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Diabetes Mellitus Among Black/African Americans: A Critical Discourse Analysis of Epigenetic Research

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DIABETES MELLITUS AMONG BLACK/AFRICAN AMERICANS: A CRITICAL DISCOURSE ANALYSIS OF EPIGENETICS RESEARCH

By

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ABSTRACT

During their lifetime, Black/African Americans have a higher likelihood of developing diabetes mellitus metabolic disorder than other racial and ethnic groups in the United States. While research indicates that socioeconomic status, diet, and obesity factor into race disparities in health, the epigenetics field additionally identifies historical and contemporary racism as contributors to race disparities. This study is a Critical Discourse Analysis (CDA) and qualitative analysis of health science research articles that use an epigenetics approach to understand diabetes among Black/African Americans. I analyzed the extent and mechanisms through which articles subtly reproduce dominant stereotypes of Black/African Americans and diabetes through representations of culture, diet, and sugar consumption, among other factors. Moreover, my analysis shows how these articles recreate new scripts that view biological differences as a product of historical and ongoing racism. The result of this analysis indicates three themes: 1) presentations of race as a social construction and racism as a cause of biological outcomes; 2) utilization of cultural perspectives that reify racial categories and point to social environments within households/neighborhoods and diet as a cause; and 3) advocating for a multidisciplinary approach in medicine to foster collaborative change within minority communities. These results further emphasize the importance for research scholars to consider the important role of epigenetics and help identify social-environmental factors that help reduce health disparities in minority communities. Furthermore, by becoming more educated on epigenetics, sociologists can further contribute to the field.

Keywords: Black/African Americans, diabetes mellitus, critical discourse analysis, epigenetics, literature review, socioeconomic factors, multidisciplinary, race disparities

DEDICATION

This thesis is dedicated to all the Black/African Americans who have a loved one or personally have Diabetes Mellitus. By continuing to contribute to the long global history of racial reckoning, critique, and healing by engaging in critical conversations, racial health equity will be achieved.

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TABLE OF CONTENTS

INTRODUCTION

Diabetes Mellitus is a metabolic disorder that disproportionately affects Black/African Americans. Specifically, African Americans are 1.8 times more likely to develop diabetes compared to their social and racial counterparts (Kuzawa and Sweet, 2009). Research traditionally considered factors such as socioeconomics, diet, and obesity as causes of race disparities. However, emerging perspectives in the epigenetics field point to historical and contemporary racism among the causes of Diabetes Mellitus (Tuchman, 2011). Epigenetic mechanisms may contribute to the pathogenesis of complex diseases (Bramswig and Kaestner, 2012). Epigenetics is a growing field of study that analyzes how social and physical environments modify how people's genes work. This theory posits that transgenerational trauma created by racism changes how the body reads DNA sequencing, thus, leading to health inequities. Although some critical race scholars are skeptical of epigenetics based on historical connections between racism and eugenics practices, (Hughey and Byrd, 2015) this study critically analyzes social epigenetics research to evaluate the field's potential and limitations.

The emergence of epigenetics came from numerous researchers who discovered that DNA itself only provided insubstantial information pertaining to individuals' maturation (Felsenfeld, 2014). Due to discovering that DNA only covers a partial state of a cell, many theorists investigated epigenetics further. Chung, Cromby et al. (2016) realized that "epigenetics has considerable potential to transform social science by embedding mutually regulative reciprocal connections between biological and social processes within the human activities it studies" (Pg. 168). Most importantly, biology scholars concluded that social epigenetics and

other social determinants can further contribute to understanding why humans develop specific autoimmune diseases such as Diabetes Mellitus (Greer and McCromie, 2012).

Problem

In the field of epigenetics, limited studies examine how epigenetics plays a role in Black/African Americans developing Diabetes Mellitus. Various scholars conducted research from a strictly biological or social health approach, but a gap exists regarding how both approaches can be tied in together. "The complexity of interactions between genes and the environment is a major challenge for type 1 diabetes studies. Nuclear chromatin is the interface between genetics and environment and the principal carrier of epigenetic information" (Miao, Smith et al., 2008, p.3189). Insubstantial epigenetics research leaves many researchers with an unclear answer on whether environmental factors can play a role in gene altercation, which can cause the development of Diabetes Mellitus. Furthermore, due to researchers unable to find a correlation between genes and the environment, there is an unclear reason as to why Black/African Americans have a greater prevalence rate to developing any type of diabetes. The distinct types of diabetes include Type 1 Diabetes, which has no known cause; Type 2 Diabetes, which is caused by inadequate exercise, diet, and weight; and Gestational Diabetes, which is developed when a woman becomes pregnant. Exploring the diverse types of Diabetes through an epigenetic approach may reveal how environmental and biological components are intertwined when it comes to the development of Diabetes Mellitus among Black/African Americans.

