

Polypharmacy Experience of Middle-Aged and Elderly Patients with Type 2 Diabetes Comorbidity: A Qualitative Study

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Purpose: To reveal the real experience of polypharmacy in middle-aged and elderly patients with type 2 diabetes comorbidity, based on the Common-Sense Model of self-regulation (CSM).

Patients and Methods: With the method of purposive sampling, 15 middle-aged and elderly patients with type 2 diabetes comorbidity hospitalized in the endocrinology department of a tertiary hospital were selected for semi-structured interviews. Using the Colaizzi's seven-step method to analyze and organize the interview results.

Results: 4 themes and 9 subthemes were identified and organized based on the Common-Sense Model of self-regulation: cognitive representation (cognitive struggle in coexistence with medicines, physical discomfort and adjustment, expectations for treatment methods); emotional representation (memory burden, space management burden); coping strategies - negative and positive responses (negative emotions related to polypharmacy, self driven); external factors (family support feels helpful, medical staff support feels relieved).

Conclusion: The psychological experience of middle-aged and elderly patients with type 2 diabetes comorbidity in the course of taking medicine includes the interaction of cognitive and emotional representation, coping strategies and external support system at all levels. Medical personnel should clarify patients' treatment burden, polypharmacy burden, self-management workload, coping strategies and effective support system during the medication process, in order to provide patient-centered medicine care and achieve more ideal emotional and health outcomes.

Keywords: diabetes mellitus, comorbidity, polypharmacy, qualitative research, common-sense model of self-regulation

Introduction

The comorbidity of diabetes has become a serious health problem. Comorbidity refers to the same patient having two or more diseases simultaneously.¹ In the group of diabetes patients, comorbidity is extremely common. Related large sample research results show that 83.3% of middle-aged and elderly patients with type 2 diabetes are comorbidity.² Compared with single disease, comorbidity of diabetes is one of the key factors threatening health aging. The presence of comorbidities can greatly shorten the life expectancy of patients, with an average loss of life of 5.4 to 6.8 years per person.³ And often face greater challenges in disease management. These patients have relatively poor physical function, usually requiring the use of multiple medications, and the frequency of medical resource utilization is also higher.^{4,5} In addition, comorbidities can further exacerbate the economic pressure and treatment burden on patients.⁶ Therefore, comorbidities have a profound impact on the clinical prognosis, psychological state, and treatment burden of patients.

Medication management is a crucial part of daily health management. Regular medication can enable patients to more effectively control their blood glucose levels, thereby avoiding the occurrence of complications.⁷ However, the complexity of medication regimens not only increases the risk of side effects and medicine interaction events,^{8,9} but also increase

the medication burden on patients, reduce their quality of life and medication adherence.^{10,11} Furthermore, it affects the patient's blood glucose control level and re-hospitalization rates.^{10,12}

In the research field of medication adherence of diabetes patients, cross-sectional research currently occupies a leading position. For example, Ahmed et al¹³ investigated many influencing factors of medication adherence of patients with diabetes through cross-sectional study. Qualitative research can reveal the true feelings of nursing objects that are difficult to quantify numerically in nursing practice, and providing strong support for developing personalized nursing plans.

The Common Sense Model of illness self-regulation¹⁴ suggests that when individuals face health threats, they will form two relatively independent self-regulation systems: cognitive representation (including their experiences with medication and the degree to which diseases affect their lives) and emotional representations (emotional reactions caused by health threats) and coping processes, the patient's cognitive and emotional representation will directly or indirectly affect the emotional outcome and disease outcome through coping style, at the same time, the social and cultural environment in which an individual operates will also play a regulatory role throughout the entire process.

This study adopts descriptive phenomenological research methods, based on the Common Sense Model of self-regulation, through semi-structured interviews with middle-aged and elderly patients with type 2 diabetes comorbidity with a wide variety of medication types, to deeply explore the emotional outcomes and disease outcomes related to the emotional outcomes in the Common Sense Model of self-regulation, that is, patients' experience in the process of polypharmacy and medication adherence affected by emotional outcomes and directly related to disease outcomes. To provide scientific recommendations for establishing a comprehensive and effective medication treatment nursing model, in order to reduce the difficulties and negative pain experiences faced during the polypharmacy process, effectively leverage promoting factors, and thereby improve patients' medication compliance and health outcomes.

