

LITERATURE REVIEW

Diabetes Mellitus and Health Services: Access Gap During the COVID-19 Pandemic

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Abstract: Diabetes Mellitus is a significant health problem worldwide and its prevalence is increasing yearly. This fact is coupled with the problem of the discovery of a new virus known as SARS-CoV-2 or COVID-19. Many questions have been asked, starting from how to treat patients with diabetes and their access to treatment. As a disease with a high risk of complications, integrated diabetes health care is still underdeveloped. For this reason, it is necessary to search to see what gaps exist in the use of telemedicine-based health services so that themes of these discrepancies can be identified. This study uses the method of searching and reviewing 24 kinds of literature. There were gaps in access and health care for racial and ethnic minorities, Obstacles faced in the diagnosis of Diabetes, Obstacles to patients in self-monitoring of blood sugar, Gaps in providing care due to COVID-19, Gaps in access to diabetes drugs, insulin, SGLT2 in Type 2 Diabetes patients, Gaps in access to care for type 2 diabetes patients with cardiovascular disease, use in access to diabetes care, and using telemedicine. It is necessary to develop a healthcare strategy for patients with Diabetes, including the team, then glycaemic and control targets, as well as patient preferences and priorities.

Keywords: Access, COVID-19 pandemic, diabetes mellitus, health services

INTRODUCTION

Diabetes Mellitus is a significant health problem worldwide, and its prevalence is increasing yearly.¹ This fact is coupled with the problem of the discovery of a new virus known as SARS-CoV-2 or COVID-19 and in a short time,

has been established by the World Health Organization (WHO) as a pandemic.² COVID-19 has impacted individual lives, with mortality rates from mild illnesses including a very high risk of diabetes.³ The COVID-19 pandemic has dramatically changed the health landscape.³ Many

questions have been asked, starting from how to treat patients with diabetes and obesity and their access to treatment that needs to be continued until optimal treatment for patients infected with COVID-19 and what to expect after the pandemic subsides.³ The arrangement for implementing diabetes and obesity, which is still not optimal, is influenced by the possibility of a lockdown which can exacerbate the implementation arrangement in several places.³ Therefore the medical community needs to be prepared to deal with the potentially significant burden resulting from complications of diabetes and obesity in the aftermath of the pandemic.⁴

As a disease with a high risk of complications, integrated diabetes health care is still underdeveloped.⁴ For this reason, it is necessary to develop a healthcare strategy for patients with diabetes, including the team, then glycaemic and control targets, as well as patient preferences and priorities.⁴ Primary health care for diabetes is one thing that is very important and can be done based on evidence.⁵ However, integrated care, especially for individuals with diabetes, is still incomplete. It is necessary to look for elements of care for diabetic patients in the literature.⁵ The articles found that there are elements of precision health care and then defined and developed precision care strategies for diabetic patients.⁵ It is therefore suggested that patient-centred care can lead to improved health and reduced overall costs as well as further promotion of health care.⁶

Various meaningful clinical experiences in many countries have occurred.⁵ Apart from specialists in internal medicine, health professionals are essential during this COVID-19 era; for example, they can help prevent severe hypoglycaemia or control hyperglycaemia with a healthier lifestyle and therapeutic adherence.⁵ Even more importantly, identify risk factors that are not profitable for them because the infection of most patients has no symptoms at all, and also a comprehensive approach to reduce cardiometabolic risk in diabetic and obese patients with or without COVID-19.⁴ With limited health resources, it is necessary to carry out health services based on patient needs.⁵ This capital seeks to develop the delivery of health services to patients with type 2 diabetes.⁵ A survey conducted in Iran found that experience-based service components included continuity of care, distribution of tasks, resources at a low cost, and levels of access by providers that increased responsiveness of care, completeness of nursing, and decision-making.⁶ Patient-centred service delivery is significantly dependent on clinical outcomes, patient experience, task distribution occurs at lower costs and resources, and there is increased access by patients.⁷ Then there are variations in the utilization of services to increase catching power, comprehensive care, maintenance feasibility, and joint decision-making. Interventions that focus on disease-specific health behaviours, especially adherence to drug use recommendations, are needed.⁷ Because diabetes mellitus is a disease

whose prevalence is increasing, it even has the potential to cause significant risks if exposed to COVID-19.⁷ Many patients avoid scheduled routine check-ups and treatment and even take medication.⁷ Therefore, changes in health services such as telemedicine, the use of social media, and sophisticated methods, such as monitoring blood glucose using satellites, have caused significant changes to traditional health services previously carried out by face-to-face examinations.⁷

