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Barriers and facilitators influencing the implementation of IWGDF guidelines among healthcare professionals: a qualitative study based on the CFIR framework

jiaqian chen
Anhui Medical University
Yuanyuan Liang
Anhui Medical University
Zhijun Shu
Anhui Medical University
Chuanqin Wu
Anhui Medical University
Yang Hao
Anhui Medical University
Shaohua Hu
yfy203065@fy.ahmu.edu.cn

Anhui Medical University

Research Article

Keywords: Diabetic foot ulcer, IWGDF guidelines, guideline implementation, CFIR, qualitative study, healthcare professionals

Posted Date: November 17th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11004852/v1

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Additional Declarations: No competing interests reported.

Abstract

Background

Diabetic foot ulcer (DFU) is a serious complication of diabetes that is associated with high risks of infection, amputation, and mortality. The International Working Group on the Diabetic Foot (IWGDF) guidelines provide evidence-based recommendations for diabetic foot prevention and management. However, translating guideline recommendations into routine clinical practice remains challenging due to multiple contextual barriers. This study aimed to explore healthcare professionals' perspectives regarding the implementation of IWGDF guidelines and identify barriers and facilitators using the Consolidated Framework for Implementation Research (CFIR).

Methods

A qualitative descriptive study was conducted among healthcare professionals from six tertiary hospitals in China. Twenty healthcare professionals, including 14 nurses and 6 physicians, were recruited through purposive sampling. Semi-structured individual interviews were conducted between April and June 2026. Data were analyzed using directed content analysis guided by the CFIR framework. Two researchers independently coded transcripts using NVivo 15.0, and discrepancies were resolved through discussion.

Results

A total of 36 factors influencing IWGDF guideline implementation were identified, including 18 facilitators and 18 barriers across the five CFIR domains. Facilitating factors included recognition of the evidence-based value of the guidelines, alignment with standardized diabetic foot management needs, organizational support, multidisciplinary collaboration, integration of guideline recommendations into clinical workflows, healthcare professionals' commitment to evidence-based practice, and continuous evaluation and feedback mechanisms. Major barriers included the complexity of guideline recommendations, limited adaptation to local clinical contexts, insufficient referral systems, inadequate staffing, heavy workload, limited multidisciplinary communication, insufficient confidence in managing complex cases, and lack of long-term supervision mechanisms.

Conclusions

Implementation of IWGDF guidelines is influenced by multiple interacting factors at individual, organizational, and system levels. Successful guideline implementation requires more than knowledge dissemination; it depends on establishing supportive organizational structures, strengthening multidisciplinary collaboration, adapting recommendations to local contexts, and developing continuous monitoring and feedback mechanisms. These findings provide practical insights for developing context-specific strategies to promote sustainable implementation of diabetic foot care guidelines.

Introduction

Diabetes is a chronic disease. Diabetic foot ulcer (DFU) is one of the most common serious lower extremity complications in patients with diabetes, affecting approximately 15% of diabetic patients[1]. The global prevalence of DFU is 6.3%[2], with an annual mortality rate of 11% and an annual amputation rate of 22%[3]. If improperly managed or treatment is delayed[1, 4], DFU can lead to infection, gangrene, amputation, and even death. In addition, lower extremity amputation can result in prolonged hospitalization, multiple rehabilitation treatments, and the need for home care and social support[4]. Evidence suggests that appropriate treatment and early referral for DFU patients can improve healing rates and prevent advanced complications. Delayed referral affects treatment outcomes and increases the likelihood of delayed recovery and amputation[5].

The International Working Group on the Diabetic Foot (IWGDF) guidelines, as authoritative DFU guidelines, promote early prevention and treatment of DFU worldwide by developing and updating guidelines for healthcare professionals in DFU and related fields, with the aim of reducing adverse outcomes and amputation rates of diabetic foot[6]. However, guideline implementation is a complex process influenced by multiple factors including the evidence itself, contextual factors, healthcare professionals, and patients[7]. Various barriers have consistently constrained guideline implementation[8], leading to a gap between knowledge and practice[9–10]. The vitality of guidelines lies in their implementation[11]. Whether the numerous published guidelines can play an important role in clinical practice and achieve full value depends on the actual application of guideline recommendations[12]. However, multiple systematic reviews have found that most existing guidelines have not been consistently implemented[13–14]. Due to various subjective and objective factors, the effects of guideline implementation may not be immediately apparent in the short term, but when guidelines are continuously applied, the significance of practice change will emerge[15]. Guideline implementation is a key component of implementation science and a current research hotspot. Factors influencing guideline application include key innovations in specific contexts, individual characteristics, leadership decisions, funding resources, and internal environmental structures[16–21]. Among these, sustained leadership support and multimodal staff training are the optimal implementation strategies[22–23].

