Am J Transl Res 2025;17(12):9759-9770
www.ajtr.org /ISSN:1943-8141/AJTR0168411

Original Article

Promising community nursing effect on diabetic foot patients under the "six-in-one" collaborative management model

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Received August 28, 2025; Accepted December 3, 2025; Epub December 15, 2025; Published December 30, 2025

Abstract: Background: Diabetic foot complications are among the most severe and costly complications of diabetes. This study aims to explore the effectiveness of a nurse-led multidisciplinary collaborative nursing model under the "Six-Profession Co-Management Model" in the nursing intervention for community-based patients with high-risk diabetic feet. Methods: A prospective analysis was conducted from July to December 2023, involving 148 community-based DHRF patients. Participants were randomly allocated (1:1) to a control group receiving conventional nursing care, or an experimental group receiving nurse-led multidisciplinary interventions within the Six-Profession Co-management Model, alongside conventional care. Outcomes including laboratory measures (fasting and postprandial blood glucose, glycated hemoglobin, lipids), high-risk foot examination results, and scores from the Diabetic Foot Care Knowledge and Daily Care Behavior questionnaires were compared between groups before and after the 6-month intervention. Results: No statistically significant differences were observed in baseline data between the two groups ($P > 0.05$). Before the intervention, there were no significant differences in laboratory indicators, high-risk foot examination results, or questionnaire scores between the two groups ($P > 0.05$). After the intervention, significant differences were observed in all these measures, with the experimental group demonstrating markedly better outcomes than the control group ($P < 0.05$). Conclusion: The nurse-led multidisciplinary collaborative nursing model under the "Six-Profession Co-Management" framework is effective in managing community-based DHRF patients. It supports risk factor screening and assessment of foot care knowledge and behaviors, offering valuable guidance for early intervention.

Keywords: "Six-in-one" collaborative management model, diabetic foot, intervention effect, standardized management

Introduction

Diabetic high-risk foot (DHRF) refers to a condition in which patients have not yet developed diabetic foot ulcers (DFUs) but are at a high risk of progression to DFUs [1]. The International Working Group on the Diabetic Foot (IWGDF) 2015 guidelines define DHRF as "the presence of peripheral neuropathy with or without foot deformity or peripheral artery disease, or a history of foot ulceration, or a history of lower extremity or foot amputation in a patient with diabetes, without an active ulcer" [2]. As a serious chronic complication of diabetes mellitus, diabetic foot constitutes a high-risk condition involving foot infection, ulceration, and/or deep tissue injury related to distal lower extremity neuropathy and peripheral arterial disease [3]. Diabetic foot lesions mostly occur in elderly diabetic patients with long disease duration and result from the interaction of multiple risk factors [4]. The primary causes include peripheral neuropathy, peripheral vascular disease, and infection [5]. Peripheral neuropathy leads to reduced or absent sensation in the lower limbs, causes foot muscle atrophy, alters plantar pres-

https://doi.org/10.62347/JCYQ7972

sure distribution, and increases the risk of skin breakdown due to foreign objects in shoes or tight footwear, ultimately resulting in ulcer formation [6, 7]. Abnormal local plantar pressure contributes to ulcer development. Impaired blood circulation hinders ulcer healing and increases susceptibility to infection [8, 9]. Ulcers that develop on the basis of neurovascular complications, when complicated by infection and progressive worsening, become difficult to heal and may even lead to amputation [10].

