (%) unless otherwise specified. Bold indicates statistical significance.

Table 1: Demographics of pregnancy outcome of people living in food deserts (Tipton et al., 2020).

CARDIOVASCULAR RISKS THAT DEVELOP DURING THE PREGNANCY

Pregnancy causes strain on the heart and there is a chance of developing heart related issues as a result of becoming pregnant. Black women in specific are at a higher risk for developing CVD as a result of being pregnant (Gad et al., 2021). Many researchers point to this a large contributor the fact that black women are more likely to die during childbirth (Gad et al., 2021).

In a statistical analysis, researchers found that not only did America have a high rate of maternal mortality for such a developed country but also that these increasing numbers were seen more prominently in Black mothers then in their white counterparts (Gad et al., 2021). They specifically saw that black women were more likely to have an acute myocardial infraction, a stoke or a pulmonary embolism (Gad et al., 2021).

Another study on cardiomyopathy in African Americans showed that black women are more likely to get cardiomyopathy in the last weeks of being pregnant or directly after being pregnant then white women (Irizarry et al., 2017). Black women who were pregnant are also more likely to get cardiomyopathy at an earlier age. Also, for those who do develop cardiomyopathy, black women are more likely to experience it worsening after the original time of diagnosis. Black women are also less likely to make a full recovery and more likely to recover more slowly than white women if they do recover at all (Irizarry et al., 2017).

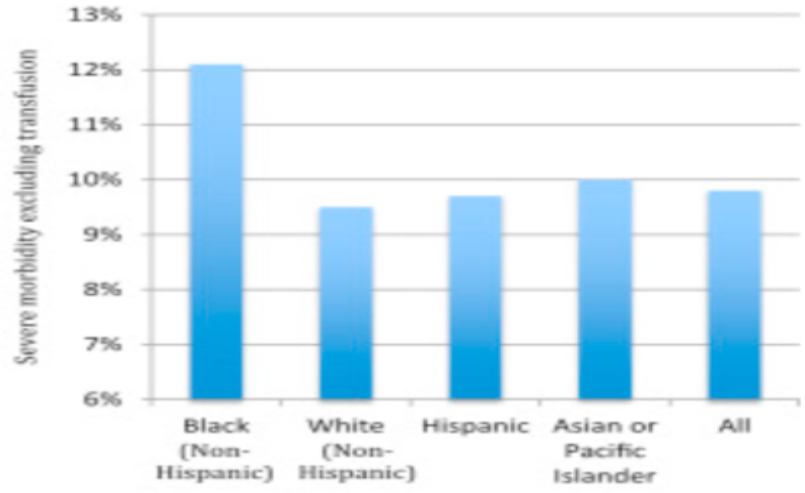
Preeclampsia is a large risk factor for the mortality of pregnant black women. While normally older women are more likely to develop preeclampsia during pregnancy, African American women are more likely to develop

preeclampsia at a younger age (Zhang et al., 2020). Zhang also found that black women are 3 times more likely to die from complications due to preeclampsia then white women are (Zhang et al., 2020). Additionally preeclampsia puts black women more at risk for preterm labor and intrauterine fetal death posing a risk to both mom and baby (Zhang et al., 2020). In the same study it was found that those who suffer preeclampsia and survive are at higher risk for post-partum cardio metabolic diseases. As for genetic factors, Dr. Zhang found that sickle cell in the mother may put her at higher risk for preeclampsia which would explain why black women suffer from preeclampsia at a much higher rate. They also stressed the importance in recognizing the risk factors and screening women prior to giving birth so that more can be done to mediate the effects of preeclampsia.

RACE AND RISK OF HEMORRHAGE

As briefly discussed in the introduction, post-partum hemorrhage is a rare occurrence; however, in African Americans it is something that occurs more frequently. Hemorrhage is cited as one of the most common causes of preventable maternal mortality. Cases of these avoidable deaths are seen more commonly in African American according to researchers (Gyamfi-Bannerman et al., 2018). The Centers for Disease Control found that non-Hispanic black women were 3 times more likely to die as a result of hemorrhage then their white counterpart (Gyamfi-Bannerman et al., 2018) and the study conducted by Bannerman and his associates concurred with this assessment (Gyamfi-

Bannerman et al., 2018). They studied women 15-54 and found that black women have a higher risk for sever morbidity and mortality both with and without the usage of a blood transfusion (Gyamfi-Bannerman et al., 2018).