LITERATURE REVIEW

Type 1 Diabetes

Currently, scientists have yet to determine how individuals who have Type 1 Diabetes (T1D) developed the autoimmune disease. A range of factors are associated with the development of T1D. These factors include family history, childhood environment, and social factors such as health education (Chiang, Maahs et al. 2018). Although many scientists have pointed to biological genetic risk factors, such as family history and genetic makeup, these factors do not account for individuals who develop T1D due to non-genetic effects (Redondo, Steck et al.2018). However, recently scientists discovered that children who currently have T1D showed epigenetic changes within cells of their immune system before the antibodies of the disease were detected in their blood (Suomi, Kalim et al. 2022, p.77). Due to this recent discovery, it is a possibility that the development of T1D can be identified during early childhood development. Among Black/African American adolescents, in numerous forms of literature, many researchers implemented the relational developmental systems theory framework, which led to the conclusion that identity development is linked to the reduction of risk behaviors and the promotion of Black/African American adolescents' healthy development (Brittain, 2012). For instance, in children between 10-19 years old, the SEARCH for Diabetes in Youth Study (SEARCH study) reported findings that, in 2001, African Americans children with type 1 diabetes had an estimated prevalence of 2.07% (Mayer-Davis, Beyer et al., 2009). With the SEARCH Study, the results highlight that T1D among Black/African Americans American youth may be heavily impacted by T1D due to being in low socioeconomic environments.

Furthermore, numerous environmental problems have been linked to those who have T1D. These environmental influences include viral infections, gut microbiota, stress levels, and diets, (Rewers and Ludvigsson, 2016) influences that are linked to epigenetic factors and mechanisms. These various environmental factors such as healthcare access play a crucial role and support the idea that non-genetic factors play a role in the development of autoimmune diseases (Dang, Jerram et al., 2017, p.89).

Recent studies have shown the importance of further exploring epigenetic factors among Black/African American youth regarding the development of T1D as many scientists believe that epigenetic analyses can be used in clinical settings as epigenetics can be used to predict disease development and outcomes (Dang, Jerram et al., 2017).

Type 2 Diabetes

Regarding Type 2 Diabetes, various researchers found a correlation between Black/African Americans who have Type 2 Diabetes and their participation in/level of physical activity (Boyer, Churilla et al., 2018). Due to this correlation, many social scientists indicated that overall physical activity can also be an influential component to Black/African Americans having a greater prevalence rate of developing diabetes. Within the Black/ African American population, those with Type 2 Diabetes have reported lower levels of physical activity (Spanakis and Golden, 2013). Furthermore, many researchers noted specifically how cardiac performance sensitivity to glucose availability is due to its reliance on glycolytic energy supply. These researchers also noted that glucose is also integral to signaling processes (Brimble, Dellbridge et al., 2015). These signaling processes engage in cardiac structural and functional modeling.

Overall physical activity can also vary depending on one's environment and one's perception of sufficient daily activity (Sallis, Floyd et al., 2012). Various social factors, such as limited health literacy, food deserts, lower levels of daily exercise, less access to gyms/exercise equipment and high costs of gym memberships, and limited emphasis on the importance of overall health, are crucial components to having limited access to adequate health within one's community. These components can contribute to Black/African Americans' higher probability of developing this chronic disease in their lifetime compared to their racial/ethnic counterparts due to systematic/structural racism and inequities caused by historical events such as slavery. Additional research indicates that social determinants of health caused by systemic/structural racism and inequities can be an underlying reason for the rapid rates of the development of Type 2 diabetes among Black/African Americans (Gee and Ford, 2011).

Gestational Diabetes

Gestational Diabetes Mellitus (GDM) is a form of diabetes that develops among pregnant women. Additionally, Gestational Diabetes can cause extremely high blood sugar levels that can negatively affect a woman's pregnancy and the child's health. Regarding this form of diabetes, researchers have found a link between the metabolic health of the offspring of a woman who has gestational diabetes and epigenetic fingerpaints at birth due to diabetes in pregnancy (Grunnet, Hjort et al., 2019). The identification of epigenetic footprints at birth raises numerous questions and concerns on whether the environment revolving around women who have gestational diabetes during pregnancy may increase the risk of offspring developing long-term, permanent diabetes. Scholars also note that Black/African American women are currently disproportionately affected by GDM (Tang, Foster et al., 2014). Despite being highly prone to

developing gestational diabetes, many Black/African Americans American women are unsure about what specific preventative measures to take when it comes to avoiding the development of Diabetes Mellitus among their children (Buchanan, Xiang et al., 2012). If sociologists further explore epigenetic factors, their findings may provide more clarification if Black/African Americans women who currently have gestational diabetes, increase the chance of not only developing Diabetes later in life but also passing it down to their children.