In China, the reported incidence of diabetic foot among diabetic patients has exceeded 4% and continues to rise [11]. The prevalence of diabetes within communities has reached 11.52%, exceeding the national average, and the annual incidence of new foot ulcers among diabetic patients in communities exceeds 2% [11, 12]. Diabetic foot poses a substantial health burden. Foot complications represent one of the most severe and costly consequences of diabetes [13], characterized by high treatment difficulty, long treatment cycles, high rates of disability and mortality, substantial costs, and poor prognosis, placing a heavy burden on patients, their families, and society [14]. Studies indicate that the lifetime risk of developing a foot ulcer in diabetic patients is approximately 10-25%, and the five-year mortality rate after diagnosis of a foot ulcer is as high as 42-44% [15]. Once diabetic foot develops, hospital stays are significantly prolonged, with the average length of hospitalization extending to 26 days - 2.51 times that of diabetic patients without foot complications [16]. Foot ulcers are a major cause of lower extremity amputations; the amputation rate within three years of ulcer occurrence exceeds 50%. Once amputation occurs, mortality rises to 40-79% [17].

The 2015 IWGDF guidelines identify regular examination of the high-risk foot as the primary task among the five key elements for diabetic foot prevention. Early prevention and nursing interventions for DHRF are crucial for reducing the incidence of diabetic foot and can lower diabetes-related amputations by at least 50% [18]. In a retrospective analysis of data from UK hospitals spanning nearly six years, Ahmad et al. demonstrated that 9.85% of amputations could be avoided through effective and proactive interventions [19]. Standardized management is profoundly important for preventing and treating diabetic foot and reducing amputation rates caused by diabetic foot [20]. Communities, as the primary living units of residents, are the foremost setting for implementing early prevention and intervention for diabetic foot, playing a significant role in preventing the progression of DHRF to DFUs [21]. Investigators such as Fan Lifeng found through patient surveys that nearly half of the patients had insufficient knowledge about DHRF, more than half lacked daily foot care knowledge for prevention and exhibited poor foot care behaviors, with DHRF patients particularly deficient in preventive nursing knowledge [22].

A patient-centered care team composed of six types of professionals-clinicians, clinical nurses, clinical pharmacists, clinical dietitians, psychological consultants, and health managers-provides comprehensive and integrated management through multidisciplinary communication and discussion. In summary, the multidisciplinary collaborative care intervention model plays a positive role in the management of diabetic patients and represents an emerging trend. However, research on the application of multidisciplinary collaborative care models in nursing interventions for community-dwelling DHRF patients remains limited. A nurse-led multidisciplinary collaborative approach to nursing interventions for community DHRF patients can help them acquire more comprehensive foot management knowledge, guide patients toward better rehabilitation outcomes, and effectively address the gap in standardized management experience regarding nursing interventions for DHRF in community settings. This study therefore aims to explore the application effect of a nurse-led multidisciplinary collaborative nursing model under the “six-discipline co-management” framework in nursing interventions for community DHRF patients. It provides a basis for risk factor screening, assessment of foot care knowledge, and evaluation of daily foot care behaviors in this population, and it indicates a direction for further early treatment.

Materials and methods

Study subjects

A total of 148 patients at high risk for diabetic foot from communities in Beilun District, Ningbo, were enrolled in the study between

2023 and 2024. Using a random number method, the patients were divided into two groups: a control group (routine intervention group, n = 74) and an experimental group (intervention group under the "Six-Professionals Co-Management Model", n = 74). Patients in the control group received conventional nursing management for high-risk diabetic foot. In addition to conventional care, patients in the experimental group were subjected to foot risk factor screening led by nurses under the "Six-Professionals Co-Management Model" through multidisciplinary collaboration. Comprehensive interventions were actively implemented, along with assessments of foot care knowledge and daily foot-related behaviors. An internet-based integrated healthcare platform was also provided to optimize online and offline community nursing management for high-risk diabetic feet. This study has been reviewed and approved by the Medical Ethics Committee of Beilun People's Hospital (2022-17K).

