Combatting the Disparities in Diabetes Healthcare Administration Among Minority Groups in America

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

Although diabetes technology and insulin advancements have increased the level of treatment for diabetic patients in America, there are still disparities among the people who are able to afford and access the tools necessary to manage the disease. Low-income, uninsured, and underinsured populations of Americans, which are disproportionately represented by racial and ethnic minorities because of structural inequities, are more likely to face economic barriers to accessing insulin, and endure the subsequent health consequences (Peek, 2021). This research will analyze how disparities arose in the treatment and care of underrepresented groups in America and how the American healthcare system can strive toward administering equal and unbiased care to all of its citizens. The aim of this research is to answer the question of why these disparities exist and how America's healthcare system can close the gaps caused by the disproportionate care administered to its underrepresented citizens.

This paper will tackle three main components/players in diabetes healthcare discrimination: social determinants of health, healthcare providers and patients, and technology and facilities. The social determinants of health are conditions in the places where people live, learn, work, and play that affect their health risks and outcomes. Together, they account for 50% to 60% of health outcomes and are a key contributor to health and health care disparities (CDC, 2023). Collectively, this is the environmental factor to the research problem.

The human factor of discrimination stems from policymakers and healthcare providers. Many healthcare providers lack the awareness of health disparities among their patients that precedes action to improve outcomes. Limited health disparities training is a probable contributor (Taylor et al., 2019). Policy can also limit health disparities; for example, among people with diabetes in the lowest income strata, the proportion of income spent on health costs

decreased significantly from 6.3% to 4.8% after the Affordable Care Act was passed (Hill-Briggs et al., 2021).

Technology and facilities also play an integral role in diabetes discrimination. For example, continuous glucose monitors (CGMs) are an important tool for diabetes management and blood glucose control. However, disparities in CGM use exist, with lower use in certain marginalized racial and ethnic groups. People with diabetes may not be aware that CGM is an option or that insurance may cover the cost of the device. This may be especially the case among marginalized populations with limited healthcare access and suboptimal quality of care (Vrany et al., 2023).

Evidence will be collected through an analysis of previous research, current studies, and the personal experiences of healthcare professionals. The combined results from these sources will be used to provide suggestions of how the healthcare system can improve and what steps can be taken for this progress. After analyzing numerous studies, reports, and interviews it is concluded that if the American healthcare system can follow the American Diabetes Association four-step approach to educate, negotiate, litigate,and legislate about diabetes discrimination, then the proper steps can be taken to eliminate medical bias in the United States.

Background and Significance

In 2021, 38.4 million Americans, or 11.6% of the population had diabetes (ADA, n.d.). With the disease itself there is a diabetes stigma, which is defined as negative attitudes, judgment, discrimination, or prejudice against someone because of their diabetes (CDC, 2022). Among the people who had the disease, there is an even smaller percentage of minorities who are further discriminated against. Decades of research have demonstrated that diabetes affects

racial and ethnic minority and low-income adult populations in the U.S. disproportionately, with relatively intractable patterns seen in these populations' higher risk of diabetes and rates of diabetes complications and mortality (Hill-Briggs et al., 2021). This paper will focus on three main components: the environmental, technological, and social aspects of the bias in diabetes health care.

Environmental factors affect diabetes bias in many different ways including but not limited to dietary habits, physical activity, perceived self-efficacy, and genetics. Racial segregation can also lead to health disparities. Minorities tend to live in geographically distinct communities, which can lead to different environmental and social risk exposures (LaVeist et al., 2009). Neighborhood factors may influence the development of prediabetes by limiting access to healthy food, green spaces, safe housing, and transportation options and by constraining healthy choices, which can increase the risk of poor diet, insufficient physical activity, obesity, and other major risk factors for diabetes (Mujahid et al., 2023). Social-economic status (SES) is another factor that encompasses educational, economic, and occupational status. SES is a consistently strong predictor of disease onset and progression at all levels of SES for many diseases, including diabetes. However despite the long-standing evidence for SES as a key determinant of both diabetes risk and outcomes, systematic investigation of impact on diabetes of change in SES remains a gap in the literature (Hill-Briggs et al., 2021).

