

Qualitative Research on Nutritional Literacy in Patients with Type 2 Diabetes—Patient and Health Worker Perspectives

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ABSTRACT

Background: Medical nutritional therapy is the basis of the treatment of type 2 diabetes mellitus. To deeply explore the nutritional literacy status and influencing factors of type 2 diabetes mellitus patients, to understand the nutritional needs of patients, and to provide a basis for strengthening the nutritional literacy level of diabetes mellitus patients in China, improving self-management, and improving the quality of life.

Methods: A phenomenological research method was used to conduct semi-structured interviews with 12 patients with type 2 diabetes mellitus and 10 healthcare professionals, and the Colaizzi 7-step method was used to analyze the data and refine the themes.

Results: Four themes and 11 sub-themes were summarized: lack of beliefs about nutrition management (ambiguity about the role of nutrition management, lack of willingness to gain in-depth knowledge about nutrition, lack of awareness of dietary nutritional risks, and poor beliefs in nutritional management); insufficient knowledge and skills in nutrition management (misconceptions about nutritional knowledge, lack of skills in nutritional combinations and food exchanges, and insufficient ability to cope with difficulties); and insufficient ability to interact with nutritional information (active less access to nutritional knowledge, limited transformation and utilization of nutritional information); and insufficient ability to critique nutritional information (difficulty in identifying nutritional information, selective acceptance of nutritional information).

Conclusion: The overall nutritional literacy of patients with type 2 diabetes mellitus is insufficient, the perception of nutritional management is weak, nutritional knowledge and skills are more lacking, the interactive and critical ability of nutritional information needs to be improved, and the patients are unable to carry out effective disease management; therefore, it is necessary for healthcare professionals to improve the nutritional literacy of the patients for the self-management and healthy outcomes by targeting the weak points.

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a long-term metabolic disorder syndrome characterized by hyperglycemia, insulin resistance, and relative insulin deficiency. According to the 10th edition of the International Diabetes Federation (IDF) diabetes map International Diabetes Federation et al. (2023), by 2021, there will be 537 million diabetic patients in the world and 140 million diabetic patients in China, ranking first in the world, which has become one of the major public health problems in the world Wang et al. (2023). Persistently high blood glucose levels in individuals with type 2 diabetes have been widely recognized to be associated with a range of debilitating complications affecting the heart, kidneys, nerves, and eyes and are strongly associated with frequent

hospitalizations, premature death, and reduced quality of life Marx et al. (2023), 4. Ma et al. (2018).

The IDF indicates that comprehensive treatment is needed for diabetes, a typical nutrition-related chronic disease. Among them, nutritional and dietary therapy is the basis of other treatment measures. Throughout any stage of the course of diabetes, the principle of diabetes nutritional therapy is to achieve reasonable total energy intake, a reasonable and balanced distribution of carbohydrates, fats, proteins and other nutrients, strict control of high glucose intake, and restoration and maintenance of an ideal body weight to achieve the purpose of controlling blood glucose. Providing a reasonable nutritional mix can improve the body's metabolic rate, control the patient's blood glucose level,

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reduce complications, improve the patient's health outcomes, and play a pivotal role overall Sivi et al. (2022).

Nutritional literacy is closely related to health literacy and is a specific form of health literacy. Nutritional literacy refers to the ability of individuals to obtain, understand and utilize nutritional information to make nutritional decisions that are conducive to the development of their nutritional health. From the analysis of the literature, both abroad and at home, in addition to regular outpatient follow-up, patients choose home treatment more often, and the reasonableness of nutritional intake and the quality of meals depend on their own level of nutritional literacy. An insufficient nutritional literacy will lead to daily dietary structure errors, low dietary quality, poor glycemic control, loss of confidence in disease management, and subsequent worsening of the condition, resulting in a vicious cycle Xie et al. (2021). It has been shown that nutritional literacy is highly correlated with patients' healthy eating behaviors, eating patterns, and dietary treatment adherence Itzkovitz et al. (2022), Zhang et al. (2023). Individuals with lower nutritional literacy seldom consult food labels, have greater difficulty interpreting food labels and estimating appropriate food portions, and have lower diet quality and healthy eating indices Miller et al. (2015), Koca et al. (2020). Understanding the level of patients' nutritional literacy is the prerequisite and foundation for constructing an intervention program. To date, there are few studies on nutritional literacy in patients with type 2 diabetes mellitus, and the existing measurement tools are limited to the level of health and nutritional knowledge of the general population and lack the assessment of nutritional information at the interactive and critical levels, which does not reflect the nutritional literacy of patients with T2DM comprehensively and realistically Gibbs et al. (2012). Therefore, this study adopted a qualitative approach to understand the nutritional literacy status of T2DM patients from the perspectives of patients and healthcare professionals, with the aim of improving the nutritional management level of patients, ultimately providing a theoretical basis for improving their self-management and health outcomes and broadening new perspectives for dietary guidance for healthcare professionals.