Inclusion and exclusion criteria

Inclusion criteria: ① Met the diagnostic and classification criteria for diabetes mellitus published by the World Health Organization (WHO) in 1999. ② Met the criteria for high-risk feet according to the established diabetic foot risk grading system. Specifically: patients without peripheral neuropathy or peripheral vascular disease were classified as grade 0 (low risk); those with only neuropathy as grade 1 (high risk); those with both peripheral neuropathy and at least one of either peripheral vascular disease and/or foot deformity as grade 2 (high risk); and those with a history of foot ulcer or amputation as grade 3 (high risk). ③ Local permanent residents registered in the community, with no plans to leave within six months. Participants were required to be able to attend regular follow-ups, capable of self-care, mentally sound, able to communicate verbally, have an education level of primary school or above, able to use a smartphone.

Exclusion criteria: ① Patients with gestational diabetes mellitus; ② Those with severe diabetic complications; ③ Patients who had undergone major amputation (amputation above the ankle); ④ Those with neuropathy due to other causes, such as central nervous system injury, herniated disc compressing nerves, or congenital insensitivity to pain; ⑤ Patients with a confirmed diagnosis of diabetic foot currently receiving treatment.

Nursing protocol

Conventional nurse-led intervention model for diabetic high-risk foot (Control group): The conventional nurse-led management model for diabetic high-risk foot includes: establishing health records for residents; providing health education for diabetic patients, covering daily self-care knowledge such as diet, exercise, medication, monitoring, complication prevention, and foot care guidance; distributing health education materials; and conducting follow-ups (outpatient follow-up, telephone follow-up, and home visit follow-up). The specific contents are as follows:

① Nursing intervention for diabetic high-risk foot deformities: Based on foot conditions and different plantar pressure abnormalities, orthotic insoles made from different materials are customized to suit the patient's specific situation. Guidance is provided on wearing orthopedic shoes and appropriate toe sleeves or metatarsal pads.

② Nursing intervention for foot skin and toenail conditions: Medical foot care is provided for conditions such as calluses, corns, onychomycosis, and ingrown toenails. Patients with tinea pedis are instructed to apply antifungal or nail/nail bed nourishing oil twice daily (morning and evening). Toenails should not be trimmed too short. Moisturizer should be applied when foot skin is dry. Soaking feet in excessively hot water should be avoided, with foot bath water temperature controlled around 40°C. Properly fitting shoes and socks should be selected. Daily foot inspection is recommended.

③ Nurse-led online management for diabetic high-risk foot patients via the "Internet + Nursing" project: Patients can conduct real-time text/image consultations through the "Internet + Nursing" project, overcoming spatial and temporal limitations. They can place online orders to schedule nursing services as needed. Home visit services are booked via the internet platform to provide personalized care. The diabetic nursing service encompasses 9 items (including basic nursing services such as pressure ulcer care, safety protection and

nursing, etc., and 5 specialized diabetic nursing services including diabetic foot, diabetic retinopathy, diabetic nephropathy, diabetes glycemic management, and hypoglycemia management), fully addressing the home service needs for both basic and specialized nursing care of diabetic patients.

④ Nursing intervention for diabetic foot ulcers by diabetic specialist nurses or wound specialist nurses: Necrotic tissue or black eschar on the wound is debrided in small amounts multiple times using sterile instruments, avoiding aggressive removal that could enlarge the wound, and instead performing small-area debridement. As diabetic foot wounds require debridement, timely dressing changes are necessary in the later stages of wound care. With technological advancements, many new dressings based on moist wound healing theory have emerged, primarily including hydrocolloid dressings, silver ion dressings, and enzymatic debriding dressings. Nurses select different dressings according to the specific wound condition to promote healing. Many studies have shown that the aforementioned dressings have significant effects on wound healing. The use of hydrophilic fiber silver-containing dressings in the care of diabetic foot patients was found to result in better wound healing outcomes compared to conventional gauze. The use of alginate dressings for treating diabetic foot ulcers was found to accelerate granulation tissue maturation and wound healing speed, while simultaneously reducing the frequency and duration of dressing changes.