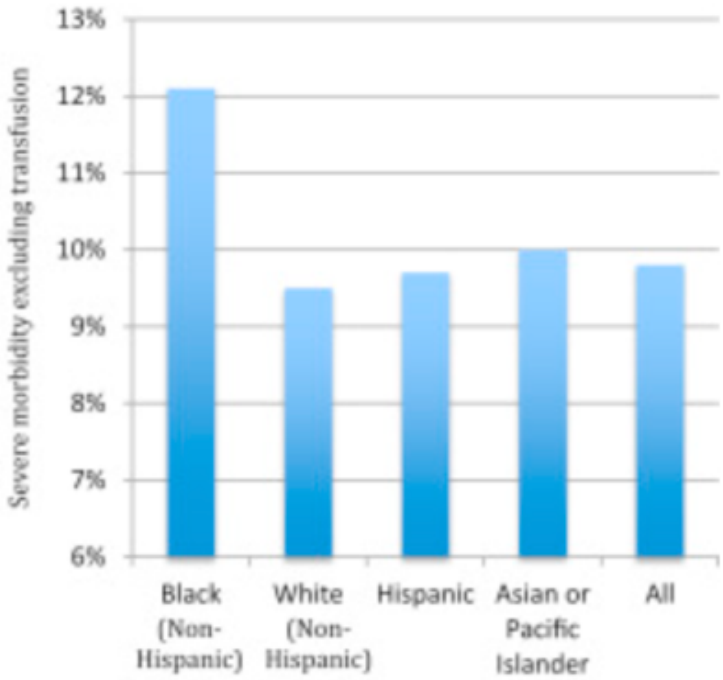


Figure 9. Morbidity rates with and without blood transfusions grouped by race (Gyamfi-Bannerman et al., 2018)

A significant improvement on this front has been posed by a group of anesthesiologists. In their work, this group discovered that obstetric hemorrhage was a major complication that women experienced and hospitals that did not have a 24-hour anesthesiologist on-site saw more fatalities (Scott et al., 2019). Additionally, they found that fewer black and Hispanic women were likely to have an epidural. This caused them to be more likely to be given general anesthesia rather than neuraxial anesthesia if the delivery ended in a cesarean (Scott et al., 2019). This form of anesthesia is directly correlated to an increase in mortality rates (Scott et al., 2019). While more research is needed in this front this issue perfectly illustrates how maternal mortality rates of black women hinge both on medical disparities in terms of the patient's health and also a disparity in access to care.

POST-PARTUM SEPSIS

In a study that looks specifically at readmission to the hospital with sepsis post-partum researcher found that there were several risk factors that guided the trends in their data. Namely, woman who had experienced hemorrhaging or preterm births (Foeller et al., 2020). Other risk factors included obesity and the use of government insurance (Foeller et al., 2020). All of the initially stated risk factors are the same factors that are known to occur higher in African American

women (Foeller et al., 2020). The risk for hemorrhage was mentioned in previously cited studies (Gyamfi-Bannerman et al., 2018).

Previously conducted studies also show that black women are 2 times more likely to experience a preterm delivery which put them at greater risk for sepsis during the recovery period (Manuck, 2017). The figure below further empathizes African American mother are more likely to deliver early throughout the entirety of the pregnancy