Methods

Design

The core of descriptive phenomenology lies in exploring the essence of lived experience. Through multiple interviews and in-depth analysis, researchers have taken the patient's perspective and comprehensively grasped the subjective feelings in the process of polypharmacy, covering multiple dimensions such as cognition, emotion, and behavior. Therefore, this study adopts descriptive phenomenological research and focuses on Interpretivism philosophical orientation to deeply understand the inner experience of polypharmacy in middle-aged and elderly patients with type 2 diabetes comorbidity. Follow COREQ's standards in the design and reporting process.¹⁵

Setting and Participant

The data collection was conducted in the endocrinology ward of a tertiary hospital in Liaoning Province, China. Due to the complexity of medication regimens for hospitalized patients, the ability to maximize the presentation of the emotional experience of "polypharmacy" constitutes the phenomenon explored in this study, which is conducive to obtaining a "thick description" for more comprehensive consideration of the types of polypharmacy experiences of patients in the future. The hospital has a large number of patients and is concentrated, and the research team has a cooperative relationship with the hospital. Therefore, this hospital was selected as the recruitment point.

Through the purposive sampling method, the principle of maximum differentiation is followed to ensure the diversity of patients in terms of age, gender, education level, residence, course of diabetes, types of combined diseases. Inclusion criteria include (1) patients with type 2 diabetes diagnosed by doctors, (2) patients with one or more chronic diseases besides type 2 diabetes, (3) patients over 45 years of age, and (4) patients taking five or more medications. Excluded patients who are unable to communicate normally.

Data Collection

The interviewer is a female nursing graduate student who has obtained the English CET-6 and nursing qualification certificate, and has received systematic training in qualitative research methodology and has a dual identity as a student nurse in the

endocrinology department and a qualitative researcher. The identity of an student nurse familiarizes researchers with the patient's condition, and also establishes a good trust relationship. At the same time, in order to avoid desirability bias and power imbalance caused by participants viewing the interviewer as a member of the medical team, the researcher clearly informed the participants before the interview that I am currently a researcher, and the answers to the interview will not have any impact, in order to reduce the medical authority effect. During the interview process, the first author conducted semi-structured interviews in a face-to-face manner. Another researcher observed and recorded the interviewee's non-verbal information such as tone, intonation, facial expressions, and changes in body movements in detail. The final interview outline was presented in Table 1.

Data Analysis

After the interview, the researcher transcribed the interview data into text within 24 hours and supplemented it with on-site notes to verify the interviewee's facial expressions, silence time, and body movements at that time, forming a written document. And use the Colaizzi's seven-step method for data analysis.¹⁶

Two researchers independently and repeatedly read the transcribed text, extracted meaningful statements, constructed them into meaning units, and preliminary classified and integrated the codes into themes. Further, each theme will be described in detail to form the essential structure of polypharmacy use experience of patients, and be improved and optimized. Due to the clear viewpoints expressed by some patients during the interview process or their discharge and loss to follow-up, after a detailed description of the themes, this study will return to participants for formal member checking when necessary and feasible to confirm that the theme is in line with its original intention. The analysis results were not returned to all participants for formal member verification, but the core viewpoints were immediately reiterated to the participants after the interview, obtaining their initial confirmation.

During this process, the two researchers continuously discussed; return to the original text for inconsistent codes and discuss it again in context; timely resolution of differences to reach consensus. Throughout the entire data analysis process, the two researchers maintained an open and inclusive attitude, constantly reflecting on whether their personal values and identities had any potential interference or impact on the research results.

Ethical Considerations

Before the formal interview, the research team explained in detail the purpose and process of the study to the patients, promised to strictly follow the principle of confidentiality, and after obtaining the patient's consent, guided the interviewees to fill out the general information questionnaire (Figure 1) and informed consent form. After obtaining the patient's consent, the recording was made.

In order to protect the anonymity and privacy of participants, all identification information that may involve personal identity in the research results was replaced with numbers (such as N1, N2, etc).

Table 1 Semi-Structured Interview Outline

Interviewee	Interview Content
Middle-aged patients with type 2 diabetes comorbidity	(1) Can you briefly explain what medications you need to take every day now? What is the main treatment for?
	(2) Can you fully follow the doctor's advice to take the medication?
	(3) What is the biggest challenge you are currently facing while managing so many medications?
	(4) What are your feelings and experiences during the medication process?
	(5) Can you talk about the impact of medication on your daily life and social interactions?
	(6) What assistance or reminders have your family and medical staff provided in managing medication?
	(7) What other assistance would you like to receive?