Nurse-led diabetic high-risk foot intervention model under the "six-professionals co-management" model (Experimental group): In addition to conventional nurse-led management for diabetic high-risk foot, the "Six-Professionals Co-Management" model employs multidisciplinary collaboration to manage diabetic high-risk foot patients through comprehensive interventions including diet, exercise, psychological care, blood glucose monitoring, specialized diagnosis and treatment, health management, and medication monitoring. The specific contents are as follows:

① Psychologist: Psychological care is implemented before and after intervention. As diabetes is a chronic lifelong disease, many patients experience negative emotions. Psychological comfort is provided, such as timely identification and soothing of negative emotions, and frequent communication with patients, to encourage their active cooperation with treatment.

② Dietitian: Blood glucose control requires dietary intervention. When fasting blood glucose is ≥7 mmol/L or postprandial blood glucose is ≥10 mmol/L, the dietitian intervenes to strengthen dietary education and develop individualized meal plans.

③ Clinical Pharmacist: Medication monitoring for diabetes is conducted before and after intervention, especially for high-risk foot patients using insulin for glycemic control, monitoring for adverse drug reactions and ensuring correct administration methods.

④ Clinical Physicians and General Practitioners: Diagnosis and treatment of diabetic patients are managed during the intervention period. Two-way referral is arranged for patients with acute or severe conditions.

⑤ Health Manager: Health management regarding patient lifestyle, weight, exercise, etc., is conducted before and after intervention to promote patient health.

Study indicators

General demographic data of community diabetic high-risk foot patients: Gender, age, occupation, height, weight, education level, monthly family income, smoking history, dietary habits, and diabetes history were included.

Nurse assessment of patient laboratory indicators before and after intervention: Metabolic indicators at baseline (before intervention) and after 6 months of intervention. These include: fasting blood glucose, postprandial blood glucose, glycated hemoglobin (HbA1c), and blood lipids.

Nurse assessment using the diabetic foot knowledge questionnaire and diabetic foot care behavior questionnaire before and after 6 months of intervention: Diabetic Foot Care Knowledge Questionnaire: Contains 5 dimensions with 33 items. Diabetic Foot Care Behavior Questionnaire: Contains 4 dimensions with 27 items.

To ensure the quality and uniformity of questionnaire completion, the researcher was responsible for distributing and collecting all materials. Uniform instructions were provided to the participants to ensure full understanding of each item before independent completion. Questionnaires were collected on-site, carefully checked and verified, and any missing items were promptly filled in.

Nurse assessment of diabetic high-risk foot examination findings before and after 6 months of intervention: The "Diabetic High-Risk Foot Risk Factor Questionnaire" was used to investigate "high-risk foot risk factors" and "lifestyle" in patients. Nurses screened patients for lower extremity peripheral neuropathy and lower extremity peripheral arterial disease to determine the presence or absence of these conditions. Foot examinations were conducted for morphology, skin, and toenails to identify foot deformities, calluses, corns, onychomycosis, ingrown toenails, fissures, and blisters. A comparison of lifestyle factors in diabetic foot patients before and after intervention was also performed (daily foot self-examination, application of foot moisturizer, frequency of toenails trimmed too short, and barefoot walking). Screening results and examination findings were recorded.

Specific assessment methods for foot status: ① Peripheral Neuropathy: Pressure Sensation Test: This study employed the 10-gram monofilament test at three measurement sites, as recommended by the International Working Group on the Diabetic Foot (IWGDF). As stipulated by the Endocrinology Branch of the Chinese Medical Doctor Association, the three test points are the plantar surfaces of the great toe and the first and fifth metatarsal heads of both feet. Each point is tested three times. If two or more errors occur at a point, it is judged as abnormal pressure sensation at that point. Abnormal pressure sensation at one of the three points is judged as abnormal pressure sensation for that foot.

Pinprick Sensation Test: The patient is asked to close their eyes. The examiner gently pricks the plantar surfaces of both feet with a blunt pin, avoiding calloused areas. The patient is asked to report whether they feel the stimulus and if it is sharp or dull. This is repeated three times, with one instance being a "false stimulus" where the blunt end of the pin touches the skin. If two or more out of three responses are incorrect, the pinprick sensation test is considered positive.

