

Applying the principles of Evidence-Based Public Health in addressing the diabetes mellitus epidemic among African-American communities living in the district of Colombia: A literature review

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Abstract

Diabetes is an epidemic in the United States and is ranked as the sixth leading cause of death in the District of Columbia. According to the US Census population in 2010, >52,000 out of 610,000 residents have been diagnosed with diabetes. The highest prevalence was noted in wards 4, 5, 7, and 8, with the worst impact recorded in ward 8. The diabetes death rate among African Americans is five times that for Caucasians living in Colombia district, according to the DC department of health. There is an 11% disparity in the prevalence of diabetes when comparing black- and white people in the district (14% and 3%, respectively). This amounts to more than double the 6% disparity in the national population. This is also evident at both district and nationwide levels (prevalence of diabetes among people with no high school diploma, 21%; that in college graduates, 5%). The incidence of end-stage renal disease (ESRD), a life-threatening condition and diabetes-related complication is increasing in Colombia district and is rated as the number one cause of death from diabetes. In 2010, the newly diagnosed ESRD cases (420) and total number of ESRD cases due to diabetes (642) in the district were twice that of neighboring states (Maryland, Virginia, and West Virginia) and the entire US. In this review, the importance of implementing an evidence-based public health program in solving the epidemic of diabetes among the black community living in Ward 8 is emphasized. This study applies to every poor or minority ethnic group worldwide and in the US.

Keywords

Diabetes mellitus, health promotion, African Americans

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Introduction

According to Census bureau in 2010, the population of the district of Colombia is 710,893, marking an 18.14% increase from 670,000 in 2010. In this project, our target population is ward 8 of this district, which has a common public health problem characterized by type 2 diabetes mellitus.

The population of ward 8 is 80,085 out of the city's 710,893 persons. The male population in ward 8 is 36,801, whereas the female population is 43,284. The hispanic/Latino population comprises 2.83% whereas non-Hispanic/Latino people comprise 97.17% of the population. The average age of people living in this ward is 25–34 years. Most of the people living in ward 8 are high school graduates, 9% are college

graduates, and 24% have some college experience or no degree.¹ The District overall unemployment rate is at 7.29%, whereas the unemployment rate in ward 8 is at 18.54%.

Ward 8 is located in the south end of district of Columbia (DC), and is mostly occupied by African-American

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people. In this area of the city, 88% of the residents have health coverage under the government health assistance program (Medicaid).

The median income in this ward is \$25,017, the income per capita is \$12,630, the proportion of people and families in poverty are 36% and 33.1%, respectively, 11% of the people are less likely to work than other District of Columbia residents.

Discussion

Diabetes mellitus in Ward 8, District of Columbia

Diabetes mellitus occurs when the body lacks control of sugar in the blood. There are several causes of diabetes in humans, including obesity, genetic predisposition or mutation, chronic hypertension, hormonal imbalance (Cushing's syndrome, acromegaly, and hyperthyroidism), some medications (niacin, diuretics, anti-seizure drugs, some HIV medications, pentamidine, glucocorticoids, and some anti-rejection drugs used to prevent rejection of organ transplants.² The common symptoms of diabetes include an increased need to drink and urinate, constant hunger, tiredness, trouble with vision, tingling with numbness in feet or hands, sores that never heal, particularly on the feet, and unexplained loss of body weight. The main cause of diabetes in this community according to the Behavioral Risk Factor Surveillance System (BRFSS) data is obesity, with the residents in this ward having an average body mass index (BMI) of $>30 \text{ kg/m}^2$ accompanied by a lack of physical exercise.³

According to the 2014 Health Assessment, 1 in 11 residents in the District of Columbia has been diagnosed with diabetes. Diabetes was ranked as the ninth leading cause of hospital admission with 1572 total visits in a year, and the fifth leading cause of death with 144 in the year 2014. Ward 8 is the most affected area in the district with over annual 25 deaths compared to the other 7 wards in the city.⁴ The 2016 DC community Health Needs Assessment concluded that the major reason for this chronic disease impact on ward 8 is poor access to healthy nutrition. In ward 8, 20% of adults reported being physically inactive.

Diabetes prevention opportunities in Ward 8

Diabetes mellitus (DM) is a chronic disease that has no cure, but is preventable and manageable, particularly type 2. The main step to take toward the prevention process is making lifestyle changes. Some of these changes include the following: diet (ChooseMyplate.gov is a guide to knowing and achieving adequate nutrition), staying rehydrated at all times as water speeds up digestion, maintaining some level of physical fitness, such as 30 min exercise

three times a week, getting at least 8 h of sleep per night, effectively managing one's stress, and not smoking.