Campbell (2021) seeks models of diabetes care that are most expeditious and improve medical outcomes, patient experience, provider satisfaction, and cost savings.⁸ Among the innovative models of diabetes care are promoting collaborative care and increasing access to high-quality health services specifically for diabetes patients.⁸ Emerging pandemics present a force that is disrupting healthcare around the world.⁸ Of course, diabetes treatment innovation to promote health care in the New Normal era is better for the healthcare community, especially patients with diabetes.⁸ Currently, community service professionals need to provide a platform with virtual networking and face-to-face features for healthcare partitioning as a pilot project.⁹ Increase training and quality improvement opportunities by leveraging professional public relations at the government level to encourage primary care and special care collaboration and encourage health technology industry collaboration for design and care approaches to healthcare practice.⁸ A critical consequence of the pandemic is the

need to accelerate the adoption of digital technologies in healthcare delivery, where healthcare, policy, and economic perspectives can add value to the possibility of survival over long periods.⁸ Diabetes among young people, especially in Asia, is increasing.⁸ However, this population lacks knowledge about metabolic control, complications, and medical behaviour.⁹ The results of a study assessing preference for type 2 diabetes mellitus in young turnover, slow turnover, and risk factors concluded that this study highlights the increasing trend of patients with diabetes mellitus at a young age in Taiwan so that the need for effective management and primary prevention of diabetes.⁹ Even so, this telemedicine-centred health service activity needs to improve its weaknesses that sometimes cause several gaps.⁹

According to several definitions, health inequality or health disparities is a type of health difference closely related to social, economic, or environmental factors.^{9,10} These health disparities adversely affect groups of people who systematically experience barriers to achieving health equity based on race or ethnic group, religion, social, economic, status, sex, age, mental health, cognitive, sensory, physical, gender orientation, identity, biographical location or other characteristics related to discrimination or exclusion.¹⁰ Lemon (2019) establishes obstacles to diabetes patients accessing health services in Canada.¹¹ Then it was found that there were three categories of obstacles: close, medium, and far.¹¹ Close obstacles include geography, educational

attainment, and health professional bias, resulting in inadequate prompt care in the community.¹¹ Medium obstacles include employment, income inequality, and the health education system that residents cannot access.¹¹ Far obstacles include colonialism, racism, and social exclusion, which result in limitations in policy making.¹¹ Based on this explanation, it is necessary to search to see what gaps exist in the use of telemedicine-based health services so that themes of these discrepancies can be identified.

METHODS

This study uses the method of searching and reviewing 24 kinds of literature through PubMed and Google Scholar to obtain credible related articles. The keywords used in this study include access, gaps, health services, Diabetes Mellitus, and the COVID-19 pandemic. After selecting the 54 articles obtained, the researcher chose 24 articles that managed to make this article. The mechanism for compiling references was carried out using Mendeley, and compiling literature was done by compiling a literature review based on similar themes encountered by researchers in compiling articles.

RESULTS

There were gaps in access and health care for racial and ethnic minorities, obstacles faced in the diagnosis of diabetes, obstacles to patients in self-monitoring of blood sugar, gaps in providing care due to COVID-19, gaps in access to diabetes drugs, insulin, SGLT2 in type 2 diabetes

patients, gaps in access to care for type 2 diabetes patients with cardiovascular disease, use in access to diabetes care, and using telemedicine.