Technological advancements, new medications, and facility quality are also instruments in diabetes discrimination. Over time, disparities by race, education, income, and insurance in the use of diabetes medications have emerged. Minorities with diabetes experience barriers to initiating newer diabetes medications (Elhussein et al., 2021). By 2010–2013, Black adults with diabetes were about 4 percentage points less likely than white adults to use these new

medications, a disparity of 27 percent (Ding & Glied, 2022). The disparities not only affect medication use but also adaptation to technology. One innovation, the insulin pump, has led to improvements in glycemic control, quality of life, satisfaction with treatment, and lower diabetes distress. However, during a study conducted by UCLA, insulin pump use was 67% among whites, 41% among Hispanics, 29% among Black, and 46% among other racial and ethnic groups (Everett, 2022). Another study found that Black patients with T1D are half as likely to receive insulin pump devices and continuous glucose monitors even though they have a threefold increased risk of hospitalization with diabetic ketoacidosis and hypoglycemia, 1.5% higher A1C, and a twofold increased risk of death compared with white patients (Kanbour et al., 2023). Moreover, it was found that racial and ethnic minorities often receive care at lower quality institutions, and interventions designed to improve care within healthcare systems may be an effective tool to reduce diabetes health disparities (Wilkes et al., 2011). Increased quality of care can lower the risk for diabetes complications and mortality. Researchers from the Commonwealth Fund gave health system performance scores by state and race/ethnicity. Figure 2 shows the staggering differences between races/ethnicities and how they received care in each state.

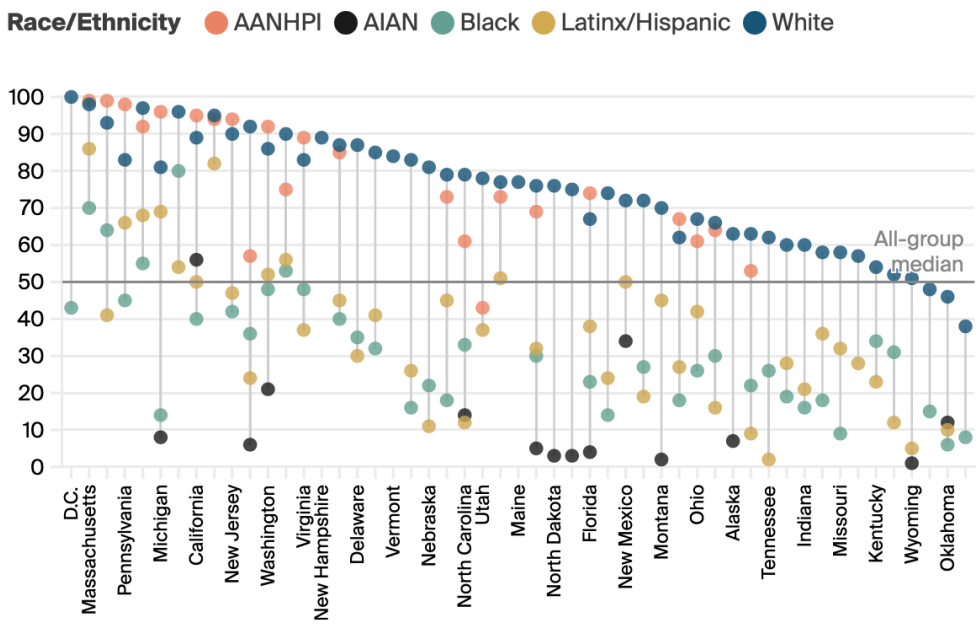

Figure 2. Health System Performance Scores (Radley et al., 2021)

These inequalities might be due to the social aspect of diabetes discrimination, where healthcare providers not having as many discussions and prescribing these technologies. Another explanation could be insurance or clinical practice requirements related to diabetes self-management skills, fulfillment of subjective criteria regarding appropriate patient selection, factors influencing the process of shared decision making, and provider implicit racial bias (Kanbour et al., 2023). To combat this imbalance, one study suggested that pharmacists, as one of the most accessible healthcare providers, are well poised to expand awareness about the risk factors for diabetes and can act as a patient identifier, educator, and advocate (Terrie, 2023). Interestingly, past survey evidence demonstrated that providers tend to consider patient factors (such as patient preferences and behaviors) as more important contributors to racial differences in care than provider factors (such as bias or poor communication) (Gollust et al., 2018). However, it is important to consider all factors in the multifaceted problem of diabetes care,

including healthcare providers, patients, insurance companies, medication manufacturers, and policy makers. Unfortunately, there still remains research gaps to determine the exact reasons behind the disparities in diabetes care; however, the current research is shining light on these inequalities and raising awareness and hope that there can be solutions to these issues.