② Peripheral Arterial Disease: Dorsalis Pedis and Posterior Tibial Artery Pulse Palpation: Pulses of the dorsalis pedis artery and posterior tibial artery are palpated. Diminished or absent pulses are considered positive findings.

③ Ankle-Brachial Index (ABI) Measurement: Cuffs of an Omron electronic blood pressure monitor are used. Brachial systolic blood pressure is measured in both upper arms, and the higher value is taken as the brachial systolic pressure. The cuff is then placed at the ankle to measure the systolic pressure of the posterior tibial artery in both legs. ABI = ankle systolic pressure/brachial systolic pressure. An ABI < 0.9 is considered abnormal. An ABI between 0.9 and 1.3 is considered normal. An ABI > 1.3 suggests possible vascular calcification or reduced arterial elasticity.

Statistical methods

Statistical analysis was performed using SPSS 22.0 software. Quantitative data conforming to a normal distribution are presented as mean ± standard deviation ($\bar{x} \pm s$). For the comparison of indicators at different time points within the same group, the paired t-test was employed. The statistical significance level was set at $\alpha = 0.05$. Effect sizes were calculated using Excel. Qualitative data are presented as numbers and percentages (%). A *P*-value of < 0.05 was considered statistically significant.

Results

Comparison of general characteristics between the two groups

No statistically significant differences were observed between the two groups in terms of gender distribution, age, occupation, educational level, glucose control methods, or history of smoking and alcohol consumption (all P > 0.05). See **Table 1**.

Comparison of laboratory indicators before and after the intervention

Before the intervention, no statistically significant differences were found between the two

Table 1. Comparison of general characteristics between the two groups

Items		Control group (n = 74)	Experimental group (n = 74)	x^2/t	*p*-value
Gender	male	34	32	0.109	0.741
	female	40	42		
Age		66.54±10.54	65.36±12.55	0.617	0.538
Occupation	farmer	17	14	0.395	0.821
	housework	36	37		
	others	21	23		
Educational attainment	Primary school and below	44	44	0.341	0.843
	Junior high school	23	21		
	High school and above	7	9		
Blood sugar control	Oral hypoglycemic drugs	66	59	2.552	0.112
	Oral hypoglycemic drugs + Insulin injection	8	15		
History of smoking	no	62	63	0.051	0.821
	yes	11	12		
History of alcohol consumption	no	60	9	1.287	0.257
	yes	14	65		

groups in fasting blood glucose (FBG), postprandial blood glucose (PBG), glycosylated hemoglobin (HbA1c), total cholesterol (TC), triglycerides (TG), high-density lipoprotein cholesterol (HDL-C), or low-density lipoprotein cholesterol (LDL-C) (all P > 0.05). After the intervention, both groups exhibited reductions in FBG, PBG, HbA1c, TC, TG, and LDL-C levels compared to pre-intervention values, with a more pronounced decrease observed in the experimental group (all P < 0.05). In contrast, HDL-C levels increased in both groups after the intervention, with a significantly greater increase in the experimental group (P < 0.05). See **Table 2**.

Comparison of diabetes foot care questionnaire scores before and after the intervention

Before the intervention, no statistically significant differences were noted between the two groups in the scores of the Diabetes Foot Care Knowledge Questionnaire and the Diabetes Foot Care Behavior Questionnaire (both P > 0.05). After the intervention, scores increased significantly in both groups, with the experimental group achieving markedly higher scores than the control group (P < 0.05). See **Table 3**.

Comparison of diabetic high-risk foot examination status before and after the intervention

No statistically significant difference was observed in diabetic high-risk foot examination status between the two groups before the intervention (P > 0.05). After the intervention, the experimental group demonstrated better examination outcomes than the control group (P = 0.01). See **Table 4**.

