Research Article

Negotiating Medicines in Chronic Illness: A Qualitative Inquiry into Drug Utilization Practices in Diabetes Care

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ABSTRACT

Introduction and Aim: Diabetes mellitus requires lifelong pharmacotherapy, yet drug utilization studies rarely capture how patients experience and manage prescribed medicines in daily life. This study aimed to examine drug utilization practices in outpatient diabetes care by integrating drug utilization data with patient perspectives.

Materials and Methods: This study was conducted in a tertiary care teaching hospital in India using a sequential explanatory mixed-methods design, which consisted of a quantitative drug utilization study in the first phase followed by qualitative in-depth interviews in the second phase. Drug utilization data from 100 adults with type 2 diabetes mellitus were analyzed descriptively. Inferential associations were examined using chi-square tests. Findings informed purposive sampling for in-depth interviews with 25 patients to explain and expand quantitative findings. Qualitative data were analyzed thematically, and integration occurred at interpretation. Institutional ethics committee approval was obtained, and informed consent was secured from all participants.

Results and Conclusion: Oral hypoglycemic agents (OHAs) alone were prescribed to 68% (n=68) of patients, while 32% (n=32) received OHAs with insulin. Polypharmacy (≥3 agents) was observed in 46% (n=46). Insulin use was significantly associated with longer duration of diabetes (p=0.002). Interviews revealed structured routines related to long-term medicine use, organizational strategies for multiple medications, layered self-care practices. Drug utilization in diabetes care reflects both prescribing patterns and patient adaptation. Integrating patient perspectives with drug utilization data provides a more comprehensive understanding of real-world medicine use.

Keywords: Diabetes mellitus; Drug utilization; Mixed-methods research; Chronic illness; Polypharmacy; Patient-centered care

1. INTRODUCTION

Diabetes mellitus is a long-term condition that requires people to live with medicines on a daily basis [1-3]. For most patients, treatment does not remain the same over time. As diabetes progresses, medicines are added, doses are adjusted, and in many cases, insulin is introduced. [4] What begins as a clinical prescription gradually becomes part of everyday life, shaping daily routines, self-care practices, and how individuals experience their illness [5].

Drug utilization refers to the pattern, extent, and determinants of medicine prescribing and use within a defined population and healthcare setting. Drug utilization studies are valuable in understanding how diabetes medicines are prescribed in real-world settings [6]. They offer valuable information on the types of drugs used, the extent of combination therapy, and patterns of treatment escalation [7]. However, these studies analyze prescriptions as written documents. They tell us little about how patients actually live with these medicines—how they take them, adapt them to daily life, or respond emotionally and practically to increasing treatment complexity [8-10].

The motivation for this study arose during routine drug utilization study in outpatient diabetes clinics. While reviewing prescriptions, it became clear that patients receiving similar treatment regimens often behaved very differently in practice. Some accepted treatment changes easily, while others delayed or modified medicine use, particularly when insulin was introduced [11-13]. These differences could not be explained by clinical factors alone. Thus, an important question was raised: what happens to prescribed medicines once patients leave the clinic?

Previous qualitative work has shown that patient beliefs, experiences, and daily circumstances strongly influence medicine use in chronic illness [14-16]. Yet such studies are often conducted separately from prescription audits, making it difficult to directly connect prescribing patterns with patient behavior. As a result, an important gap remains between what is prescribed and how medicines are actually used.

This study was therefore designed to bridge that gap by combining drug utilization data with in-depth patient interviews. The aim was to examine drug utilization practices in outpatient diabetes care and to understand how prescribed medicines are experienced, adapted, and negotiated by people living with type 2 diabetes mellitus.

2. Materials & Methods

Study design and setting

This study was conducted using a sequential explanatory mixed-methods design, consisting of two distinct but connected phases [17]. In the first phase, a quantitative drug utilization study was conducted to characterize drug utilization patterns in diabetes care. In the second phase, qualitative in-depth interviews were conducted with a purposively selected subset of patients drawn from phase one cohort. The qualitative component was designed to explain and expand upon the quantitative findings by exploring how prescribed medicines were experienced and managed in daily life. Integration occurred at the interpretation stage by explicitly linking drug utilization patterns with patient reported practices. The study was carried out in the outpatient departments of a tertiary care teaching hospital in India.