There are several diabetes-prevention health promotion programs in the district and the YMCA DC now referred to as the Y (for youth development, for healthy living, for social responsibility) is the most popular program in ward 8 dedicated to fighting this epidemic. The YMCA diabetic prevention program is part of the US Center for Disease Control and Prevention (CDC) program that focuses on helping individuals at high risk of the disease with a healthy meal plan, physical fitness sessions, and weight management with no membership required.⁵

Another way to prevent diabetes in Ward 8 is by increasing the number of grocery stores in this community. Currently, there are only two grocery stores serving this region and several fast food joints. This is entirely unhelpful because fast foods tend to be cheap and affordable compared to grocery shopping in these poor neighborhoods. To solve this problem of food consumption, it is necessary to support the local farmers' market and offer food vouchers to families in need that would enable them to buy fresh fruits, vegetables, and foodstuff for home-cooked meal preparation. This can also be achieved by reaching an agreement with grocery stores for tax cuts if they decrease the prices of food items in this community, thus increasing accessibility and availability of healthy foods for families in need.

Next, renovating the old parks and playgrounds in this community can help to solve the problem of physical activity. Most of the parks lack proper maintenance and have become an area for drug addicts and crime; thus, proper renovation and installation of police surveillance cameras would reduce the crime rates and encourage the responsible residents of this community to use the park for its intended purpose. Creating more bike lanes and making the bike lanes safe by putting demarcating barriers that will keep cyclists safe is also necessary, as are walkways to enable residents to do their morning runs and walks.

Anti-diabetic drugs and access to healthcare services are important to decrease the morbidity and mortality of diabetes among affected people. This can be achieved by expanding healthcare coverage for the disease and supporting mobile clinic services (which help to screen for the disease by conducting free blood sugar tests).

Awareness about the severity of DM should be raised in ward 8. The information should be displayed in simple language and social media platforms that consider the level of education and average age group in the community should be used. The information must contain the common abovementioned symptoms of DM, the health risks associated with the disease progression, available treatment, and accessibility of these services in the area.

The potential stakeholders in this community

Ward 8 of the District of Columbia is mostly occupied by the African-American population, which happens to be the race most affected by the disease. Therefore, it is necessary to consider the culture and the common behavioral lifestyles in this community when choosing stakeholders. The stakeholders best suited for this ward include leaders from community-based organizations (teachers in schools, ward council personnel, and families), health and social agencies, and faith-based organizations like church leaders. Other races in this ward must also be considered; thus, the health promotion programs must also be written in Spanish to give non-black individuals a sense of belonging in the community as well.⁶

Working with families by providing them with healthy tips on ways to prevent childhood-onset obesity, which commonly results in adult-onset diabetes, is the strongest means of solving this public health problem from the root cause. In schools, this can be achieved by encouraging healthy school lunch menus and the removal of soda and soft drinks, replacing these with water, as a healthy start. The school's physical activity program must be extended to 1 h during recess. Supporting the bike-to-school program among elementary school children is also a viable option. Other health agencies should ensure that they screen all patients for diabetes during hospital visits.

The Evidence-Based Public Health to solving the obesity crisis in Ward 8

The formulation of strategies as part of the Evidence-Based Public Health was intended to improve the performance and activities of public health departments and effectively utilize little resources available to them. There are several steps to be undertaken while a strategic plan to solve the obesity crisis in the target community is created:

1. *Community Assessment.* This is a very important step in creating a strategic plan to solve obesity in ward 8 as recommended by Accelerating Progress in Obesity Prevention (APOP). Promotion of the health program is implemented at the community/local level, therefore, accurate and rapid knowledge of local obesity-related conditions in the target community are essential for planning and managing community obesity prevention initiatives.⁷ The Community Obesity Assessment and Surveillance plan serves as a guide for evaluating the current status and trends in obesity and it is a determinant of health in ward 8 in the District. This is done by creating a template to customize a plan for assessment and surveillance that contains detailed instructions for identifying a group of

common indicators that measures the levels of impact and outcomes of the different strategies recommended in the APOP report. These can also be measured, compared, and distributed across the wards in the district, provide direction and guidance to containing these assessment tasks, and accommodating other communities with different resources and assets.