The Consolidated Framework for Implementation Research (CFIR) is one of the most widely used frameworks in the field of implementation science. In recent years, it has often been used as an analytical framework in research on guideline implementation strategies and has successfully identified factors affecting guideline implementation[24]. The CFIR framework is comprehensive and practical and has been applied in multiple implementation studies in fields such as fall prevention[25] and cancer palliative care[26]. However, evidence regarding the implementation of IWGDF guidelines in real-world clinical practice remains insufficient, particularly regarding the contextual factors influencing healthcare professionals' adoption and sustained use of guideline recommendations. Therefore, this study adopted a qualitative research method guided by the CFIR framework[27] to explore healthcare professionals' perspectives on IWGDF guideline implementation and to identify barriers and facilitators in the guideline

implementation process, providing a basis for developing context-specific implementation strategies and promoting sustainable guideline adoption.

1 Methods

1.1 Study design and theoretical framework

A qualitative descriptive study was conducted to explore healthcare professionals' experiences and perceptions regarding the implementation of the International Working Group on the Diabetic Foot (IWGDF) guidelines and to identify contextual factors influencing guideline implementation.

The Consolidated Framework for Implementation Research (CFIR) was adopted as the analytical framework. CFIR was selected because guideline implementation involves interactions among multiple levels of healthcare systems, including characteristics of the intervention, organizational context, characteristics of Individuals and implementation processes[24]. The framework was used to guide the development of interview questions and the interpretation of qualitative data.

This study was reported according to the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist[28].

1.2 Study setting and participants

This study was conducted across six tertiary hospitals located in different regions of China. The participating hospitals provided diabetic foot-related clinical services, including prevention, assessment, treatment, and follow-up care.

Healthcare professionals were recruited through purposive sampling. Eligible participants were physicians and nurses who had direct experience in diabetic foot management and exposure to diabetic foot guideline implementation.

A total of 20 healthcare professionals participated in the study. The sample included both physicians and nurses to capture perspectives from different professional roles involved in diabetic foot care delivery.

Participant recruitment and interviews continued until data saturation was reached[29]. Saturation was considered achieved when subsequent interviews no longer generated additional concepts relevant to the research questions.No eligible participants declined participation during the recruitment period.

1.3Research team and reflexivity

The research team consisted of the first author, JQC, a master's student, and the corresponding author, SHH, a Chief Nurse with a doctoral degree and extensive experience in qualitative research. Both researchers were female. The interviewers had received qualitative research training and were familiar with semi-structured interviewing techniques. Although some participants worked in the same hospitals

as the interviewers, no direct supervisory relationship existed. Before the interviews, participants were informed about the interviewers' professional backgrounds, the purpose of the study, and the voluntary nature of participation. They were also informed that the interviews were conducted for research purposes and that their responses would be kept confidential. The researchers maintained reflexive awareness throughout the research process and considered how their professional backgrounds and clinical experiences might influence data collection and interpretation.

1.4 Data collection

Semi-structured individual interviews were conducted between April and June 2026.

An interview guide was developed based on the CFIR framework(see Table 1). Rather than focusing only on individual perceptions, the interviews explored how guideline implementation was experienced within clinical practice environments, including participants' understanding of guideline recommendations, factors affecting adoption, organizational support, workflow integration, and suggestions for improving sustainable implementation.

Each interview lasted approximately 30 minutes and was conducted by trained researchers.Interviews were audio-recorded with participants' permission and transcribed verbatim. Field notes were recorded during and after the interviews to document contextual information, key interview impressions, and researchers' reflections.

To improve the accuracy of interpretation, transcript checking and interpretation checking were conducted. Participants were invited to review their interview transcripts and provide feedback. Preliminary analytical interpretations were also shared with participants to determine whether the findings accurately represented their experiences.No repeat interviews were conducted because the initial interviews provided sufficient information to address the research objectives.