MATERIALS AND METHODS

Study Design

This study used a descriptive phenomenological research method, focusing on the researcher's life experience and experience. The purpose of this study was to understand the real experience of the patient nutrition management process and medical staff in providing dietary guidance for patients; therefore, using a descriptive phenomenological research method is appropriate.

Participants

Patients with type 2 diabetes were voluntarily recruited

from the Department of Endocrinology, Affiliated Hospital of Hangzhou Normal University, Hangzhou, Zhejiang, China. When patients were interviewed at age 12 and medical workers at age 10, both researchers agreed that no new themes were found from the interview data, the data reached saturation, and recruitment was stopped. The inclusion criterion for patients was an age ≥ 18 years.

② Met the relevant diagnostic criteria for T2DM in the Clinical Diagnosis and Treatment Guidelines for T2DM in China. ③ Patients who had normal verbal communication skills and ④ patients who voluntarily participated in this study. Patients were excluded if they had severe cardiovascular disease or serious organic disease or if they had cognitive impairment, mental disorders, or inability to act. The inclusion criteria for medical workers were as follows: ① obtained a practice certificate for medical staff; ② had a primary title or above; ③ had worked in the endocrinology department or metabolic center for at least 3 years; and ④ provided informed consent and voluntary participation. The exclusion criteria for medical workers were as follows: ① training staff and interns ④ withdrew from the investigator for various reasons.

Data collection

A semi-structured interview guide (Table 1) was used to collect information through face-to-face interviews. This interview guide was developed by physicians, nurses, and patients and was based on a literature review and project team discussions.

The final interview guide was revised after consultation with qualitative nursing experts and nutriology specialists and after pre-interviews with three patients. All the interviews were conducted by a postgraduate nursing student who was trained in qualitative research.

Patients who were interested in participating in the study and met the inclusion criteria were informed of the purpose and significance of the study and signed an informed consent form. The interviews will be conducted in the department's education center or ward, and if necessary, a quieter location will be chosen. Each interview lasted for 15-30 minutes.

The samples were carefully listed and recorded. In the interviews, the interviewers avoided language guidance, did not interrupt patients, chose an appropriate time to ask and retell any questions about the content, and observed and recorded the facial expressions and true feelings of the interviewees. With the consent of the interviewee, the entire process was recorded synchronously.

If the interviewee did not agree to the recording, one researcher interviewed the patient, and the other researcher handwritten the records.

Table 1: Semi structured interview guide

Semi-Structured Interview Guide	
Patients	① Did you have any changes in your diet before and after your illness? Can you give me some examples?
	② Do you think dietary nutrition management is important in diabetes control?
	③ What difficulties and problems do you have in daily nutritional management?
	④ What nutritional information do you pay more attention to in your daily life for better disease management? How do you get this information?
	⑤ What problems do you encounter in obtaining information through the above means? What can you do to solve it?
	⑥ What else would you like to know about diabetes nutrition?
	⑦ What skills or qualities do you think are needed in the process of diabetes nutrition management?
Healthcare workers	① What nutritional knowledge and information do you think people with diabetes need to have?
	② How well do patients have diabetes nutrition knowledge and skills?
	③ What kind of nutritional knowledge and information do patients often ask for?
	④ What is the most important element of advice you give to your patients?
	⑤ What knowledge do patients question during a nutritional mission?
	⑥ What has been your experience in providing patients with brief answers to dietary questions?
	⑦ What problems do you see when managing patients' diabetes nutrition?
	⑧ What skills or qualities do you think patients need to have in order to manage their nutrition?