2. *Quantifying the public health problem (obesity).* In this step, the causes of obesity and its prevention in the target community are analyzed. The most common causes of being overweight and obese in ward 8 are the following: excess caloric intake and little physical exercise; genetic, metabolic, socioeconomic, cultural, or environmental predispositions; amount of screen time; and some prescription medications, such as steroids. Possible preventive measures include encouraging healthy meals, exercising, reducing stress, getting good sleep, and limiting the amount of time spent watching TV.⁸
3. *Developing a concise statement of the issue.* This step will occur after all statistical data on obesity has been collected, which will further prove the strength of its impact on the target population. Developing a complete statement of the public health issue helps to create effective programs containing several interventions that will be large-scale, long-term, and applicable.
4. *Determining what is known through the scientific literature.* This is the stage when decision-makers evaluate what works and for whom. They also assess how large the obesity impact has been and how effective the new plan will be in combating the public health issue. Such information can also be retrieved from Health Impact Assessments. A research study known as Comparative Effectiveness Research—the application of evidence-based principles to the comprehension of how different interventions compare to one another—helps to solve the question of how the benefits and harms of a new health promotion plan would differ overall or in specific race or case.⁹
5. *Developing and prioritizing program and policy options.* There are several criteria to identify priority problems, such as: determining the cost and available solutions; the impact of obesity on the target population; available resources such as staff members, time, money, and equipment for solving the public health problem in the community; how urgent it is to solve the public health problem; and the number of people in the target community impacted by the health problem. There are also criteria for identifying which intervention best suits the problem, such as hiring expertise to implement the new strategic plans, return on investment, the

strength of the new plan in terms of solving the health problem, swift implementation and maintenance of the new plan, any future negative consequences or legal considerations, positive or negative impact on health, and feasibility of the interventional strategic plan.^{10,11}

6. *Developing an action plan and implementing interventions.* When creating an action plan, some necessary questions must be considered, including what specific change is expected following after the plan is implemented; who will execute the new plan; what is the duration of the plan until the outcome, etc.? Theoretical frameworks are also important for guidance during intervention planning and data collection. A formative evaluation plan which provides local diagnostic data. A partnership with other healthcare providers for adapting intervention strategies and materials for use and lastly, feedback from clinical and interventional experts. The investigators also can use the Predisposing, Reinforcing, and Enabling Constructs (PRECEDE) model to guide their intervention process. This model helps public health professionals to consider a combination of potential interventions to influence the behavior of other healthcare providers by predisposing them to be able to make the desired changes using academic detailing, social media platforms, or consultations and helps providers to use screening techniques to screen patients for pre-diabetes, and thereby reinforce the implementation of change by providing social or economic reinforcement.¹¹
7. *Evaluating the program or policy.* There are several steps involved in evaluating the health promotion program policy, including the following: engaging the stakeholders, describing the program, evaluating the design, gathering credible evidence, justifying the conclusions, and ensuring the use and sharing of the lessons learned. It is also imperative that we know who wants the evaluation results and the reason they want such results, whether the evaluation procedures were practical or feasible, whether the evaluation was conducted fairly and ethically, and whether the approach at every step was performed accurately. There is a slight difference between policy- and program evaluation: policy evaluation focuses on a community-level approach, whereas program evaluation focuses on the program itself. The control level and clear boundaries are more applicable to policy evaluation. A challenge always exists when comparing communities with policy, data collection protocols, policy evaluation and the type and number of stakeholders involved in the planning.¹² Policy evaluation utilizes a range of research methods to survey the effectiveness of policy

interventions, implementation, and processes, as well as determining their accuracy, worth, and value depending on the social and economic support of different stakeholders. To properly evaluate the policy of a health promotion program, the content of the policy and implementation of the new policy must be evaluated, along with final impact of the policy. The latter can be done by ensuring that the policy produces the intended outcome by either short-term or long-term outcomes.

It is also important that we measure status and progress at both community and local levels to determine the efficacy of the health promotion plan in our target community. These outcomes can be measured by ensuring that:

- Planning and land use in the district will focus mainly on creating built environments that support walking, biking, and increase access to healthy food choices, thus limiting the availability of and exposure to junk foods.
- Schools, especially elementary schools, provide healthy lunches and increase physical activity during recess.
- Organizations provide and encourage community programs that focus on increasing physical activities.
- The local government and health agencies adopt new strategies that will reduce the availability of sugary beverages in this community.
- Healthcare providers improve practices for screening, diagnosis, and treatment of obesity and being overweight.
- Employers should support active living and healthy food habits at work.

