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Quality of diabetes care among patients with schizophrenia. A mixed-methods study

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ABSTRACT

Objectives: Patients with schizophrenia are at high risk of developing diabetes. Our study aimed to determine the prevalence of diabetes in patients with schizophrenia and assess their quality of diabetes care. We further aimed to explore the factors affecting diabetes care in patients with schizophrenia.
Research design and methods: We conducted a retrospective review of medical records for patients presenting with schizophrenia from October 2017 to October 2018. Thereafter, we conducted semi-structured interviews based on the Theoretical Domains Framework to explore healthcare providers' attitudes and perspectives toward diabetes care in patients with schizophrenia at a tertiary hospital for mental health services in Saudi Arabia.
Results: The prevalence of diabetes in patients with schizophrenia was 3.7%. The rates of annual testing for quality indicators of diabetes were 8.6% for HgbA1c and 31.4% for low-density lipoprotein cholesterol (LDL-C). Screenings for albuminuria and examinations of the eyes and feet were not conducted. Documentation of smoking status was done infrequently (8.6%). The in-depth interviews uncovered issues with managing diabetes in patients with schizophrenia. We identified four themes: the consequences of poor quality diabetic care provided to patients with schizophrenia; problems with the identification of diabetes in patients with schizophrenia; challenges in the management of patients with both diabetes and schizophrenia; and opportunities to improve the quality of diabetes care provided to patients with schizophrenia.
Conclusions: This study identified areas that need a considerable amount of work to be undertaken in Saudi Arabia to help patients with schizophrenia. There are numerous opportunities for improving the quality of Type 2 diabetes care such as the involvement of pharmacists to effectively manage diabetes and expanding community-based health services to include mental health, which could accelerate improved care services.

1. Introduction

Over the past two decades, the prevalence and incidence of Type 2 diabetes have dramatically increased. Saudi Arabia, which is ranked seventh globally for diabetes rates, and second in the Middle East, has an estimated two million adults with the condition.[1,2] The global prevalence of schizophrenia is 1.1%, of which 40% is untreated.[3] The lifetime prevalence of psychological disorders in Saudi Arabia is 34.2%[4] and the prevalence of schizophrenia is unknown.[4]

There is a wealth of data indicating that patients with schizophrenia have at least double the risk of developing Type 2 diabetes than the general population.[5,6] Furthermore, patients with schizophrenia have a higher risk of mortality, with a life expectancy that is 13–15 years shorter than for patients without schizophrenia.[7]

While the exact causes underlying the development of Type 2 diabetes in patients with schizophrenia remain unclear, research suggests it is a combination of genetics, treatment with atypical antipsychotics, the long duration of schizophrenia, an unhealthy lifestyle, and high triglycerides.[8–10] There are several studies that have investigated undiagnosed Type 2 diabetes in patients with severe mental illness.[11]

These patients have low screening rates for metabolic syndromes. Furthermore, they receive lower quality diabetes care such as annual tests for HbA1c, low-density lipoprotein cholesterol (LDL-C) and/or microalbuminuria.[12] A recent cohort study taken from the Danish population, which included 83,813 patients with diabetes and 669 with schizophrenia and diabetes, compared the quality of diabetes care between patients with and without schizophrenia and found that patients with both diabetes and schizophrenia had a lower probability of receiving standard diabetes care.[13] In another retrospective cohort study of more than one million patients with diabetes, 25,628 were found to have associated schizophrenia. The authors found that patients with both schizophrenia and diabetes received lower-quality diabetes care and had higher hospitalization rates

than those without schizophrenia.[14] Moreover, a comprehensive review demonstrated that patients with diabetes and mental illness were less likely to receive guideline-based treatment.[15]

There is also a concern regarding physicians' knowledge as the management of patients with both Type 2 diabetes and schizophrenia. One study found that only 21% of psychiatrists scheduled metabolic risk factor screenings for their patients.[16] In a mixed-methods study that examined physicians' attitudes toward patients suffering from both schizophrenia and diabetes, the authors found that physicians managed these patients negatively, i.e., they stereotyped their patients, trusted them less, and relied on information provided by someone other than the patient. Furthermore, physicians reported sharing practices that resulted in alerting colleagues' attitudes toward patients with schizophrenia before even meeting their patients.[17]