Social Epigenetics and its role in Diabetes Mellitus Diagnosis

The history of epigenetics stems from the ideology of biomedical research exploring the mechanisms by which genes are regulated and how the activity of producing proteins is controlled (Landecker and Panofsky, 2013). Epigenetics is additionally defined as the "investigation of heritable changes in gene expression that occur without changes in DNA sequence" (Baccarelli and Bollati, 2010). The term epigenetics emerged in the field of research in the 1940s, specifically in 1942 by British Biologist Conrad H. Waddington (Dupras, Joly et al. 2012), where he successfully discovered inheritance being acquired in a population with the aid of environmental stimulus (Noble, 2015). Despite the field of epigenetics originating from Biochemistry and Molecular Biotechnology, the emerging field of epigenetics is also deemed a crucial field for sociologists to explore due to the emergence of environmental epigenetics, which is also known as social epigenetics (Baccarelli and Bollati, 2010). Beginning in the 1990s, many scholars began to explore molecular biology from an epigenetic perspective, which led to findings of social and environmental factors being a cause of numerous medical conditions.

Social epigenetics, which is also referred to as environmental epigenetics, is defined as the "relationships between social factors and health inequities embodied at the molecular level" (Elliot and Shantz, 2021). The term social epigenetics has emerged in the field of research to describe the relationship between the social environment, specifically may influence bodies at the molecular scale through mediating gene expression (Chung et al., 2016; Cunliffe, 2016). In recent years, social epigenetics has been noted as a rapidly emerging field of research that seeks to determine whether specific epigenetic patterns can be found among populations grouped by numerous social factors (Elliot and Shantz, 2021). Social epigenetics has been cited as a possible cause of numerous autoimmune diseases, including Diabetes Mellitus (DM), because many individuals with DM do not possess any symptoms or have an immediate family member with diabetes.

Social Epigenetics and Diabetes Mellitus

Due to social epigenetics recently becoming a growing field of research, numerous scholars are curious if social epigenetic factors play a crucial role in autoimmune disease development. With numerous scientists making contributions toward "genetic and environmental influences" (Kuzawa and Sweet, 2009), social epigenetics has been heavily debated and caused controversy within the public health, social sciences, and medical communities regarding whether it plays a key factor in Black/African Americans developing diabetes at increasingly alarming rates (Vick and Burris, 2017). It has been noted within the last 15 years that researchers have been making a collaborative effort to understand the underlying determinants of racial disparities through genetic and non-genetic components (Krieger, 2005; Lillie-Blanton and Laveist, 1996; Williams, 1999). Specifically, with the higher prevalence rates of Diabetes Mellitus

among the Black/African American community, it is pertinent for "scholars to conduct additional research on social epigenetics to explore the reason why there is a disproportionate disease and mortality burden of Black/African Americans" (Kuwaza and Sweet, 2009).

Purpose

The purpose of this study is to conduct a Critical Discourse Analysis (CDA) (Fairclough, 2013) to analyze the discourses about Black/African Americans who have any form of diabetes among experts within the field of epigenetics. A CDA is "a type of discourse analytical research that primarily studies the way social power abuse, dominance, and inequality are enacted, reproduced, and resisted by text and talk in the social and political context" (van Dijk, 2001, p. 352). This thesis will be a critical discourse analysis of a sample of research articles pertaining to Diabetes Mellitus diagnoses in Black/African Americans and explores various perspectives of the cause of the development of DM among the Black/African American Community. This study includes articles that are focused on various forms of Diabetes (Types 1 and 2, and Gestational Diabetes). This evaluation of various Diabetes types will shed light on whether epigenetic factors contribute to Black/African Americans' higher likelihood of developing Diabetes Mellitus.

Findings from an examination of discourses about epigenetic factors associated with increased risk of developing Diabetes Mellitus among Black/African Americans, compared to their racial and ethnic counterparts, can reveal bias in research and improve/enhance public health and medical understanding of diabetes in Black/African Americans. Moreover, reducing bias by considering epigenetic factors could be an important next step in helping develop ways to improve morbidity and mortality from DM in Black/African Americans and reduce disparities.

RESEARCH METHOD

Data Approach

This research implements a Critical Discourse Analysis (CDA), an approach that investigates the relationship between language and power by examining how everyday "texts" create and reinforce social inequality and hierarchy (Holland and Novak, 2017). Furthermore, CDA is also considered to be a "growing interdisciplinary research movement which consists of several unique theoretical and methodological approaches to the study of language" (Johnson and Mclean, 2020). Language is used as a form of social practice among numerous research scholars. The purpose of implementing a Critical Discourse Analysis is to engage with topics of power and inequality among various social issues.

To investigate the construction of Black/African Americans in epigenetic research on Diabetes, I conducted a literature review. I searched published literature online using EBSCOhost, PubMed, MEDLINE, U.S. National Library of Medicine (NLM), Sage Publications, and Journal Storage (JSTOR). I used various combinations of the search terms "social epigenetics", "Black/African Americans", "Diabetes", "Sociology", and "Medicine".

