

# Medication Bias During the Hospital-to-Family Transition Among Young and Middle-Aged Chinese Patients with Type 2 Diabetes: A Qualitative Study

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**Objective:** This study aimed to examine the prevalence of medication non-adherence among young and middle-aged Chinese individuals diagnosed with type 2 diabetes, and to explore the underlying causes of such deviations.

**Methods:** The Medication Discrepancy Tool (MDT) was used to assess medication deviations in a cohort of 100 patients who had been discharged from the hospital. Furthermore, 15 subjects were interviewed to gain a better understanding of their medication non-adherence experiences.

**Results:** The rate of medication deviation in the studied cohort was 79.5%, with the most frequent deviation being a reduction in the types of drugs taken. The primary cause of this deviation was found to be patient-derived, with the most common reason being symptom improvement. Iatrogenic medication deviation was most often caused by incomplete or inaccurate medication education for medical staff at discharge, resulting in patients having to guess their own medication. Internal and extrinsic motivating factors were identified as the primary causes of medication deviation behavior.

**Conclusion:** This study has demonstrated that medication non-adherence is a major issue among young and middle-aged Chinese individuals diagnosed with type 2 diabetes. Therefore, it is essential for nurses to be aware of the importance of medication adherence management and working.

**Keywords:** young and middle-aged, type 2 diabetes mellitus, medication deviation, transitional phase

## Introduction

In 2019, the total number of patients with diabetes worldwide rose to an unprecedented 463 million, with alarming projections indicating an expected surge to as many as 700 million by the year 2045. An alarming trend is also observed in China, where the number of adults with diabetes has surpassed 114 million as of present. Of particular concern is the rapid increase in diabetes prevalence among young and middle-aged demographics, who now face complex and long-term health complications that pose significant challenges.<sup>1</sup>

Drug therapy is a crucial approach to manage and alleviate the condition of patients with diabetes.<sup>2</sup> Due to the presence of multiple complications and chronic diseases in patients with diabetes, they often require a combination of medications, which in turn leads to a significant rise in the occurrence of adverse drug events during the hospital-home transition period.<sup>3,4</sup> This period is defined as the eight-week duration following hospital discharge, during which patients are returning home.<sup>5</sup> The term “transitional medication deviation” pertains to the variance between the prescribed medication and the actual one consumed by the patient in the transition period between different medical facilities.<sup>6</sup> A study examining medication deviation reported a 48.1% prevalence of this issue during hospitalization, which then rose to 61.2% one month post-discharge.<sup>7</sup> Dubai a study showed that 64.6% of adults with diabetes were considered not to be taking their medication.<sup>8</sup>

Medication errors have long been regarded as indicators of healthcare quality. Therefore, managing medication deviations is a crucial strategy to ensure medication safety for diabetic patients. In the 2020 Patient Safety Goals (NPSGs), the American Joint Committee for Hospital Accreditation has identified addressing medication bias and ensuring accurate medication use during transitional periods as vital management measures towards global patient medication safety goals. While previous studies have looked into medication bias among diabetic patients, most of these studies have been limited to cross-sectional studies with large sample sizes, and have neglected comprehensive studies on the transitional periods of individuals within specific developmental processes.

This investigation employed a questionnaire survey method along with the interview method to examine the prevalence of medication deviation during the hospital-family transition period among young and middle-aged patients suffering from type 2 diabetes, as well as to analyze their psychological experience of medication deviation.

## Method

### Study Population

One hundred young and middle-aged patients diagnosed with Type 2 diabetes, who were admitted to the Endocrinology Department of the hospital between February and November 2021, were purposefully selected for the study using the intentional sampling method.

The present study employed inclusion and exclusion criteria to identify eligible participants. Inclusion criteria comprised the following: (1) diagnosis of type 2 diabetes based on the Chinese Diabetes Prevention and Control Guidelines 2017 Edition of the Diabetes Branch of the Chinese Medical Association; (2) age range of 18–59 years according to the United Nations World Health Organization classification; (3) normal cognitive function and proficient language skills; and (4) willingness to participate in the study. In contrast, gestational patients with diabetes and newly diagnosed patients with diabetes were specified as exclusion criteria. Of the study population, 68 females and 132 males were included, with disease duration ranging from 2 to 9 years (mean=5.15±2.25 years) and age ranging from 27 to 57 years (mean=40.67±8.04 years). The interview portion of the study adopted a purposeful sampling approach where the selection of participants was guided by the principle of information saturation until no new topics emerged during data analysis.