Currently, the status of managing diabetes in patients with schizophrenia in Saudi Arabia is unknown. Therefore, this study was carried out to evaluate the quality of Type 2 diabetes care provided to patients with schizophrenia. We followed a mixed-methods approach by reviewing the care provided to a sample of patients with schizophrenia in a tertiary mental health hospital in Saudi Arabia, followed by in-depth interviews with health care providers (HCPs) who were directly involved with this population subset. The research objectives were to determine the prevalence of Type 2 diabetes among patients with schizophrenia in Saudi Arabia, assess the quality of Type 2 diabetes care provided, and explore HCPs' attitudes and perspectives toward the quality of Type 2 diabetes care delivered.

2. Material and methods

2.1. Setting

This was a single-center study. The sample was recruited from the Eradah (Al-Amal) Complex for Mental Health in Riyadh, Saudi Arabia. There are 20 psychiatric hospitals in Saudi Arabia and the Eradah Mental Health Complex is the only governmental mental-health-specialized institution in the Riyadh region. The complex was established in 2004 and includes buildings for emergencies, intensive care units, outpatient clinics, and the supportive services of pharmacies, laboratories and radiology.[18] Additionally, it has eight villas for the hospitalization of mental health patients and for addiction treatments as well as an entertainment center. Although the Eradah Mental Health Complex provides well-developed outpatient and inpatient services, there are no governmental community mental health care services for psychiatric patients in Saudi Arabia, which leaves patients with chronic mental health disorders to face numerous challenges.[19] The lack of community services for patients with psychiatric illnesses, and the absence of half-way homes, places a burden on both the patients and the psychiatric hospitals. For instance, patients are required to pick up their mental health medications from psychiatric hospitals, even if they live far away.[19] According to the Saudi National Mental Health Survey, 93% of outpatient visits are hospital based.[19] Furthermore, there are a number of staffing challenges such as lack of psychiatrists, psychologists, social workers and nurses. Moreover, staff may be assigned to psychiatric institutions without advanced training or postgraduate education in psychiatry.[19]

Our study sample included patients with schizophrenia who attended the outpatient clinic at the Eradah Complex for Mental Health. We obtained the electronic medical records for all of the patients who were diagnosed with schizophrenia and had attended the outpatient clinic.

Ethical approval

The Research Ethics Committee from Eradah (Amal) Complex for Mental Health, Ministry of Health approved the study (registration number H-01-R-063-9) on October 1, 2018.

2.2. Study design

This study used a mixed-methods approach that included a retrospective chart review and an in-depth interview. The Good Reporting of a Mixed Methods Study (GRAMMS) guidelines were used as a framework for the methodology and are presented in Appendix 1.[20]

2.3. Retrospective chart review

We retrospectively reviewed the medical records of patients diagnosed with schizophrenia and Type 2 diabetes from October 2017 to October 2018. Although the medical records were on an electronic system, the records from the hospital consisted primarily of scanned versions of physician handwritten notes, laboratory reports (the ones conducted in Eradah hospital), and pharmacy/medication records. To identify patients who had both Type 2 diabetes and schizophrenia one researcher read the physician handwritten notes to identify any tests conducted for (or comments about) Type 2 diabetes. The researcher went through the records to identify patients who were aged >20 years, attended the outpatient clinic, and had been diagnosed with schizophrenia for at least one year. The sample size identified from the records review was *2803*.

As the screening required reading through hundreds of handwritten notes for each patient, we decided to screen every third patient in the file list ($n = 935/2803$). Patients who were identified as having Type 2 diabetes and schizophrenia were included. The same researcher reviewing the records considered a patient to have a diabetes diagnosis if they found a diabetes test result and/or diabetes medications. Other data collected included sociodemographic information and clinical characteristics. We also collected process measures for the quality of Type 2 diabetes care developed by the National Diabetes Quality Improvement Alliance[21] as follows:

1. percentage of patients having one or more HbA1c tests annually,
2. percentage of patients with at least one low-density lipoprotein cholesterol (LDL-C) test annually,
3. percentage of patients with at least one test for microalbuminuria during the measurement year or who had evidence of medical attention for existing nephropathy,
4. percentage of patients who received a dilated eye examination or evaluation of retinal photography by an ophthalmologist or optometrist during the current year or during the prior year if the patient was at low risk of retinopathy,
5. percentage of patients receiving at least one-foot examination annually, and
6. percentage of patients whose smoking status was ascertained and documented annually.