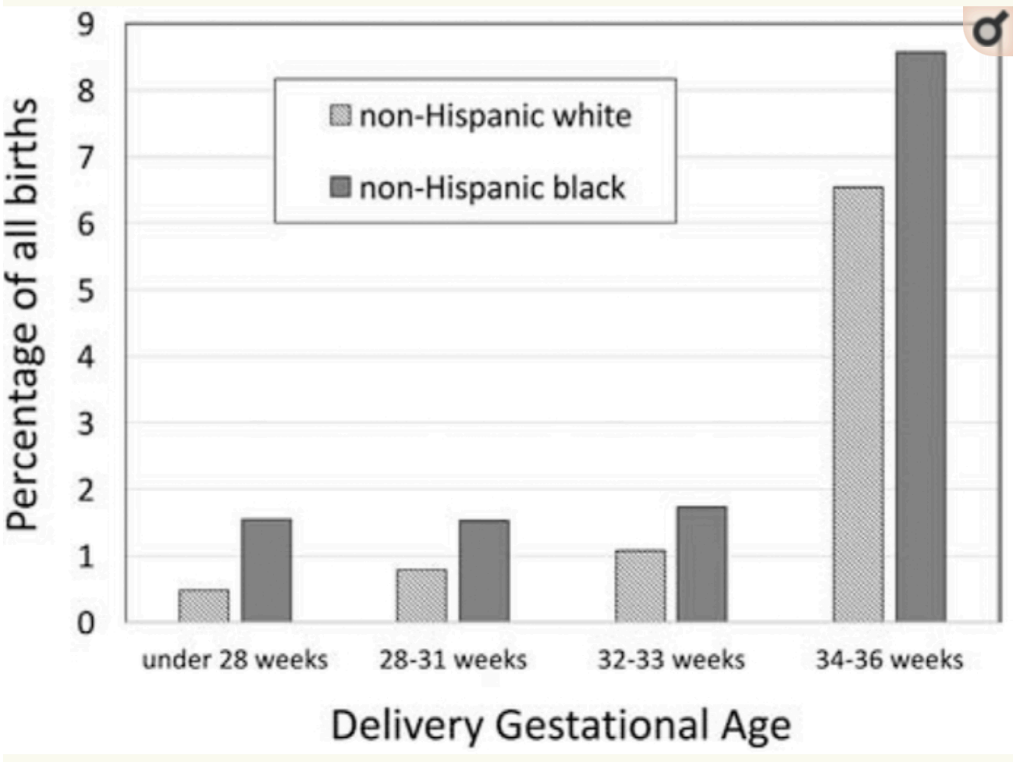


Figure 10: Proportion of pre-terms births organized by gestational age (Manuck, 2017)

The 3rd risk factor listed for developing post-partum sepsis is obesity (Foeller et al., 2020). We know from many previous studies that black women

are disproportionately more likely to suffer from obesity. While the correlation is strongly established there are many theories as to the ethologily to this problem. Researchers found that black women are 70% more likely to be obese than their white counter parts (Agyemang & Powell-Wiley, 2013) and around two thirds of black women in America are considered obese according to their BMI. Although weight was mentioned within the frame of heart disease it is important to note that excess weight can have many effects that could have adverse effect on a woman at various times throughout the pregnancy, in this case putting the patient at a higher risk of developing sepsis after the baby is born. Dr. Powell-Wiley and his associates also emphasized in the figure below that the three main factors that greatly contribute to the high population of obesity.