Methodology

I approached this question by analyzing numerous studies that tried to find the root of discrimination in diabetes. However, since discrimination itself in the United States is a multifaceted issue, when applied to a specific disease the cause is rooted in many different areas. Therefore, the research must span across many areas including environment, social, structural, technological, and societal influences. By intentionally exploring each of these sectors, I have compiled extensive research and evidence that points us to the causes of discrimination. Additionally, different forms of information can be gathered in each section. This can include studies done, interviews, personal experiences, and data analysis. My STS analytical framework resulted in case studies, ethical analysis, and actor-network theory analysis.

After gathering all of my sources, I described each sector in detail and how they intertwined with each other to solidify the discrimination in diabetes. For example, how some systemic policies grouped minority neighborhoods together. Some of these minority neighborhoods have low SES, sparring grocery stores or safe physical activity access, and long distances to a nearby hospital. All of these factors could lead into lower quality of care for a diabetic patient or an environment that is predisposed to diseases like diabetes. I delved into each case and explored the players such as environment, personal, and technological, for each story or study.

My STS analytical framework is a mesh of case studies, document analysis, policy analysis and ethical analysis. The case studies are from previous studies done to determine where diabetes discrimination arises in a plethora of examples. Document analysis includes examining data surrounding the research question. For this piece of the framework, I focused on the diabetic stigma and how people with diabetes are perceived. Then I went further to understand how minority populations are also perceived by healthcare administrators, legislators, and the general public. I conducted policy analysis by studying how policy affects healthcare and the care received by all U.S. citizens from different SES statuses and ethnicities. I attempted to distinguish if there was a difference between diabetes treatment and other diseases by assessing various policies, outcomes, and potential players in the legislature. The final component was the ethical analysis of how the healthcare system is responding to the discrimination felt among diabetic patients. I focused on this aspect specifically because it is the action piece and answer to reversing this inequality. The American Diabetes Association made a four-step plan to end discrimination by educating, negotiating, litigating, and legislating change. Other resources pointed to these same steps by shedding light on the diabetic disparity and how awareness can improve action.

I also used Actor-Network Theory to conceptualize diabetes discrimination in its entirety. Despite some limitations, an Actor-Network Theory-based approach is conceptually useful in helping to appreciate the complexity of reality and the active role of technology in this context. This can prove helpful in understanding how social effects are generated as a result of associations between different actors in a network. Of central importance in this respect is that Actor-Network Theory provides a lens through which to view the role of technology in shaping social processes. Attention to this shaping role can contribute to a more holistic appreciation of

the complexity of technology introduction in healthcare settings (Cresswell et al., 2010). An intersectional analysis has shown the vulnerability of people with caring responsibilities and identities, reinforced by the increasing use of diagnostic and therapeutic programs based on the standard of patient-citizen, and the biomedical concept of "lifestyle" that is blind towards relationships. Without considering care in its totality it is impossible to address diabetes care (Radicioni, 2020).

By applying the STS analytical framework, I was able to uncover the interconnection between science, technology, and society in the discrimination in diabetes healthcare. This approach emphasizes the need to address structural inequalities and systemic biases within healthcare systems to ensure equal access to quality diabetes care for all individuals. It also highlights the importance of considering the broader social, cultural, economic, and political contexts in which healthcare disparities occur, rather than solely focusing on biomedical factors.

In summary, the STS analytical framework provides a holistic perspective for investigating discrimination in diabetes healthcare by integrating insights from various disciplines and acknowledging the interconnectedness of science, technology, and society. I also adapted the Actor-Network Theory to fully understand how actors are involved in the network of discrimination and what events and players further its existence. Both the analytical framework and theory help to identify underlying systemic issues and propose comprehensive solutions to address the healthcare disparities in diabetic treatment.