2.4. In-depth interviews

We interviewed HCPs to explore factors affecting diabetes care provided to patients with schizophrenia. In-depth, semi-structured interviews were conducted by using open-ended questions. An interview topic guide was developed based on the Theoretical Domains Framework (TDF)[22] (Appendix 2). Interviews were conducted by two of the authors (AA and NA) between December 2018 and January 2019. Meetings took place at the participants' work and lasted between 15 and 50 min. All conversations were digitally recorded, with the participants' permission, and transcribed verbatim.

2.5. Data analysis

Descriptive analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 21 (IBM Corp., Armonk, NY, USA). Interview transcripts were thematically analyzed using Atlas/ti 8 (Scientific Software Development GmbH, Berlin, Germany). Transcripts were analyzed by two independent coders (NA and KA).

2.6. Theory

The TDF was used to capture behavioral change and implementation strategies needed for the better management for Type 2 diabetes and schizophrenia. TDF is a comprehensive, theory-informed process used to explore HCP behavior. The TDF consists of 128 constructs obtained from 33 theories that are most relevant to exploring behavior and behavior change.[22] The first author (NA) has expertise in using the TDF in the context of health behavior and Saudi Arabia.

3. Results

3.1. Retrospective chart review

We screened 935 patients with schizophrenia and found 35 patients with Type 2 diabetes, giving a prevalence of 3.7%. Table 1 shows the sociodemographic and clinical characteristics of the sample. The mean age was 45.4 ± 9.6 years, and 22 patients were males (62.9%). Table 2 lists the frequency of Type 2 diabetes process measures. The annual testing rates were 8.6% for HgbA1c and 31.4% for low-density lipoprotein (LDL-C). Screening for albuminuria and examinations of the eyes and feet were not conducted. Smoking status was documented in 8.6% of the sample.

3.2. In-depth interviews

The demographic characteristics of the interviewed HCPs are presented in Appendix 3. An analysis of the interviews identified four major themes

Table 1

The sociodemographic and clinical characteristics of the patients.

Sociodemographic and clinical characteristics	(n = 35)
Male	22 (62.9%)
Age (years)	45.4 (9.6)
Weight (kg)	86.2 ± 20.7
Height (cm)	169.6 ± 6.9
Body mass index	
Normal	3 (8.6%)
Overweight	2 (5.7%)
Obese	3 (8.6%)
Not mentioned	27 (77.1%)
Diabetes	
Type 1	1 (2.9%)
Type 2	4 (11.4%)
Not mentioned	30 (85.7%)
Duration of diabetes (in years)	
<10	1 (2.9%)
>10	2 (5.7%)
Not mentioned	32 (91.4%)
Type 2 diabetes treatment regimen	
Oral hypoglycemic	16 (45.7%)
Insulin	2 (5.7%)
Both	4 (11.4%)
Diet	3 (8.6%)
Not mentioned	10 (28.6%)
Duration of schizophrenia (in years)	
<10	11 (31.4%)
≥10	19 (54.3%)
Not mentioned	5 (14.3%)
Schizophrenia treatment regimen	
Typical antipsychotics	2 (5.7%)
Atypical antipsychotics	23 (65.7%)
Both	9 (25.7%)
Others	1 (2.9%)

Continuous data is presented as mean ± standard deviation. Categorical data is presented as number and percent.

Table 2

Quality indicators used for identifying diabetes care.

Process measure	(n = 35)
One or more HbA1c test performed annually	3 (8.6%)
At least one LDL-C test performed annually	11 (31.4%)
At least one test for urine microalbuminuria performed	0
Documentation of annual eye examinations	0
Documentation of at least one foot examination annually	0
Smoking status documented at least once	3 (8.6%)

Data are presented as number and percent. LDL-C: low-density lipoprotein cholesterol.

that affected the quality of Type 2 diabetes care provided to patients with schizophrenia: 1) the consequences of poor-quality diabetic care provided to patients with schizophrenia, 2) issues with the identification of Type 2 diabetes in patients with schizophrenia, 3) challenges in the management of patients with both Type 2 diabetes and schizophrenia, and 4) opportunities to improve the quality of Type 2 diabetes care provided to patients with schizophrenia.

