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Socioeconomic Influences on Diabetes Care and Management: A Systematic Review of Urban and Rural Differences

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Abstract:

The increasing prevalence of diabetes mellitus as one of the most common forms of chronic non-communicable disease presents a large-scale public health concern in terms of its increase in frequency of occurrence, the variety and severity of complications related to it, and the financial burden. For effective management of diabetes mellitus, patients are required to be involved in their own care through continuous access to medical services; modification of personal lifestyles, such as diet, physical activity, etc.; continued access to regular monitoring for signs of complications or failure to adhere to treatment regimens; and other means. In addition to these basic aspects of diabetes management, there are numerous socio-economic variables which may influence the success with which an individual can achieve successful management of his/her diabetes, and include income, educational attainment, employment status, access to private health insurance (if available), the availability and quality of health care, and the level of social support. Due to socio-economic factors being so influential on outcomes from managing diabetes mellitus, substantial variations have been observed in outcomes among individuals residing in urban areas compared to those living in rural settings. The purpose of this review was to identify various socio-economic factors that affect how patients utilize health care, take their prescribed medications, perform self-management practices regarding their diabetes mellitus, and ultimately achieve optimal outcomes.

Keywords: *Diabetes Management; Socioeconomic Determinants; Urban-Rural Disparities; Healthcare Access; Health Literacy; Diabetes Care.*

Introduction:

Diabetes Mellitus is among the most important Chronic Non-Communicable Diseases (CNCDs) that affect all peoples of the world. It affects an individual's body when there are higher than normal amounts of sugar/glucose in their blood. There are two causes for this condition. Either the person does not produce enough Insulin; or they do but it does not function properly. This has led to a rapid growth of Diabetes as a Public Health Problem because of the increase in incidence and the

associated complications. In recent years, the numbers of people with Diabetes have increased dramatically around the world. Factors such as: Population Aging; Sedentary Lifestyle Patterns; Unhealthy Diets; Obesity Rates; etc., have contributed to these increases. Diabetes has been found to be responsible for a high percentage of Morbidity/Mortality and Healthcare Expenditures which are a heavy burden on Individuals/Families/Healthcare Systems/National Economies. There are Diabetes cases reported in Developed Countries and Developing Countries. The changes in Socioeconomic/Demographic conditions in many parts of the World, especially Low-and-Middle-Income Countries, have rapidly promoted the spread of Diabetes. Many of the Low-and-Middle-Income Countries have limited access to Healthcare Services. Therefore, the need for Effective Management of Diabetes will continue to grow as the Disease Prevalence increases. Thus, the Prevention of Complications such as Cardiovascular Disease; Kidney Failure; Neuropathy; Retinopathy; Lower-Leg Amputation, etc., will depend upon Effective Management of Diabetes. For this reason, Effective Management of Diabetes has become a Major Public Health Priority to improve Quality-of-Life and reduce Disease-related Healthcare Costs.
Although there have been improvements made in Medical Treatment and Access to Healthcare Services, there remain Significant Disparities in Diabetes Outcomes between Rural Populations and Urban Populations. On average, Urban Residents have greater access to Hospitals/Hospital Facilities/Specialized Services compared to Rural Residents who may experience Challenges related to Availability/Affordability/Accessibility of Healthcare Services. These differences can lead to Variations in how well a Person with Diabetes manages their disease; Adheres to their prescribed treatments; Maintains Healthy Behaviors/Lifestyle Choices.