Inclusion criteria for articles in this study were as follows. First, articles had to be written in English and originate from the United States. Second, articles were published between January 1, 2003, to December 31, 2022, to present the most accurate information about the epigenetics field. Third, each article had to distinctly focus on how social and environmental factors can influence Black/African Americans developing any form of Diabetes Mellitus, including Type 1, Type 2, and Gestational Diabetes. Fourth, articles focused on a sociology/sociological

perspective. No article-type restrictions were imposed. Out of a total of 40 articles, I selected 15 of the consulted health science peer-reviewed articles to examine social discourse among Black/African Americans with Diabetes that met the inclusion criteria. Specifically, I examined these articles to discover different ideologies regarding how research scholars viewed Black/African American diabetics.

Each peer-reviewed academic journal article that met the inclusion criteria also focused on the role of race and social determinants of health among Black/African Americans. Through this focus, the authors of each article made distinct comparisons to non-Black/African American racial/ethnic groups. Exclusion criteria were studies that: 1) Had unavailable articles, 2) Included interventions that did not use a systematic social approach, 3) Did not include Black/African Americans who have Diabetes Mellitus, 4) Did not focus on the role of environmental factors, or 5) Did not use a multidisciplinary approach (i.e. researchers from more than one field/discipline) to studying Diabetes Mellitus. Finally, after exploring the relationship between language and power, I critically analyzed each peer-reviewed article for the literature review.

Data Collection

Regarding the coding process, I critically analyzed 15 electronic and printed Health Science articles about Diabetes, Social Epigenetics, and Black/African Americans. Within this process, I highlighted pertinent sections and made notations where themes were identified that related to power, language, and socioeconomic status. I entered relevant quotes and notes into a coding table in Microsoft Word. Within the CDA, I followed the footsteps of Emily S. Mann and Patrick R. Grzanka (2018), which aided me in incorporating each author's insights to build the

Critical Discourse Analysis. After a general pattern was revealed within the results, I coded 15 of the remaining articles into the identified themes. Finally, while coding the remaining articles, I was open to identifying new themes.

RESULTS

The results reflected three distinct categories: 1) Race is a Social Construction, 2) Utilization of Cultural Perspectives that Reify Racial Categories and Point to Social Environments as a Cause, and 3) Developing a Multidisciplinary Approach to Diabetes Mellitus in Black/African Americans. These distinct categories challenged whether epigenetic factors are a key indicator of why Black/African Americans develop Diabetes Mellitus at increasingly higher rates compared to other ethnic and racial groups. Furthermore, in conducting a CDA on several articles, all three forms of Diabetes Mellitus among Black/African Americans showed intersections between epigenetic, social, and biological causes. However, despite the intersection between various causes, some articles had more of a focus on biological or social causes rather than epigenetic causes.

Category 1: Race is a Social Construction

While conducting the CDA, my findings revealed race as one important social construct. Furthermore, articles that fell under the category of race being a social construction indicated that racism is a crucial component of biological outcomes. Centuries of research have indicated that each race is considered a distinct group of individuals who are defined only by specific biological and genetic differences. Due to this ideology, numerous scholars have used race as a category to explain various observed differences within the healthcare field. Specifically, with

Diabetes Mellitus, based on the CDA, many researchers determined that there was a predisposition of Diabetes Mellitus among the Black/African American community (Akam, Eftitan et al., 2022).

Within the CDA, many scholars noted that "that race/ethnic minorities have a higher prevalence of diabetes than non-minority individuals" (Spanakis and Golden, 2013). This perception holds strong specifically among the Black/African American community. Researchers examining all types of diabetes among Black/African Americans described this population as a "heterogeneous group" and indicated that within centuries worth of time their genetic makeup became "admixture" (Marshall Jr, 2005). The articles also presented that other race/ethnic groups cannot also present intertwining genetic makeup (Pratt, Rajsic, et al., 2015). Furthermore, when discussing Diabetes Mellitus among Black/African Americans, mainly only Type 2 Diabetes is addressed within the peer-reviewed articles. Due to the stigma of Type 2 Diabetes as a chronic condition caused by one's overall lifestyle, such as poor diet and inactivity, other scholars argue that this train of thought cultivates a negative connotation of how Black/African Americans view their health. In addition, they argue that social/environmental components have a very insignificant role in explaining why the Black/African American community has a significant prevalence of Diabetes.

Category 2: Utilization of Cultural Perspectives that Reify Racial Categories and Point to Social Environments

My findings also revealed that the development of Diabetes among Black/African Americans populations may be due to their social environments. Category 2 findings further suggest that epigenetics plays a significant role in explaining why Black/African Americans have a greater likelihood of developing any form of Diabetes within their lifetime than their racial/ethnic counterparts. During the CDA, the articles also described the importance of various cultural perspectives in explaining the risk of developing Diabetes Mellitus among Black/African Americans. Specifically, how their social environments, either within their households or neighborhoods, can be influential. Finally, within this category, the articles revealed that overall diet is the most influential social environment factor that may explain the increased rate of Black/African Americans developing Diabetes Mellitus. This includes their perception (i.e. understanding, views, attitudes, and beliefs) of what constitutes a healthy meal and their lack of access to nutritional education. The findings of this study also revealed Black/African American food environments can also play a role (e.g., restaurants, nearby stores, food banks, and food deserts, among others). Food security, such as access to healthy food options in grocery stores and restaurants, and food insecurity, including living in food deserts, affect the prevalence rates of DM in Black/African Americans and diabetes management.