Comparison of plantar sensation threshold and ankle-brachial index before and after the intervention

Before the intervention, no statistically significant differences were detected between the two groups in plantar sensation threshold or ankle-brachial index (ABI) (both P > 0.05). After the intervention, plantar sensation thresholds decreased in both groups, with the experimental group showing a significantly lower value than the control group (P < 0.05). Meanwhile, ABI values increased significantly in both groups after the intervention, with the experimental group exhibiting a notably higher value than the control group (P < 0.05). See **Table 5**.

Comparison of weight loss effects before and after the intervention

No statistically significant differences were observed in body mass index (BMI) or body fat percentage between the two groups before the intervention (both P > 0.05). After the intervention, the control group showed no significant reduction in BMI or body fat percentage, whereas the experimental group exhibited significant decreases in both parameters (P < 0.05). See **Table 6**.

Table 2. Comparison of laboratory indicators before and after the intervention

Time	Group	FBG (mmol/L)	PBG (mmol/L)	HbA1c (%)	TC (mmol/L)	TG (mmol/L)	HDL-C (mmol/L)	LDL-C (mmol/L)
Before intervention	Control group (n = 74)	7.88±1.83	12.55±4.02	8.52±2.30	4.34±1.16	1.77±1.61	1.15±0.43	2.62±1.08
	Experimental group (n = 74)	8.18 ±1.89	11.90±3.67	8.67±2.51	4.31±1.20	2.02±1.43	1.07±0.41	2.51±0.99
	t	-1.003	1.030	-0.380	0.148	-1.015	1.159	0.636
	p-value	0.318	0.305	0.705	0.883	0.312	0.248	0.526
After intervention	Control group (n = 74)	7.17±1.57*	10.05±1.54*	8.20±1.94*	4.00±0.61*	1.73±0.95*	1.29±0.34*	2.56±0.86*
	Experimental group (n = 74)	6.68±1.22*	9.49±1.21*	7.63±1.49*	3.50±0.65*	1.37±0.61*	1.49±0.31*	2.28±0.78*
	t	2.112	2.459	1.991	4.852	2.749	-3.706	2.048
	p-value	0.036	0.015	0.048	0.000	0.010	0.000	0.042

FBG: fasting blood glucose; PBG: postprandial blood glucose; HbA1c: glycosylated hemoglobin; TC: total cholesterol; TG: triglycerides; HDL-C: high-density lipoprotein cholesterol; LDL-C: low-density lipoprotein cholesterol. *: There were statistically significant differences before and after the intervention, with $P < 0.05$.

Table 3. Comparison of diabetes foot care questionnaire scores before and after the intervention

Time	Group	The scores of the Diabetes Foot Care Knowledge Questionnaire	The Diabetes Foot Care Behavior Questionnaire
Before intervention	Control group (n = 74)	55.19±17.22	67.07±8.57
	Experimental group (n = 74)	58.56±20.32	64.51±10.53
	t	-1.090	1.616
	p-value	0.278	0.108
After intervention	Control group (n = 74)	70.29±14.13*	78.17±6.79*
	Experimental group (n = 74)	80.41±14.43*	81.83±5.82*
	t	-4.308	-3.515
	p-value	0.000	0.000

*: There were statistically significant differences before and after the intervention, with P < 0.05.

Table 4. Comparison of diabetic high-risk foot examination status before and after the intervention

Time	Group	Foot examination for high-risk diabetes M (P25, P75)	Z	*p*-value
Before intervention	Control group (n = 74)	1 (1, 2)	-1.530	0.126
	Experimental group (n = 74)	1 (1, 2)		
After intervention	Control group (n = 74)	1 (1, 1)	-2.560	0.010
	Experimental group (n = 74)	1 (1, 2)		

Table 5. Comparison of plantar sensation threshold and ankle-brachial index before and after the intervention

Time	Group	Plantar sensory threshold (V)	Ankle-brachial index
Before intervention	Control group (n = 74)	18.76±3.31	0.52±0.09
	Experimental group (n = 74)	18.24±3.13	0.54±0.07
	t	0.978	-1.394
	p-value	0.330	0.165
After intervention	Control group (n = 74)	15.78 ±2.47*	0.70±0.09
	Experimental group (n = 74)	12.17±1.48*	0.80±0.10
	t	10.78	-6.472
	p-value	0.000	0.000

*: There were statistically significant differences before and after the intervention, with P < 0.05.