3.2.1. Theme 1: Consequences of poor Type 2 diabetes care provided to patients with schizophrenia

HCPs reported that complications from Type 2 diabetes were considerably worse in patients with schizophrenia, as described by the following:

"The complications of diabetes in patients taking antipsychotic drugs are long-term. I encountered one case who had bedsores, and another patient lost her vision because of uncontrolled diabetes. It is not easy." T1.

"If diabetes affected the kidneys, it would limit our use of antipsychotics." T3.

Furthermore, the suffering of patients with Type 2 diabetes complications was reported to extend to rejection by patients' families. Participants described family rejection as when the family refused to take care of patients with Type 2 diabetes complications in addition to the schizophrenia:

"Some of them are admitted for a long time in the hospital [because of diabetic complications] which result in the family rejecting the patient…this is a crucial point…" T1.

"We have a large proportion of our patients admitted for years because of this problem [complications from having diabetes and schizophrenia]… neglected, no one took care of them." T2.

"…We have a whole section called Alikha'a center, this is for chronic patients who were rejected by their families…" T4.

Additionally, the HCPs reported that patients discontinued antipsychotic medications if they developed Type 2 diabetes or had the risk of developing Type 2 diabetes, as discussed by the following participant:

"…a patient came after discontinuing the medication and relapsed! The reason was that a doctor told him the medication is the cause of his diabetes. We know the response to antipsychotics after relapse is less; it took 3 to 6 months to get a response." T1.

"In particular, some patients read that our medication caused diabetes!" T3.

One participant mentioned that the hospital administration faced a legal case brought on by a patient who believed that his Type 2 diabetes was caused by olanzapine, an atypical antipsychotic medication. The following participant mentioned it:

"One of the legal complaints against the hospital was from a patient who thought that his diabetes was because of the hospital management …he received olanzapine, and he asked for compensation…" T4.

HCPs also mentioned that poor Type 2 diabetes management usually worsened and decreased the response of antipsychotics, as mentioned by the following participants:

"Definitely, if diabetes was not controlled, the situation would worsen, and the response to medication would be less, and we must decrease our expectations." T3.

"I mean, the response to medication [antipsychotics after discontinuation] is less, but we have to try until we succeed…"T1.

Additionally, HCPs noted that a Type 2 diabetes diagnosis affected the antipsychotic options available:

"The presence of diabetes in patients with schizophrenia reduces our treatment options to a class of drugs that do not affect blood sugar, which is scientifically said to be less effective." T6.

Participants indicated that there was a risk of patients not showing up for a scheduled appointment if they were provided with Type 2 diabetes care in addition to psychiatric care:

"One of the problems that we faced [was] that patients did not show up for their psychiatry appointments if we add another appointment for their diabetes." T4.

"Currently, we have 40% dropouts in the psychiatry clinic visits, so there is a high possibility the patients will not come for their appointments if we take care of diabetes too." T5.

3.2.2. Theme 2: identification of Type 2 diabetes in patients with schizophrenia

There was no consensus concerning who was responsible for the management of Type 2 diabetes in patients with schizophrenia. Some physicians believed that their hospital, as a specialized mental health hospital, should not treat Type 2 diabetes or any other chronic illness, while others thought that they need to address patients holistically.

"We are a specialized psychiatry hospital. It is not our responsibility to take care of diabetics. They [are] supposed to be managed in another hospital." T1.

"I treat the human being, so I think every hospital needs to provide integrated healthcare for their patients." T6.

Furthermore, a system to identify Type 2 diabetes in patients with schizophrenia in an outpatient setting was lacking:

"… I usually found out about diabetes from the patient when I asked about their medications or from a complaint of side effects…occasionally, some doctors write it in a note, but there is nothing in the system to clearly identify any other medical problems." T1.

"Unfortunately, we consider the psychiatric patient as if he is disease-free [other than psychiatry]." T1.

"For any inpatient, [not the outpatient], we request all the routine investigations, and if the patient has any chronic problem, he/she will be coded and followed by the medical team." T5.

However, even if an HCP diagnosed a patient with diabetes, there was a lack of complete information concerning their conditions, as the following participant illustrated:

"Once, we accidentally we accidentally found a diabetic patient during rounds! The physician and the nurse did not know that; they did not receive her diabetes medications because, during the admission, they only focused on the psychiatric problem and forget about other medical problems." T2.