DISCUSSION

In cases where the patient can regularly attend the outpatient clinic, it is necessary to change the option that may be preferable to face-to-face visits.¹ In the context of the COVID-19 pandemic, health service providers have been instructed to manage hospitals by reducing the number of visits to avoid exposure to the virus.¹ However, this has several obstacles.¹ The first obstacle is patient-based barriers, especially those who lack education, technology, direct contact, and individual doubts.¹ Then access-based barriers are the unavailability of these services, technology costs, and the absence of internet access.¹ There are also design-based barriers, i.e., lack of customization for patients, patient preferences and needs, lack of transparency and accuracy of online visit time issues, and intensive workload by healthcare providers.¹ To realize this telemedicine activity, it is necessary to overcome all obstacles and get support from all parties, including the government, to adopt medical care for patients with diabetes without direct outpatient care on the spot.¹

The gaps and obstacles that occur in the use of access to telemedicine health services for type 2 DM patients based on the articles described in the methodology above are as follows:

1. Obstacles faced in the diagnosis of Diabetes

Diabetes is a common disease with high complications, and the number of diabetes patients increases every year worldwide.⁵ Monogenic diabetes is diabetes that is rare but is the most common cause of genetic mutations.⁵ Sometimes misdiagnosis occurs in patients with type 1 diabetes and type 2 diabetes, given the significant burden due to the high cost of diabetes.² Therefore, an assessment of the economic impact of genetic testing for monogenic diabetes in clinical care is needed.² Abd-al Razzaq (2021) has briefly summarized the barriers to the timely diagnosis of diabetes and CEA findings in genetic testing of monogenic diabetes.¹² The results showed that with routine genetic examinations, the clinical diagnosis of type 1 diabetes patients could save population costs.¹² Routine screening is not cost-effective in adults, but it is effective.¹² Difficulty accessing specialist diabetes departments, poor medication adherence, and inadequate motivational support contribute to poor glycaemic control.¹² In addition, the high number of patients and low funding limit the doctor's time spent on counselling.¹² The existence of these barriers in diabetic patients causes high complications of diabetes and encourages increasingly expensive treatment costs and lower patient quality of life.¹²

1. Gaps in access and healthcare

The use of remote diabetes treatment methods has not yet gained widespread use due to many obstacles, such as lack of

acceptance and doubts about its effectiveness, available time and cost, technical potential, and regulatory issues.^{1,13} It offers applications to provide telemedicine diabetes care and addresses the potential to revolutionize outpatient care of patients with diabetes.¹³ Furthermore, their adherence to therapy and lack of awareness of the consequences of uncontrolled diabetes results in the need for alternative options that are time-efficient, cost-effective, easy to use, and practical in providing optimal diabetes care.¹ Racial differences are known in the use of diabetes technology.¹ They need to underline the disparities in social status, socioeconomic status, education level and the necessary steps to increase technology uptake.¹³

2. Gaps in access and health care for racial and ethnic minorities

The use of diabetes technology still contains racism, and there are social inequalities such as educational issues, patient motivation, and surrounding social support.¹³ White people use diabetes technology tools significantly more than black people.¹³ As the seventh leading cause of death in the United States and a leading cause of disability and reduced quality of life, diabetes has histerically excluded some people, such as racial and ethnic minorities.^{13,14} Those with low economic status bear a disproportionate legal burden of diabetes and its complications.¹⁴ These include blindness, neuropathy, limb amputation, chronic kidney disease, cardiovascular disease, and even death.^{13,14} In addition, the enormous

economic burden due to diabetes treatment causes a loss of productivity.¹⁴ Diabetes is a public health crisis that occurs in marginalized communities while the contributors to diabetes are multi-factorial.¹⁴

Across racial and ethnic groups, healthcare inequality is prevalent.¹⁰ For decades, research has shown that diabetes is affected by racial and ethnic minorities in the low-income adult population of the United States and that they have a higher risk of diabetes complications and death with an emphasis on values-based care.¹⁰ Therefore, equity in health after the COVID-19 pandemic began to run and has highlighted the inequalities and vulnerabilities borne by disadvantaged racial and ethnic minority groups in the community.¹⁰

For people with type 1 diabetes, there is a need to increase access to and care for medical disparities, reflected in access to care and health outcomes.¹⁰ Eberly (2021) highlights differences in the HbA1c of diabetic ketoacidosis and severe hypoglycaemia, as well as the use of technology between races and ethnicities.¹⁵ Nearly 20,000 children and adults non-Hispanic black ethnicity with type 1 diabetes have higher and more severe rates of acidosis, hypoglycaemia, and lower rates of technology use.¹⁵ It is necessary to underscore the need to study and address barriers to inequality in care, especially used in type 1 diabetes patients.¹⁵ The results show that inequities in various areas of diabetes care are still felt the latest in treatment disparities during the COVID-19

disease, and also show that differences in diabetes persisted among racial, ethnic, and insurance status groups.¹⁵ Non-Hispanic blacks and publicly insured individuals are more likely to be hospitalized, including those with experience with diabetic ketoacidosis.¹⁵ In addition, potential contributors include low levels of technology use, economic literacy or access to technology, limited English skills, cultural views, and low income.^{15,16} Therefore, particular interventions are needed focusing on black and Hispanic individuals with type 1 diabetes.¹⁵