General Information Questionnaire

Please check the appropriate options according to your own situation.

1. What is your gender? ① Male ② Female
2. What is your date of birth? _____ - _____ - _____
3. What is your level of education?
 - ① Primary school and below ② Junior high school ③ High school
 - ④ Undergraduate or associate degree ⑤ Graduate students and above
4. Your residence? ① Urban ② Rural
5. Your duration of diabetes? _____ years
6. What chronic diseases do you have?

☐ coronary heart disease ☐ hypertension ☐ osteoarthritis
☐ osteoporosis ☐ ischemic stroke ☐ arteriosclerosis ☐ diabetes nephropathy
☐ diabetes, others _____

Figure 1 General Information Questionnaire.

Rigor

In the research design phase, this study first conducted pre interviews, and then modified the interview outline based on the interview results and research group discussion results to determine the final interview outline, ensuring that the interview outline can cover the questions of this study.

During the interview process, the first author act as a researcher and maintains a neutral attitude and does not interrupt the interviewee's response to ensure that the research subjects can express their true experiences without reservation and avoid power desirability bias. A triangulation method of questioning participants and reviewing medical records to ensure the accuracy of data collection was used.

In the data analysis stage: After the interview, the research team promptly transcribed and reviewed the interview data. As the analysis deepens, constantly reflecting and adjust the codes.

Results

Participant Characteristics

This study interviewed a total of 15 patients who met the inclusion criteria and completed the interview. After interviewing the 11th participant, the explanatory dimensions of each code or theme began to reappear, and no other explanations were found. The depth of meaning of the code and theme was fully explored, the data has reached meaning saturation.¹⁷ Table 2 provides detailed data.

Table 2 Demographic Characteristics of the Participants

ID	Gender	Age (Years)	Education Level	Residence	Course of Diabetes (Years)	Types of Combined Diseases	Number of Medications Taken	Types of Medications Taken	Whether to Use Insulin or Not
1	Male	69	Junior high school	Urban	4	①②③⑥⑩	5	Antihyperglycemic agents Antihypertensive agents Antihyperlipidemic agents	Yes
2	Female	62	High school	Urban	8	①②③⑥⑦⑩	9	Antihyperglycemic agents Antihypertensive agents Antihyperlipidemic agents hypnotics	Yes
3	Male	53	High school	Urban	14	①②③⑥⑩⑪	10	Antihyperglycemic agents Antihypertensive agents Antihyperlipidemic agents Nephroprotective agents Neurotrophic agent	Yes
4	Female	63	Primary school	Rural	11	②③	8	Antihyperglycemic agents Antihypertensive agents Antihyperlipidemic agents	No
5	Female	70	Primary school	Rural	9	①⑤⑦⑪	5	Antihyperglycemic agents Antihyperlipidemic agents	Yes
6	Male	59	Junior high school	Urban	7	②③⑩⑪	7	Antihyperglycemic agents Antihypertensive agents Antihyperlipidemic agents	No
7	Male	56	High school	Urban	3	②③⑧	7	Antihyperglycemic agents Antihypertensive agents Antihyperlipidemic agents Nephroprotective agents	Yes
8	Male	45	Bachelor's degree	Urban	1	②③	5	Antihyperglycemic agents Antihypertensive agents Antihyperlipidemic agents	No
9	Male	73	Junior high school	Urban	10	⑧⑨	5	Antihyperglycemic agents Nephroprotective agents	Yes

(Continued)

Table 2 (Continued).

ID	Gender	Age (Years)	Education Level	Residence	Course of Diabetes (Years)	Types of Combined Diseases	Number of Medications Taken	Types of Medications Taken	Whether to Use Insulin or Not
10	Female	67	Primary school	Rural	8	②③⑨⑩⑪	6	Antihyperglycemic agents Antihypertensive agents Antihyperlipidemic agents Neurotrophic agent	Yes
11	Female	70	High school	Urban	5	①②③④⑤⑦⑩⑪	7	Antihyperglycemic agents Antihypertensive agents Antihyperlipidemic agents Neurotrophic agent	Yes
12	Male	59	Junior high school	Rural	8	②③	5	Antihyperglycemic agents Antihypertensive agents Antihyperlipidemic agents	Yes
13	Male	72	Junior high school	Urban	5	②⑥⑩⑪	5	Antihyperglycemic agents Antihypertensive agents Antihyperlipidemic agents Neurotrophic agent	Yes
14	Male	80	Primary school	Rural	18	③⑧⑨⑩⑪	6	Antihyperglycemic agents Antihyperlipidemic agents Nephroprotective agents Neurotrophic agent	Yes
15	Male	61	Primary school	Rural	3	②⑩⑪	5	Antihyperglycemic agents Antihypertensive agents	Yes