Study population and sample size

The quantitative component included 100 adult patients (≥18 years) diagnosed with type 2 diabetes mellitus who attended routine outpatient follow-up during the study period. Prescriptions issued to these patients were reviewed as part of the study. Patients with gestational diabetes, those receiving inpatient treatment, and prescriptions related to acute medical emergencies were excluded to ensure focus on chronic diabetes management. Patients with type 1 (juvenile) diabetes were also excluded as treatment pathways, insulin dependence and self-management practices differ substantially between type 1 and type 2 diabetes [18]. Including both groups would have introduced clinical heterogeneity and reduced interpretive clarity.

A total of 100 consecutive prescriptions of adult patients with type 2 diabetes mellitus were included in the drug utilization study. The sample size was determined based on feasibility within the study period and is consistent with drug utilization studies conducted in similar outpatient settings [19-22]. The objective of the quantitative phase was descriptive and exploratory rather than hypothesis driven estimation.

For the qualitative component, 25 patients were selected from the drug utilization study cohort using purposive sampling. Purposive selection was made to ensure variation in treatment modality (OHAs alone or in combination with insulin), number of antidiabetic medications prescribed, and duration of diabetes. Interviews were conducted until thematic saturation was achieved, defined as the point at which no new themes or patterns emerged in three consecutive interviews. Saturation was assessed through ongoing review of transcripts during data collection.

Data collection procedure

Quantitative data were collected through systematic review of outpatient prescriptions. Prescription data was extracted into a structured database and included patient age and sex, duration of diabetes, place of residence, type of antidiabetic therapy, number and class of

antidiabetic medications prescribed. Polypharmacy was operationally defined as the concurrent prescription of three or more antidiabetic agents [23]. Regimen complexity referred to the intensity of antidiabetic therapy and included number of antidiabetic agents prescribed, use of insulin and concurrent use of OHAs and insulin [24]. Oral hypoglycemic agents (OHA) were defined as non-insulin glucose-lowering medications.

Following this, semi-structured, in-depth interviews were conducted using an interview guide in a private setting within the hospital. The interviewer explored perceptions of long-term medicine use, management of multiple medicines, experiences with insulin initiation, day-to-day adaptations and decision-making. Interviews were conducted in the local language and were audio-recorded after obtaining participant consent. The interviews lasted approximately 30–45 minutes. Recordings were transcribed verbatim and translated into English.

Statistical methods

The quantitative data was entered in MS excel and was analyzed using the SPSS software.

Quantitative data were analyzed using descriptive statistics and presented as frequencies and percentages. Associations between demographic variables and treatment patterns were examined using Chi-square (χ^2) tests. Degrees of freedom (df) and exact p-values are reported. A p-value <0.05 was considered statistically significant.

Qualitative data were analyzed using thematic analysis. Transcripts were read repeatedly to achieve familiarization. This was followed by open coding. Codes were compared across transcripts and by constant comparison were grouped into themes. Integration of quantitative and qualitative findings occurred during interpretation, linking prescribing patterns with patient narratives. Integration occurred through joint interpretation of quantitative and qualitative findings rather than statistical combination of datasets.

Approval was obtained from the Institutional Ethics Committee prior to commencement of the study. Written informed consent was obtained from all interview participants. Drug utilization data were anonymized at the time of extraction, and confidentiality was maintained throughout the study.

Table 1. Drug utilization and demographic characteristics of patients with type 2 diabetes mellitus (N = 100)

Characteristic	Category	n (%)
Sex	Male	31 (31.0)
	Female	69 (69.0)
Age Group (years)	< 50	24 (24.0)
	≥ 50	76 (76.0)
Duration of diabetes	< 5 years	28 (28.0)
	5–10 years	40 (40.0)
	> 10 years	32 (32.0)
Place of residence	Panchayat (rural)	68 (68.0)
	Municipality	20 (20.0)
	Corporation (urban)	12 (12.0)
Type of antidiabetic therapy	OHA alone	68 (68.0)
	OHA + insulin	32 (32.0)
Number of antidiabetic agents	One	14 (14.0)
	Two	40 (40.0)
	Three or more	46 (46.0)

OHA – Oral hypoglycemic agents.