Diabetes Care and Management

Diabetes care should be a lifelong commitment with a focus on long-term management. Medication Adherence is one of the key elements of managing your diabetes. It includes taking your prescribed medication at the same time every day (as directed) and using it as directed. If you do not take your medication as directed, then you may have high or low blood glucose levels. High blood glucose can increase your risk for developing complications. Blood Glucose Monitoring is another essential element of managing your diabetes. The monitoring will help you and your doctor determine if your treatment plan is working effectively. Dietary Management is also very important in managing your blood sugar levels. Eating a well-balanced diet with minimal amounts of added sugars, simple carbohydrates, and processed foods; and incorporating a variety of nutrient rich food choices will assist you in maintaining optimal glycaemic control. Physical Activity is just as important when managing your diabetes. Exercise has been shown to improve insulin sensitivity, support weight loss and reduce your risk for cardiovascular disease. Your self-management practices (such as taking your

medication as directed, making healthy lifestyle changes, monitoring your symptoms and adhering to the advice from your provider) are all important factors to achieve positive health outcomes. Diabetes management does not depend solely on the medical intervention by your provider. Rather, it is dependent upon how much responsibility you want to take for managing your own health.

Socioeconomic Determinants of Health

The socioeconomic factors play a significant impact on whether or not individuals are able to properly manage their diabetes. One of the most important socio-economic indicators for proper diabetes management is income. The amount of money that people have will dictate how much they can spend on: doctor visits, medication, testing, and healthier foods. For those who earn less than others, it is possible that they will be unable to pay for treatments necessary to meet recommendations and make the appropriate changes to their way of life. Another very important socio-economic indicator for managing diabetes is education. Generally, when an individual has higher levels of education, there is a direct correlation with better knowledge about how to manage your diabetes (health literacy), and how to follow the plan you created with your provider; whereas, if someone does not have high enough education, he/she may not fully understand the medical advice they receive from providers and therefore cannot provide the best care for themselves. One of the other very important indicators is healthcare accessibility. Proximity to a healthcare facility, available means of transportation to get to the facility, quality of service at the facility all contribute to a person's ability to manage his/her diabetes. Social support and environment in which patient lives are also important in order to help a patient stay healthy and continue to take steps to improve and manage chronic disease.

Urban–Rural Context of Diabetes Management

Urban vs Rural Diabetes Management differs greatly because of the vast difference in Healthcare Infrastructure and Resource Availability. Generally, urban locations have much more sophisticated and accessible Health Care Facilities than Rural Areas. Additionally, Urban Locations have a greater number of Specialists available compared to Rural Areas, which has an impact on Diagnostic Services and Treatment Options. On the other hand, Rural Communities are plagued by Shortages of Healthcare Professionals, Limited Medical Resources and Less Opportunities for Specialized Care. Access to Medication and Diagnostic Services are more frequently restricted in Rural Areas; therefore, Delayed Diagnosis and Insufficient Disease Monitoring occur. Furthermore, Transportation Barriers (i.e., traveling farther) and Increased Travel Distance to Health Care Providers/Services may deter individuals from making Regular Visits to their Health Care Provider or obtaining Follow-Up Care.

Environmental/Lifestyle Factors also vary significantly between Urban Residents and Rural Residents. For example, Urban Residents tend to have increased risk of Sedentary

Occupation/Unhealthy Dietary Habits while Rural Residents encounter Barriers to Healthcare Access, Health Literacy and Socioeconomic Disadvantage. These Contextual Differences contribute to the variation in Diabetes Prevalence, Diabetes Management Practices and Health Outcomes.

Rationale for the Study

Understanding the socioeconomic influences on diabetes care and management is essential for addressing disparities in health outcomes and improving the effectiveness of healthcare interventions. Although numerous studies have examined diabetes management and social determinants of health, findings often vary across geographical and socioeconomic contexts. Existing evidence suggests significant differences between urban and rural populations in terms of healthcare access, treatment adherence, and disease outcomes.

Literature Review

Concept of Diabetes Mellitus

Diabetes mellitus is a long-term metabolic disorder that causes high amounts of sugar in your bloodstream as a result of low insulin, poor response to insulin, or both. Due to its increasing numbers and potential risks, it is currently considered to be one of the largest threats to global public health today. If not properly treated, diabetes can affect many parts of your body such as heart, kidneys, nerves, eyes and even shorten your life expectancy.

