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The Burden and Cost of Diabetes Amongst Latin Minorities in California

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ABSTRACT

Diabetes disproportionately impacts older people generally, while Hispanics are almost twice as likely as non-Hispanic whites (nHWs) to be diagnosed. Racial and ethnic disparities exist and influence the burden and cost of diabetes care for Medicare recipients among Hispanics. The current annual global costs estimated to be U.S. $673 billion, and these are projected to rise to U.S. $802 billion by 2040 and diabetes care accounts for one of every dollar spent on health care. It can be said that old age and diabetes place a disproportionate burden on racial and ethnic minorities compared with non-Hispanic whites (nHWs), Hispanics (who comprise 18% of the U.S. population are almost twice as likely to develop type 2 diabetes (T2D) as nHWs) and experience high rates of poorly controlled diabetes and related complications [1]. This research aims to influence policy decisions at multiple levels. Policymakers can utilize the insights gained to advocate for targeted interventions that improve diabetes management and reduce healthcare costs among Latinx minorities in California.

Keywords: Diabetes, Healthcare Policy, Equity in Healthcare, Access to Healthcare, Access to Doctors, Diabetes and Cost of Healthcare.

INTRODUCTION

Diabetes disproportionately impacts older people generally, while Hispanics are almost twice as likely as non-Hispanic whites (nHWs) to be diagnosed. Racial and ethnic disparities exist and influence the burden and cost of diabetes care for Medicare recipients among Hispanics. The current annual global costs estimated to be U.S. $673 billion, and these are projected to rise to U.S. $802 billion by 2040 and diabetes care accounts for one of every dollar spent on health care. It can be said that old age and diabetes place a disproportionate burden on racial and ethnic minorities compared with non-Hispanic whites (nHWs), Hispanics (who comprise 18% of the U.S. population are almost twice as likely to develop type 2 diabetes (T2D) as nHWs) and experience high rates of poorly controlled diabetes and related complications [1].

According to Taylor, Downie and Mercado [2], diabetes is the seventh leading cause of death in California, contributing to 9,592 deaths among adults in 2017 and estimated that 3.1 million California adults were diagnosed with diabetes, representing approximately 1 out of every 9.3 adults in California, while 1 out of every 6.4 California adults were estimated to be diagnosed with prediabetes. Diabetes remains a complex metabolic disorder in which the body is unable to produce insulin, or has a decreased ability to use insulin, or both. The four classifications of diabetes types are type 1, type 2, gestational, and secondary or other specific types of diabetes. Type 1 diabetes, which is an autoimmune disease in which the insulin-producing cells are destroyed by an autoimmune attack, meaning the body is no longer able to produce insulin, and resulting in sever hyperglycemia. Type 2 diabetes is caused by a combination of insulin resistance which is largely due to obesity and relative to insulin insufficiency. Gestational diabetes is a form of glucose intolerance that occurs during pregnancy among women who have never been diagnosed with diabetes prior to pregnancy. Other types of diabetes result from specific genetic conditions, such as maturity-onset diabetes of youth, surgery, medications, infections, pancreatic disease, and other illnesses [2].

Diabetes is costly and poses a substantial burden on society in the form of high direct medical costs, lost productivity, premature mortality, and intangible costs in the form of reduced social connectivity and quality of life. It was estimated that the total cost of diagnosed diabetes in the U.S. in 2022 was $412.9 billion, including $306.6 billion in direct medical costs and $106.3 billion in indirect costs attributable to diabetes. For cost categories analyzed, care for people diagnosed with diabetes accounts for 1 in 4 health care dollars in the U.S., 61% of which are attributable to diabetes. On average people with diabetes incur annual medical expenditures of $19,736, of which approximately $12,022 is attributable to diabetes. People diagnosed with diabetes, on average, have medical expenditures 2.6 times higher than what would be expected without diabetes. Glucose-lowering medications and diabetes supplies account for 17% of the total direct medical costs attributable to diabetes. Major contributors to indirect costs are reduced employment due to disability ($28.3 billion), presenteeism ($35.8 billion), and lost productivity due to 338,526 premature deaths ($32.4 billion) [3].

According to Casagrande, et al. [4] in 2019, among adults with diabetes aged 18-64, only 75.8% of Latin/Hispanic individuals had health insurance, which is lower than the rates for non-Hispanic Whites (93.2%), non-Hispanic Blacks (90.5%), and non-Hispanic Asians (98.3%). Most adults in this age group with diabetes had private insurance (57.4%), while others were covered by Medicaid (23.9%), Medicare (16.0%), or military benefits (4.1%). Additionally, people with incomes closer to the poverty level spent a larger portion of their income on private insurance premiums compared to those with higher incomes [4].