Table 1
Specific Interview Guide

CFIR Framework Domain	Interview Guide
Intervention Characteristics	1. How does the IWGDF guideline perform in terms of scientific rigor and clinical value, and what guiding role can it play in diabetic foot management? 2. Are the recommendations in the IWGDF guideline easy to translate into clinical operational procedures in actual application? 3. Based on the actual situation of the hospital, does the IWGDF guideline need to be adapted? 4. What additional costs are involved in the guideline implementation process?
Outer Setting	1. Can the implementation of the IWGDF guideline meet the needs of diabetic patients? 2. Does the external hospital environment (policy, medical insurance, regional medical collaboration) affect guideline implementation? Specifically, how does it affect guideline implementation? 3. Is the hospital simultaneously promoting other clinical projects or guidelines? Do these projects affect IWGDF guideline implementation?
Inner Setting	1. What work has the hospital and department management done to support IWGDF guideline implementation? 2. How is collaboration among different disciplines carried out during diabetic foot guideline implementation? 3. Has the IWGDF guideline been integrated into routine clinical workflows? 4. What resource support is needed during guideline implementation? 5. Does guideline implementation increase the workload of healthcare professionals? 6. Has the department established corresponding mechanisms for training and learning? 7. Has the hospital monitored and provided feedback on guideline implementation effects?
Characteristics of Individuals	1. How do you understand the role of the IWGDF guideline in diabetic foot management? 2. Have you encountered difficulties in implementing the IWGDF guideline? What was the greatest difficulty? 3. What factors would promote your continued application of the guideline?
Implementation Process	1. Did the hospital develop a specific plan before starting IWGDF guideline implementation? 2. Who mainly drives this work during guideline implementation?

CFIR Framework Domain	Interview Guide
	3. Are there continuous improvement methods during implementation, such as regular summary meetings and process adjustments based on feedback? 4. How effective has guideline implementation been, what changes have occurred, and what are the reasons?

1.5 Data analysis

Data were analyzed using directed content analysis guided by the CFIR framework[30].

The analysis process involved three stages. First, researchers repeatedly read the transcripts to become familiar with participants' experiences and identify meaningful statements related to guideline implementation. Second, initial codes were generated and compared across transcripts. Third, codes were organized according to the CFIR domains, allowing barriers and facilitators to be interpreted within their relevant implementation contexts. The coding structure consisted of initial codes derived from meaningful statements, categories developed through comparison and refinement, and higher-level domains corresponding to the five CFIR domains. The coding framework was continuously refined through discussion among the research team.

Two researchers independently coded the transcripts using NVivo 15.0 software. Differences in coding were discussed through regular meetings until consensus was achieved. When interpretation remained uncertain, discussions with additional members of the research team were conducted to reach agreement.

Throughout the analysis, researchers maintained reflexive awareness of how their clinical backgrounds and previous experiences might influence interpretation of the data.

1.6 Ethical considerations

Ethical approval

was obtained from the Ethics Committee of the First Affiliated Hospital of Anhui Medical University (Approval No. PJ2025-10-49).

All participants provided written informed consent before participation. Participants were informed that participation was voluntary and that they could withdraw from the study at any time. All data were anonymized before analysis to ensure confidentiality.

2 Results

2.1 Participant Characteristics

A total of 14 nurses and 6 physicians participated in this study. The research subjects came from six tertiary Grade A hospitals in different regions of Southwest, Central, North, and East China, namely Hospital A (n = 6), Hospital B (n = 3), Hospital C (n = 3), Hospital D (n = 3), Hospital E (n = 3), and Hospital F (n = 2). Their ages ranged from 28 to 46 years, and their clinical work experience ranged from 4 to 35 years.(see Table 2)

Table 2
Characteristics of Study Participants (n = 20)

Number	Gender	Age	Education	Title	Position	Work Years	Duration of Guideline Implementation
N1	Female	44	Master's degree	Associate Chief Nurse	Head Nurse	17years	16-20years
N2	Female	46	Bachelor's	Nurse-in-Charge	Nurse	22years	≥ 20 years
N3	Female	43	Master's degree	Associate Chief Nurse	Nurse	13years	11-15years
N4	Female	39	Master's degree	Associate Chief Nurse	Head Nurse	16years	6-10years
N5	Female	44	Doctorate	Associate Chief Nurse	Head Nurse	20years	6-10years
N6	Female	28	Bachelor's	Senior Nurse	Nurse	5years	1-5years
N7	Female	40	Bachelor's	Nurse-in-Charge	Head Nurse	20years	16-20years
N8	Female	39	Master's degree	Associate Chief Nurse	Head Nurse	17years	6-10years
N9	Female	38	Bachelor's	Nurse-in-Charge	Head Nurse	14years	11-15years
N10	Female	37	Master's degree	Nurse-in-Charge	Nurse	12years	6-10years
N11	Male	46	Doctorate	Associate Chief Nurse	Head Nurse	18years	16-20years
N12	Male	37	Bachelor's	Nurse-in-Charge	Nurse	14years	6-10years
N13	Female	54	Bachelor's	Chief Nurse	Head Nurse	35years	6-10years
N14	Female	35	Master's degree	Nurse-in-Charge	Nurse	12years	6-10years
N15	Female	36	Doctorate	Attending Physician	Physician	5years	1-5years