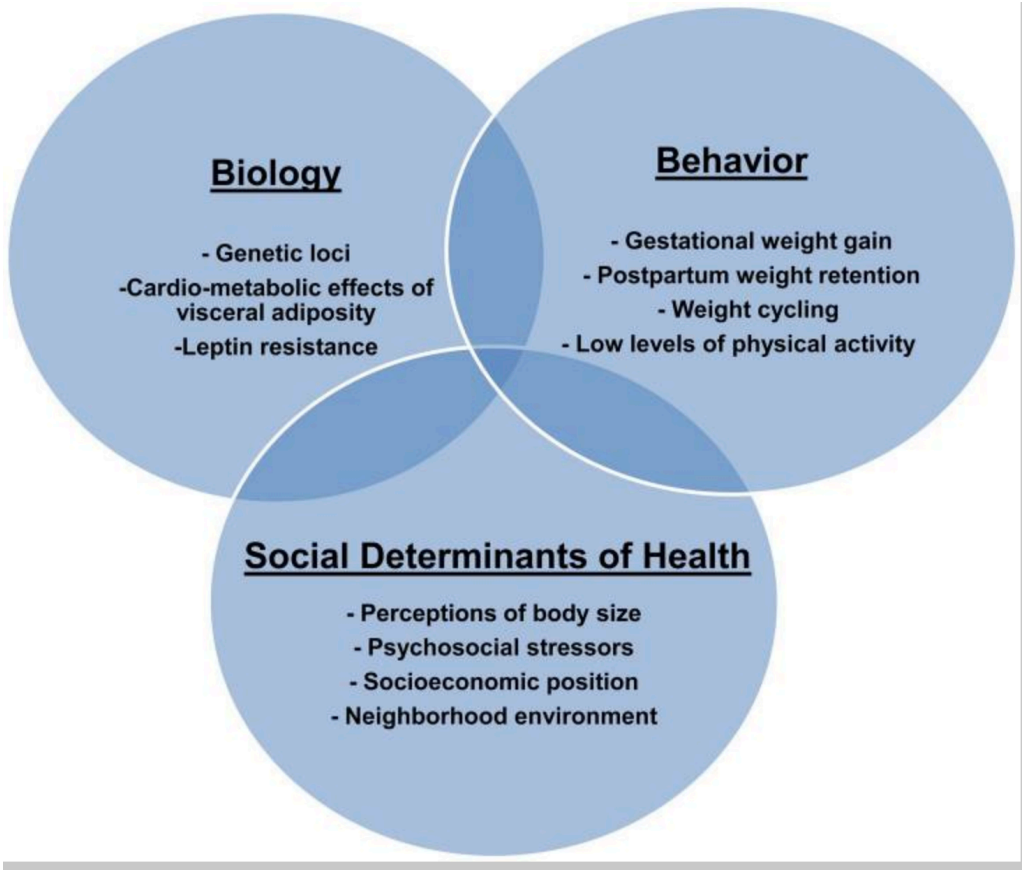


Figure 11: various factors both internal and external that contribute the obesity of African American women (Agyemang & Powell-Wiley, 2013).

The last risk factor becoming septic post partum was being enrolled in government provided insurance rather then private insure through an employer (Foeller et al., 2020). This mediating factor is key as it emphasizes that fact that not all insurance is equal even the current affordable care act. Prior to the Affordable Care Act in 2017 black people were less likely to have insurance through an employer or a spouse's employer which in turn meant that African

Americans were more likely to be seen in an Emergency setting for health care rather than receiving wellness checks with a primary physican (Bulatao et al., 2004). Today the Affordable care act leaves many more black people with insurance of some kind; however, data shows that African American's are almost two times more likely to be publicly insured as illustrated in the figure below (Chaudry et al., 2019)

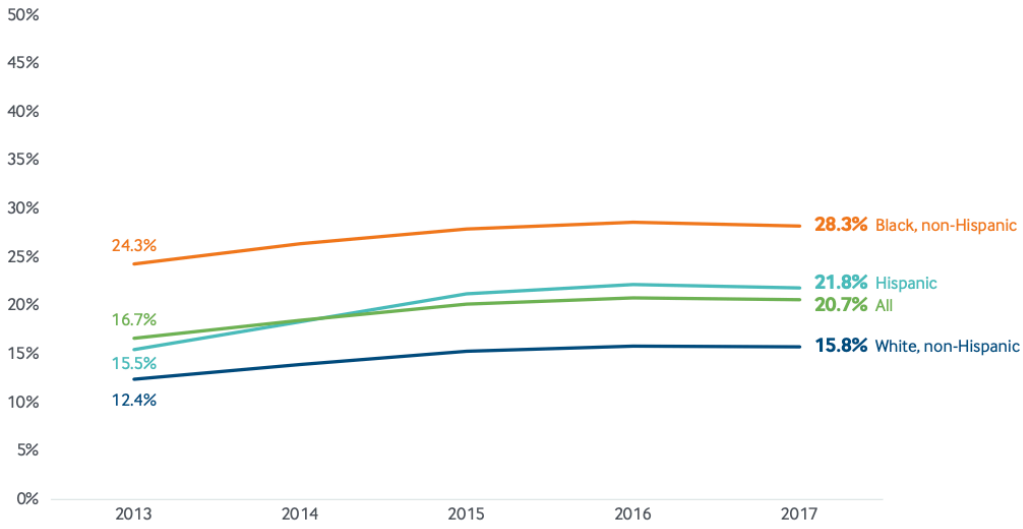


Figure 12: Publicaly insureed people in America organized by race. (Chaudry et al., 2019)