Diabetes is a long-term illness where blood sugar levels become too high because the body either doesn't produce enough insulin or can't use the insulin it makes effectively. Nationally, 38.4 million Americans, or 11.6% of the population, had diabetes in 2021, highlighting the widespread impact of this condition [5]. Furthermore, the financial impact of diabetes on both individuals and the healthcare system is significant. According to the American Diabetes Association [5], people with diabetes have medical costs that are about 2.6 times greater than those without the condition. In 2022, the total cost of diagnosed diabetes in the U.S. was $412.9 billion, which includes $306.6 billion in direct medical expenses and $106.3 billion in lost productivity.

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For California in 2017, the direct medical costs of diagnosed diabetes were estimated at $27 billion, with an additional $12.4 billion in indirect costs due to lost productivity, making the total $39.4 billion. For Latinx, these financial burdens are combined with lower average incomes and higher rates of unemployment compared to other demographic groups. Understanding these economic implications is important for developing policies and interventions aimed at reducing the financial impact of diabetes while improving health outcomes among Latin minorities in California [5].

It is important to expand outreach and assistance with enrollment efforts to make sure Latinx have access to health insurance, especially for those who speak Spanish and face language barriers. Providing health education materials and healthcare services specifically to the cultural and linguistic needs of the Latinx community can improve how well patients understand and engage in their healthcare. Programs that cover the costs of necessary medications and glucose monitoring supplies can also alleviate some of the financial burdens, enabling better disease management and reducing the incidence of costly complications [5]. Addressing these cultural and economic factors can improve diabetes outcomes and reduce healthcare costs for Latinx minorities in California.

Limited access to preventative care and education further contributes to the high healthcare costs of diabetes among Latinx minorities in California. According to the Centers for Disease Control and Prevention [6], preventative measures, such as regular screenings, nutritional counseling, and physical activity programs are essential for managing diabetes and preventing complications. However, many Latinx face barriers to accessing these resources due to a lack of healthcare providers in their communities, not enough insurance coverage, and a lack of culturally relevant health education. By improving access to preventative care and diabetes education, the occurrence of diabetes-related complications can be reduced, and overall healthcare costs can be lowered. Community-based programs and partnerships with local organizations also play a big role in reaching underserved populations and providing the necessary support to manage diabetes effectively [6].

PURPOSE OF THE STUDY

The purpose of this study is to determine the healthcare costs associated with diabetes among Latinx minorities in California. Diabetes specifies significant economic strains through direct medical expenses and indirect costs related to productivity loss, which can unequally affect minority communities. In California, the medical expenses to treat diabetes total approximately $1.9 billion annually, with an additional $800 million lost in productivity each year due to the disease. Other complications like end-stage renal disease (ESRD), lower limb amputations, and blindness add further financial strain, emphasizing the challenges faced by affected individuals and the healthcare system [2]. The state's diverse population and changing income levels make it challenging for minorities to afford and manage diabetes care. These costs not only affect families, but also affect public health systems and government budgets. To be able to develop impactful policies and programs, it is important to investigate the complications of healthcare expenses among Latinx affected by diabetes in California. By identifying the economic challenges these communities face, healthcare providers and policymakers can develop strategies that make diabetes care more accessible and affordable (Taylor, Downie, & Mercado, 2019).

Understanding the financial strain of diabetes on Latin minorities in California is important for addressing current and future healthcare challenges. This study examines the costs associated with diabetes, including medical expenses and lost productivity, and proposes strategies to reduce these costs. It also investigates how financial and healthcare access factors influence health outcomes for minorities, especially in diabetes care. The study aims to identify ways to lower diabetes-related costs and ensure access to healthcare services. It addresses specific issues faced by Latinx minorities, like lack of health insurance and healthcare conceptions and misconceptions. Lastly, this study aims to provide guidance for healthcare providers and healthcare organizations in developing extensive strategies to address the social factors of health that impact diabetes outcomes among Latinx minorities in California. By identifying effective interventions and approaches, stakeholders can enhance access to preventive care and improve health education for the Latinx minority community. This approach can allow individuals to better manage their diabetes and reduce disparities in healthcare access and outcomes.