Number	Gender	Age	Education	Title	Position	Work Years	Duration of Guideline Implementation
N16	Female	38	Master's degree	Attending Physician	Physician	10years	6-10years
N17	Male	40	Doctorate	Associate Chief Physician	Physician	10years	6-10years
N18	Male	31	Doctorate	Attending Physician	Physician	6years	1-5years
N19	Female	30	Master's degree	Attending Physician	Physician	4years	1-5years
N20	Male	48	Doctorate	Attending Physician	Department Director	21years	16-20years

According to the interview results, a total of 36 influencing factors for IWGDF guideline implementation in China were identified, including 18 facilitators and 18 barriers. These influencing factors were distributed across 29 constructs under the five CFIR domains of the studied guidelines (see Table 3).

Table 3
Facilitators and Barriers to IWGDF Guideline Implementation

CFIR Domain	Facilitators	Barriers
Intervention Characteristics	1. The IWGDF guideline has high evidence-based quality and provides a basis for clinical decision-making; 2. Guideline recommendations are highly aligned with the need for standardized diabetic foot management; 3. The guideline can promote standardization of diabetic foot screening, assessment, and treatment processes	1. Guideline content involves multiple links such as assessment, infection control, offloading, and vascular assessment, making the implementation process complex; 2. Some recommended measures need to be adapted to hospital equipment conditions and patient characteristics; 3. Some advanced treatment technologies are costly, limiting comprehensive implementation of guideline-recommended measures
Outer Setting	1. The demand for standardized treatment and wound management among patients with diabetic foot is continuously increasing; 2. National chronic disease management policies promote the standardized management of diabetes-related complications; 3. Experience exchange with regional diabetic foot alliances and other hospitals facilitates guideline implementation.	1. Patients' economic burden affects the choice of treatment regimens; 2. An inadequate primary care referral system delays patients' access to specialized treatment; 3. Hospitals simultaneously undertake multiple quality improvement projects, which affects the priority of guideline implementation.
Inner Setting	1. Hospital management supports the standardized development of diabetic foot care; 2. A diabetic foot multidisciplinary team (MDT) has been established to promote collaborative management; 3. Guideline content has gradually been integrated into nursing assessment, dressing change processes, and clinical pathways; 4. Departments regularly conduct case discussions and quality feedback; 5. Healthcare professionals improve their awareness of the guidelines through training.	1. Insufficient dedicated diabetic foot management personnel; 2. Multidisciplinary communication mechanisms still need to be improved; 3. Heavy clinical workload leads to decreased adherence to guideline implementation; 4. Lack of continuous data monitoring and quality evaluation systems; 5. Nursing staff have increased implementation tasks but lack time and position support.
Characteristics of Individuals	1. Healthcare professionals recognize the concept of evidence-based practice;	1. Some healthcare professionals believe that the short-term effects of

CFIR Domain	Facilitators	Barriers
	2. A sense of responsibility to improve outcomes for patients with diabetic foot; 3. Enhanced implementation confidence after participating in training and practice.	guideline implementation are not obvious; 2. Lack of experience in applying guidelines to complex cases; 3. Insufficient individual motivation to actively participate in guideline promotion.
Implementation Process	1. Clear plans and division of responsibilities established before implementation; 2. Continuous promotion of guideline implementation by the core team; 3. Regular evaluation of implementation effects and feedback-driven improvement.	1. Strong initial promotion but insufficient long-term maintenance; 2. Lack of continuous incentive and supervision mechanisms; 3. Clinical changes and staff turnover affect implementation continuity.

2.2 Intervention Characteristics

In the intervention characteristics domain, 6 influencing factors were identified, of which 3 were facilitators and 3 were barriers. From the interview results, most healthcare professionals recognized the IWGDF guideline as having high evidence value and clinical guiding significance. Respondents stated, N19: "The guideline was developed with reference to internationally authoritative evidence and expert consensus, and provides clear measures in diabetic foot risk screening, wound assessment, infection control, offloading therapy, and patient management. I think it has clinical guiding significance." Compared with the previous model of managing diseases mainly based on clinical experience, implementing the guideline can help reduce practice variation among different healthcare professionals and make diabetic foot management more standardized. At the same time, the alignment between guideline content and actual clinical needs was also seen as a facilitating factor for guideline implementation. Diabetic foot patients have complex conditions and long treatment cycles, and there are problems in clinical practice such as inconsistent assessment standards and treatment decisions relying on personal experience, whereas the guideline can help healthcare professionals form a common management framework.