Several other studies look at the correlation between race and the rate at which a person experiencing sepsis is treated. One study on looked at genomics to identify if there was a specific gene markers that would alert doctors that a patient is more at risk of developing sepsis. They found that a single nucleotide

polymorphism gene is a useful maker in determining whether a patient is more or less likely to develop sepsis (DiMeglio et al., 2018).

Another set of researchers found that a gene involved in tyrosine kinase receptor that is used in cell-to cell adhesion call FER gene is also more likely to decrease the mortality rate from sepsis in white patients (Taudien et al., 2016). This study used a cohort of people who were all of European descent but shows that need for further investigation into the effects that genomics might have on African Americans developing sepsis.

Comorbidities such as the prescience of the HIV infection has also been proven to increase the chances of developing sepsis. While both HIV can be present in people of all races, a study found that almost 12% of septic patients in the hospital are black compared to only .69% of white patients who are both septic and HIV positive (DiMeglio et al., 2018).

An additional factor that contributes to the increased mortality of black women due to sepsis is the disparity within in the emergency departments. When a person arrives at the hospital they are assigned a triage acurity score which is a method used to make sure that the most urgent patients are seen first; however, one study stated that when they case matched between Black and Caucasian patients, black patients were often given lower triage acruity scores then their white counterparts (Schrader & Lewis, 2013). As previously mentions the key to treating sepsis is to catch it early (*What Is Sepsis | Sepsis Alliance*, n.d.). These increased wait time are putting post-partum women who

are experiencing sepsis at a greater disadvantage when they are trying to receive treatment.

In addition to wait times, not all hospitals are equally equipped to offer the same level of treatment in the chance that sepsis is occurring in a patient (DiMeglio et al., 2018). African Americans are more likely to be treated at safety net hospitals which are more likely to be under funded (DiMeglio et al., 2018). This study also found that black patients who experience sepsis are less likely to experience organ dysfunction and ultimately death due to the delay in proper treatment.

RELATIONSHIP BETWEEN THE AFRICAN AMERICAN COMMUNITY AND HEALTH CARE PROFESSIONALS

There is a strain between the African American population and the medical community. Besides the fact that black people were kept out of working in the field for so many years, there are many instances of the poor ethical choices that violated African American bodies such as the Tuskegee syphilis study (Foeller et al., 2020). During the famous syphilis study, 600 African American men were promised free health care if they enrolled in the project. There was were two participant groups, one with syphilis and one who did not have the disease. Even though researchers knew that penicillin was the correct treatment, they wanted to study the long-term effects of syphilis. They decided to administer placebos to the participants who thought that they were being treated

for their illness. Experiments such as this and many others are a large factor that amplifies the distrust that African American have for the medical community.

Researchers Owens and Fett discuss how this distrust stems even further than one may think (Black Maternal and Infant Health: Historical Legacies of Slavery | AJPH | Vol. 109 Issue 10, n.d.). When the slave trade was banned in the US in 1807, medical doctors started to take more interest in the health of the black female slaves. This increased interest however was not because the end of the slave trade meant that slaves were afforded more rights. Now with no new slaves crossing the middle passage, they had to ensure that they monitored and preserved the fertility of the slaves that they currently had. Taking care of the reproductive health of the current slaves insured that the owners would have a new generation of slaves to come (Black Maternal and Infant Health: Historical Legacies of Slavery | AJPH | Vol. 109 Issue 10, n.d.).