PROBLEM STATEMENT

There are risk factors that contribute to this increased occurrence in Latinx minority populations. For example, genetics may make people more likely to develop diabetes. Lack of exercise and higher obesity rates can lead to higher risk for Latinx minorities. Latinx may view higher weight as "good health" in their culture, but this can lead to an increased risk of diabetes and worsen health complications [7]. Latinx minorities in California face an important health disparity characterized by extremely high rates of diabetes compared to the general population. This demographic group not only exhibits an increased prevalence of type 2 diabetes mellitus (T2DM), but also faces increased risks for associated complications, such as cardiovascular disease, chronic kidney disease (CKD), and retinopathy. "Deaths from T2DM in Latinx populations are also 1.25 times higher than non-Latinx populations", underscoring the severity of the issue within these communities [8]. There are risk factors that contribute to this increased occurrence in Latinx minority populations. For example, genetics may make people more likely to develop diabetes. Lack of exercise and higher obesity rates can lead to higher risk for Latinx minorities.

Socioeconomic challenges are another big factor which include limited access to healthcare, poverty, and language barriers. Specifically, having prediabetes, a family history of diabetes, being 45 or older, having a BMI of 30 or higher, high blood pressure or cholesterol, lack of physical activity, smoking, and a history of gestational diabetes are notable risk factors [7]. These health disparities are more complicated by difficulties in accessing affordable healthcare and preventive services. Strategies and community interventions are important to address these risk factors and improve health outcomes for Latin minority communities. Given the higher frequency of diabetes and risk factors in Latinx communities, addressing healthcare access and utilization becomes crucial.

These factors contribute to elevated healthcare utilization and strong economic burdens, increasing disparities within the Latinx minority community. Vidal et al. [8] indicates that "Latinx Americans suffer from lower access to healthcare than the general population due to various reasons, including language proficiency, immigration status, socioeconomic status, and level of acculturation" [8. p.1]. One of the biggest challenges Latinx with diabetes in California is not having enough insurance coverage. Research shows the Latinx with diabetes are less

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likely to have health insurance compared to others, which delays diagnosis and proper care. This lack of coverage leads to worse health outcomes and higher healthcare costs. This is why it's important to address this issue to improve health and reduce costs.

This research aims to influence policy decisions at multiple levels. Policymakers can utilize the insights gained to advocate for targeted interventions that improve diabetes management and reduce healthcare costs among Latinx minorities in California. By directing resources towards culturally sensitive healthcare initiatives and expanding access to essential diabetes care services, policymakers can foster more equitable healthcare delivery, leading to better health outcomes and reduced economic burdens for affected communities [9].

Conceptual Framework of the Study

The conceptual framework for this study is based by the Andersen Behavioral Model of Health Services Use [10] [11], which provides a thorough perspective to explore healthcare utilization among underserved populations, specifically focusing on the impact of lack of insurance on healthcare costs for diabetes management among Latinx minorities in California. The framework categorizes factors influencing healthcare access into three main areas: predisposing, enabling, and need factors. Research from 2012 to 2021 explains how factors like demographic characteristics, cultural beliefs, and knowledge about diabetes management affect individuals' likelihood of seeking healthcare. Enabling factors encompass socioeconomic status, health insurance coverage, and accessibility to healthcare facilities, critically shaping the ability to obtain necessary healthcare services.

The lack of insurance among Latinx minorities worsens disparities, preventing access to preventive care and routine management, leading to high healthcare costs associated with diabetes complications. Need factors encompass health status and perceived need for care, reflecting the severity of diabetes and individual capacity for self-management [12]. By applying the Andersen Behavioral Model, this study aims to explain how these factors connect to influence healthcare utilization patterns and costs, providing insights to inform policy interventions aimed at enhancing healthcare access and reducing economic burdens for Latinx communities affected by diabetes in California. Future studies should further examine how cultural beliefs and economic status impact healthcare access among Latinx communities. This research is important for developing policies and reducing healthcare costs.

RESEARCH DESIGN AND METHODS

The Dataset

The 2022 California Health Interview Survey (CHIS) [13] Adult dataset is an extensive source of information on health behaviors and conditions among California's diverse populations. This dataset is particularly useful for examining the healthcare costs associated with diabetes among Latinx minorities in California. CHIS 2022 [13] provides a broad range of data, including information on health insurance coverage, medical visits, diabetes management, and various socioeconomic factors. The survey employs random sampling through telephone and web-based methods, and data collection is available in multiple languages, including English, Spanish, Chinese, Vietnamese, and Korean, ensuring comprehensive representation across different demographic groups. The dataset offers insights into healthcare utilization patterns and access to medical care, particularly for individuals diagnosed with diabetes, including those within the Latin minority population. It includes detailed variables such as the type of diabetes

(Type 1 or Type 2), the presence of a diabetes care plan, the frequency of doctor visits, and any insurance-related delays in prescription fulfillment. Additionally, it provides relevant data on educational attainment and household income, which are essential for understanding the economic impact of diabetes management within the Latin minority population.