However, the IWGDF guideline involves multiple links such as patient screening, neurovascular examination, infection management, wound assessment, and long-term follow-up, making the implementation process complex. N2: "The guideline is quite complex to use in the department, involving multiple aspects, and difficult to implement." Some recommended measures in the guideline come from foreign medical environments and differ from China's hospital resource conditions, patient disease characteristics, and medical payment methods. Therefore, in actual application, appropriate adjustments are needed according to specific hospital conditions. In addition, some newer treatment technologies,

special dressings, and auxiliary equipment are expensive, and patients' economic conditions are limited, making it difficult to fully apply all guideline-recommended measures in practice. N7: "Although the guideline itself provides a good direction, when it comes to each patient, it still needs to be adjusted according to hospital conditions and the patient's actual situation, and cannot be directly copied."

2.3 Outer Setting

In this study, 6 influencing factors were identified in the external environment, with 3 facilitators and 3 barriers. Some respondents mentioned that diabetic foot patients have relatively high needs for reducing infection, preventing amputation, and improving quality of life, and this demand has become a major driving force for implementing related guidelines. With the increasing incidence of diabetes and enhanced patient health awareness, the clinical need for standardized diabetic foot management has gradually become a real demand. National chronic disease management policies and academic exchanges between hospitals also provide external support for guideline dissemination.

Diabetic foot patients usually require long-term treatment and continuous care, and patients' acceptance of treatment plans directly affects guideline implementation effects. N8: "Many patients, due to insufficient understanding of diabetic foot, long treatment cycles, and heavy economic burdens, have limited acceptance of long-term standardized treatment and some guideline-recommended measures." Poor continuity of out-of-hospital medical services is also an important factor affecting guideline implementation. Some patients are not promptly identified as having diabetic foot risks at the primary care stage, and by the time they are referred to specialized hospitals, the disease has already progressed, increasing treatment difficulty. N12: "While implementing the guideline, we also need to implement other projects, which affects implementation." This indicates that guideline implementation effects depend not only on internal hospital execution but also on regional referral arrangements and primary care management capacity support.

2.4 Inner Setting

Among the many factors affecting diabetic foot guideline implementation, the internal environment had the largest number of related factors identified, with 10 items in total, including 5 facilitators and 5 barriers. Interview results showed that hospital management support, team collaboration, and integration of guidelines into daily work processes are key conditions for promoting sustained guideline implementation. Multiple respondents mentioned that management support is not only at the level of policy advocacy but, more importantly, can promote the construction of diabetic foot management teams, coordinate cooperation among different departments, and provide guarantees in terms of personnel and resources for guideline implementation. Some hospitals adopted a multidisciplinary collaboration approach for diabetic foot, with endocrinology, vascular surgery, wound treatment teams, and nursing staff jointly participating in patient management, so that clinical pathways and nursing processes gradually incorporated guideline requirements. N5: "A team-based implementation approach can make the guideline more sustainable than relying solely on individual learning." In addition, regular training, case discussions, experience exchange, and collection of implementation effect feedback were

also considered helpful for healthcare professionals to better understand guideline content and improve execution ability.

However, barriers in the internal environment remain prominent. First, diabetic foot management requires additional work such as risk assessment, data recording, case discussions, and quality evaluation, while the clinical workload itself is heavy, making it often difficult for healthcare professionals to invest sufficient time. N9: "Daily diagnosis and nursing tasks often take priority over guideline work, and guideline-related matters sometimes can only be completed in spare time." Second, some hospitals still have problems such as insufficient dedicated diabetic foot management personnel, imperfect communication mechanisms between departments, and incomplete continuous quality evaluation systems, making it difficult for guideline implementation to reach an ideal state. N3: "Although we recognize the value of the guideline, the clinical workload is heavy, and without dedicated personnel responsible, it is difficult to sustain the guideline in the long term."

2.5 Characteristics of Individuals

In the individual characteristics domain, 6 influencing factors were identified, with 3 facilitators and 3 barriers. Respondents generally mentioned that healthcare professionals' recognition of evidence-based concepts and professional responsibility for improving patient outcomes are important intrinsic motivations for promoting guideline implementation. Healthcare professionals with diabetic foot management experience usually better understand the value of the guideline and will proactively apply recommendations in clinical practice. At the same time, participating in training and long-term practice can enhance healthcare professionals' familiarity with guideline content and improve implementation confidence. N14: "Through continuous learning and case practice, I have gradually been able to flexibly apply the guideline according to patient conditions, rather than mechanically executing recommendations."