Notes: ①coronary heart disease; ②hypertension; ③dyslipidemia; ④osteoarthritis; ⑤osteoporosis; ⑥ previous chronic cerebral infarction; ⑦arteriosclerosis; ⑧diabetes nephropathy; ⑨ diabetes retinopathy; ⑩ Diabetic peripheral neuropathy; ⑪ diabetic peripheral vascular diseases.

Key Themes

Table 3 shows the themes and subthemes formed based on the interview results.

Theme 1: Cognitive Representation

Cognitive Struggle in Coexistence with Medicines

Patients' understanding of medicines is a dynamic cognitive process constantly constructed in their daily polypharmacy experience. Patients often worry about side effects during the treatment process, and this fear and anxiety caused by not taking medication lead to uncontrolled blood glucose levels, creating a dual pressure. In addition, some patients acknowledge the necessity of medication treatment, but still find it emotionally difficult to fully accept the transition of their life state to "lifelong medication". Strive to find a balance between worrying about side effects and craving to

Table 3 Themes and Subthemes

Theme	Subtheme	Codes	Representative Quotations
Cognitive representation	Cognitive struggle in coexistence with medicines	The interweaving of side effects and fear of disease development	Sometimes I also feel anxious. Not taking medication can cause high blood glucose, and taking medication can harm both the liver and kidneys. (N2) If (the medication is) stopped, blood glucose and blood pressure may rise, and the consequences for the body will be even greater. (N7)
		Rational cognition and emotional acceptance	I have also experienced anxiety, worrying about the side effects of medication, and fearing that I will have to take medication for the rest of my life. However, the doctor also told me precautions and advised me that medication is necessary to control the condition and reduce complications. (N6) I hope my body can recover to its previous state and return to normal life and work. Taking medication on time and in the right amount is a key step in achieving this expectation. (N7)
		Suspected efficacy	Sometimes it feels useless. After taking medicine for so many years, my blood glucose is still high and low. I just feel like it's just like that whether or not I take medicine. (N9) At the time of initial diagnosis, I was able to continue taking medication for a few days, but later on, my blood glucose levels did not drop much, so sometimes I stopped taking it. (N10)
	Physical discomfort and adjustment	Adverse effects	The side effects of these medicines also make me quite annoyed. (N7) This diabetes medicine works very well, but I always have urethritis. Then you have to drink a lot of water, if I cannot metabolize (so much water), my legs will swell. So, can this oral medication solve the problem of urethritis caused by this medication. This is a big problem. If you take this medicine, you will get urethritis and it will hurt when you urinate. Who can bear to have urethritis all day long? Who can endure it all day long? Oh, I have no choice. (N11)
		Confusion in attribution of physical discomfort	At the time of initial diagnosis, I was able to continue taking medication for a few days, but later on, my blood glucose levels did not drop much, so sometimes I stopped taking it. (N10)
		Response to adverse effects	I asked the doctor to adjust the timing of my medication and take it after the meal. (N8)
	Expectations for treatment methods	Desire for precise treatment	I just hope to prescribe the right medicine, ah, if the medicine is given well, then the blood glucose will be regulated well. (N5)
		Desires to surpass the limitations of current treatments	It is the stem cell of leukemia transplantation. Now diabetes has started in Shanghai. Will it be popularized in the future? It does not damage other organs, right? Whether you take hypoglycemic medications or get hypoglycemic injections now, they all damage other organs and have certain side effects. (N11)
Emotional representation	Memory burden	Memory decline perception	Now it's just. A decline in memory, like when I went out, locked the door, went downstairs, took a step, (thought again) locked the door, right? (I am) back again. (N1) And sometimes I forget. (N10)
		Polypharmacy memory burden	The timing and dosage of each medication are different, and sometimes it's easy to get confused when busy. (N7) That's too troublesome, some before and after meals (taking medication). I cannot remember. (N9)
		Negative emotions that interfere with memory	But sometimes I am lazy and speak my mind, sometimes I forget while taking and disturbing, and sometimes I forget. (N1)
	Space management burden	The conflict between coding medication rhythm and going out	Oh my god, wherever I go to play, I have to carry medicine and insulin in my bag. (N2) Every time I go out, I have to bring a big bag of medicine and a blood glucose meter, worried that there will not be any medicine to take on the way. (N7)
		Insulin carrying burden	I bought a refrigerated cup specifically for this insulin, which is very, very troublesome, but I cannot do it without it, because there's something wrong with my body, there is no way to deal with high blood glucose. (N11)
		Concerns about injection in public spaces	(When I traveling) Regardless of whether someone is there or not. Then I have to take medicine and get an injection when I need it. (N2)