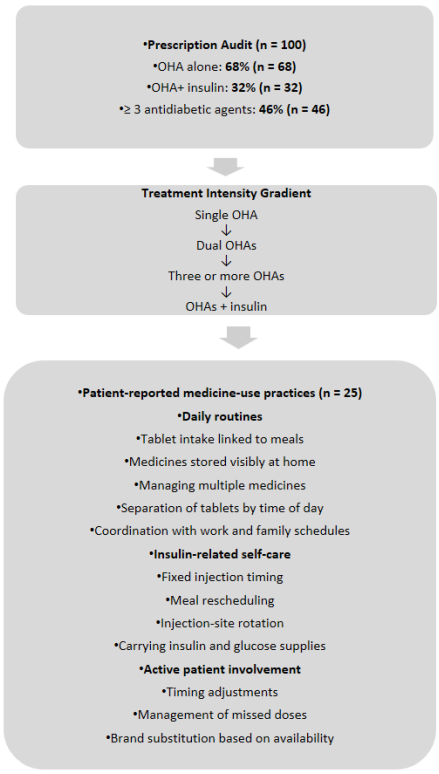

Figure 1. Integrated representation of drug utilization study findings (N=100) and qualitative interview findings (n=25).

OHA – Oral hypoglycemic agents.

The left panel summarises treatment modality and regimen complexity identified in the prescription audit. The central gradient illustrates

increasing treatment intensity. The right panel summarises corresponding medicine-use practices reported in interviews. The figure visually demonstrates how prescribing patterns are translated into structured routines and self-care adaptations in daily life.

Table 2. Characteristics of interview participants (n = 25)

Characteristic	Category	n (%)
Sex	Male	8 (32.0)
	Female	17 (68.0)
Duration of diabetes	< 5 years	7 (28.0)
	5–10 years	10 (40.0)
	> 10 years	8 (32.0)
Type of antidiabetic therapy	OHA alone	14 (56.0)
	OHA + insulin	11 (44.0)
Number of antidiabetic agents	One	3 (12.0)
	Two	9 (36.0)
	Three or more	13 (52.0)

OHA – Oral hypoglycemic agents.

3. Results & Discussion

Study sample and demographic characteristics

A total of 100 patients with type 2 diabetes mellitus were included in the drug utilization study. Demographic characteristics are summarized in Table 1. Female patients constituted 69 % (n = 69) of the sample, while 31 % (n = 31) were male. The majority were aged ≥50 years (76 %, n = 76). Duration of diabetes was <5 years in 28 % (n = 28), 5–10 years in 40 % (n = 40), and >10 years in 32 % (n = 32) of patients. Most participants resided in rural panchayat areas (68 %, n = 68). With respect to educational status, 44 % (n=44) had completed high school or technical secondary education, 21 % (n=21) had primary education, 17 % (n=17) had middle school education, and 14 % (n=14) were illiterate or semi-literate. Only 4 % (n=4) had college-level education or above. Hypertension was documented in 75 % (n=75) of patients, while dyslipidaemia was present in 65 % (n=65).

Drug utilization and treatment patterns

Regarding antidiabetic therapy, 68 % (n = 68) of patients were prescribed oral hypoglycemic agents (OHA) alone, while 32 % (n = 32) received OHA in combination with insulin. Monotherapy was observed in 14 % (n = 14), dual therapy in 40 % (n = 40), and regimens involving three or more antidiabetic agents in 46 % (n = 46). Metformin was the most frequently prescribed OHA (92 %, n = 92), followed by sulfonylureas (58 %, n = 58) and DPP-4 inhibitors (34 %, n = 34).

Association between demographic variables and treatment patterns

Inferential analysis demonstrated a significant association between duration of diabetes and insulin use (χ^2 (2, N=100) =14.6, p=0.002), with insulin therapy more common among patients with diabetes duration greater than ten years. Polypharmacy (≥3 agents) was also significantly associated with longer duration of diabetes (χ^2 (2, N=^{2} (11.9, p=0.003).

Sex was not significantly associated with insulin use (χ^2 (1, N=100) =1.24, p=0.26). Patients residing in rural areas were more likely to receive OHA alone compared with those in urban or municipal settings (χ^2 (2, N=100) =6.18, p=0.045).

Qualitative Findings on Medicine Use

Table 2 presents characteristics of the 25 interview participants, who reflected variation in treatment modality, regimen complexity, and duration of diabetes. Interviews with the 25 participants revealed detailed accounts of how prescribed medicines were incorporated into daily life. Four recurrent patterns were identified, with complexity varying by treatment regimen and duration of diabetes.