However, some healthcare professionals still lack implementation confidence. Diabetic patients have relatively complex conditions, and treatment effects are influenced by many factors. Improvements brought by guideline implementation usually take a long time to manifest. Healthcare professionals mentioned that it is difficult to see obvious effects in a short period, which may affect their enthusiasm for continued participation in guideline implementation. In addition, for younger healthcare professionals with insufficient experience, how to make clinical decisions based on guidelines when encountering complex infections, severe ischemia, or diabetic foot patients with multiple interacting factors still presents certain difficulties.

2.6 Implementation Process

In the implementation process domain, 6 influencing factors were identified, with 3 facilitators and 3 barriers. From the interview results, a complete implementation plan, clear responsibility division, and continuous supervision and feedback are important factors for promoting IWGDF guideline implementation. Some hospitals specifically established work teams in the early stage of implementation, developed training plans, clarified work responsibilities, and continuously optimized

implementation processes through case discussions, stage summaries, and quality feedback. N11: "Regular reflection and evaluation can help us promptly identify shortcomings in guideline execution and also promote continuous improvement of clinical processes."

However, sustained difficulties still exist in the guideline implementation process. Some respondents pointed out that in the initial stage, because management paid more attention and the team was more motivated, implementation was relatively ideal. But as time progressed, without continuous supervision, evaluation, and incentives, some measures tended to weaken. In addition, heavy clinical work pressure and staff turnover made it difficult for some healthcare professionals to maintain a high level of investment over the long term, and guideline implementation gradually changed from proactive to passive completion. N6: "At the beginning, everyone would advance according to the plan, but after a long time, if there is no continuous checking and feedback, it is easy to return to the previous way of working."

3 Discussion

3.1 Based on the CFIR Framework, Diabetic Foot Guideline Implementation Is Revealed to Be Jointly Affected by Multilevel Factors

Using the CFIR framework as a basis, this study systematically identified facilitators and barriers affecting IWGDF guideline implementation across five domains. From the research results, DFU guideline implementation is not simply a process of knowledge dissemination[31], but is jointly affected by multiple factors such as guideline characteristics, healthcare organizational environment, healthcare professional behavior, and implementation strategies. From the perspective of implementation science, high-quality guidelines cannot automatically become clinical practice after publication, and translating evidence into practice depends on whether healthcare organizations can create supportive environments and implementation processes that enable healthcare professionals to incorporate recommendations into routine practice[32]. In recent years, research in implementation science has also pointed out that leadership participation, implementation leaders, resource guarantees, intervention adaptability, and participation of key stakeholders are important determinants of implementation success[33].

In the context of complex chronic disease management such as diabetic foot, the study further points out that guideline implementation has strong specialty-specific attributes. On the one hand, the IWGDF guideline provides a relatively unified management pathway and also brings evidence support to clinical work. On the other hand, diabetic foot is a complex disease involving multiple links such as infection control, vascular status, wound healing, offloading measures, and long-term management[5, 34–35], and its execution requires breaking through the previous single-discipline diagnosis and treatment model. Therefore, whether the guideline can truly be implemented depends not only on healthcare professionals' familiarity with guideline content but also on whether the hospital has established supporting organizational arrangements and collaborative processes conducive to guideline implementation.

3.2 Recognition of Guideline Value Promotes Implementation, but Complexity and Contextual Adaptation Limit Clinical Translation

The results of this study indicate that among healthcare professionals, the evidence value and clinical advantages of the IWGDF guideline are generally recognized, and it is believed that the guideline helps improve the standardization of diabetic foot management and reduce variation in clinical operations. This is consistent with previous research conclusions on guideline implementation. Whether guidelines are credible, whether the evidence base is solid, and whether they match actual clinical needs[31] are important aspects affecting healthcare professionals' acceptance. Relevant systematic reviews also show[31] that guideline characteristics (such as evidence quality, applicability, and clinical relevance) are important factors affecting guideline implementation, and high-quality guidelines that are easy to apply are more conducive to promoting clinical practice translation.

At the same time, this study also found that the complexity of the guideline itself and insufficient adaptation to specific contexts are important barriers to implementation. This is consistent with the findings of Gagliardi[36] et al., indicating that the main difficulty encountered in guideline implementation is not whether healthcare professionals recognize the guideline, but how to translate guideline recommendations into workflows that fit the actual medical environment.