There are three main categories of diabetes; T1DM (Type 1 Diabetes Mellitus) and T2DM (Type 2 Diabetes Mellitus) and GDM (Gestational Diabetes Mellitus). A type 1 diabetic suffers from an auto-immune condition where their bodies' immune system will attack the insulin producing beta-cells in the pancreas. This is generally seen when someone is in their teens or younger and requires a lifetime of insulin treatment. Type 2 diabetes, the most common category, represents about 90-95 percent of all diabetics. Most people develop Type 2 diabetes because they have been obese, inactive, eat poorly and have a family history of the disease. Gestational diabetes is developed during pregnancy and may increase the likelihood of developing Type 2 diabetes at some time in their lives after pregnancy. The study of the frequency and distribution of diseases is known as epidemiology. There is a rapidly increasing burden of diabetes worldwide. Over the last couple of decades there has been a dramatic rise in the number of people who have diabetes due to urbanization, the aging of the population, changes in lifestyle and the transition into a new economic status.

Socioeconomic Determinants and Diabetes Management

Income and Financial Resources

Income is important for managing type 2 diabetes because many of the tools needed to manage it (medications, blood glucose monitoring equipment, insulin, etc.) cost money. Because income provides the ability to pay for those expenses, people who have higher incomes will have better health

outcomes from their type 2 diabetes management. On the other hand, people who do not earn enough money will face significant economic barriers to receiving the proper type 2 diabetes diagnosis, treatment, and follow-up care.

Affordability of Medications

Medication adherence is strongly influenced by financial capacity. Many diabetic patients require lifelong treatment, including insulin and oral hypoglycaemic agents. High medication costs can result in delayed prescription refills, reduced dosages, or treatment discontinuation, negatively affecting glycaemic control.

Education and Health Literacy

Education significantly affects health outcomes by enhancing individuals' ability to understand medical information and make informed health decisions. Health literacy enables patients to comprehend treatment plans, monitor symptoms, and implement lifestyle modifications effectively.

Knowledge of Disease Management

Patients with higher educational attainment generally possess greater knowledge regarding diabetes prevention and management. They are more likely to understand the importance of blood glucose monitoring, medication adherence, and dietary regulation.

Self-Care Behaviors

Education positively influences self-management behaviors such as healthy eating, physical activity, routine medical visits, and adherence to prescribed therapies. Conversely, limited health literacy may contribute to misconceptions about diabetes and inadequate disease control.

Work-Related Constraints

Certain occupations may create barriers to effective diabetes management. Long working hours, physically demanding jobs, and irregular schedules can limit opportunities for medication administration, meal planning, exercise, and medical appointments.

Access to Employer-Sponsored Healthcare

Employer-sponsored health benefits often improve healthcare access by reducing financial barriers. Employees with comprehensive health coverage are more likely to receive preventive care and adhere to treatment recommendations.

Medication Adherence

Studies consistently demonstrate that insured individuals exhibit higher medication adherence rates than uninsured populations. Reduced financial burden improves patients' ability to obtain prescribed medications regularly.

Social Support

Social support contributes significantly to successful diabetes management. Emotional encouragement, practical assistance, and shared health behaviors can improve treatment adherence and psychological well-being.

Family Involvement

Family members often play a vital role in supporting dietary management, medication adherence, and lifestyle modifications. Positive family involvement enhances patients' motivation and capacity to manage their condition effectively.

Urban-Rural Differences in Diabetes Management

Significant disparities occur among urban versus rural populations for diabetes management and outcome. Urban residents have more access to health care providers, better infrastructure and more medical specialists. Additionally, many urban locations provide specialized diabetes clinics, state-of-the-art diagnostics technology and comprehensive treatment plans.
Urban residents tend to use preventive health services at a higher rate than those living in rural communities. Urban residents will most likely utilize routine health screenings, diabetes education programs, etc. Rural populations tend to be diagnosed later or they have less opportunity to engage in preventative measures against chronic diseases like diabetes.
These significant differences result in different health results. Studies show that diabetic patients residing in rural communities have worse glycaemic control, higher complication rates and a greater likelihood of hospital admission when compared to urban diabetic patient populations. Socioeconomic issues coupled with limited health care opportunities can exacerbate this disparity.