3. Obstacles to patients in self-monitoring of blood sugar

Lee (2021) intends to understand the obstacles to self-monitoring of blood glucose in gestational diabetes patients and the factors affecting adherence to self-glucose testing.¹⁶ The result is that the patient's obstacles to checking blood glucose are that materials for self-examination are only prescribed.¹⁶ In addition, there is fear of using self-examination, and the last is a family history of type 2 diabetes.¹⁶ The use of smartphone technology and education for checking blood sugar can increase patient compliance with the use of independent blood glucose checks.¹⁶

4. Gaps in providing care due to COVID-19

The COVID-19 pandemic has caused the gap in providing care to be acutely highlighted based on social, economic, and regional factors where technology should

be able to provide significantly positive things where appropriate.¹⁵ The COVID-19 pandemic has resulted in a fragmented state of health services in Mexico, resulting in a health gap.¹⁵ Efforts have been made to increase regular access to more comprehensive and quality health care and to reallocate health care resources to vulnerable groups.¹⁷ The COVID-19 pandemic has increasingly highlighted the disproportionately high healthcare inequalities affecting African, American, Hispanic, and Native Americans in the Americas.¹⁷ This reality is motivated by climate, race, and social injustice, so health providers must get out of their comfort zone and address the social problems that contribute to it.¹⁴

5. Gaps in access to diabetes drugs

Research over several decades has shown that diabetes is affected by racial and ethnic minorities in the low-income adult population of the United States and that they have a higher risk of diabetes with high complications and death, with an emphasis on values-based care.¹⁰ For this reason, after the COVID-19 pandemic began, health equity has highlighted the inequalities and vulnerabilities borne by disadvantaged racial and ethnic minority groups in the community.¹⁰ Rattleman (2021) tries to see the occurrence of disparities and gaps in drug use in type 2 diabetes in several sociodemographic and some of its use in Australia.⁷ The result is that patients with diabetes who live in remote areas do not receive new diabetes drugs.⁷ Although this effect has diminished

over time, there remain significant disparities in accepting new drugs in large cities and remote parts of Australia.⁷

6. Gaps in access of diabetic patients to insulin

The discovery of insulin in 1921 has changed the prognosis in diabetic patients, specifically those with type 1 diabetes.¹⁸ Furthermore, the problem that arises is the affordability of getting insulin which is a challenge in this part of the world.¹⁸ Because of this, the availability of insulin is the framework of the World Health Organization (WHO), especially in the drug cycle regarding the patient's ability to access and buy insulin.¹⁸ Many companies worldwide have produced insulin, but sometimes the marketing process requires a markup so that the price increases when it reaches the consumer.¹⁸ In some countries with a high average income, insulin purchase is made using insurance.¹⁸ Meanwhile, in lower-middle-income countries, patients with diabetes have to spend personal budgets to buy insulin.¹⁸

7. Gaps in Access to SGLT2 in Type 2 Diabetes Patients with low economic status

SGLT2 drug became one of the gaps themes obtained because it was listed in 1 article read by the researcher.¹⁹ Diabetic patients widely need this drug, but several articles write those patients have difficulty getting it.¹⁹ Treatment using Sodium-glucose cotransporter 2 (SGLT2) is vital because it can prevent cardiovascular death, heart failure, hospitalization, and the

development of kidney disease in patients with type 2 diabetes.¹⁹ Black people have a disproportionate burden of cardiovascular and chronic kidney disease.¹⁹ Practical therapeutic function, especially in women and black patients with low economic status, felt slower than in white people with better economic status.¹⁹ The retrospective cohort study was conducted in the United States to assess inequality based on race or ethnicity, gender, and economic status using SGLT 2.¹⁹ Treatment using SGLT 2 is increasing in type 2 diabetes patients, but use is low, especially in black, females, and people of low economic status.¹⁹ However, interventions are needed to ensure fairer use to prevent worsening cardiovascular and renal outcome disparities in the United States.¹⁹