The treatment of diabetic foot involves multiple aspects such as risk screening, wound assessment, infection control, vascular assessment, offloading therapy, and patient education[37–38], and management is highly complex. International guidelines are usually developed based on systems with sufficient medical resources. However, different hospitals differ in staffing, equipment conditions, professional levels, and patients' economic status. Therefore, guideline-recommended measures need to be adjusted according to specific contexts. Previous studies have pointed out that one important reason for guideline implementation failure is ignoring differences in implementation environments, and simply disseminating guidelines cannot solve process barriers in clinical application.

Therefore, future promotion of diabetic foot guidelines should not stop at guideline training but should further develop localized implementation tools suitable for different hospital levels, such as: (1) establishing simplified clinical pathways; (2) forming diabetic foot assessment standards; (3) developing nursing execution checklists; and (4) implementing stratified implementation according to hospital resource levels.

3.3 Internal Organizational Context Is Critical for Sustained Guideline Implementation: Moving from Individual Efforts Toward Structured Institutional Support

The study shows that the internal environment is the part with the most concentrated influencing factors. Among them, hospital management support, multidisciplinary collaboration, training systems, and process integration can promote guideline implementation, while insufficient staffing, heavy

workload, and limited resources constitute major barriers. It can be seen that the core challenge facing diabetic foot guideline implementation is not a lack of willingness among healthcare professionals, but a structural contradiction between the requirements proposed by the guideline and the current medical work model. Research in implementation science also points out[24] that organizational leadership participation and resource support have important effects on implementation outcomes. Kirk et al.[27] also stated that leadership investment, internal implementation leaders, and available resources are relatively stable key determinants in implementation research frameworks. The study also found that, for diabetic foot management, organizational support does not only mean management recognition, but more importantly, establishing a work system capable of supporting guideline operation. For example, the construction of multidisciplinary teams can promote information sharing among different professionals, transforming guideline requirements from individual-level behavior into team collaboration processes.

However, at present, some hospitals still mainly rely on a small number of core healthcare professionals to promote diabetic foot management, and stable position settings and long-term management mechanisms are still lacking. When implementation work depends more on individual responsibility, once personnel changes occur or clinical pressure increases, guideline execution is easily weakened. Therefore, future implementation strategies should shift from "training guideline executors" to "building guideline implementation systems," specifically including clarifying the scope of responsibilities of diabetic foot management teams, setting full-time or part-time guideline implementation leaders, incorporating guideline execution indicators into departmental quality management systems, and establishing continuous feedback mechanisms.

3.4 Individual Factors Affect Guideline Acceptance and Execution, Requiring Improvement of Healthcare Professionals' Implementation Ability

The results show that healthcare professionals' concepts of following evidence, sense of responsibility, and learning initiative promote guideline implementation, while insufficient implementation confidence and inadequate experience in handling complex cases become barriers. This further indicates that guideline implementation is not only an organizational matter but also a process of individual behavior change. Although the guideline provides standardized recommendations, patients differ greatly in clinical practice, and healthcare professionals need the ability to adjust guideline application according to patient conditions. Therefore, knowledge training alone is insufficient to improve implementation effects. It is more necessary to combine case discussions, simulation training, and practical feedback to enhance clinical application ability. Fischer et al.[39] showed that common barriers in guideline implementation include insufficient implementation training, difficulty understanding recommendations, and lack of confidence among medical staff.

Therefore, future training should shift from a model focused on knowledge transmission to one that emphasizes ability development, focusing on improving healthcare professionals' abilities in diabetic

foot risk assessment, selection of guideline recommendations, multidisciplinary communication, and clinical problem handling.

3.5 Sustained Implementation Requires Establishing Dynamic Evaluation and Feedback Mechanisms

The results of this study point out that the main difficulty in the implementation process is not in the initial launch stage, but in the long-term maintenance stage afterward. Some hospitals can carry out training and promote process construction according to plan in the initial stage, but as time goes on, execution gradually declines. This situation indicates an "implementation decay effect" in guideline implementation, meaning that if new working methods lack continuous reinforcement mechanisms, they are easily replaced by original clinical habits.

The field of implementation science believes[40] that successful implementation includes not only adoption but also sustained maintenance. CFIR framework-related research also points out that implementation plans, internal facilitators, and continuous evaluation mechanisms play important roles in sustained implementation. Therefore, diabetic foot guideline implementation needs to establish a continuous improvement model, using regular case audits, guideline compliance evaluation, patient outcome indicator monitoring, and team feedback meetings to form a cyclical process of "implementation-evaluation-adjustment-reimplementation."