Data analysis

The recordings were transcribed word by word within 24 h after the interview. Colaizzi's seven-step method was used for data analysis Liu et al. (2019): (1) fully familiar with the data, (2) identifying meaningful statements, (3) building units of meaning, (4) clustering topics, (5) providing a detailed description, (6) producing basic structures, and (7) verifying basic structures. Two researchers independently analyzed and coded the raw data. In cases of disagreement, the group discussed and reached a consensus. The research interviewer was a qualitative research training nursing graduate student who practiced in the department before the interview, established a good relationship with the patients, and ensured the authenticity and authenticity of the information. When analyzing the data, the researchers were loyal to the original text and did not add their own subjective understanding. As a result, credibility was

ensured.

Ethical consideration

Ethical approval for this study was granted by the ethics committee (approval number: 2023062). Informed consent was provided and obtained from all participants before the study commenced. To protect the privacy of the interviewees, the interviews were presented anonymously, and names were replaced with letters.

RESULTS

General information

A total of 22 respondents were enrolled, including 12 patients and 10 health workers. The general characteristics of the study respondents are presented in Tables 2 and 3.

Table 2: Characteristics of the patients (n = 12)

	Characteristic	Patients
Gender	Female	6
	Male	6
Age	<60	4
	≥60	8
Education	High school or less	9
	College or higher	3
Employment status	Employed	2
	Retired	10
Residence	City	10
	Rural area	2
Duration of diabetes	<5	4
	5~10	5
	>10	3

Table 3: Characteristics of the health workers (n = 10)

	Characteristic	Health workers
Gender	Female	10
	Male	0
Education	Undergraduate	8
	Postgraduate	2
Employment	Nursing	8
	Doctors	2
Years of service	<5	1
	5~10	5
	>10	4

Poor belief in nutritional management

1. Ambiguous role of nutritional management

Patients lack an accurate understanding of the role of nutritional management, often believing that medication or exercise therapy is more effective than dietary nutrition, and tend to neglect nutritional management until serious complications arise.

P1: "I do not pay much attention to diet, what's the point of paying attention to it, it does not help, diet is important, but it is not terribly important."

P3: "Did not pay attention to nutritional knowledge, usually I exercise for an hour in the evening after dinner and my blood glucose falls off, I have tested my blood

glucose the next day after exercising to be better, and my diet does not eat much, and I never pay attention to my diet, so I just eat what I want to eat."

P4: "If this diabetes did not have an impact on my life, my diet would not change anything."

H5: "When I tell the patient, what kind of complications are you likely to have in the future, so you need to have your blood sugar under control, but he will tell me, I will not because he did not have complications, it is very hard for him to think that what you're saying is true; they will think that you're just trying to scare me, and I'm not going to be like that."

2. Lack of willingness to learn more about nutrition

Some patients, due to age, energy, personality, and

comorbidities with other diseases, believe that dietary management will reduce their enjoyment of life and do not want to learn more about nutrition.

P1: "I purposely do not try to understand, there are too many things to control when I understand, I just feel too tired, do not you think? Because I'm a thyroid malignancy now, it is even more pointless for me to try to control it, I see it on my phone and scroll past it, and any other avenue I see it I avoid it."

P11: "I eat what the doctor tells me to eat, I do not want to determine about it myself, I do not have that much energy to determine about it anymore, I just do what the doctor says."

P7: "Do not need to know anymore, I'm old and do not need to know anything, we do not have many years to live for."

P6: "I know what I cannot eat, 20 years of diabetes, I cannot eat sweet, I cannot eat pickled, I usually eat a lot of veggies in the house and very little meat, I do not need to understand, diabetes is just sweet not to eat."

H5: "They resist accepting something new and do not listen to us at all."

3. Lack of awareness of dietary nutritional risks

Most patients focus only on portion control and do not realize the potential nutritional risks.

P12: "I think I'm controlling myself pretty well, my glycosylated hemoglobin is 6.3 right now, but my doctor said to me, you're so skinny you can still relax a little bit appropriately."

P7: "I often get low blood sugar, I do not know why, I just eat a little bit of omnivorous rice, a little bit more vegetables, my stomach is bloated, I want to vomit, I cannot eat, I have lost three pounds in the past two days."

4. Poor beliefs in nutritional management

Some patients are aware of the importance of nutritional management but lack the willpower to adhere to it in the actual implementation process, do not follow the advice of healthcare professionals, and choose food based on self-perception.

P1: "I do not truly want to go into moderation, I truly want to eat, then my eyes close and I eat first."