Medicines as Long-Term Components of Daily Life

Participants commonly described diabetes medicines as permanent features of daily routines, particularly among those receiving OHA alone. Medicine intake was frequently linked to meals and habitual activities.

"Morning tea is there, breakfast is there, tablet is also there. Everything happens together now." *(Participant 4, male, OHA alone)*

Several participants described an early expectation that medicines would be temporary, followed by acceptance of lifelong use.

"In the beginning, I thought I can stop tablets after sugar comes down…but now it is like brushing teeth."*(Participant 9, female, OHA alone)*

Participants with long standing diabetes mellitus had well established routines and fewer missed routines.

Managing Multiple Medications and Regimen Complexity

Participants who were prescribed multiple antidiabetic agents described various organizational strategies. Some participants separated tablets by time of day. Others coordinated doses with meal timings, and most participants adjusted timing of doses to fit work schedules.

"Morning tablets separate. Evening tablets separate."

(Participant 12, female, three OHA)

Those with three or more agents often described managing diabetes medicines alongside treatment for other chronic conditions.

"BP tablet, sugar tablet, cholesterol tablet – all are there." *(Participant 17, male, ≥3 agents)*

Adaptations Following Insulin Initiation

Participants receiving insulin described marked changes in routines and self-care practices. Insulin was viewed as requiring more planning than tablets.

"Tablet you can take anywhere. Injection you have to plan." *(Participant 21, female, OHA + insulin)*

Reported adaptations included fixed injection schedules, meal-time adjustments, injection-site rotation, increased glucose monitoring, and carrying insulin and glucose supplies when outside the home.

"If I go out, pen and sugar tablet must be in bag". *(Participant 22, male, OHA + insulin)*

These practices occurred alongside continued OHA, resulting in combined OHA and insulin routines.

Participant Involvement in Day-to-Day Medicine Management

Many participants described actively managed medicine timings so as not to miss doses. Some participants substituted OHA brands based on cost reflecting practical adaptations to daily circumstances.

"If I eat lunch late, tablet also will be eaten late". *(Participant 8, female, OHA alone)*

"Doctor writes one medicine but sometimes shop gives another name". *(Participant 5, male, dual therapy)*

Mixed-methods integration

Integration of quantitative and qualitative findings was undertaken at the interpretation stage by directly linking prescribing patterns identified in the audit with medicine-use practices described in interviews. The integration of drug utilization data and in-depth interviews showed a close alignment between prescribing patterns of diabetes medicines and lived medicine-use practices (Figure 1). Participants who were receiving OHA alone described relatively stable daily routines. In contrast, those prescribed multiple diabetes medicines reported need of greater organizational effort around medicine use, reflecting higher regimen complexity.

Participants taking concurrent OHA with insulin had layered routines involving both tablets and injections. Longer duration of diabetes, which was associated with insulin use and polypharmacy quantitatively, was reflected qualitatively in more established but complex self-management practices.

Overall, drug utilization patterns identified through the study were observed to be enacted through specific, observable behaviors in daily life, thus demonstrating coherence between quantitative prescribing data and participant-reported medicine use. Drug utilization study data demonstrate variation in treatment modality and regimen complexity. Increasing treatment intensity corresponds to progressively complex daily routines and self-care practices reported by participants.

Discussion

Medication adherence in Indian and other low – and middle-income settings is variable and often suboptimal, underscoring the importance of understanding lived medicine-use practices [25, 26]. This study examined drug utilization practices in outpatient diabetes care by using a mixed-methods approach. A drug utilization study of 100 patients was conducted followed by in-depth interviews with 25 purposively selected participants. In this study, rather than focusing

solely on prescribing patterns, we explored how these prescriptions are translated into everyday medicine use. By linking quantitative findings with patient experiences, the study provides insight into how diabetes medicines are incorporated into daily routines and adapted over time.

Most patients in this study received OHA alone for managing diabetes mellitus. Nearly one-third participants received insulin in addition to OHA. Combination therapy with OHAs was observed to be common. Almost half of the patients were prescribed three or more antidiabetic medicines. These findings reflect routine treatment intensification in diabetes care. However, the qualitative findings demonstrated that increasing treatment complexity influenced daily life in ways that cannot be captured by prescription data alone. Recent pharmacy-based and hospital studies highlight the prevalence of polypharmacy in diabetes and its potential to increase regimen complexity and treatment burden [2, 27].