In total, 15 patients were interviewed and their identities have been anonymized for privacy reasons, being referred to as N1 to N15. [Table 1](#) displays the general information of the interviewed patients.

We hereby affirm that our study adheres to the principles stated in the Declaration of Helsinki. This study was approved by the Ethics Committee of Changzhou Hospital of Traditional Chinese Medicine, China, under the approval number: 2022-L-L-035(s).

### Research Tools

The General Information Questionnaire was devised by the researcher and encompasses demographic factors such as gender, age, marital status, educational level, living style, and type of medical insurance.

In 2004, Smith and colleagues developed the Medication Discrepancy Tool (MDT) which effectively detects medication discrepancies and delineates their underlying causes through patient-derived and iatrogenic factors. As the most comprehensive tool for medication bias assessment utilized by physicians, pharmacists, and nurses, MDT's structure served as the basis for cultural adaptation and refinement of Xiuying et al<sup>9</sup> resulting in a Chinese version of the MDT evaluation items.

An assessment of the two-component Chinese version of the MDT was conducted to evaluate prescription accuracy and investigate medication bias in patients. In the process, a total content validity score of 0.97 and inter-rater reliability of 0.84 were established. To gain further insights into the reasons for medication deviation, patients and their families were contacted and relevant medical records were examined. These records included discharge summaries, drug prescriptions issued before discharge and nursing records during hospitalization. The data gathered was then comprehensively analysed to ascertain the root causes of medication deviation.

**Table 1** Demographic and Sociological Data of the Respondents

Numbering	Gender	Marital Status	Educational Level	Age (Years)	Course of Disease (Years)	Career	Number of Drugs	Payment Method	Living Style
N1	Female	Married	Senior Middle School	36	5.5	Workman	2	Self-Pay	Live Alone
N2	Male	Widowed	Technical Secondary School	57	8	Driver	3	Medical Insurance	Cohabitation
N3	Female	Married	Junior High School	41	7	Unemployed	2	Medical Insurance	Cohabitation
N4	Male	Married	Undergraduate	44	4.5	Clerk	1	Medical Insurance	Cohabitation
N5	Female	Unmarried	Undergraduate	32	2.3	Saller	3	Medical Insurance	Live Alone
N6	Male	Married	Senior Middle School	50	8	Self-employed	2	Medical Insurance	Live Alone
N7	Male	Unmarried	Master	29	3	Student	4	Medical Insurance	Cohabitation
N8	Female	Married	Senior Middle School	36	6.4	Clerk	2	Medical Insurance	Cohabitation
N9	Female	Married	Undergraduate	45	4	Designer	1	Medical Insurance	Cohabitation
N10	Male	Married	Junior High School	43	5.6	Driver	3	Self-Pay	Cohabitation
N11	Female	Married	Undergraduate	39	3.8	Accountant	3	Medical Insurance	Cohabitation
N12	Male	Married	Undergraduate	40	2	Saller	2	Medical Insurance	Cohabitation
N13	Male	Divorced	Undergraduate	42	5.8	Self-employed	2	Medical Insurance	Cohabitation
N14	Male	Married	Junior High School	49	9	Workman	1	Medical Insurance	Live Alone
N15	Female	Unmarried	Undergraduate	27	2.4	Teacher	3	Medical Insurance	Live Alone

## Data Collection

This study utilised a phenomenological research method to investigate the psychological experience of medication bias in young and middle-aged patients with type 2 diabetes, as informed by Dodson's law. A questionnaire survey was conducted via Questionnaire Star, with all 100 distributed questionnaires being recovered and analysed, achieving an effective recovery rate of 100%. Subsequent semi-structured interviews and public method based on the network were conducted, with the data collected subject to thematic analysis to identify pertinent themes. Prior to each interview, a trust relationship was established with the interviewee, and their consent was obtained for the purpose and process of the interview.