A recent article by Hill-Briggs et al. (2022) indicated that "the human and economic costs of diabetes are not distributed equally; racial and socioeconomic disparities in diabetes result in marginalized populations carrying excess disease burden in incidence, prevalence, morbidity, mortality, and utilization." (Hill-Briggs, Ephraim et al., 2022). The researchers argue that Diabetes Mellitus among Black/African Americans is not due to their race, but rather due to society's failure to adequately distribute economic aid toward their communities (Meloni and

Müller, 2018). The researchers further explained that there are "pervasive patterns" of disparities revolving around Black/African Americans due "to racial/ethnic minorities and lower socioeconomic (SES) groups experiencing lower health care quality, patient experience, and outcomes" (Hill-Briggs, Ephraim et al., 2022). Ultimately, this CDA found Category 2 articles emphasize that Black/African Americans are most likely to have diabetes because of their social environment, patient experience, and health care quality. These contributions further add to the idea that epigenetic factors play a developmental role in the prevalence of Diabetes Mellitus among the Black/African American community.

Category 3: Developing a Multidisciplinary Approach to Diabetes Mellitus in Black/African Americans

Finally, this CDA revealed a third category focused on articles implementing an important multidisciplinary approach to studying Diabetes Mellitus among Black/African Americans. This includes articles emphasizing the importance of both social environments and racism in playing a crucial role in the development of Diabetes Mellitus among Black/African Americans. Researchers explained how systematic racism, social construction pertaining to race, generational wealth, and overall health education among the Black/African American community ties into their higher rates of Diabetes Mellitus when compared to non-Hispanic Whites.

The Importance of Incorporating All Three Perspectives (Biological, Social, and Epigenetics)

Despite this CDA focusing on articles from the field of epigenetics when understanding why Black/African Americans have a higher chance of developing a form of Diabetes, researchers emphasized the importance of exploring Diabetes among Black/African Americans using an interdisciplinary approach. By sociologists doing more research on epigenetic factors, their findings may be able to assist biological scholars to view the relationship between Diabetes and Black/African Americans more cross-sectionally.

DISCUSSION

This discourse analysis sought to find common underlying themes regarding the development of diabetes and epigenetic factors among Black/African Americans. Although the study of epigenetics is still a developing research field, this analysis discovered and contributed key findings. Some of these findings include "genetic variations associated with this condition can in part explain the differences in frequency of diabetes risk in individuals belonging to one population or different populations" (Kwabi-Addo, 2017). This finding affirms that various social factors can play a role in explaining why Black/African Americans have a significantly higher chance of developing Diabetes compared to their ethnic and racial counterparts.

Based on the results, it is critical for sociologists to study epigenetics and how modification of gene expression can affect an individual's overall health. With a careful understanding of the epigenetic process, sociologists may possess the capacity to examine how social environments can alter gene expression. Through prior investigation, research has shown that "Epigenetic mechanisms impact gene expression that could predispose individuals to the diabetic phenotype during intrauterine and early postnatal development, as well as throughout

adult life" (Keating & El-Osta, 2013). As sociologists explore the epigenetics field, their work may further examine the impact of social determinants on health and how contemporary/systematic racism plays a role.

By understanding the process of epigenetic mechanisms, while incorporating social determinants of health, the association of exploring systematic racism in health can also provide cross-collaboration among social adversity and health disparity researchers. Specifically, within the Black/African Americans American community, there have been multiple instances where environmental and social disparities contributed to the development of various health inequities as well as chronic illnesses (Keating & El-Osta, 2013).

The results further emphasize how epigenetics may also provide a bridge between social and biological sciences, potentially allowing an integrative understanding of the relationship between human behavior and health. Within the research and healthcare fields, there has been an emphasis on providing equal attention and treatment to minority populations. Due to healthcare promoting the importance of interdisciplinary approaches, "research in this field rapidly progresses, noting that special efforts must be made to ensure inclusion of racial and ethnic minority populations in clinical research and equal access to all treatment modalities" (Akam, Eftitan et al., 2022). Through examining Black/African Americans with Diabetes from an epigenetic approach, we stand not only to foster more inclusion in the medical field, but also encourage additional preventative health techniques that may detect Diabetes Mellitus among Black/African Americans American during the earlier stages. More importantly, an epigenetic perspective would promote long-term prevention strategies for Black/African Americans to avoid being diagnosed with Diabetes.