3.2.3. Theme 3: challenges in the management of patients with Type 2 diabetes and schizophrenia

Participants referred to the characteristics of patients with schizophrenia that escalated the existing risk of Type 2 diabetes:

"… people with schizophrenia have poor insight, so why and how to convince the patients about the importance of exercise…it differs from case to case but explicitly dealing with them is very difficult." T4.

"We know that the activities of patients with schizophrenia are limited, so even if they don't have it [diabetes], the medications they use can increase their appetite and risk, choosing a drug sometimes means choosing those that are not diabetogenic." T5.

"… we know that some of our medications can increase blood glucose levels." T5.

"The problem of patients with schizophrenia and diabetes is a double one." [T3]

Additionally, there was a lack of resources for Type 2 diabetes management in psychiatric hospitals, such as medications, strips, and specialized HCPs:

"…when the patients come, we don't have diabetes care services, neither the medication nor the care or … blood sugar measurement or monitoring… usually, we inform the patient to go to the hospital they are used to following." T1.

"Our problem is that we do not have endocrinologists… we lack communication with the specialists to assure that our patients are taking the appropriate treatment, and it is not easy as it needs continuous follow up not [just] once." T4.

The participants further identified a lack of time and information access for follow up and monitoring as the following interviewees indicated:

"In the outpatient clinic, the patients are encountered every three months, and we spent only 10 minutes … do you not see the problem? I need to check on the major issues, and I rely on primary healthcare …" T5.

"We have a problem with the outpatients' clinic because of the policy of requesting tests and privacy, unlike the inpatients where we have to fill the monitoring sheet for the metabolic parameters for any patients prescribed atypical antipsychotics." T6.

Furthermore, the participants indicated the need for guidance to help in managing this population efficiently:

"How to set guidelines, for example, how to keep patients who have a diabetes risk away from medications such as olanzapine, for example, give him another treatment…" T5.

"…management is easy, but if there is guidance and a protocol so that there is no room for human error, what happens is probably a personal decision." T2.

The participants discussed the knowledge and skills of HCPs as they relate to Type 2 diabetes management as follows:

"If I compare my knowledge to others [pharmacist to physician], they are not aware of many things such as insulin types and how to divide the doses to manage different levels of blood sugar…" T2.

Additionally, participants struggled to gain patient trust and lacked the skills needed to manage patients with both Type 2 diabetes and schizophrenia, as the following participants illustrated:

"Dealing with them is very difficult. You win if you succeed in getting them to go to the consultant appointment!" T2.

"There are many barriers; sometimes, I hold their hands and tell them, because of the confidence between us, do this or that. The subject is not easy; the relationship with patients with schizophrenia and diabetes must be approached with caution. If you lose the unity between you and them, you will lose them taking your schizophrenic medication..." T1.

There was variability in the engagement of HCPs in the management of Type 2 diabetes and schizophrenia.

"it depends … from doctor to doctor, some doctors are interested, and they do not see the patients as schizophrenic cases only, and others are not. We do not have policies and guidelines for such cases, patients with schizophrenia and diabetes." T1.

"Some physicians ask if the patients have other diseases… other not…" T2.

Participants recognized the challenges associated with medication adherence in patients with Type 2 diabetes and schizophrenia, as presented below:

"…schizophrenia is a chronic disease and, if it occurs with diabetes, which is another chronic disease, both require medications for life … so, if we ask patients to take both groups of medications, adherence will be affected and decreased." T6.

Some of the participants discussed the need for family involvement to take care of patients with schizophrenia:

"Rarely, the patient with schizophrenia comes alone, always with the family, the patient has low cognitive ability; they cannot take care of themselves… family is always involved." T1.

".. if we discuss with the family that diabetes is affecting the patients' medication efficacy, and if improved, it will result in much better management, they usually cooperate … you want to keep both the family and the patient engaged …" T6.

"Most medications that affect blood glucose, like olanzapine, have a sedative effect, and most families love them because they help to keep the patient under control." T6.

3.2.4. Theme 4: opportunities to improve the quality of Type 2 diabetes care provided to patients with schizophrenia

The opportunity to create strong relationships between HCPs, patients and their families in a psychiatric hospital was proposed as an opportunity according to the following participants:

"Our care here [in psychiatry] depends mainly on the relationship between the physician and the patient and must always check how much the patients are convinced with their treatment." T3.