IMPLICIT BIAS, RACISM, AND THE ASSOCIATED IMPLICATIONS

In a 2015 systematic review, researchers looked at the implicit racial and ethnic bias within health care professionals (Hall et al., 2015). Up until this point, there was a plethora of evidence that people hold implicit bias toward those that don't look like them; however, there was no specific study looking just at health care professionals, their attitudes and their interactions with patients. This study affirmed the current researchers that biases did indeed existed in the medical community; however, did not outline clear ways that these biases affected patient

care (Hall et al., 2015). This study called for further inspection of patient outcomes and its relation to the attitude of the doctors administering care.

Some still question if the mortality rate of pregnant black women is directly related to their skin color because on a biological level black women are the same as white women. Despite the lack of biological differences, researchers have established the effect that experiencing racism has on physiological function (Bower et al., 2018). In a pregnancy risk monitoring study, researchers concluded that there was a significant association between experiencing an upset due to racism and preterm labor (Bower et al., 2018). An additional study further explored this topic by looking at various forms of racism that black women might experience. These included discrimination in the fields of housing, policing, education, and of course medicine (Chambers et al., 2021). Establishing the presence of all of these stressors experienced by black women during their reproductive years calls for greater resolve working to eliminate the racism that black women experience in its various forms in order to see better patient outcomes.

One factor that is speculated as a reason why African American women have a higher mortality rate then white women is the due to the negative effects that the stress of racism has on their body physically (Williams et al., 2003). Study's how that stress level is correlated to physical health, meaning that people under high stress of any kind can be predisposed to developing illnesses (Cooper et al., 1994). Dr. William and his associate's found that is some studies

showed that a higher level of experienced discrimination was correlated to increased blood pressure (Williams et al., 2003).

Having established that stress can cause illness and that racism and discrimination can lead to stress, some researchers looked at health outcome of mother who are under stress prior to having a baby or during gestation. Researchers in this studied classified some of the most common stressors as: poor working conditions, low education neighborhood safety, education, access to health care, income poverty, food insecurity and perceived discrimination and racism (Bermúdez-Millán et al., 2011). They found that experienced stress can cause poor outcomes while having a baby, namely preterm birth with poses a risk to both mom and baby (Bermúdez-Millán et al., 2011). Participants in this study also cited that while they were pregnant and experienced mental stress, it manifested physical ways such as chest pain and in ways that disturbed their mental health such as increased feelings of depression (Bermúdez-Millán et al., 2011). These studies further shows that stress can have adverse effects on the pregnant mothers and can also pose a risk to the development of the baby and is ability to survive after birth (Bermúdez-Millán et al., 2011).

CURRENT SOLUTIONS TO DECREASE BIAS AND IMPROVE PATIENT OUTCOMES.

In a journal article authored by Dr. Gillespie-Bell, an OBGYN, she highlights what she has found to be in main causes of these health disparities

within in the health care system (Gillispie-Bell, 2021). While many professionals might place heavy blame on nutrition habits and other modifiable risk factors, this article does not. The authors agreed with previously mentioned research that implicit bias within the health care system is the root cause of the disparities (Gillispie-Bell, 2021). A major example of the implicit bias that is so deeply rooting in the health care system are the diagnostic algorithms that are used on a day-to -day basis. Many of them inappropriately factor in race and cause blacks and other minorities to not receive the same standard of care as their non-minority counterparts (Gillispie-Bell, 2021). These algorithms can have various effects such as being discharged from the hospital prematurely or having an unnecessary cesarean (Gillispie-Bell, 2021). The main point of bells research is to improves these disparities is to invest more resources into rectifying the implicit biases starting with the institutions that train doctors.

Additional steps to further the elimination of implicit biases within the medical institution are outlined by Dr. Reed and Dr. Griffin from Tufts Medical Center. They outlined an approach created by professors Schein and Kotter (Griffin & Reed, 2021). This approach states that to progress, all parties must be willing to do three things. First, unfreeze and disconfirm, acknowledge that we all have bias. Next, we must have engaged in cognitive reconstruction which is the act of being open to alter your thinking. Lastly, refreeze which is to become comfortable problem solving and learning new methods (Griffin & Reed, 2021).