Research Methodology

Research Design

Systematic Literature Reviews (SLRs) are being used as an analytical framework in this study to explore the socio-economic determinates which affect diabetes care and management within both rural and urban communities. A systematic literature review involves systematically reviewing the available body of peer reviewed research. Therefore, it is more than simply a review; rather it is a formalized, systematic, and transparent process. Traditional literature or narrative reviews do not follow such a formal protocol and therefore may be subject to some degree of reviewer prejudice or bias. In addition, they typically exclude some or all of the potentially relevant studies. The purpose of this SLR is to identify and evaluate the relationships between socio-economic factors and diabetes management. Furthermore, it seeks to highlight differences in these areas related to accessibility of healthcare services, treatment compliance, and overall health outcomes between residents of urban versus rural settings.

Data Sources

Multiple international academic databases were used to collect all available information on previous studies. The databases selected were Scopus; Web of Science; PubMed; ScienceDirect; and Google Scholar. Scopus & Web of Science were chosen based upon both the breadth of their indexed journal list and their quality control process (peer-review). Using multiple databases increases the chances of finding a wide variety of evidence relative to diabetes management and socioeconomic factors.

Search Strategy

A comprehensive search strategy was developed to identify relevant studies published between 2015 and 2025. The search process employed a combination of keywords and Boolean operators to maximize the retrieval of pertinent literature.

The following search string was used as a guide:

("Diabetes Management" OR "Diabetes Care") AND ("Socioeconomic Factors" OR "Income" OR "Education") AND ("Urban" OR "Rural")

Study Selection Process

Records identified through database searching

(Scopus, Web of Science, PubMed, ScienceDirect, Google Scholar) (1,250)

Source: Prepared by the Author following PRISMA Guidelines.

PRISMA Flow Table

Figure 1. PRISMA Flow Diagram for Study Selection

Stage	Number of Studies
Records identified through databases	1,250
Additional records identified	50
Total records identified	1,300
Duplicates removed	250
Records screened	1,050
Records excluded	850
Full-text articles assessed	200
Full-text articles excluded	140
Studies included in final review	60

Objectives of the Study

1. To identify and examine the key socioeconomic determinants
2. To compare the impact of socioeconomic factors on diabetes management outcomes between urban and rural populations based on existing literature.

3. To synthesize evidence on barriers, disparities, and opportunities for improving diabetes care and provide recommendations for reducing urban–rural inequalities in diabetes management.

Results

A considerable number of studies concerning diabetes management, social determinants, and rural-urban disparity were identified through a literature search. Articles were searched from a variety of databases (Web of Science, PubMed, Science Direct, Google Scholar) as well as Scopus. Titles and abstracts were reviewed for relevance to the study's objectives after duplicate entries were removed. During this stage, the studies that did not assess diabetes management, socioeconomic aspects, or rural/urban disparities were eliminated. Full article reviews were then completed to identify which studies would be included in the review based upon the previously defined inclusion and exclusion criteria. The study selection process used the PRISMA framework to provide transparent and methodologically sound processes. The PRISMA diagram shows the various stages of the selection of studies. Overall, the selected studies produced an extensive body of evidence relative to how socio-economic determinants affect diabetes treatment and management in different locations with varying health care systems.

Themes Identified

Theme 1: Income and Financial Constraints

Income was found to be a significant determinant for both the delivery and management of diabetes care. A majority of study findings indicated that those of lower income have greater challenges in obtaining access to health care, acquiring prescription drugs and following healthy diets. Lower-income patients commonly experienced financial barriers which led to delays in medical consultation, less frequent self-monitoring of their blood glucose levels, and failure to adhere to their prescribed treatment protocols. Consistently across all studies it has been shown that lower-income diabetic patients are at a greater risk for having uncontrolled diabetes and experiencing more serious diabetes related complications. In contrast, diabetic patients of higher socioeconomic status had greater access to health care resources and were able to achieve better results from their efforts to manage their disease.