The interview outline comprises the main experience, tracking questions, and exploratory questions. Based on the research purpose and literature review, the researchers prepared the initial interview outline and conducted pre-interviews with three young and middle-aged patients with type 2 diabetes. Following several iterations, the final interview outline was established. The interview questions consisted of the following: (1) Elaborate on your long-term experience and emotions regarding hypoglycemic medication use; (2) Describe the psychological changes you have experienced during the course of medication use and the most significant impact it has had on you; (3) Have you taken any initiative to rectify medication deviation, if any; (4) Discuss the level of pressure you have faced during this period and how it has been managed; and (5) What are your future plans in regards to managing your diabetes?

In-depth interviews were conducted with 15 participants to elicit a natural dialogue. Due to the limited conditions, this research was predominantly online-based, focusing on the self-narration and expression of the interviewees. Interview recordings were transcribed into text on the same day, with each interview lasting between 30–40 minutes. Dodson's Law served as a basic framework model, providing an outline to which details and tracking questions were continuously deepened, supplemented and expanded.

## Statistical Methods

Data were acquired and analyzed using SPSS 22.0 statistical software. Descriptive statistics were used to provide an overview of the research subjects, with measurements expressed as means and standard deviations. A significance level of  $\alpha=0.05$  was adopted. Interview data were analyzed using Colaizzi's 7-step phenomenological approach.

## Results

The current study examines the prevalence of medication deviation in young and middle-aged patients with type 2 diabetes mellitus. Out of the 100 patients evaluated, a staggering 75 (75%) participants experienced at least one medication deviation within 2 weeks after discharge. In total, the number of medication deviations amounted to 158. The majority of patients, 90 (57.0%), incurred one deviation while 60 (37.8%) had two deviations. Meanwhile, the percentage of patients that had three deviations was 3.8% ( $n=6$ ) and 1.3% ( $n=2$ ) had four or more deviations. Please refer to [Table 2](#) for supplementary details.

## Intrinsic Drive Disorders

### Perceived Fear of Disease

Fear emerged as the predominant stress response among the respondents, evidenced by various manifestations such as apprehension towards unforeseen complications, pain caused by treatment and adverse reactions, costly medical expenses, and the perceived insecurity of their future life. The pervasive sense of uncertainty and loss of control triggered by excessive fear markedly compromises the quality of life of patients.<sup>10</sup>

This study examined young and middle-aged individuals, who are the backbone of society, the main force of the family, and the core leader of the future. These individuals play multiple social roles and are tasked with the long-term challenge of diabetes treatment. During the interviews, it was determined that they generally attributed hypoglycemia to improper diet and the use of hypoglycemic drugs, suggesting a need for greater public education on the science of diabetes management.

**Table 2** Status of Medication Deviation in Young and Middle-Aged Patients

Type of Deviation	Frequency	Medication Situation
Increased Frequency	8	Hypoglycemic Drugs
Decreased Frequency	38	Hypoglycemic Drugs
Missed Medication	49	Hypoglycemic Drugs + Insulin
Irregular Medication	3	Hypoglycemic Drugs + Insulin
Dose Increase	10	Hypoglycemic Drug + Insulin + Lipid-lowering Drug
Dose Reduction	18	Hypoglycemic Drugs
Method Error	6	Hypoglycemic Drugs
Drug Substitution	2	Hypoglycemic Drug + Insulin + Lipid-lowering Drug
Time Error	9	Hypoglycemic Drugs
Reduction in Variety	7	Hypoglycemic Drugs + Insulin
The Variety Increases	6	Hypoglycemic Drugs
Repeated Medication	2	Hypoglycemic Drugs + Insulin

The recent study of Bekele et al<sup>11</sup> has found that individuals living with chronic illness can experience a depletion in their capacity for empathy, such as numbness and indifference, and have autonomously generated fear. Participant experiences from the study, such as N1's apprehension about potential side effects from taking more medication and N4's fear of becoming blind, further support this notion. N8 further highlighted the annoyance of taking medication and the fear of missing doses as barriers to socializing outside. In addition, N4 commented on the potential burden of their illness on their elderly family members.

### Low Self-Efficacy

Young and middle-aged patients with prolonged work fatigue were found to have decreased self-efficacy, leading to a lower capacity for adhering to prescribed medication regimens. This was further evidenced by the study participants, who reported underestimating or overestimating their abilities in the early stages of discharge. A gradient in self-efficacy was observed, however, as the duration of the medication process increased. Narratives such as "I started to become very irritable, and I refused to take medicine because I thought it couldn't be cured" (N5) and "Taking medicine, the more you think about it, the more annoying you are" (N14) further support the notion that self-efficacy is an important indicator of medication adherence.