"We conducted a project called the 'family conference' where the family meets the treating team on admission, and we explore how the family is managing the patient, and we discuss the plan with them. Then we meet again two weeks before discharge from the hospital to discuss the treatment plan and how to manage the patient in the best way…" T5.

Participants also acknowledged the benefit of involving pharmacists in the care of this patient population:

"People who are qualified to do this are called clinical pharmacists, and they are few. Even the clinic must have a clinical pharmacist. Sometimes they are busy with other things. Lack of them is one of the problems." T3.

"The team accepts any help, especially since the clinical pharmacist was involved… they appreciated the acceptance of their participation [the pharmacist]." T2.

"Medication education clinic is great where the clinical pharmacist manages patients on clozapine and monitors the therapeutic effect of other medication such as lithium, valproic acid, and carbamazepine." T6.

The participants discussed the opportunity of reinforcing an efficient primary healthcare model to help take care of patients with both Type 2 diabetes and schizophrenia as follows:

"The best model of care to which the whole world is heading is the primary care setting. Being nearby the patients' house [you] can check their blood sugar, we are pushing to attempt to implement mental health in primary health care." T5.

Furthermore, some participants suggested using the available technological solutions to improve patient care:

"Currently, technology is implemented in the Ministry of Health information system, which facilitates communication with doctors in primary healthcare. If they notice a need for any psychiatry consult they can book an appointment with us, and the opposite, if we notice a case of diabetes we book them with the required specialty." T4.

Strengths of the local HCP's board training and government initiatives were highlighted as opportunities to be harnessed, as the following participants mentioned:

"The Ministry of Health is highly developed, and the quality of the training of our doctors who get the psychiatry board is growing... the best is coming…" T4.

"Currently, I see the potential with the National Transformation Program that included mental health components and with the initiation of the unified medical record …" T5.

4. Discussion

Our study examined the quality of Type 2 diabetes care provided to patients with schizophrenia using a mixed-methods approach. This provided a broader understanding of the challenges of treating Type 2 diabetes in patients with schizophrenia and how to solve it. Our quantitative results are consistent with previous studies that have reported low to no Type 2 diabetes care being provided to this population.[12,13,15,16] We explored the problem with HCPs who were directly involved with managing schizophrenia in the studied sample and identified four themes ranging from the consequences of providing poor-quality diabetes care to the issue of identification of diabetes in patients with schizophrenia. Furthermore, the HCPs mentioned several challenges in the management of this patient population and elaborated on a number of opportunities to improve the quality of the care provided.

4.1. Consequences of poor Type 2 diabetes care provided to patients with schizophrenia

The in-depth interviews identified the problems of patients discontinuing schizophrenic medication after developing Type 2 diabetes or not knowing the risk of developing Type 2 diabetes. Avoiding such a serious issue should take priority in managing patients with schizophrenia. It is essential that careful thought and consideration is given to how patients are informed of the side effects of antipsychotic medications and how to manage Type 2 diabetes.[23] In addition, re-introducing antipsychotic medication after discontinuation carries a high risk for treatment failure, and studies have shown re-initiated medications to be ineffective in managing schizophrenia.[23]

A systematic review investigating medication adherence in patients with schizophrenia identified patients' perceptions of the benefits of medication as a positive factor for improving adherence.[24] Unfortunately, medication adherence to antipsychotics has been shown to increase the incidence of Type 2 diabetes.[25] Complex mental illnesses require additional care for managing diabetes, as studies have shown that depression may play a significant role in lower rates of adherence to antipsychotic medications and poorer Type 2 diabetes prognoses.[24]

4.2. Identification of Type 2 diabetes in patients with schizophrenia

Our quantitative study yielded a very small number of patients with both Type 2 diabetes and schizophrenia, which we believe was lower than the actual percentage. One explanation for the low percentage may be fallout in the identification process, i.e., guidance in the screening, diagnosis, documentation, and follow up and where each step falls in the management plan. We noticed a primary issue of not knowing, or agreeing upon, who was responsible for the management and follow-up of Type 2 diabetes in patients with schizophrenia. Furthermore, if the psychiatrist wanted to intervene and follow patients with Type 2 diabetes, there was a lack of access to Type 2 diabetes related information because it either did not exist, or it was conducted in a different sector of the healthcare system. Labeling and documenting diabetes and its quality measures in this population could be the first step toward providing high-quality diabetes measures.