Evidence-based public health can reduce the gap between research and practice in diabetes prevention and control in ward 8. Its concept is based on the stages of integrating a science-based intervention with community choices to improve the health of ward 8 residents.¹³ It enables health practitioners to make decisions based on the appropriate scientific-proven evidence, apply program planning and quality-improvement activities, involve the community in the assessments and decision making, and promote familiarization with the evidence-based policies.

Understanding the burden of diabetes among the ward 8 residents is very important, particularly when working on finding the solution to the health problem. As we already know, most of the population in ward 8 are predisposed to this disease either by lifestyle or genetic and iatrogenic means. The most frequent and efficient factors that reduced the rates of obesity were nutritional education for the entire community residents, promoting physical activity through

a community-wide health promotion campaign, making changes in the school-lunch program to provide healthy meals in addition to supporting physical education programs in schools, and promoting social- and peer support.

Conducting survey. The Diabetes Self-Management Questionnaire (DSMQ) was created to target diabetes self-care and assess behaviors associated with metabolic control as a treatment regimen for both type 1 and 2 DM. Several components are assessed with this method, including self-monitoring of blood glucose, which monitors how well an individual manages their blood sugar level.

ANOVA is another means of surveillance and is carried out by documenting individual body mass indices (BMIs). There are several other questionnaires on self-care and treatment regimen adherence that healthcare providers use to keep check of their patients' HbA1c levels to note treatment efficacy.¹⁴

Application of cohort studies in solving the obesity problem in Ward 8 DC. Cohort studies can be applied in the fight against obesity among our target population by observing the development of adult obesity in individuals who were obese in childhood, and other complications of obesity among obese adults. A cohort study is traditionally known as a prospective study that can function as both prospective and retrospective, depending on the method of exposure and comparison of the groups being monitored.

The study will allow direct measurement of the rate of obesity development by exposure status to fast food or junk food consumption (for example), exposure to environmental factors, genetic factors, and hormonal factors, ultimately permitting direct measurement of relative risk estimation in the target population. Using the prospective cohort, the study allows the public health officials to exert better control over data collection and identify the significant confounding variables. With this type of study, we can identify the target population according to racial and environmental factors to learn their exposure factors.¹⁵ Conversely, a retrospective study identifies previous exposures and does not require an added observation period, but is limited by the recall of sample subjects and availability of the study participants' accurate medical records. This study design provides information on time-lapse between the individual's first exposure to environmental factors (e.g. foods and physical inactivity) and the development of obesity or the individual's first diagnosis of obesity and development of diabetes, heart disease, and other obesity-related complications, thus providing investigators with several risk factors that expose people to obesity.

Application of cross-sectional studies in solving the obesity problem in ward 8 DC. A cross-sectional study can be used either descriptively or analytically. The descriptive cross-sectional study describes the prevalence of a health

outcome in a target population. The prevalence of obesity in ward 8 under this study design is assessed at either one point in time (also known as point prevalence) or over a particular time (period prevalence).¹⁵ The period prevalence can be applied to our target population as collecting sufficient information on the overall health status of the ward 8 medical records will take some time. This includes information such as the proportion of individuals with diabetes as a result of health problems other than obesity. The analytical cross-sectional study collects data on the prevalence of exposure and health outcome, which are later used to compare differences in health outcomes for the exposed and unexposed individuals in the target community.

Descriptive cross-sectional studies are very useful for our target population when estimating the proportion of people who are obese and those who are at risk of becoming obese. When this study is completed, we can work with the population at risk of obesity by helping them make positive changes in their behaviors and lifestyles, such as increasing physical activity and eating healthy meals. The proportion of the population who are already obese can be further grouped under mild, moderate, and severe according to the BMI scale. The severely obese individual can be administered medication or undergo bariatric surgery for a gastric bypass that could save their life. Individuals with mild to moderate obesity (BMI < 40) can be encouraged to be active in their lifestyle and eat healthy meals.

Conclusion

Diabetes, particularly type 2, is preventable. Many of the same lifestyle habits that aid in preventing type 2 DM can also be effective in managing the condition regardless of type (gestational, type 1, or type 2). EBPHs, such as the District of Columbia Diabetes control program, have been created to reduce the burden of the disease in the District of Columbia owing to health policy changes, sustainable community programs, and improvements in healthcare delivery. However, more work in improving the quality of life of the people already diagnosed with the disease is needed, including providing non-needle stick tech gadgets that help monitor blood glucose levels, for example, the FreeStyle Libre, and New Dexcom system. Such technology must be made available to all diabetic patients, irrespective of their types of health insurance coverage.