### Damaged Self-Worth Image

This study found that a patient's medication compliance can be independently affected by the opinion of their colleagues. Maslow's "Theory of Human Motivation" and Hegel's practical philosophy of "self-actualization ethics" provide a theoretical basis for the observed reactions and low self-esteem among respondents. Results indicated that four respondents experienced negative emotions such as loss, depression, anger, and overwhelm, and reduced their social activities due to their poor self-image and nervousness. Additionally, respondents N6 and N9 reported that their moods affected their willingness to take medication, with N6 noting that the sympathetic and strange looks from colleagues induced a lot of fluctuation in mood. N9, on the other hand, cited an understanding of their physical condition as the basis for their self-determined dosage.

## Extrinsic Drive Disorders

### Poor Social Support

The onset of illness among young and middle-aged people, often a primary source of income for their family, may lead to job loss, resulting in difficulty in covering essential expenses and consequently a deterrent to effective medication adherence.<sup>12</sup>

The presence of a chronic disease can have a significant impact on the dynamic between husbands and wives. In order to cope with the disease, many individuals take medication on a daily basis, as exemplified by N9, who avoids taking medicine in the presence of family members. N7 and N8, however, exhibit a heightened sense of caution and limit their

intake of medication, with N7 expressing fear of the effects on finding a partner. N8 is faced with the challenge of maintaining a healthy diet in the face of a hectic work environment. Similarly, N11 is unable to take medication in the presence of clients, necessitating a wait until the conclusion of the engagement. Lastly, N10 highlights the emotional burden of managing a chronic disease, with the individual resorting to taking extra medication in order to cope.

In conclusion, to improve standards of care for young and middle-aged type-2 diabetes mellitus (T2DM) patients, it is essential that governments take the lead in strengthening diabetes management systems, providing reliable occupational security and encouraging family participation in the health management of patients, including the provision of diabetes management training for spouses to further strengthen family cohesion.

### Lack of Information Support

The transition period after being discharged from hospital can be a challenging time for patients with regards to health-promoting behaviour, particularly in terms of their participation and awareness of treatment and blood sugar management. In a study of patients' experiences, many reported inadequate information support and limited access to specific diet recipes, leading to reliance on online sources such as Baidu to find dietary advice.<sup>13</sup> Additionally, they perceived the information they had been provided to be targeted primarily at elderly patients.

Respondents expressed a need for increased education on diabetes from medical professionals and community-based activities for middle-aged and young patients. One respondent stated, "I'm so busy, and I don't have time to pay attention to too much information about diabetes", while another noted

I feel that I am so young and I am in the stage of career advancement, neither have the extra time to attend the free clinic lectures of some hospitals nor have the time and energy to manage so much.

These comments suggest a need for improved educational opportunities to ensure proper diabetes management.

### Weak Disease Warning

Maslow suggested that the essential requirement for individuals is the need for security. When this is ensured, a propensity to strive for self-development and positive conduct is likely to be observed. In interviews, the majority of elderly people with diabetes reported that the condition is a long-term ailment, and the consequences are not as severe as commonly assumed. N7 commented, "I don't think other bodily functions are affected except by dietary restrictions."

## Discussion

### Medication Deviations: Diverse Forms and Negative Experiences

This survey found that young and middle-aged patients with type 2 diabetes have various forms of medication deviation, and at the same time, different psychological experiences, which is consistent with the results of related research.<sup>14</sup> Another study indicated that a sense of love and responsibility for family and society can promote healthy behaviors that are essential for efficient patient compliance.<sup>15</sup> Despite this, the respondents in the study still failed to recognize the importance of correct medication intake, as well as the diverse negative psychological experiences that accompany medication bias. Furthermore, this study demonstrated a mediating effect between medication bias and emotional distress, suggesting that positive beliefs may be effective in improving medication bias to a certain extent.