P3: "I do not truly manage it, I do not usually pay much attention to what I eat, the healthcare worker did tell me, I cannot control my mouth, I eat when I want to."

H2: "Some patients do not care about anything."

Lack of knowledge and skills

1. Mis-conceptions about nutritional knowledge

Patients believe that a diabetic diet is simply about not eating sugar and not getting full and have misconceptions about nutritional knowledge.

P10: "Since I was found to be diabetic, I do not eat any fruit anymore, just cucumbers and tomatoes".

P8: "I do not pay much attention to nutrition; I just try to eat as little as possible and just avoid sugar, not much else."

H3: "In regard to staples, patients just assume it is rice, and they usually say, I did not even eat staples, but I ate pancakes, noodles, chaos, dumplings. Some people think sugar-free pastries are okay to eat."

H5: "They eat cucumber, the sugar content of cucumber is already low, and patients think it is okay to eat two more, three more, and they do not control the amount they consume."

2. Lack of nutritional and food exchange skills

Most patients pay attention only to the combination of vegetables and meat in their daily life; lack of understanding of the combination of nutrients such as carbohydrates, fats, and proteins; have an improper combination ratio; and do not know how to exchange food.

P10: "I do not pay much attention to the nutritional combination; I just try to eat as little as possible."

P7: "Two days ago there was a lecture here, I have been there, talked about how to match diabetic nutrition, what can be eaten, what cannot be eaten, and now the problem is that what should be eaten, I do not want to eat, and what cannot be eaten I want to eat."

P10: "I have a bad stomach; if I change white rice to mixed grain rice, I absolutely cannot accept it."

H2: "The main thing is that when they are discharged from the hospital, they are at home, and they have a single type of diet."

3. Poor problem coping skills

Compared to patients with simple diabetes, patients with a combination of other chronic diseases have more difficulty coping with the various conditions of the disease, often through selective management.

P9: a single disease are good to cure, I have this time are stipulated very well, half of an apple in the afternoon, walnuts every day to eat two, but the dietary attention cannot be, ah, I'm this high blood pressure, diabetes, heart disease, gallstones, kidney stones, too many things wrong,

what is the disease is more anxious, I will pay attention to this aspect first, the earliest time, the liver is not very good, I will 8 years 10 years do not drink alcohol, I now heart disease is the main one."

P1: "Because of all kinds of diseases added together, and given me Chinese medicine, I read the ingredients, I think these things are very high in sugar, so many things are eaten together, absorb so much sugar, then I have no choice, I can only cure this current disease first."

Lack of interactive nutritional information

1. Less access to nutritional knowledge

Some rural patients are illiterate, do not know how to use electronic devices, believe in the nutritional information provided by friends and relatives, and have a single way of obtaining nutritional information about diabetes.

P 2: "I will hear other friends say this is better for diabetes if I take it, I will try it, I seldom contact others, just my own friends."

P9: "I have not heard any lectures before, I will just take a look on my phone."

H1: "Patients usually do not participate in nutritional activities; they just listen to this person and that person. Of course, it may also be related to our lack of extensive publicity".

Professionals emphasize that due to issues such as time, energy, and ability, they are unable to provide sufficient professional information support for patients.

H2: "Most hospitals do not have much time for propaganda and education. If they are hospitalized, the nurses will perform propaganda and education, and there is no time for propaganda and education in the outpatient department. Or there is a special diabetes education outpatient department now, which is not carried out very much. Patients also do not know that there is such an outpatient department."

2. The transformation and utilization of nutritional information are affected

Influenced by traditional culture, Chinese patients often dine with their families. When there is a conflict between the therapeutic diet and family interests, patients often choose to accommodate their families and lack the ability to translate information and skills into practice in the nutritional management process.

P5: "Once my granddaughter wanted to eat Stir-fried tomato and scrambled eggs, I made a plate for her. I made something else, but she could not eat it. Is not that waste? Since then, I will not do anything else. I will eat with her."

P2: "I will listen to the doctor's advice, but not entirely

because we have children at home."

H5: "There is a problem where the visiting family members do not understand. They will give it to him, and he will feel like he needs to eat it. If he does not eat it, it will rot."

Lack of critical nutritional information

1. Difficulty in identifying nutritional information

With the continuous development of the internet, there are an increasing number of channels for accessing nutritional information. Excessive media promotion and a lack of uniform information are contradictory, making it difficult for patients to identify and crave professional guidance.