Comparison of peripheral vascular and neuropathic status before and after the intervention

Before the intervention, no statistically significant differences were found between the two groups in dorsal pedis artery blood flow, posterior tibial artery blood flow, or Toronto Clinical Scoring System (TCSS) scores (all P > 0.05). After the intervention, both groups demonstrated significant increases in dorsal pedis and posterior tibial artery blood flow, with the experimental group showing significantly higher values than the control group (P < 0.05). Additionally, TCSS scores decreased significantly in both groups after the intervention, with the experimental group displaying notably lower scores than the control group (P < 0.05). See **Table 7**.

Discussion

As a serious complication of diabetes, diabetic high-risk foot significantly impairs patients' quality of life and overall health [2, 22, 23]. The rising global incidence of diabetes has been accompanied by a continuous increase in dia-

Table 6. Comparison of weight loss effects before and after the intervention

Time	Group	BMI	Body fat percentage
Before intervention	Control group (n = 74)	24.75±3.80	32.59±7.43
	Experimental group (n = 74)	23.52±3.79	32.10±6.99
	t	1.960	0.438
	p-value	0.072	0.662
After intervention	Control group (n = 74)	24.31±3.22*	29.90±6.18*
	Experimental group (n = 74)	22.83±2.75*	27.76±3.12*
	t	3.005	2.655
	p-value	0.003	0.009

BMI: body mass index. *: There were statistically significant differences before and after the intervention, with P < 0.05.

Table 7. Comparison of peripheral vascular and neuropathic status before and after the intervention

Time	Group	Dorsal pedis artery blood flow (mL/min)	Posterior tibial artery blood flow (mL/min)	TCSS
Before intervention	Control group (n = 74)	19.94±2.51	91.11±4.87	9.91±2.53
	Experimental group (n = 74)	19.68±2.52	90.78±5.61	9.69±2.60
	t	0.621	0.391	0.513
	p-value	0.536	0.696	0.609
After intervention	Control group (n = 74)	22.24±3.41*	98.10±6.42*	7.46±1.65
	Experimental group (n = 74)	25.69±9.09*	104.85±9.96*	6.45±1.84
	t	-2.412	-4.896	3.533
	p-value	0.017	0.000	0.001

TCSS: Toronto Clinical Scoring System. *: There were statistically significant differences before and after the intervention, with P < 0.05.

betic high-risk foot cases [19, 20]. Consequently, understanding the early identification, preventive strategies, and foot care interventions for diabetic high-risk foot is crucial for diabetic patients [12, 24]. A considerable proportion of patients with diabetic high-risk foot can achieve effective control during hospitalization; however, the lack of effective management after discharge leads to high ulcer recurrence and readmission rates [25, 26]. Effective community management can reduce the incidence of diabetic foot in this population. However, current healthcare system limitations often trap diabetic high-risk foot management in a repetitive hospital-community cycle, with substantial variations in care quality during transitions [17, 27]. The "Six-Professionals Co-Management" model demonstrates a positive and comprehensive interventional effect on patients with diabetic high-risk foot. Through multidisciplinary collaboration, it substantially alters the previous single-department treatment approach, providing patients with more holistic and continuous management. Furthermore, this model helps patients acquire more comprehensive knowledge of foot care, guiding them toward better rehabilitation outcomes. For the community, it effectively compensates for the lack of experience in standardized management and nursing interventions for diabetic high-risk foot.