During the interviews, the participants expressed negative psychological experiences and identified various maladaptive defense mechanisms, negative consequences, and unfavorable behaviors. Such strategies possess the capacity to mitigate adverse emotions associated with drug resistance in young and middle-aged individuals with type 2 diabetes, as well as promote the development of internal and external protective factors. These protective factors further promote psychological resilience, curtail negative responses, mitigate scientific pessimism, endorse positive social interactions, and facilitate effective life organizational planning, thereby enabling individuals to cope more efficiently with the dual challenges of work and life.<sup>16</sup>



## Multi-Dimensional Risk Management Support

Risk management strategies for the medication process can be improved through the establishment of a patient-led medication safety self-examination system, the initiation of “medication safety analysis meetings” to facilitate communication, and the provision of advice and suggestions to identify potential safety hazards and improvement points.<sup>17</sup> Additionally, patient participation in medication knowledge training can improve training effectiveness. Consequently, a closed-loop system involving all stakeholders to participate in and monitor the improvement process is essential.<sup>18</sup>

The interactive and other methods used by medical personnel to conduct health education have the potential to reduce the risk of disease and improve future outcomes. However, Young and Middle-Aged people patients frequently lack proper attention and care, highlighting the need for greater social support. To this end, we should encourage and affirm them, create a positive working atmosphere and implement flexible management. Furthermore, community-level research into the family situation and existing problems should be conducted in order to address any practical difficulties. Additionally, the introduction of automated health systems featuring communication and patient safety tools can ensure the Young and Middle-Aged people enjoy fair and just employment, promotion and other legitimate rights and interests.

We explore the potential of guiding rational thinking about health behaviours among those with a cognitive response to the disease, in order to assist the parents of affected children in establishing a positive coping style and a strong mentality in facing future life. Good social support, together with deep cognitive processing, can be leveraged to pay attention to the present and take steps to avoid any potential misalignment with medication.

## Guidance for Medication Predicament

The application of evidence-based medicine has driven the proliferation of shared decision-making as the predominant paradigm of clinical decision-making. Results of a study by Karagiannis et al<sup>19</sup> indicate that paternalistic decision-making ignores autonomy, fails to respect the patient’s right to choose, and may lead to decision-making dilemmas. Moreover, a simple and curt approach to decision-making can lead to poor patient satisfaction regarding the medical treatment process and patient compliance. To ensure optimal outcomes, it is essential to encourage all parties to engage in a comprehensive evaluation of the benefits and risks of taking the drug, and to make a decision that is consistent with the patient’s values and preferences. Results of a medication bias assessment tool revealed a high incidence of missed medication and voluntary reduction of medication frequency; this may be attributed to the inability of families to assume their roles and functions, leading to heightened conflicts and economic burden, which consequently reduces the patient’s confidence in treatment execution and cognitive function.

Naturally, this is solely an initial investigation into medication deviation within the domain of chronic diabetes management. Subsequent research could utilize affirmative psychological intervention techniques such as remote prompts and stress mitigation. Concerned entities must adopt comprehensive safeguard procedures, including a thorough electronic medication management system and a medication error reporting protocol, to ensure patients adhere to proper medication procedures and receive precise diagnosis and treatment information. Through targeted approaches focused on critical factors, patients can be assisted in breaking free from medication-related dilemmas in a scientifically-sound manner.

## Conclusion

This study revealed that young and middle-aged individuals with type 2 diabetes manifest generally low executive ability, multiple negative psychological tendencies, weak self-disease warning signals, and a limited understanding of the ailment. In light of being the primary healthcare providers, medical institutions ought to adopt a scientific and comprehensive approach towards drug management, while delivering essential psychological support throughout the management process. Early warning educational campaigns have the potential of restoring patients’ confidence in taking their medication, expanding the scope of extended care, and offering full support service to diabetic patients. Moving forward, it is imperative to diversify the intervention approaches by leveraging the power of the internet, developing internet-based platforms and hosting online sharing meetings to facilitate intervention. Furthermore, it is essential to

explore the influencing factors of drug adherence amongst young and middle-aged patients and institute appropriate intervention measures to improve the pertinence of the intervention content.

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## Limitations

The study subjects were exclusively sourced from tertiary hospitals, potentially limiting the sample's diversity; the reported events by the subjects may have been influenced by reporting bias, and data extraction may have lacked emotional sensitivity. Our future research will place emphasis on addressing the sample's heterogeneity, further exploring and elucidating the spiritual requirements of patients.

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## Disclosure

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