A statistically significant rural–urban difference in prescribing patterns was observed in this study, with patients residing in rural areas more likely to receive OHA alone. Although this study did not examine underlying determinants, possible contextual explanations may include differences in healthcare access, affordability of insulin therapy, and availability of monitoring resources (28). Local reports and studies also emphasise challenges in insulin availability and affordability, particularly in rural or resource-limited settings, which can shape patient adaptations to prescribed regimens [29, 30].

Participants in this study had come to regard diabetes medicines as long-term or lifelong companions. Metta et al reported similar accounts of diabetes patients among adults in Southeastern Tanzania [31]. Many participants described an initial period of adjustment when treatment was initiated. This stage was followed by gradual acceptance that medicines would remain part of everyday life. Over time, the medicine use had become habitual for many participants and was closely linked to daily routines such as meal timings. This linking of medicine use to daily routine has been noted by Ahmad et al in a study on medication taking behavior among diabetics in Australia [32]. Many participants described how they planned their day around medicine dosing times and how they always kept their medicines in visible places. [32] Some participants had developed fixed morning and evening routines so as not to miss medicine timings. These experiences explain how changes in treatment such as addition of new medicines or insulin, are often perceived as significant transitions by the patients and not as routine clinical steps [33].

Participants who were prescribed multiple antidiabetic agents described resorting to several practical strategies for managing several medicines each day. Practices such as separating tablets by time of intake, relying on phone reminders or family support, and adjusting dosing schedules of medicines for accommodating work and daily activities were observed to be common. This has been reported in other similar studies in patients with diabetes mellitus. [31, 32]. Many participants also coordinated diabetes medicines with treatments for other coexistent chronic conditions, thus increasing the overall burden of self-management of medicines [34]. These descriptions illustrate how regimen complexity of treatments translates into sustained cognitive and organizational effort for participants [35].

Many participants described insulin initiation as particularly demanding in terms of self-care. [36, 37]. Most participants prescribed insulin continued OHA alongside insulin, resulting in layered routines involving both tablets and injectable therapy. Participants described adjusting meal timings, learning injection techniques, rotating injection sites, blood glucose monitoring, and carrying injection supplies and glucose monitors when outside the home [38, 39]. Similar routines has also been reported by Ahmad *et al.*, [32]. These practices shows that insulin initiation increases treatment burden by adding new responsibilities [40].

Many participants described active involvement in managing medicine use. This included adjusting dosing times to work timings and travel. These behaviors reflected practical responses to daily circumstances and not deviance from prescribed drug regimes [41].

Methodologically, the study demonstrates the value of integrating drug utilization studies with participant perspectives to better understand how medicines are used in real world.

Several limitations should be acknowledged. This study was conducted in a single tertiary care centre, and hence may limit transferability to other healthcare settings. The cross-sectional design of the study does not capture longitudinal changes in medicine use over time. Although education level and comorbidities were described, the quantitative component was designed primarily to examine antidiabetic prescribing patterns rather than predictors of treatment variation. Multivariable modelling was beyond the scope of the study. In addition, qualitative findings are based on self-reported accounts and may be subject to recall bias. The study did not measure clinical outcomes; therefore, conclusions relate to medicine-use practices rather than treatment effectiveness.

4. Conclusion

Drug utilization in outpatient diabetes care extends beyond the simple act of prescribing to include patient routines, interpretations, and everyday adaptations. By integrating drug utilization data with patient interviews, the study highlights that medicine use in diabetes is a negotiated process shaped by treatment intensity, self-care demands, and daily life constraints.

In this context, "negotiated" refers to the practical adjustments patients described in response to prescribed regimens, including timing modifications, management of missed doses, and integration of insulin into daily routines.

A key strength of the study lies in its mixed-methods design, which directly linked prescribing patterns with patient experiences and addressed an important gap in conventional drug utilization research. Within its limitations, the findings support the study objectives and underscore the importance of incorporating patient perspectives when evaluating medicine use in chronic disease management.

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Conflict of Interest

The authors declare no conflicts of interest.

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