Limitations

While this study had multiple strengths, there were also several limitations. One major limitation was the paucity of epigenetic studies pertaining to Black/African Americans with diabetes. Since epigenetics is a new field of research still in its infancy, there was not a substantial amount of peer review articles to analyze. Due to the few articles on epigenetics among Black/African Americans, there was a limited number of perspectives expressed by scholars. Furthermore, the CDA awakened my own confirmation bias as a researcher. Confirmation bias is defined as “the observation that people are more likely to actively seek out and agree with ideas that are already like their own" (Pratt, Rajsic, et al., 2015). Confirmation bias often results in researchers actively seeking out research and/or ideas that are similar to their beliefs. While seeking out principles identical to their own beliefs, they often disregard opposing ideologies. Ultimately confirmation bias causes a worldwide phenomenon known as unconscious bias. I did my best to limit confirmation bias within this Critical Discourse Analysis by developing reflection protocols, including alternative hypotheses, in my analysis to have a more wide-scale view.

Another limitation was the number of articles pointing to epigenetic factors among the three forms of Diabetes Mellitus. Compared to Type 2 and Gestational Diabetes, there were not many articles considering the idea of epigenetic factors among Black/African Americans who have Type 1 Diabetes. Due to insignificant articles on the relationship between Type 1 Diabetes and epigenetic factors among Black/African Americans, the CDA was not as thorough compared to the review of articles on the other two types of Diabetes Mellitus.

Additional Limitation: Social Epigenetics vs Epigenetics

When initially searching results using the keyword "Epigenetics," biological–based peer-reviewed articles were revealed. As a result of the few epigenetic articles from a sociology perspective, this originally caused fewer studies to meeti inclusion criteria for the purpose of the study. To gather more relevant studies pertaining to the research question, keyword searches were expanded to social epigenetics to reveal more studies on Black/African Americans who have diabetes from a sociological perspective. This study revealed the minimal amount of research done on social epigenetics from not only the field of sociology, but research in general.

Additionally, when epigenetics was used in biologically based articles, some articles briefly mentioned social determinants of health. However, while using a multidisciplinary approach, many of these same articles did not explicitly indicate the intersection between biological and social health factors and focused on one perspective more than the other. Thus, the peer-reviewed articles only further reaffirmed how health is only seen through one lens. Despite the "'epigenome' describing the overall state of a cell in flux, each point in time yielding multiple cascading possibilities for divergence of individual phenotypes" (Chung, Cromby et al., 2016), there is a clear distinction in the research field that is focusing primarily on genetics versus epigenetic research from a social perspective. Due to the various possibilities of one's individual phenotype and how that phenotype may react in a specific environment, it is crucial for researchers to further highlight epigenetics from a multitude of perspectives.

Future Research Directions

Further research on epigenetics is necessary to learn why Black/African Americans experience an increased probability of developing Diabetes Mellitus. Such research should focus on gaining perspectives from Black/African Americans who currently have any form of Diabetes Mellitus. Specifically, conducting in-depth interviews with those diagnosed with diabetes can shed further light on how epigenetic factors may be a contributing cause to developing diabetes.

Interviews could follow a semi-structured format based on an interview guide or validated and reliable questionnaires that could ask the participants about the causes of Diabetes Mellitus. These questions could include, "Do you believe your social class & environment had a role in your development of diabetes?" and, "Do you believe your prior and current health status, behavior, and lifestyle could have affected your chances of developing Diabetes Mellitus?" These questions can further inquire whether epigenetic factors are significant in Black/African Americans Diabetes Mellitus development. Furthermore, by asking such questions, researchers may observe whether one's environment, race, and responses to the questions correlate with developing diabetes and conduct longitudinal, quantitative life-course research to address this issue. An in-depth interview may also provide a better idea of the afflicted participant and why they believe they have Diabetes. The participants' answers may assist sociologists in further exploring the field of epigenetics.

Additionally, future social epigenetic research can explore differences in types of Diabetes across subgroups of Black/African Americans (e.g., by gender). Future social epigenetic research can also address the interplay between social and biological perspectives within life. By challenging the counteraction of life and social sciences, further advocation of increasement pertaining to health education within Black/African Americans communities, and

further advocation of health literacy can help in the prevention of Black/African Americans in developing Diabetes Mellitus.

Conclusion

The field of epigenetics has the potential to revolutionize the medical field by adjusting the way researchers and health professionals examine social issues such as racism, poverty, and other public health problems. Although the field of epigenetics is relatively young, this Critical Discourse Analysis sheds light on important findings. Additionally, the intersection between epigenetics and racial health disparities calls for additional attention within the research field. Specifically, it is imperative to conduct further research to understand how and why Black/African Americans have a significantly higher chance of developing any form of diabetes mellitus due to their living environments. Numerous studies have shown that "The risk of type 2 diabetes is approximately 2-fold higher in Black/African Americans than in European Americans" (Cheng, Reich et al., 2012). Due to many Black/African Americans lacking access to quality health education and healthy food options, for instance, these reasons could be why scientists and physicians observe increased biological risk factors such as increased abdominal fat in minority communities (Chiang, Maahs et al., 2018). Furthermore, various social determinants of health could contribute to diabetes among Black/African Americans as they do have some of the lowest health literacy rates.