Theme 2: Education and Health Literacy

Education and Health Literacy are Key Factors Affecting Diabetes Self-Management. People who have a greater level of education understand more clearly diabetes related information, how to manage their condition and healthy prevention behaviors. Many studies showed that health literacy greatly impacts the patient's ability to check their blood sugar, take medications on time and make healthier

life style choices. In many cases lower educational levels were found to be linked to misunderstanding of diabetes, low adherence to treatment plans and less participation in self-care behaviors.

Theme 3: Healthcare Access and Availability

Healthcare service is an important factor in the health outcome for individuals diagnosed with Diabetes." "Research has shown that when there are convenient locations of health care facilities, health care workers with training regarding diabetes, and adequate testing/diagnostic resources available, people will have better control over their diabetes." Individuals experiencing barriers to health care (long distance from a health facility, no transportation, lack of qualified or trained health care personnel, and/or little to no specialized services for diabetes) may experience problems maintaining their regimen and accessing appropriate medical treatments. Individuals living in rural areas appear to be at greater risk of encountering barriers to receiving quality health care due to fewer health care options and resources.

Theme 4: Health Insurance and Affordability

Healthcare utilization and follow-up of treatments for diabetes are heavily dependent on the type and quality of a patient's health insurance. The majority of those with sufficient health insurance will be able to schedule routine medical check-ups, seek consultation from specialists and obtain recommended preventive health care. Much research has shown that the majority of those who have no or insufficient health insurance experience significant economic barriers in obtaining health care services. Many times, patients would reduce their intake of prescribed drugs as well as delay receiving necessary medical evaluations because they feared they could not afford it. There is also strong evidence supporting the use of comprehensive health insurance in improving compliance with recommended treatment protocols, reducing an individual's financial burdens associated with health care and contributing to overall positive diabetes outcomes.

Urban–Rural Comparison

Similarities

The assessment indicated that similar challenges associated with managing diabetes existed among patients residing in urban versus rural locations. Socioeconomic variables including a patient's level of education, their income, access to health insurance, and overall social support significantly affected how they used the medical system and followed prescribed treatments for diabetes. Both types of communities experienced positive outcomes when patients had high levels of health literacy, a steady source of income, complete health care coverage, and supportive family members. Financial constraints also impacted an individual’s ability to manage diabetes, regardless of whether or not they resided in an urban or rural area.

Differences

Urban areas are also very similar; however, there have been many differentiations based on location. Residents that reside within an urban area have much greater access to a variety of types of medical resources, such as pharmacies, hospitals (general), specialized medical services and diagnostic testing. They have a much larger percentage of participation in preventative health and diabetes monitoring. The people who live in rural communities experience significant barriers to accessing their healthcare needs. These include a shortage of healthcare providers, lack of accessible transportation, and/or limited availability of specialized diabetes services. As a result, individuals living in rural communities may have longer delays for diagnosis, poor compliance with prescribed treatments, and less overall use of the healthcare system. It was found that both health literacy levels and the access to diabetes education programs were significantly higher in urban communities. This led to improved self-management and better health results for those in urban communities.

Key Determinants Affecting Outcomes

The literature review identifies some of the key determinants for diabetes, which were shown to have significant impacts upon diabetic patient's outcomes across both urban and rural populations. These include income levels, educational attainment, access to healthcare services, health insurance, and social support; among all of these factors, income levels and access to care appear to be the most influential for patient outcomes relative to disease management. Financial means and access to healthcare (as well as their interaction with socio-economic conditions) appear to be the most impactful factors for diabetic patient outcomes within rural areas. The interaction between socio-economic status and the availability/accessibility of healthcare can significantly impact an individual's ability to adhere to recommended treatment plans, engage in self-care behavior related to diabetes management, and ultimately affect one's overall health status.