P8: "Last time I heard the person on my phone say that there is something good for blood sugar, and I added WeChat to make a purchase."

P6: "Some reports on mobile phones say that potatoes cannot be eaten, some say that potatoes can be eaten, some say that melons cannot be eaten, and some say that they can be eaten. I do not understand."

H4. "Because I think many Chinese people currently do not believe in doctors. They like to ask in multiple places, although your doctor and his doctor may have the same standards, there may still be differences in some concepts. he goes around asking".

H7: "They will believe what is said online, it is easy to believe, and they think everything is right online."

H10: "He will search online himself, and he will believe in any folk remedies that can treat diseases."

2. Selective acceptance of nutritional information

Most patients selectively accept the information they are concerned about during the process of obtaining nutritional information, leading to misunderstandings of the information and inappropriate nutritional decisions without considering their own situation.

P12: "I think there is a table on the data. I will also look at those I often eat, which are outstanding."

P8: "I have several friends who are all diabetes patients. Some of them are inherited, and some of them are acquired later. They have been a long time, and they are very experienced. They told me that this thing cannot be eaten, and I generally do not eat it."

H5: "Many patients will discuss with each other, and they will feel that this is how they eat, and I should eat the same way."

DISCUSSION

The need to improve the level of nutritional status of diabetes patients is urgent

Cognition is an individual's view of external things, and positive cognition has a positive impact on disease control in patients. The results of this study show that patients who do not show obvious symptoms often do not pay attention to nutritional management, which is consistent with previous research results Zhao et al. (2018), Zhu et al. (2019). On the one hand, this may be related to inadequate health education provided by medical staff themselves Liu et al. (2020). On the other hand, for some patients, no matter how much nursing staff explained, patients may not be able to empathize with it. In addition, considering the convenience of diet, diet management has been extended to the outside world. Research has shown Jimenez et al. (2018) that using virtual technology in health education to enable patients to experience disease symptoms in advance can effectively enhance their learning effectiveness. It is recommended to refer to relevant experiences, scenario simulation, role-playing, and field investigation methods to increase patient motivation for nutritional management. In addition, patients are overly confident in their own management experience and lack the willingness to have a deep understanding of nutritional knowledge. This is related to the fact that patients believe that they are old and have little time left for malignant tumors and that continuing to control their diet and understand nutritional knowledge is useless. Such patients have excessive negative emotions, which seriously affect the prognosis of the disease. Therefore, medical staff should help patients find meaning in life and their own value and increase their self-efficacy in managing diseases. Finally, consistent with previous research results, although patients are aware of the importance of nutrition management, they lack willpower and are difficult to adhere to, and their compliance is extremely poor. At present, the diet compliance of diabetes patients is a major problem, in which the patient's diet preference is a major factor. Some studies have shown Ding et al. (2020) that changing the eating order can increase the healthy eating behavior of patients. Therefore, medical staff should consider the patient's diet preference when providing diet guidance, adjust the order of meals, develop a practical and feasible personalized dietary structure, and increase patient compliance.

Multiple dimensions of patient nutritional literacy need to be enhanced

Studies have shown Wang et al. (2023), Taylor et al. (2019) that patients with greater knowledge and skills in nutrition and health tend to choose healthy eating patterns and have greater adherence to treatment diets. The results of this study show that although diabetes is common, patients lack functional nutrition literacy, basic diabetes nutrition knowledge and skills, and there are misconceptions about nutritional treatment, which is consistent with previous research results Wang et al. (2023).