(Continued)

Table 3 (Continued).

Theme	Subtheme	Codes	Representative Quotations
Coping strategies - Negative and positive responses	Negative emotions related to polypharmacy	Helpless anxiety	Although I know these medications are very important for controlling my condition, sometimes I still feel a little helpless and anxious when I think about relying on medications to maintain my health for the rest of my life. (N6) Sometimes when I look at those pills, I feel like I have too many health problems, a low mood, and anxiety. (N12)
		Injecting negative emotions	Are not you worried about taking medicine every day? Who takes medicine every day without worries, right? There must be troubles, can you get insulin and injections every day without worries? (N11)
	Self driven	Lead ourselves	It's necessary to take whatever the doctor tells you to take. If I do not follow the doctor's advice, why am I here to see a doctor? (N2) If taking medication is helpful for my illness, then I will take it. You have to have confidence, coming to this hospital has already cost money. (N14)
		Habituation	My mental state is okay, but sometimes I feel a bit drained if I do not take it. When I feel tired, I quickly take the medicine, which means you must have missed it. (N1) You have developed a habit, it's really uncomfortable not to take (medicine). (N3) After all, I have persisted for several years and many habits have been developed. (N6) All of them are chronic diseases that require long-term medication. I have become accustomed to them. (N15)
External factors	Family support feels helpful	Spouse guardianship	Stay with me, my spouse. Do not take medicine randomly, do not get lost, and pay attention to your diet. (N1) Sometimes during meals, my husband tells me it's time to inject insulin. Sometimes he reminds me, and sometimes I forget myself. Family reminder. Yes, helpful. (N11) My wife reminds me, helpful. She does everything efficiently, and my wife does (all the household chores). (N14)
		Children's reminder	My child is thinking to me here, otherwise I sometimes forget. (N5) My children also care about me very much. Help me buy medicine (at the pharmacy). (N13)
	Medical staff support feels relieved	Medical staff emotional support	The medical staff are very concerned when they come, and the question we ask is 'Do not forget to take your medicine, do not forget to take your medicine'. (N1)
		Medical staff information support	The medical staff all explained it very clearly. (N4)

control the condition. When medicines fail to bring visible improvements as expected, patients question the significance of medicine treatment and even gradually lose patience, no longer strictly following medical advice.

Sometimes I also feel anxious. Not taking medication can cause high blood glucose, and taking medication can harm both the liver and kidneys. (N2)

If (the medication is) stopped, blood glucose and blood pressure may rise, and the consequences for the body will be even greater. (N7)

I have also experienced anxiety, worrying about the side effects of medication, and fearing that I will have to take medication for the rest of my life. However, the doctor also told me precautions and advised me that medication is necessary to control the condition and reduce complications. (N6)

At the time of initial diagnosis, I was able to continue taking medication for a few days, but later on, my blood glucose levels didn't drop much, so sometimes I stopped taking it. (N10)

Physical Discomfort and Adjustment

Side effects constitute one of the most direct and troubling components of a patient's physical experience. The patient feels a sense of powerlessness between efficacy dependence and side effects. Faced with physical discomfort, patients undergo a complex attribution process, and this attribution confusion directly affects their medication behavior. Faced with the dilemma of side effects, some patients actively seek coping methods.