Many patients with diabetes come from lower-middle-income families.²⁰ It is difficult for them to carry out glycaemic control, especially those with limited resources that hinder access to health services.²⁰ Despite improvements in health care, there is still a burden in preventing diabetes patients and their complications.²⁰ It is necessary to increase access to health services for vulnerable socio-economic groups.¹⁷ Emphasizing the importance of overcoming the main problem, namely inequality in health care and changes in this disparity, health promotion to the population is also needed so that increasing human resources allows access to and delivery of preventive measures.²¹

Diabetic retinopathy is a microvascular complication of diabetes that is difficult to detect and unknown, which

has the potential to cause permanent damage and even blindness.^{21,22} Effective screening for diabetic retinopathy has been shown to reduce the risk of vision loss.^{21,22} In England, health care implemented retinal screening, especially for diabetic retinopathy patients, in 2003, aiming to identify and treat patients with sight-threatening retinopathy.²² The findings of this study suggest that there is social deprivation where the economy is a significant risk factor for the absence of the screened population who has sight-threatening retinopathy.²³ Repeated absences are associated with vision-threatening diabetic retinopathy and barriers to such screening.²² Evidence at this time shows that screening is essential but still lacks implementation, so it is necessary to identify the characteristics of absence and the reasons for absence in conducting the screening.²² Categorizing patients as ethnic minorities or socioeconomically poor is not of much help in understanding absences in retinal screening.²²

8. Gaps in access to care for type 2 diabetes patients with cardiovascular disease

A study conducted in Denmark showed that patients with cardiovascular disease in type 2 diabetes get access to free medical nursing.²⁰ However, those with a low socio-economic position have a higher risk of developing heart disease in patients with type 2 diabetes.²⁰ For this reason, a prevention strategy is recommended. For patients with low economic positions.²⁰

9. Gaps in internet use in Access to diabetes care

In the United States, discrepancies were found in patient medication use, especially the use of the Internet for diabetes care.²³ The data shows that the internet is more likely to be used by white people than black people.²³ Hypertensive patients are more likely to use the internet less than those without hypertension.²³ People with diabetes only use the internet around 65%, while normal ones around 85%, and white diabetic patients use the internet more than black diabetic patients.²³ Generally, in America, Hispanic blacks have a lower tendency to use the internet than whites.²³ This shows the gap in getting access where minorities use health care less than other people.²³ This level of disparity may become more apparent during the COVID-19 pandemic due to social, economic, and racial disparities in several countries.²³

10. Obstacles to using telemedicine

Many telemedicine interventions are implemented in medical care with use that is eventually discontinued by patients and even discontinued.²⁴ Chevance (2020) assessed the obstacles to the use of telemedicine and the reasons for patients not discontinuing it.²⁴ The results found a clear, rational view when considering the use of telemedicine applications for the self-management of chronic diseases and the effect on patient adherence.²⁴ Next is the behavioural effect after six months of using telemedicine.²⁴ The problem with continued use so that the effectiveness of

telemedicine needs to provide content that is not excessive, disturbing, or fake.²⁴ Worries about losing direct contact with health care providers and disrupting the patient's relationship with health providers are one of the themes obtained.²⁴ Patients do not want applications that replace traditional health care, and telemedicine is only done during the COVID-19 pandemic.²⁴ Another major issue that is obtained is that these telemedicine users feel inadequate self-indication when dealing with telemedicine technology.²⁴

CONCLUSION

Health equality is the absence of health that can be unfairly avoided or repaired among groups, whether groups are determined socially, economically, demographically, biographically, or by other people. Health equality is said to be ideal when everyone has a fair opportunity to achieve potential access to health, and no one is allowed to be disadvantaged in achieving this potential. At the same time, health equity is attaining the highest health degree for everyone. Achieving equal distribution of health requires everyone's respect for social equality. In contrast, social determinants of health or SDOH are conditions in which a person is born, grows up, lives, and the distribution of finances, power, and resources at the national and global levels shapes work and the age of this condition. While the SDOH review in diabetes is determined through socioeconomic and diabetes social status, where socioeconomic status is a

consistently strong predictor for the development of diseases, including diabetes.¹⁰

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