4 Conclusion

This study identified multilevel determinants influencing the implementation of IWGDF guidelines among healthcare professionals using the CFIR framework. The findings demonstrate that diabetic foot guideline implementation is not merely an individual-level behavioral change among healthcare professionals but a complex process influenced by organizational context, professional capability, and implementation processes within tertiary hospital settings. Successful implementation requires alignment among guideline characteristics, organizational capacity, professional capability, and implementation processes. In particular, organizational readiness, multidisciplinary collaboration, and effective integration of guideline recommendations into clinical workflows appear to be critical for translating evidence-based recommendations into routine practice.

This study highlights that improving diabetic foot care quality requires a shift from passive guideline dissemination toward active implementation management. Healthcare organizations should develop context-specific implementation strategies that address local barriers, strengthen multidisciplinary coordination, and establish continuous evaluation mechanisms to support sustainable guideline adoption.

Implications for practice and health services

The findings have implications for healthcare managers and implementation practitioners involved in diabetic foot care. First, diabetic foot guideline implementation should be approached as a healthcare system improvement initiative rather than an isolated educational intervention. Implementation planning should begin with systematic assessment of contextual determinants to identify organizational and environmental barriers before introducing implementation strategies.

Second, healthcare organizations should strengthen implementation capacity by establishing multidisciplinary diabetic foot care teams, clarifying professional responsibilities, optimizing referral pathways, and integrating guideline recommendations into existing clinical workflows.

Third, implementation strategies should move beyond one-time training programs. Continuous professional development, audit and feedback mechanisms, leadership engagement, and adaptive improvement processes may facilitate sustained adoption of evidence-based diabetic foot care practices.

Finally, implementation efforts should consider variations in healthcare contexts. Strategies developed for tertiary hospitals may require adaptation before application in primary care settings, where resources, professional structures, and service delivery models differ.

Limitations

This study has several limitations.

First, although participants were recruited from six tertiary hospitals in different regions, the study population consisted primarily of healthcare professionals working in hospital-based diabetic foot services. Therefore, the findings may not fully reflect implementation challenges experienced in primary care settings or community-based healthcare environments.

Second, this study explored implementation determinants from the perspectives of healthcare professionals. Although physicians and nurses represented key stakeholders involved in diabetic foot care delivery, other important perspectives, including those of patients, caregivers, healthcare administrators, and policymakers, were not included. Future research incorporating multiple stakeholder perspectives may provide a more comprehensive understanding of guideline implementation.

Third, qualitative research aims to provide an in-depth understanding of experiences and contextual mechanisms rather than statistical generalizability. Although strategies such as purposive sampling, researcher triangulation, and member checking were used to enhance rigor, the identified determinants require further validation through quantitative studies and implementation evaluations.

Abbreviations

DFU
Diabetic foot ulcer

IWGDF
The International Working Group on the Diabetic Foot
CFIR
The Consolidated Framework for Implementation Research.

Declarations

Ethics declarations

This study has been approved by the Ethics Committee of the First Affiliated Hospital of Anhui Medical University, with ethics approval number PJ2025-10-49. This study was conducted in strict accordance with the requirements of the Declaration of Helsinki. Prior to the start of the study, all participants provided informed consent and voluntarily participated in this study.

Consent for publication

Not Applicable.

Availability of data and materials

The qualitative interview data generated and analyzed during this study are not publicly available due to confidentiality and ethical restrictions. However, anonymized data may be available from the corresponding author upon reasonable request.

Competing interests

The authors declare no competing interests.

Funding

(1) Anhui Provincial Department of Education Scientific Research Project (2025AHGXZK20012);

(2) 2026 Anhui Medical University School of Nursing Young Talent Development Project (H1qm22025088);

(3)Project supported by the Scientific Research Fund of Anhui Provincial Institute of Translational Medicine (Grant No. 2025zh-09).

Author Contributions

Jiaqian Chen: Study design, data collection and analysis, and drafting of the manuscript. Yuanyuan Liang: Literature search, data organization, and manuscript revision. Zhijun Shu: Data analysis, software support, and figure/table preparation. Chuanqin Wu: Resource coordination and survey implementation. Yang Hao: Data collection, validation, and manuscript revision. Shaohua Hu (Corresponding Author):

Study conception, methodological guidance, supervision, project administration, funding acquisition, and critical review and finalization of the manuscript.

All authors have read and approved the final version of the manuscript.

Acknowledgements

We would like to thank all healthcare professionals who participated in this study for sharing their valuable experiences and insights. We also thank the participating hospitals for their support and assistance during the data collection process.

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