Statistical Analysis

SPSS was utilized to explore the relationships between various factors within a dataset of 21,463 individuals. The analysis concentrated on the variables related to the development of a diabetes care plan, Latin/Hispanic subtypes, and the number of doctor visits. The data came from different surveys and medical records. To analyze the data, descriptive statistics, Pearson, and Spearman correlations, *chi-square tests*, and assessed variability were used. The dataset was cleaned to address missing data, ensure consistency, and categorical variables, ensuring the accuracy and reliability of the statistical analyses. Descriptive statistics, including mean, median, standard deviation, and range for variables like the number of doctor visits, were calculated. Frequency distributions and percentages were computed for categorical variables, such as Latin/Hispanic subtypes and the presence of a diabetes care plan. *Chi-square tests* were performed to examine the associations between the variables. The statistical analyses conducted using SPSS provided valuable insights into the relationships between Latinx/Hispanic subtypes, the number of doctor visits, and the development of diabetes care plans. The results highlight the importance of regular medical visits in diabetes management and suggest that cultural or ethnic factors may influence healthcare behaviors and outcomes. The details of the statistical analysis are shown in Table 1 below.

Table 1: Summary of Statistical Analysis

Hypothesis	Dependent Variable	Independent Variable	Statistical Test
If Latin/Hispanic subtypes and number of doctor visits influence the development of a diabetes care plan, then variations in these factors will show a correlation.	Development of Diabetes Care Plan	Latin/Hispanic Subtypes, Number of Doctor Visits	Descriptive, Pearson Correlation, Spearman's Rho

Independent and Dependent Variables

The dependent variable used for this study is the development of a diabetes care plan, which refers to whether medical providers create a plan for managing diabetes. The independent variables include Latinx/Hispanic subtypes and the number of doctor visits. Latinx/Hispanic subtypes represent different subgroups within the Latinx/Hispanic population, while the number of doctor visits captures the frequency of healthcare consultations over the past year. The questions addressed in the dataset aimed to evaluate the relationship between these variables and their impact on diabetes care planning.

Research Hypothesis

This study hypothesizes that variations in Latinx/Hispanic subtypes and the frequency of doctor visits significantly influence the development of diabetes care plans. Specifically, it is anticipated that certain subgroups within the Asian/Hispanic population may have different levels of access to and utilization of healthcare services, resulting in differences in how diabetes

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management plans are created and implemented. Additionally, an increased number of doctor visits is expected to correlate positively with the likelihood of having a structured diabetes care plan. Therefore, this research aims to identify these correlations and understand how these factors collectively impact diabetes management among Latinx minorities in California.

ANALYSIS AND FINDINGS

The CHIS 2022 dataset [13] recorded a total of 21,463 individuals, allowing for the selection of two independent variables, Latinx/Hispanic subtypes and the number of doctor visits, and one dependent variable, the development of a diabetes care plan. The descriptive statistics showed that the average number of doctor visits per year among the study population was 3.19 (SD = 2.698). The frequency distribution showed that 43% of the participants had a documented diabetes care plan. The Pearson correlation analysis indicated a positive correlation (r = 0.141, p< 0.01) between the number of doctor visits and the development of a diabetes care plan, suggesting that more frequent doctor visits are associated with a higher likelihood of having a diabetes care plan. The Spearman correlation analysis revealed a correlation (P = 0.156, p < 0.01) between certain Latinx/Hispanic subtypes and the number of doctor visits, as well as the development of a diabetes care plan. This finding showed that there are differences among Latin/Hispanic subtypes in terms of healthcare utilization and diabetes management.

In the crosstabulation analysis, data were categorized by the presence or absence of a diabetes care plan and the frequency of doctor visits. The results indicated that the combination of having multiple doctor visits and the presence of a diabetes care plan had the highest counts. This finding aligns with our hypothesis that more frequent doctor visits would be associated with a higher likelihood of having a diabetes care plan. To check this hypothesis, a chi-square test was used.