This diabetes medicine works very well, but I always have urethritis. Then you have to drink a lot of water, if I can't metabolize (so much water), my legs will swell. So, can this oral medication solve the problem of urethritis caused by this medication. This is a big problem. If you take this medicine, you will get urethritis and it will hurt when you urinate. Who can bear to have urethritis all day long? Who can endure it all day long? Oh, I have no choice. (N11)

At the time of initial diagnosis, I was able to continue taking medication for a few days, but later on, my blood glucose levels didn't drop much, so sometimes I stopped taking it. (N10)

I asked the doctor to adjust the timing of my medication and take it after the meal. (N8)

Expectations for Treatment Methods

When faced with diseases and side effects, patients also shift from passive acceptance to active seeking, hoping that doctors can accurately use medication to treat diseases more effectively. In addition, patients have become aware of the limitations of the current treatment model (side effects, lifelong dependence), which has given rise to deep expectations for medical breakthroughs. New technologies such as stem cell therapy have become symbols of hope for breaking free from medicine constraints.

I just hope to prescribe the right medicine, ah, if the medicine is given well, then the blood glucose will be regulated well. (N5)

It is the stem cell of leukemia transplantation. Now diabetes has started in Shanghai. Well, will it be popularized in the future? It doesn't damage other organs, right? Whether you take hypoglycemic medications or get hypoglycemic injections now, they all damage other organs and have certain side effects. (N11)

Theme 2 Emotional Representation

Memory Burden

The patient attributed the missed medication to the use of a variety of medicines, feeling a decrease in memory, and negative emotional interference related to medication, complex medication plans often exceed their memory load. Therefore, experiencing the prominent dilemma of memory burden during the medication process.

Now it's just a decline in memory, like when I went out, locked the door, went downstairs, took a step, (thought again) locked the door, right? (I'm) back again. (N1)

The timing and dosage of each medication are different, and sometimes it's easy to get confused when busy. (N7)

But sometimes I am lazy and speak my mind, sometimes I forget while taking and disturbing, and sometimes I forget. (N1)

Space Management Burden

For patients with diabetes comorbidity, they need to carry a variety of medicines when they leave their regular living space. The patients feel faced with many challenges, including the conflict between the fixation of medication time and going out activities. For patients who use insulin therapy, the special requirements of carrying insulin preservation when going out increase the space management burden. Moreover, performing injection activities in public spaces puts patients under social and psychological pressure.

Oh my god, wherever I go to play, I have to carry medicines and insulin in my bag. Regardless of whether someone is there or not. Then I have to take medicines and get an injection when I need it. (N2)

I bought a refrigerated cup specifically for this insulin, which is very, very troublesome, but I can't do it without it, because there's something wrong with my body, there is no way to deal with high blood glucose. (N11)

Theme 3 Coping Strategies – Negative and Positive Responses

Negative Emotions Related to Polypharmacy

Comorbidity patients face the challenge of long-term polypharmacy, which leads to negative psychological reactions. When patients realize the coexistence of multiple diseases, the complexity of the disease, the long-term nature of treatment while taking medication, they may fall into negative emotions. For insulin treated patients, injection therapy, as an important means of diabetes management, brings emotional burden to patients by repeated injections every day.

Although I know these medications are very important for controlling my condition, sometimes I still feel a little helpless and anxious when I think about relying on medications to maintain my health for the rest of my life. (N6)

Sometimes when I look at those pills, I feel like I have too many health problems, a low mood, and anxiety. (N12)

Aren't you worried about taking medicine every day? Who takes medicine every day without worries, right? There must be troubles, can you get insulin and injections every day without worries? (N11)

Self Driven

Sometimes patients choose to actively respond rather than passively taking medication under external coercion. Driven by a sense of responsibility, patients believe that only by actively cooperating can the effectiveness of the treatment plan be maximized, prompting them to strictly follow medical advice. When taking medication becomes a habit in patients' daily lives and integrated into their health behaviors, physical discomfort can serve as a physical signal of missed medication, and patients feel a reduced burden on memory.

It's necessary to take whatever the doctor tells you to take. If I don't follow the doctor's advice, why am I here to see a doctor? (N2)

My mental state is okay, but sometimes I feel a bit drained if I don't take it. When I feel tired, I quickly take the medicine, which means you must have missed it. (N1)

You've developed a habit, it's really uncomfortable not to take (medicine). (N3)

All of them are chronic diseases that require long-term medication. I have become accustomed to them. (N15)

Theme 4 External Factors

Family Support Feels Helpful

Reminders and support from family members can help patients avoid forgetting to take medication or inject insulin, making them feel that they are not facing it alone. Most respondents stated that family support can help them cope with complex medication plans, and through specific behaviors such as reminders, supervision, and sharing of dietary management, family members directly reduce their implementation burden.