Literature Review

To analyze the environmental factors affecting disparities in diabetic treatment, the paper titled "Diabetes control is associated with environmental quality in the USA" was further

examined to explain the cause and effect of this discrimination. Jagai et al. write that, "Environmental parameters, including built and sociodemographic environments, can impact diabetes control (DC). Epidemiological studies have associated specific environmental factors with DC; however, the impact of multidimensional environmental status has not been assessed" (Jagai et al., 2021). The study addressed this gap in research and found that decreases in cumulative environmental quality were associated with decreases in the prevalence of DC. Communities with higher levels of air and water pollution, chemical production, and waste disposal experience a greater burden of diabetes.

One hit to environmental quality is the presence of endocrine-disrupting chemicals or EDCs. EDCs are chemicals that interes with any aspect of hormone action. Ruiz et al. write, "despite a history of environmental pollution disproportionately affecting communities of color in the U.S., the potential contribution of environmental toxicants to racial and ethnic differences in diabetes risk is underappreciated" (Ruiz et al., 2018). Numerous toxins have been linked to diabetes including PCBs, pesticides, phthalates, and air pollution. PCBs are synthetic compounds that are found in food contamination, mainly from fish. They are predominantly found in African Americans due to catfish consumption and the historical siting of PCB production and disposal sites being in predominantly black communities. One study found that "PCBS were associated with diabetes, with a pooled odds ratio of 1.7" (Wu et al., 2013). Lower-income communities also tend to be located in ZIP codes containing toxic waste sites. One study found that there is a "statistically significant increase in the rate of hospitalization for diabetes after controlling for major potential confounders amount the adult population residing in ZIP codes containing toxic waste sites" (Kouznetsova et al., 2007). The study also concluded that African-Americans were

2.6 more likely to be diagnosed with diabetes than Caucasians, and hospitalization rates varied with income, being higher in individuals with lower income.

Air pollutants are also a risk factor for diabetes. Meo et al. write that "air pollution is the leading cause of insulin resistance and incidence of type 2 diabetes mellitus. The association between air pollution and diabetes is stronger for traffic associated pollutants, gaseous, nitrogen dioxide, tobacco smoke and particulate matter" (Meo et al., 2015). Furthermore, high-volume roadways are more likely to be located closer to where non-White and lower-income people live, Although it is difficult to have a silver-bullet answer to mitigate these conditions and systemic neighborhood planning, these populations may benefit from policies that reduce emissions from heavy-duty vehicles, which might reduce disproportionate impacts in lower-income communities and communities of color (Antonczak et al., 2023). Extreme heat also has an impact on managing diabetes. The National Institute of Diabetes and Digestive and Kidney Diseases states that having diabetes in extreme temperatures can make it more difficult for the body to regulate its temperature. They advise people to avoid exposure to extreme temperatures and be in air-conditioned areas to protect against heat-related illnesses and death. A Harvard professor writes that "African Americans have been disproportionately affected by extreme heat, where about 40% of the U.S. African American population vs. 30% of the U.S. general population will be affected by heat" (Hollis, 2020).

As a result, the environment plays a distinct role in the discrepancies and disproportionalities in diabetes care. Geographical location, SES, proximity to high-traffic areas, air pollution, toxic waste sites, chemical pollution, and temperature differences are all linked to increased diabetes in minority populations. Unfortunately, many of the literature that was reviewed did not provide an angle of attack to resolve these problems. However, the answer lies

in multiple entities working together to resolve these issues. For example, policies can be put into place to limit air pollution from vehicles. Companies can advertise the use of sunscreen or air-conditioning in areas where there is extreme heat. Communities can band together to create safe places to walk or exercise in their neighborhoods. By analyzing the effects of the environment on diabetes disparities, awareness can be raised and the solution to these issues are one step closer to being solved.

Results and Discussion

This paper explored how disparities arose in the treatment and care of underrepresented groups in America and how the American healthcare system can strive toward administering equal and unbiased diabetes care to all of its citizens.The aim of this research was to answer the question of why these disparities exist and how America's healthcare system can close the gaps caused by the disproportionate care administered to its underrepresented citizens. The answer lies in the environmental, social and personal, and technological disproportionalities that segregate and discriminate against minority patients in the United States.