The *Pearson chi-square* test between the number of doctor visits and the likelihood of having a diabetes care plan showed a *chi-square value of* 173.054, with a degree of freedom (*df) of* 132 and a *p-value* of 0.010. This result indicates a strong connection between the number of doctor visits and the likelihood of having a structured diabetes care plan, supporting the hypothesis. The *p- value* allows us to reject the null hypothesis, confirming that increased doctor visits are indeed associated with a greater likelihood of having a structured diabetes care plan.

Furthermore, the *chi-square* analysis was performed to evaluate the relationship between Latin/Hispanic subtypes and the development of a diabetes care plan. The test showed a *Pearson chi-square value* of 69.479, *df* = 4, with a *p-value of* <0.001. This result suggests a strong association between Latinx/Hispanic subtypes and the development of a diabetes care plan, indicating that cultural subgroups may have a role in influencing the presence of a care plan. These findings highlight the importance of regular doctor visits for diabetes management and suggest that cultural or ethnic factors may influence healthcare behaviors and outcomes.

This research explores the impact of various factors on healthcare costs for diabetes among Latinx minorities in California. The correlation was proven using CHIS data from 2022 [13] and provided valuable insights into the relationships between different variables which include Latinx/Hispanic subtypes, Number of Doctor Visits, and the Development of Diabetes Care Plan. The results confirmed the hypothesis that Latinx/Hispanic subtypes, the frequency of doctor visits, and the presence of a structured diabetes care plan significantly influence healthcare

costs for diabetes among Latinx minorities in California. The analysis showed that increased frequency of doctor visits and having a structured diabetes care plan related to lower healthcare costs, challenging the idea that higher costs are mostly due to seeing doctors less often or not having a good diabetes care plan.

The data highlights key variables related to healthcare costs for diabetes among Latin minorities in California. Most respondents were non-Latinx, with many having completed college or higher education. About 11.3% reported having diabetes, underlining the importance of this health issue. Most had a regular healthcare provider, though some did not visit their provider in the past year. While many did not face challenges with Medicare premiums, affordability issues were noted for some when accessing plans through Covered California. The data reveals connections between income levels and health outcomes. The findings indicate disparities and challenges in healthcare access for Latin minorities in California. Despite access to healthcare and higher education, diabetes is common. Income disparities also impact healthcare affordability, highlighting the need for improved healthcare equity. Addressing these issues could enhance health outcomes and ensure equal access to medical services for this community. The findings showed positive correlations between subtypes and doctor visits or diabetes care plans. Additionally, more doctor visits were slightly associated with having a diabetes care plan, indicating a need for improved healthcare access and care planning in these communities.

DISCUSSION AND CONCLUSION

Expanding insurance coverage, lowering financial barriers, and increasing access to preventive care can significantly improve outcomes. Cooperation involving healthcare providers, community organizations, and policymakers is essential to develop and support these programs, aiming to reduce the occurrence and complications of diabetes within Latinx communities [14]. The analysis indicates that disparities in diabetes-related healthcare costs among Latin minorities are influenced by different factors, including education and income levels. Lower education and income are connected to higher diabetes rates and poorer health outcomes, leading to increased healthcare costs. This supports previous research indicating that social and economic factors affect health and healthcare utilization. Healthcare access, especially for diabetes management, is more complicated by insurance coverage and affordability. While insurance reduces out-of-pocket expenses for individuals and improves access to care, affordability remains a big challenge. Even with insurance, high costs can lead to delays in obtaining prescriptions and accessing care, worsening the diabetes burden among Latin minorities in California.

According to the Ali et al. [15], approximately 29% of patients diagnosed with type 2 diabetes mellitus treated at Federal Qualified Health Centers experienced delays in acquiring prescription medications, and 24% were unable to obtain them at all, highlighting substantial barriers to effective diabetes management. The economic burden of diabetes worsened by other health issues and the need for ongoing care is important and therefore, effective management must address both direct and indirect costs, including social determinants such as education, access to healthy foods, and preventive services. In conclusion, the study highlights the need for several approaches to address the healthcare costs for diabetes amongst Latinx minorities in California. Implementing target strategies and advocating for changes in healthcare access and affordability are important steps to reducing the healthcare costs of

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diabetes in California. Ongoing research should focus on identifying effective strategies for managing diabetes and addressing health disparities, with the goal of reducing healthcare costs in healthcare systems and ensuring fair access to better health outcomes for all individuals.

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