The goal of this method is to move all health care providers to a place where they can provide more equitable health care to all people, black people specifically.

In similar efforts to decrease the mortality rates of black and brown women, a group of doctors and nurses from across the country came together to create a journal to outline what they believed they could do in their practice (Scott et al., 2019). While they emphasized the importance of preconception care they recognize that it is not something that all people have access to. They can, however, play a more active role in identifying and treating the health problem that black women are more likely to experience during pregnancy. They also identified some nonpharmacological ways that they can support black women in having successful pregnancies. These include more nurse-led prenatal care groups (Scott et al., 2019).

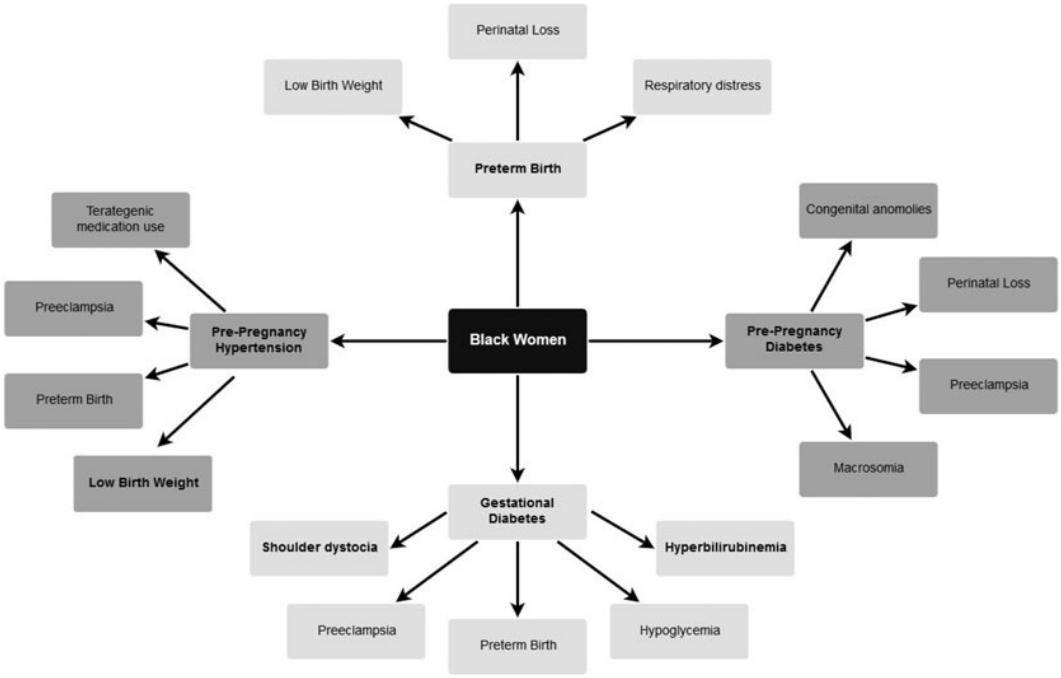


Fig 13. This figure outlines the major issues that black women face in all phases the occur with pregnancy (*Preeclampsia During Pregnancy | American Pregnancy Association*, n.d.).

CONCLUSION

The risk factors that a woman face when attempting to have a baby anywhere in the world are very large. Countless studies tell us that despite being a very developed county, America has a very high mortality rates in general. African Americans living in American are at a much greater risk for negative outcomes with it come to giving birth. While much more research is needed on this topic, it is clear that the root causes of this problem spans greater then any one topic or cause. There are both medical, social-economic and discriminatory circumstances that African American women are up against when it come to this

matter. It is important to continue studies in this arena in order to educate medical professional and policy makers on how to best mitigate this situation

Based on the current literature, preexisting heart conditions can place a woman at risk for death while giving birth. While there is data on the causes of general cardio vascular diseases there is room for improvements on this front. Creating more public health curriculum to improve the education of the general population on the effects of hyperlipidemias and hypertension can help to decrease the amount of people that develop heart disease due to personal habits such as eating habits or lack of physical activity.