In this study, patients with insufficient basic nutrition

knowledge was mostly from rural areas, which is related to the lack of detailed diet education in primary medical institutions and the restrictions of education on sugar-containing food provided by medical staff. As a result, patients take out context and have a vague concept of balanced nutrition and food exchange, and research shows that the comprehensive compliance rate of diabetes "dietary goals" is extremely low at present Zhong et al. (2023). Therefore, medical staff should strengthen their understanding of patient food labels, provide training on nutritional matching skills, and use feedback methods to evaluate the effectiveness of these methods. In addition, the results of this study show that rural patients with low levels of education have a single way to obtain nutritional information and perceive fewer available resources. Therefore, first, regular nutritional education should be provided for rural patients, and communication with professionals should be strengthened through telephone follow-up, standardized training of volunteers to organize regular rural activities, and other means. Second, the diet of most patients is influenced by their families, and they may give up treatment at any time. Studies have shown Itzkovitz et al. (2022) that among patients with higher nutritional literacy, independent food preparation is a promoting factor. Therefore, patients should be encouraged to prepare meals independently. Finally, in terms of critical nutritional information, the exaggeration of media and contradictory information increase the difficulty of identifying patients. Therefore, patients are encouraged to raise questions to professionals, obtain information suitable for their own situation from nutrition information, and develop simple and easy-to-understand diabetes diet science guides. At present, there are few intervention studies on the critical information ability of diabetes patients, which can provide a new perspective for improving the nutritional status of diabetes patients in the future.

Paying attention to the nutritional needs of diabetes patients with multiple diseases

The management of multiple chronic diseases has become a global hotspot. The incidence of multiple chronic diseases in China has reached 55%~98%, which seriously affects the quality of life and mental status of patients Jia et al. (2019). The results of this study show that patients with diabetes combined with multiple diseases often experience nutritional conflicts, and they do not know how to respond. There may be several reasons for this. On the one hand, such patients often transition to different nursing environments, and it is difficult to integrate and judge the nutritional information received. On the other hand, nursing staff focus on the management of a single disease and often overlook the mastery of non-educergist disease knowledge.

Therefore, previous studies have shown Douze et al. (2022), Kianfar et al. (2019) that nursing coordination can reduce the readmission and mortality rates of patients with multiple chronic diseases, and the lack of communication among healthcare professionals in various departments is an important factor hindering nursing coordination. Therefore, medical staff should accelerate the construction of multidisciplinary and multi-disease patient nutrition management plans and distribute brochures on multi-disease nutrition knowledge while promoting continued care after discharge, with a focus on rural areas and patients with low educational levels. Second, the "Healthy China 2030 Plan Outline" and "National Nutrition Plan (2017-2030)" specify the need to cultivate senior technical personnel in clinical nutrition nursing. Therefore, it is necessary to strengthen the training of nutrition specialty nurses CAO et al. (2023) and further evaluate whether the existing core competency evaluation criteria for nutrition specialty nurses can meet the nutritional needs of patients with multiple diseases.

ADVANTAGES AND LIMITATIONS

This study is the first to explore the experience and feelings of type 2 diabetes patients in diet management by qualitative research to clarify their nutritional literacy status and lay a foundation for subsequent related research. In addition. The interviewees in this study were not limited to patients but also included relevant medical staff to gain a deeper and more comprehensive understanding of the nutritional management needs and existing problems of patients. This study had several limitations. First, the interviewees were limited to one tertiary teaching hospital for collection, and the results may not be generalizable. Further surveys could be selected for sampling in other hospitals. Second, the subjects included in this study were patients after hospitalization, and there may be recall bias in dietary management information before hospitalization. Third, the majority of the interviewees in this study resided in cities; therefore, the research results may lack generalizability to rural areas. Future research can further explore rural patients.

CONCLUSION

This study involved in-depth interviews with 12 patients and 10 healthcare workers. Our research revealed that the nutritional literacy of patients with type 2 diabetes needs to be further improved. In the future, medical staff should fully evaluate patients, start with patients' nutritional management beliefs, knowledge and skills, nutritional information and critical ability, and develop personalized intervention programs for patients with weak links.

DECLARATIONS

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Author Contribution

WJZ collected, analyzed and interpreted the data and wrote the manuscript. YLX was an initiator of the study, wrote some part of the manuscript and offered valuable input during the whole writing process. YW checked the English and had some intellectual input in the manuscript. ZYS and JQW was an initiator of the study, and medical and intellectual input on the manuscript. YUW participated in the study design and was responsible for the supervision of the entire study process. The authors read and approved the final manuscript

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Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due to agreements with participants who restricted data sharing but are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

The study received ethical approval from the Hangzhou Normal University. (Approval ID: 2023062). The Declaration of Helsinki was followed in conducting the study. Participants received information about the objectives of the study and provided informed consent before participating in the research. Permission to access the hospitals was obtained from hospital administrators. The study was anonymous and collected data could not trace back to individual respondents or hospitals.

Consent for publication

All participants have given consent for publication.

Competing interests

The authors declare that they have no competing interests.

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