It is also essential to integrate documentation between psychiatric hospitals and sectors providing diabetes care.[26] Flagging Type 2 diabetes in patients with schizophrenia and acquiring full information about the disease in the medical file could provide a pivotal start and fall within the recommendations for screening and monitoring the risk of Type 2 diabetes in patients taking antipsychotic medication.[27] In addition, the HCPs mentioned providing diabetes care to patients in primary care as an opportunity to improve the quality of Type 2 diabetes care that is provided.

4.3. Challenges in the management of patients with Type 2 diabetes and schizophrenia

Patients with schizophrenia have a 2.5-fold higher chance of developing Type 2 diabetes than others, and Type 2 diabetes complications are much worse in this patient population.[7] Some studies have shown that patients with schizophrenia are more likely to die within seven years of receiving a Type 2 diabetes diagnosis.[13]

There is a lack of knowledge in how to manage diabetes within psychiatric institutions, as uncovered in the interviews, which might be due to the perception that diabetes care does not fall within the responsibilities of psychiatric care. Alternatively, it may be related to a lack of knowledge regarding how to provide appropriate care for the management of Type 2 diabetes. Studies have indicated that some HCPs do not receive continuing education that focuses on skill development, which can then lead to a gap in chronic disease management knowledge.[28] Fear of decreasing antipsychotic medication adherence was also mentioned as a barrier to properly following up with patients with Type 2 diabetes.

The interviews further illustrated the need to identify and flag these patients and work on improving proper management to avoid the burden of having poor Type 2 diabetes care and complications for patients with schizophrenia. The HCPs mentioned that these complications placed a burden not only on the patients but also on the patients' families. Difficulties in managing Type 2 diabetes complications (in addition to mental health issues) caused some families to refuse hospital discharges. Families that take care of patients with schizophrenia already face a number of challenges and stressors.[29] Studies have shown a strong correlation between improving Type 2 diabetes outcomes and the relationship between HCPs and a patient's family.[29]

4.4. Opportunities to improve the quality of Type 2 diabetes care provided to patients with schizophrenia

Although studies have shown some positive effects stemming from family's reactions to the management of difficult patients—such as strengthening family relationships—ignoring the financial, physical, and emotional burden that fall on families would be detrimental.[29] Within psychiatry, it is known that family involvement is important, and family support is a fundamental factor in improving Type 2 diabetes management outcomes.[30] Therefore, improving interventions that focus on family involvement could be advantageous.[31] For example, studies have shown that Type 2 diabetes medication adherence is positively associated with good relationships between HCPs and family members.[30] Moreover, working with families on non-pharmacological interventions was shown to improve Type 2 diabetes patient outcomes. By extension, promoting this type of relationship with psychiatric patients could improving their mental health outcomes as well.[32]

The involvement of pharmacists in the management of Type 2 diabetes in patients with schizophrenia is another possible intervention. This would lower the burden on physicians by involving pharmacists, who are more accessible and well qualified to follow and monitor Type 2 diabetes.[33–35] Globally, evidence has shown that medication therapy management programs, where medications are reviewed by pharmacists to ensure they are taken as prescribed and are achieving their goals, have succeeded in lowering HbA1c levels, increased screening measures, and has provided continued education and monitoring to patients with diabetes.[33,34]

One way to improve health outcomes in patients with schizophrenia who are managing their Type 2 diabetes is to involve primary care services in the provision of care. The World Health Organization (WHO) launched a gap action program for mental health, the mhGAP,[36] which provides tools for managing mental illness in non-specialized health settings.[36] Managing psychiatric diseases within primary care could concurrently help with the management of Type 2 diabetes, as this is a central service.[2] Furthermore, communication between mental health centers and primary care centers is needed. Community-based mental health services are not available in many parts of the world (including Saudi Arabia) and overcoming these obstacles could save money and effort.[27] The WHO's Mental Health Action Plan calls for the provision of such services at the community level.[36,37]