To combat the effects of the epidemiological transition, which is a known causes of the increase BMI's in more developed countries more physical activity interventions are needed. Many Adults who maybe lead busy yet sedentary lives due to their chosen profession need to consciously replace the physical activity that generations before us had worked into their everyday lives. Great options include walking or biking to work if possible or joining a gym. Also with the knowledge that increased physical activity leaded to better cardiovascular health and less major illnesses, employers would benefit by encouraging physical activity. By employers creating more time for employees to take care of their physical health they could ultimately increase productivity and decree's sick days

The researcher on the enrollment of pharmacist and their role in CDV intervention is promising and should be expanded upon. Due to the cost of health care and other factors that cause people not to see a doctor annually, many

Americans only see a medical professional in case of an emergency. Some emergency can be very critical but could have been avoided or treated easily if the personal had access to proper wellness care. Getting pharmacist more involved allows a larger net of care to be offered to people in places that are convenient for them. Allowing the community to view their local pharmacists as a resource rather than just a distributer could have a great impact of the health of many communities that are under served.

Smoking intervention had been an active talking point in the community for many years but its importance is just as important today as it was 40 year ago. While the effects of smoking on your lungs is widely recognized, more distribution of education on the effects that smoking can have on your cardiovascular health is needed.

Ultimately, a key in decreasing maternal mortality in African American women lies in early education and treatment on many of the health risks that black women face long before they conceive a child. Having a child posed many risks however the research is showing that black women commonly enter the pregnancy with more comorbidity's then their white counter parts. In addition to solving the problems that arise during pregnancy and the problems that stem from SES and racism, understanding the details of these outlined pre- existing medical conditions is imperative.

The lack of healthy food available in the communities where black people live was a topic brought up by many literary journals within this thesis. It is a

particular interesting and important topic because it falls under many categories. Poor access to food poses a great risk to the health of black women prior to them conceiving a child because it put them at higher risk for obesity, hypertension and hyperlipidemia all of which can lead to heart disease and other adverse cardiac events. Food deserted also pose a risk to the mother though the lenses of added stress. As noted in one of the aforementioned journal publication, pregnant women state that worrying about not having enough access to food that is high in nutrition increases their mental stress. Lastly, food deserts and lack of proper nutrients possess a health risk to both baby and the mother during the critical gestational periods.

Another large conclusion that surfaces from this research is the need to increase the quality of care that black people receives while in the hospitals. In looking the research on the treatment of sepsis, a condition that many African American women experience after having a baby, it can be concluded that the mortality rate can be partially attributed to the longer wait times that African Americans face at hospital. This wait time is due to a general lack of resources at “safety net” hospitals. The mortality rate is also due to the implicit biases that cause hospital staff who control which patients are attended to first to underestimate and assign lower perceived pain scored to African Americans experience.

Another example of this risks posed to African American women and their mortality when it comes to childbirth and access to proper health care is the

increased risk for hemorrhaging. Research has proven that black women are more likely to die due to hemorrhage related complication.

The combine research on the treatment of sepsis and hemorrhage illustrated that desperate need to create true equity in the health care system so that African American women can received better care while in post-partum. If African American women and their health complaints were taken more seriously they would likely receive better, quicker reducing the chances that the patient dies due to complications.

The research conducted on the presence of anesthesiologist in the hospital offered a very promising intervention to problems that are rooted in the in the long standing inequality within the health care systems. While the simple solution is to hire more anesthesiologist so that there is always one onsite, the situation at hand is more complex than just hiring more doctors. In order to hire more people, the hospital itself would need more funding in order to pay each new hire. Not having the money to hire and pay more staff members is common in hospitals that care or predominantly African Americans. The research on this topic concluded that a 24 hours anesthesiologist at all hospitals is imperative to a women health. If the anesthesiologists is always present it allows pregnant women to received faster treatment avoiding long uncomfortable wait times with the potential worsening of the patient's condition

Finally, an important way to decrease the amount of black women who die due to childbirth would be to find interventions that mends the relationship

between African Americans and Medicine. Further information is necessary to understand how the medical community can gain back the trust of the people

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