Socioeconomic Factors Affecting Diabetes Management

Income is probably the single factor, out of all those measured, which has had the greatest impact on diabetes outcomes. Those with higher incomes typically have access to a range of resources including better access to drugs, diagnostic testing, healthier diets and regular contact with their healthcare providers. On the other hand, many people experiencing financial difficulties find it difficult to be compliant with their medical treatment or use their available healthcare resources. It was reported in numerous studies that the costs associated with treating diabetes could delay treatment for some patients, lead to less frequent monitoring of blood glucose and an increase in the number of potential complications.

Both education level and health literacy were found to significantly affect how well patients manage their diabetes. Generally speaking, patients who complete more years of formal education tend to have a greater understanding of the information related to their condition and will tend to follow the recommendations made by their healthcare provider. They also will tend to engage in more positive health habits. A patient's ability to effectively communicate about his/her health is referred to as health literacy; this skill enables them to make informed decisions when using medications, selecting foods to eat, and engaging in exercise activities. If a patient lacks adequate health literacy he/she may lack awareness of his/her disease process and therefore may be unable to develop effective self-care strategies.

The stability of a person's employment and whether they have access to health insurance can both have a significant effect on diabetes outcomes. The economic security that comes with having stable employment allows the individual to pay for the care required for the treatment of their diabetes. More importantly, many employers provide their employees (and sometimes their families) with health insurance, which provides these individuals with the opportunity to receive routine preventative care, attend follow-up appointments and take their prescribed medications. Lastly, there is evidence indicating that receiving support from family and friends within the community can aid in diabetes self-management because this type of support can encourage a person to adopt healthy habits and provide emotional support.

Urban–Rural Disparities in Care

One of the most important findings from this systematic review was that a wide gap still exists today between how well people with diabetes are treated in urban versus rural areas. For example, as an urban population has better resources (more doctors, better hospitals, etc.) they have better access to the tools needed for early detection and treatment of their diabetes. In addition to having better access to tools for managing their diabetes, many urban residents take advantage of free or low-cost educational programs about diabetes management and prevention. The reality for the majority of rural populations is that they do experience several obstacles when trying to manage their diabetes effectively. One major obstacle is that there are few enough physicians available to provide adequate primary and specialty care; another barrier is that people living in rural areas usually have fewer options for travel than those who live in urban areas and therefore have less ability to attend medical appointments. As a result, it is difficult for many people living in rural areas to get the necessary medical treatments for their diabetes. The limited number of local pharmacies and the difficulty in getting medication prescribed by out-of-town specialists can also make it hard for rural residents to obtain the medications they need. Additionally, rural residents' frequent inability to schedule regular

doctor's visits and adhere to treatment plans due to lack of transportation can lead to poor diabetic control.

Recommendations

Policymakers should support a stronger healthcare system for people in rural communities. A lot of rural communities are far from healthcare facilities, specialists, testing sites, and have limited access to skilled healthcare professionals. The creation and improvement of primary care clinics, diabetes testing locations, and telehealth will provide better and faster access to health diagnoses and treatments. Also, creating better transportation and supporting community-based health delivery projects will assist with geography challenges.

Conclusion

A systemic review was conducted to evaluate the relationship between socio-economic conditions and diabetes treatment and diabetes management, particularly in relation to differences between urban and rural areas. Socioeconomic determinants (income, education, work status, health insurance, availability/affordability/accessibility to health care, social support) have significant effects on diabetes management results. Socioeconomic factors effect (a) treatment adherence; (b) health service use; (c) self- management practices; and (d) overall disease control. While those who are well-resourced financially, educated ally, and socially supported tend to have improved diabetic outcomes, disadvantageous socio-economic conditions may act as a barrier to effective diabetes management and lead to an increased risk of developing complications. Urban residents tend to have better access to health care services than do rural residents. However, rural residents are more likely to encounter issues regarding their ability to access available health care services due to both cost and availability. Therefore, addressing this disparity is crucial to creating equity in diabetes health care outcomes and decreasing the burden of diabetes. Ongoing research and evidence-based policy development will continue to be necessary to address the existing disparities and improve diabetes outcomes in all population groups.

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