With the implementation of interdisciplinary collaboration among life and social scientists, epigenetics has the potential to become a field that is further explored. Currently, the field of epigenetics is viewed very narrowly within both disciplines (Vick and Burris, 2017).

Still, scientists increasingly understand the importance of participation in epigenetic research among the two sciences. Even within healthcare, primary care providers are encouraged to see medicine through a multidisciplinary lens. With further exploration of epigenetics, interdisciplinary collaboration could present an opportunity for researchers to explore medicine through a cross-disciplinary approach. Ultimately, investigating epigenetics may provide researchers with a stronger understanding of factors associated with increased rates of Diabetes Mellitus among Black/African Americans.

Through further research development in epigenetics, sociologists may assist primary care providers in implementing preventative health strategies to help delay and significantly reduce diabetes mellitus in Black/African Americans. Diabetes on its own is already a complex autoimmune disease with numerous unanswered questions, especially among the Black/African Americans American community. As the epigenetics field grows within research communities, sociologists, health professionals, and public health officials may develop new perspectives to help prevent Black/African Americans from developing Diabetes Mellitus and ultimately reduce health disparities in these communities.

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APPENDIX A

TABLE OF ARTICLES

Year	Author	Title	Citation
2003	Frantz	In Defense of Critical Discourse Analysis. Studies in Applied Linguistics & TESOL	Frantz. (2003). In Defense of Critical Discourse Analysis. Studies in Applied Linguistics & TESOL, 3(2). https://doi.org/10.7916/salt.v3i2.1628
2009	Mayer-Davis, E. J., Beyer, J., Bell, R. A., Dabelea, D., D'Agostino, R., Jr, Imperatore, G., Lawrence, J. M., Liese, A. D., Liu, L., Marcovina, S., Rodriguez, B., & SEARCH for Diabetes in Youth Study Group	Diabetes in African American youth: prevalence, incidence, and clinical characteristics: the SEARCH for Diabetes in Youth Study. Diabetes care	Mayer-Davis, E. J., Beyer, J., Bell, R. A., Dabelea, D., D'Agostino, R., Jr, Imperatore, G., Lawrence, J. M., Liese, A. D., Liu, L., Marcovina, S., Rodriguez, B., & SEARCH for Diabetes in Youth Study Group (2009). Diabetes in African American youth: prevalence, incidence, and clinical characteristics: the SEARCH for Diabetes in Youth Study. Diabetes care, 32 Suppl 2(Suppl 2), S112–S122. https://doi.org/10.2337/dc09-S203

2011	Gee, G. & Ford, C	STRUCTURAL RACISM AND HEALTH INEQUITIES: Old Issues, New Directions. Du Bois review : social science research on race	Gee, G. C., & Ford, C. L. (2011). STRUCTURAL RACISM AND HEALTH INEQUITIES: Old Issues, New Directions. Du Bois review : social science research on race, 8(1), 115–132. https://doi.org/10.1017/S1742058X11000130
2012	Sallis, J. F., Floyd, M. F., Rodríguez, D. A., & Saelens, B. E.	Role of built environments in physical activity, obesity, and cardiovascular disease.	Sallis, J. F., Floyd, M. F., Rodríguez, D. A., & Saelens, B. E. (2012). Role of built environments in physical activity, obesity, and cardiovascular disease. Circulation, 125(5), 729–737. https://doi.org/10.1161/CIRCULATIONAHA.110.969022

2013	Elias K. Spanakis, and Sherita Hill Golden	Race/Ethnic Difference in Diabetes and Diabetic Complications	Spanakis, E. K., & Golden, S. H. (2013). Race/ethnic difference in diabetes and diabetic complications. Current diabetes reports, 13(6), 814–823. https://doi.org/10.1007/s11892-013-0421-9
2013	ST Keating and A El-Osta	Epigenetic changes in diabetes	Keating, & El-Osta, A. (2013). Epigenetic changes in diabetes: Epigenetics in diabetes. Clinical Genetics, 84(1), 1-10. https://doi.org/10.1111/cge.12121
2014	Tang, Foster, K. E., Pumarino, J., Ackermann, R. T., Peaceman, A. M., & Cameron, K. A	Perspectives on Prevention of Type 2 Diabetes After Gestational Diabetes: A Qualitative Study of Hispanic, African-American and White Women. Maternal and Child Health Journal	Tang, Foster, K. E., Pumarino, J., Ackermann, R. T., Peaceman, A. M., & Cameron, K. A. (2014). Perspectives on Prevention of Type 2 Diabetes After Gestational Diabetes: A Qualitative Study of Hispanic, African-American and White Women. Maternal and Child Health Journal, 19(7), 1526–1534. https://doi.org/10.1007/s10995-014-1657-y