“Our environment is thought to affect the risk of type 2 diabetes mainly through mechanisms incorporating lifestyle factors such as physical activity or diet, the microbiome, inflammation or chronic stress” (Beulens et al., 2022). By changing certain factors in the environment, perhaps the prevalence of diabetes will decrease. However, addressing environmental issues will take policy changes such as adding green spaces, developing better infrastructure, and mitigating homelessness issues. Additionally, the food that is provided and consumed in particular environments can determine long-term health and presence of disease. To mitigate the discrepancies of food quality in densely ethnic areas, “interventions can help lower the risks of developing diabetes and improve clinical and psychological outcomes by increasing

diabetes-targeted foods and self-management care at food banks and increasing the number of grocery stores in low-income neighborhoods" (Jeremias, 2020). However, these are just some examples of how to mitigate the environmental health discrepancies in diabetic care. The environment is a robust complex that involves food, weather, the structural environment, waste management, and transportation. That means that there is a wealth of opportunities to combat diabetes discrimination through environmental means!

From a technological perspective, interventions designed to improve care within healthcare systems may be a particularly effective tool to reduce diabetes health disparities because ethnic minorities often receive care at lower quality institutions (Wilkes et al., 2011). Quality improvement (QI) has traditionally been utilized within healthcare systems and served as a key solution to improve the health systems. Perhaps by implementing QI in hospitals with high minority populations, its effects may be seen to reduce health disparities. One study found that develop[ing more accessible education using low-literacy visual and interactive materials, institution equity in offering technology, leveraging peer and family support for initiating technology and providing more insurance support to practices all served as solutions to increase the use of diabetes technology for underserved populations with type 1 diabetes (Agarwal et al., 2022). These researchers further explained that partnering with device companies to obtain demos and device trials has potential to demystify technology for patients and enhance practice ability to make technology feel more accessible. Another potential solution could be “removing restrictive eligibility and insurance coverage criteria to increase access to diabetes technology can serve as a tool to increase self-monitoring behaviors, engage in self-care, and improve health outcomes” (Fantasia et al., 2021). However, with each technological advancement there needs to be a human factor involved.

From a social standpoint, “most of the interventions that were found reported that integrated healthcare and community components were initiated in the healthcare setting and used a combination of strategies across three common domains: (1) patient education, (2) clinician involvement, and (3) quality improvement/health system change” (Peek et al., 2014). This means that physicians can work to adequately educate their patients about how to manage diabetes. However, they might need to go further than just supplying this information, but perhaps by actively collaborating with community partners to provide education and outreach outside the healthcare setting, the management education can be well received and lived out. Furthermore, partnerships and community initiatives to link patients without access to medical care to institutions or organizations that promote the wellbeing for all people are essential to make sure that diabetes care is accessible for everyone.

Conclusion

In conclusion, the environmental, social and personal, and technological disproportionalities in the United States not only limit minority communities’ ability to obtain adequate diabetes care, but also increase the prevalence of diabetes among minority groups. This multifaceted issue can be rooted back to the infancy of the United States and has been maintained into today’s modern age. Systemic issues such as structural racism, educational inequities, environmental injustice, housing discrimination, and employment discrimination have all played a role in the healthcare disparities felt by many minority patients with diabetes. The advancement of technology has seemingly left minority groups behind, as demonstrated by the disproportionate distribution of insulin pumps and the lack of modernization of hospitals in lower-income communities. This issue is further exploited by the environment itself, where air pollution, extreme heat, and lack of fresh produce seem to plague areas with low SES and high

diversity. Furthermore, social factors including patients and their education, doctors and care providers, as well as policymakers and lobbyists also play a role in the existence of unequal diabetic care. Although the results of this research seem dire, there are beacons of hope.

To overcome these discrepancies, people can look toward the environment, technology, and social factors to reverse their adverse effects. For example, the government can put policies into place to reduce toxic waste disposal in our communities, including neighborhoods with low SES or high minority populations. Technology can be created or tested for people of color and be advertised for these communities. As an example, clinical trials and access to these trials can be highlighted in ethnically diverse municipalities to increase the interest and involvement of minority communities in newly developed diabetes technology. Additionally, the social factor can be tackled by increased awareness and education for both the patient and the caregiver. Whether that includes diversity and inclusion modules, increased educational resources for diabetes management, or an increased interest of lobbyists and policymakers for this topic, social changes surrounding diabetes discrimination can be positive and improved. Because this is a multifaceted issue, orthogonal and integrative solutions are needed to fully resolve the disparities in diabetes care in the United States.

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