4.5. Interventions designed to improve Type 2 diabetes quality of care provided to patients with schizophrenia

High-quality Type 2 diabetes care needs to be provided to patients with schizophrenia. Targeting the factors identified in this study could be implemented through various interventions, and the integration of our results could assist in constructing a comprehensive understanding of Type 2 diabetes management in patients with schizophrenia. Table 3 describes examples of interventions that might improve Type 2 diabetes quality of care provided to target obstacles. A theoretical framework was used to develop the topic guide for this study..[38] Providing high-quality Type 2 diabetes care to patients with schizophrenia requires an extensive range of interventions. Using theory to build these intervention(s) could help to save money and time.[38]

Our study was limited by the use of retrospective data and by the low number of identified cases. Furthermore, we were unable to identify significant predictable factors despite screening a large database. Due to the small number of participants in this study, performing inferential statistics was not possible. Our results did, however, show a gap in obtaining information about Type 2 diabetes in patients with schizophrenia in Saudi Arabia.

Building upon this finding, and flagging indicators of Type 2 diabetes in patients with schizophrenia, could help to facilitate the identification of other chronic conditions such as cardiovascular disease and/or obesity. While our study focused on patients with schizophrenia, the literature has

Table 3

Suggested interventions to improve the quality of Type 2 diabetes care provided to patients with schizophrenia.

Factor	Intervention	Example
Patient related		
Existing risk for Type 2 diabetes	Flag patients and adopt early intervention	All patients diagnosed with schizophrenia need to be highlighted as a higher risk group
Negative family involvement	Social support	Target family concordance with predefined key performance indicators
Limited antipsychotic medication options	Information and biofeedback	Education concerning the importance of medication adherence and apply monitoring parameters
Severe Type 2 diabetes complications	Flag patients and adopt early intervention	Implement measures for quality Type 2 diabetes care
Discontinuation of antipsychotic medication	Information and biofeedback; Guidelines and monitor adherence	Education on the importance of medication adherence and apply monitoring parameters
Family rejection	Social support and legislation	Target family concordance with predefined key performance indicators
Increased drop-outs	Service modeling	Follow-up measures
Physician related		
Lack of Type 2 diabetes management skills	Education and training	Training course and positive role model enforcement
Time scarcity	Regulation and marketing	Improve service quality by increasing the number of HCPs* and using pharmacists, nurses, and educators
Shortage of guidance	Regulation	Guideline development
Variability of physician engagement	Regulation and incentives	Incentive-based programs
System related		
Recourse deficiency	Legislation	Financial plans to provide medications and glucometers
Unclear responsibility	Guidelines communication	Guideline development
System and information deficiency	Service modeling	Implement communication systems with primary care centers

* HCP: Healthcare provider.

shown that patients with other serious mental illnesses also suffer from Type 2 diabetes. Thus, the interventions suggested here may be used to help the larger population of patients with psychiatric illnesses.[12,15,37]

Saudi society presents a unique culture composed of a younger population, limited wages for women and, for both groups, their participation in the economy is restricted.[39] The Saudi national mental health survey that was described in the introduction[4,19,39] noted special concern regarding these two populations and the quality of care provide to them. Therefore, more prospective, observational studies are needed to identify the effects of age, sex, socio-economic deprivation, and/or the effects of mental illness on Type 2 diabetes. A better understanding of how Type 2 diabetes incidence changes over time in patients with schizophrenia is needed as this information is currently unknown for the Saudi population. Furthermore, the role of depression, obesity and medication adherence should be incorporated into any future studies as these variables may affect the incidence of Type 2 diabetes in patients with schizophrenia.

5. Conclusion

Patients with schizophrenia are prone to develop Type 2 diabetes,[5,7] and they are less likely to obtain high-quality Type 2 diabetes care.[13,14,37,40] This study used quantitative and qualitative approaches to explore the quality of Type 2 diabetes care in schizophrenic patients in Saudi Arabia. The results uncovered a complicated picture for these patients that included the consequences of poor Type 2 diabetes management and its effect on adherence to antipsychotic medications. We also presented and discussed opportunities for improving the quality of Type 2 diabetes care, including involving pharmacists who can contribute to the effective management of the disease[33,34] and the expansion of community-based health services to include mental health.[36] Considerable work is needed to improve the quality of Type 2 diabetes care for patients with schizophrenia. Prioritizing interventions by using WHO recommendations to help this population in Saudi Arabia is essential.[36]

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.rcsop.2021.100070.

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