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Contribution

Nnennaya Opara: writing of the manuscript. Emmanuel Opara: proof-reading and editing.

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Ethical approval and consent to participate

This study does not require institutional review board approval since it doesn't include human subject enrollment or chart review.

Patient consent for publication

This study does not require patient consent approval.

Informed consent

Not applicable to this study.

Significance for public health

The implementation of evidence-based public health programs in the community improves population health, decrease health care costs, and improves the work life of healthcare providers. Evidence-based practices are designed to provide the most effective healthcare improvement strategies that improves patients' health outcomes, promote the right attitude among healthcare providers in a more effective way, and ensures that health resources are used wisely when funding health services. In this review article, we explained in details the impacts of evidence-based health promotion programs, and way to create an effective EBPH in solving the epidemic of diabetes mellitus and obesity in the district. We strongly believe that similar health promotion programs could be applicable and effective in reducing the rates of obesity and diabetes worldwide.

Availability of data and material

The data on the ward 8 population and the District diabetes rates that were used to support the findings of this study are included and cited within the article.

References

- DC Health Matters. Race data for city: District of Columbia. DC Health Matters, <https://www.dchealthmatters.org/demographicdata?id=130951&ionId=940> (2021, accessed 25 January 2022).
- National Institute of Diabetes and Digestive and Kidney Disease; US Department of Health and Human Services. Diabetes, <https://www.niddk.nih.gov/health-information/diabetes> (2019, 25 January 2022).
- District of Columbia Department of Health. Ward 8 – profile of health and socio-economic indicators. District of Columbia Department of Health Center for Policy, Planning and Epidemiology State Center for Health Statistics, https://doh.dc.gov/sites/default/files/dc/sites/doh/publication/attachments/Profile_of_Health_and_Socio_Economic_Indicators_Ward_8_2000.pdf (2004, accessed 25 January 2022).
- YMCA. YMCA's Diabetes Prevention Program, <https://www.ymca.org/what-we-do/healthy-living/fitness/diabetes-prevention> (2022, accessed 25 January 2022).
- Chandra A, Blanchard JC and Ruder T. District of Columbia Community Health Needs Assessment, https://www.rand.org/pubs/research_reports/RR207.html (2013, accessed 25 January, 2022).
- Institute of Medicine. *Evaluating Obesity prevention efforts: A Plan for Measuring Progress*. 1st ed. Washington, DC: National Academic Press, 2013.
- Garner T and Lewis T. Obesity in the District of Columbia. Government of the District of Columbia Department of Health, <https://doh.dc.gov/sites/default/files/dc/sites/doh/publication/attachments/Obesity%20Report%202014.pdf> (2014, accessed 25 January 2022).
- Developing Healthy People 2020. Evidence-based clinical and public health: generating and applying the evidence, <https://www.healthypeople.gov/sites/default/files/EvidenceBasedClinicalPH2010.pdf> (2010, accessed 25 January 2022).
- Richardson J. Guide to prioritizing techniques. National Association of County & City Health Officials, <https://virtualcommunities.naccho.org/viewdocument/guide-to-prioritization-techniques> (2020, accessed 25 January 2022).
- Curran GM, Mukherjee S, Allee E, et al. A process for developing an implementation intervention: QUERI Series. *Implement Sci* 2008; 3: 17.
- Center for Disease Prevention. Overview of policy evaluation, <https://www.cdc.gov/injury/pdfs/policy/brief%201-a.pdf> (n.d., accessed 25 January 2022).
- Zwald M, Elliott L, Brownson RC, et al. Evidence-based diabetes prevention and control programs and policies in local health departments. *Diabetes Educ* 2015; 41(6): 755–762.
- Schmitt A, Gahr A, Hermanns N, et al. The Diabetes Self-Management Questionnaire (DSMQ): development and evaluation of an instrument to assess diabetes self-care activities associated with glycaemic control. *Health Qual Life Outcomes* 2013; 11: 138.
- Tilley DS, Roux G, Liu F, et al. An integrative review of literature regarding health concerns of rural dwelling adolescents. *Online J Rural Res Policy* 2014; 9(1): 1–22, <http://newprairiepress.org/cgi/viewcontent.cgi?article=1066&context=ojrrp>
- Alexander LK, Lopes B, Richetti-Masterson K, et al. Cross-sectional studies. *Eric Notebook* 2015; 2(6): 1–5.