Stay with me, my spouse. Don't take medicine randomly, don't get lost, and pay attention to your diet. (N1)

My child is thinking to me here, otherwise I sometimes forget. (N5)

Sometimes during meals, my husband tells me it's time to inject insulin. Sometimes he reminds me, and sometimes I forget myself. Family reminder. Yes, helpful. (N11)

Medical Staff Support Feels Relieved

When medical staffs explain medication plans in a detailed and clear manner, patients not only experience information acquisition, but also a sense of existential “comfort” - this comfort comes from the “seeing” and “responding” of professional others, which relieves patients’ uncertainty and anxiety when facing complex treatment plans.

The medical staff are very concerned when they come, and the question we ask is ‘Don’t forget to take your medicine, don’t forget to take your medicine’. (N1)

Discussion

This study is based on the Common Sense Model of self-regulation and clarifies the four core dimensions of cognitive representation, emotional representation, coping strategies, and external factors that affect patients’ emotional and health outcomes when facing health threats.

When patients face the health threats of comorbidities and polypharmacy, they develop cognitive representation (cognitive struggle in coexistence with medicines, physical discomfort and adjustment, expectations for treatment methods), as well as emotional representation (memory burden, space management burden). This leads to positive or negative coping strategies, which in turn affect the emotional outcomes (polypharmacy experience) and disease outcomes (medication adherence) related to the emotional outcomes. During this process, external support from families and medical staff played a moderating role.

Main Findings at Cognitive Representation Level

The patient’s cognitive representation of medication affects their polypharmacy experience. This cognition is mainly reflected in the understanding of medication side effects, perception of diseases and medication effects. As mentioned, for patients who require long-term medication, worrying about the potential side effects of the medication is a common psychological state. However, some patients believe that reducing medication to avoid side effects may further worsen the condition. At the same time, they also hope to restore their health through rational medication use, so they need to seek a balance between medication efficacy and side effects. On the contrary, patients who are skeptical about the efficacy of medication often lack confidence in treatment.

Related Research Support

In terms of medication side effect cognition and treatment confidence, Wu’s¹⁸ research found that Chinese elderly patients with type 2 diabetes who have low general harm beliefs often have a high sense of self-efficacy, which makes their medication adherence level higher. According to the theoretical framework of the health belief model, patients’ decisions about their health behaviors can be influenced by two important cognitive factors: the assessment of the potential serious consequences of diseases, such as death, disability, and long-term health problems, and the perception of the advantages of adopting healthy behaviors, these cognitive aspects affect patients’ long-term treatment adherence.¹⁹ Perceived susceptibility, perceived medication benefits, and self-efficacy were significant health belief model predictors for medication adherence in the population of type 2 diabetes patients.^{20,21} Abdelhamid et al²² and Bilondi et al²³ further shows that disease cognition is an important predictor of medication adherence of diabetes patients.

Clinical Implications

It has been reported that the efficacy and side effects affect patients’ polypharmacy experience. Therefore, patients can be guided to correctly view the efficacy and side effects of medicines and actively observe the positive changes that occur in their bodies after regular medication adherence, which may effectively improve their medication self-management level.

Main Findings at Emotional Representation Level

Emotional representation is an important component of the Common Sense Model of self-regulation, which directly affects patients’ coping behaviors and emotional outcomes. From the perspective of emotional representation, this study found that the burden of memory and space management in the polypharmacy experience of diabetes comorbidity

patients were the core variables. It is worth noting that this burden is not only due to the complexity of the medicine regime,²⁴ but also closely related to the interference of negative emotions on cognitive function. The “spatial management burden” in this study reveals the multiple challenges faced by patients in outdoor situations. From the perspective of emotional representation, these spatial management dilemmas essentially trigger patients’ stigma and constitute a strong negative emotional experience.

Related Research Support

The self-regulation theory regards medication adherence as a health behavior that requires self-regulation.²⁵ Negative emotional states can consume an individual’s self-control resources, leading to impaired memory in patients. For patients who inject insulin in public places, frequent feeling embarrassed or criticized is one of the difficulties faced by patients.^{26,27}

Clinical Implications

Actively evaluating the emotional representation status of patients, paying attention to the regulatory effect of emotional status on behavior, identifying the emotional context behind behavior, and thereby helping patients establish emotional regulation ability to alleviate the burden of polypharmacy can be considered by nursing staffs.