2015	Mellor, Brimble, M. A., & Delbridge, L. M.	Glucose as an agent of post-translational modification in diabetes — New cardiac epigenetic insights.	Mellor, Brimble, M. A., & Delbridge, L. M. (2015). Glucose as an agent of post-translational modification in diabetes — New cardiac epigenetic insights. Life Sciences 129, 48-53. https://doi.org/10.1016/j.lfs.2014.03.020
2016	Zheng, Linarelli, L. E., Brooke, J., Smith, C., Wall, S. S., Greenawald, M. H., Seidel, R. W., Estabrooks, P. A., Almeida, F. A., & Cheng, Z	Mitochondrial Epigenetic Changes Link to Increased Diabetes Risk and Early-Stage Prediabetes Indicator. Oxidative Medicine and Cellular Longevity	Zheng, Linarelli, L. E., Brooke, J., Smith, C., Wall, S. S., Greenawald, M. H., Seidel, R. W., Estabrooks, P. A., Almeida, F. A., & Cheng, Z. (2016). Mitochondrial Epigenetic Changes Link to Increased Diabetes Risk and Early-Stage Prediabetes Indicator. Oxidative Medicine and Cellular Longevity, 2016, 5290638–10. https://doi.org/10.1155/2016/5290638

2017	Bernard Kwabi-Addo	Health Outcomes in a Foreign Land: A Role for Epigenetic and Enivronmental Interaction	Kwabi-Addo. (2017). Health Outcomes in a Foreign Land A Role for Epigenomic and Environmental Interaction (1st ed. 2017.).. Springer nternational Publishing. ttps://doi.org/10.1007/978-3-319-55865-3 201
2018	Chiang, J. L., Maahs, D. M., Garvey, K. C., Hood, K. K., Laffel, L. M., Weinzimer, S. A., Wolfsdorf, J. I., & Schatz, D	Type 1 Diabetes in Children and Adolescents: A Position Statement by the American Diabetes Association	Chiang, J. L., Maahs, D. M., Garvey, K. C., Hood, K. K., Laffel, L. M., Weinzimer, S. A., Wolfsdorf, J. I., & Schatz, D. (2018). Type 1 Diabetes in Children and Adolescents: A Position Statement by the American Diabetes Association. *Diabetes care*, *41*(9), 2026–2044. ttps://doi.org/10.2337/dci18-0023

2018	Meloni, M & Müller, R.	Transgenerational epigenetic inheritance and social responsibility: perspectives from the social sciences. Environmental epigenetics	Meloni, M., & Müller, R. (2018). Transgenerational epigenetic inheritance nd social responsibility: perspectives from the social sciences. Environmental epigenetics, 4(2), dvy019. ttps://doi.org/10.1093/e ep/dvy019
2019	Hjort, Novakovic, B., Grunnet, L. G., Maple-Brown, L., Damm, P., Desoye, G., & Saffery, R. (2019)	Diabetes in pregnancy and epigenetic mechanisms—how the first 9 months from conception might affect the child's epigenome and later risk of disease	Hjort, Novakovic, B., Grunnet, L. G., Maple-Brown, L., Damm, P., Desoye, G., & Saffery, R. (2019). Diabetes in pregnancy and epigenetic mechanisms—how the first 9 months from conception might affect the child's epigenome and later risk of disease. The Lancet. Diabetes & Endocrinology, 7(10)., 796-806. ttps://doi.org/10.1016/S 2213-8587(19).30078-6

2021	Ammous, Zhao, W., Ratliff, S. M., Mosley, T. H., Bielak, L. F., Zhou, X., Peyser, P. A., Kardia, S. L. R., & Smith, J. A.	Epigenetic age acceleration is associated with cardiometabolic risk factors and clinical cardiovascular disease risk scores in Black/African Americans. Clinical Epigenetic	Ammous, Zhao, W., Ratliff, S. M., Mosley, T. H., Bielak, L. F., Zhou, X., Peyser, P. A., Kardia, S. L. R., & Smith, J. A. (2021). Epigenetic age acceleration is associated with cardiometabolic risk factors and clinical cardiovascular disease risk scores in Black/African Americans. Clinical Epigenetics, 13(1), 55–55. https://doi.org/10.1186/s13148-021-01035-3

2022	Felicia Hill-Briggs, Patti L. Ephraim, Elizabeth A. Vrany, Karina W. Davidson, Renee Pekmezaris, Debbie Salas-Lopez, Catherine M. Alfano, Tiffany L. Gary-Webb	Social Determinants of Health, Race, and Diabetes Population Health Improvement: Black/African Americans as a Population Exemplar	Hill-Briggs, F., Ephraim, P. L., Vrany, E. A., Davidson, K. W., Pekmezaris, R., Salas-Lopez, D., Alfano, C. M., & Gary-Webb, T. L. (2022). Social Determinants of Health, Race, and Diabetes Population Health Improvement: Black/African Americans as a Population Exemplar. *Current diabetes reports*, *22*(3), 117–128. https://doi.org/10.1007/s11892-022-01454-3