Main Findings at Coping Strategies Level

In the coping style dimension of the Common Sense Model of self-regulation, individuals will develop coping strategies based on their cognitive and emotional responses, and actively adopt regulatory behaviors. This study found that it includes negative coping with negative emotions caused by the disease itself, as well as polypharmacy and insulin injections, and promoting medication as a habit to maintain treatment adherence or positive coping driven by a sense of responsibility without consuming cognitive resources. These coping strategies reflect patients’ negative and positive cognitive evaluations of cognitive and emotional representations.

Related Research Support

The relevant survey shows that there is a significant difference between positive and negative coping style of diabetes patients, and the number of patients who choose negative coping style is higher than that of positive coping style.²⁸ Problem solving positive coping style help improve medication adherence, while negative coping strategies are negatively correlated with medication adherence.²⁹ And patients on insulin therapy were associated with an increased risk of depression compared with those on non-insulin treatment.³⁰

Clinical Implications

Based on this, there is a complex interaction between diabetic trouble and coping mechanism, and patients may strictly follow the treatment plan on the surface, but bear a huge emotional burden on the heart. Patients may be beneficial for nursing staffs to go beyond the behavioral level of adherence assessment, pay attention to the coping style dimension of patients’ polypharmacy experience, provide emotional support and cognitive reconstruction for those patients who are “highly dependent and suffering”, to promote their transformation from “painful persistence” to “active management”.

Main Findings at External Factors Level

For external support systems, the Common Sense Model of self-regulation suggests that an individual’s social environment will also affect their perception and coping strategies towards diseases, and further influence emotional and disease outcomes. The supports from family members or medical staff serve as external environmental factors, helping patients feel embedded in the meaning network of family relationships and feel a sense of security and belonging in the reality of multiple diseases coexisting and polypharmacy.

Related Research Support

According to social support theory, information or emotional support networks from families or healthcare professionals can buffer the negative impact of adverse events on emotions.³¹ Research has found that the quality of social support is the core mechanism for improving polypharmacy experience. Patients with informal caregivers such as friends and family have significantly higher levels of medication adherence.³² Further research by Olagbemide has shown that good family support can significantly improve patients' medication adherence, thereby promoting better blood glucose control, in the strong family support group, 69.5% achieved medium/high medication adherence, and 65.7% achieved good blood glucose control.³³

Clinical Implications

Therefore, there is evidence supporting the active effects of external factors. Providing professional and emotional support and guide family members to actively participate in medication management is recommended to nursing staffs to improve patients' polypharmacy experience and more effectively manage related diseases.

Limitations

Due to the lack of longitudinal research in this study, it is difficult to clarify the changes in polypharmacy experience and adherence among patients at different stages of the disease. In view of this, future research can fully consider the differences in economic, cultural, and medical levels among different regions in China, further expand the scope of research subjects, extend follow-up time, and conduct multi center patient journey map research, in order to have a more comprehensive and in-depth understanding of patient conditions, further enrich research results, and provide more valuable reference for related research and practice.

Conclusion

Based on the Common Sense Model of self-regulation, this study focuses on the polypharmacy experience of middle-aged and elderly patients with type 2 diabetes comorbidity, to provide reference for targeted nursing measures. The research results show that the middle-aged and elderly patients with type 2 diabetes comorbidity have complex perceptions of diseases and medicines, management burdens, positive and negative coping style, and needs and recognition of external support systems in the process of polypharmacy. Medical staff can identify the polypharmacy experience of middle-aged and elderly patients with type 2 diabetes comorbidity from multiple perspectives, actively explore personalized nursing intervention strategies, improve patients' medication emotional experience, and then promote patients to adopt health behaviors to improve adherence, thus promoting patients' health outcomes.

Ethics Approval and Informed Consent

The first author of this study is a current graduate student at Liaoning University of Traditional Chinese Medicine, and the corresponding author is a supervisor at Liaoning University of Traditional Chinese Medicine. A cooperative relationship was established with Tieling Central Hospital in Liaoning Province, and this study has been reviewed and approved by the Ethics Committee of Tieling Central Hospital (2025-40). This study was conducted in accordance with the Helsinki Declaration, ensuring that all ethical standards were followed throughout the research process. All the participants informed consent included publication of anonymized responses/direct quotes.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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