Fasting blood glucose, postprandial blood glucose, and HbA1c are conventional indicators for assessing glycemic control stability in diabetic patients and serve as important metrics for evaluating disease stability [28, 29]. This study monitored blood glucose and HbA1c levels in both groups before and after the intervention. The results indicated that glycemic control in patients under the Six-Professionals Co-Management model was significantly better than that in the control group. This suggests that the intervention measures within this model effectively monitor the medication adherence of patients with diabetic high-risk foot, allow for timely adjustments to the correct administration of diabetic drugs, and facilitate the understanding of adverse drug reactions. Concurrently, the model also controlled

patients' body weight through lifestyle and daily exercise interventions. Moreover, post-intervention levels of TC, TG, and LDL-C in the blood significantly decreased, while HDL-C increased compared to pre-intervention levels, substantially reducing the risk of thrombosis and vascular sclerosis in these patients.

Out-of-hospital management is crucial for controlling disease progression and mitigating infection risk in patients with diabetic high-risk foot. Current research on this management primarily focuses on regular monitoring of parameters like blood glucose, blood pressure, and blood biochemistry, supplemented by health lectures and follow-ups [30, 31]. These approaches are monotonous in form, insufficiently comprehensive in management content, and lack timely and effective information exchange among hospitals, communities, and patients [11, 30]. According to research reports, approximately half of the diabetic patients managed in community home-based care settings in China have insufficient knowledge of diabetic foot care, resulting in poor foot care practices and a high incidence of diabetic foot [32, 33]. Under the Six-Professionals Co-Management model, nurses can provide online management for patients with diabetic high-risk foot through the "Internet + Nursing" program. Similarly, patients can conduct real-time text and image consultations via the same program, overcoming spatial and temporal limitations. They can place online orders to schedule nursing services and book home-visit services through internet platforms, thereby receiving personalized care. This study evaluated the scores of foot care questionnaires, the status of diabetic high-risk foot examinations, plantar sensation thresholds, ankle-brachial indices, as well as indicators of peripheral vascular and neuropathic diseases before and after the intervention. The results demonstrated that the intervention significantly enhanced patients' knowledge of foot care and assessment methods, including foot inspection, daily care practices, evaluation of foot skin and nail conditions, and regular assessments for peripheral neuropathy and vascular disease. Consequently, it substantially reduced the risk of diabetic foot in out-of-hospital patients with diabetic high-risk foot.

As this study was limited to a single district, it cannot demonstrate the feasibility of implementing the Six-Professionals Co-Management model in all communities. Additionally, the implementation of this model requires multidisciplinary collaboration and cooperation between medical and nursing staff, which increases the complexity of management and personnel allocation. Future research should adopt multi-community and multi-hospital collaborations to further explore the application value of the Six-Professionals Co-Management model in managing diabetic high-risk feet.

Based on the specific characteristics of patients at high risk for diabetic foot, this study adopted a Six-Professionals Co-Management model, creating a favorable management environment and establishing individualized, dynamic, and continuous management approaches, thereby reducing the incidence of diabetic foot. As a novel comprehensive intervention model encompassing "hospital-community-patient" aspects, the Six-Professionals Co-Management model addresses issues related to diabetic foot care through both online and offline foot care interventions and guidance. It resolves patients' insufficient knowledge of foot care and their inability to manage complications promptly after discharge. This model enables patients to receive professional and targeted out-of-hospital management even within the community.

Conclusion

The nurse-led multidisciplinary collaborative care model under the "Six-Professionals Co-Management" framework demonstrates clear effectiveness in the nursing intervention for community-based patients with diabetic high-risk foot. It provides a basis for screening risk factors, assessing foot care knowledge, and evaluating daily foot care behaviors in these patients, thereby pointing the way for further early treatment.

Acknowledgements

This study was supported by Medical and Health Science Program of Zhejiang Province (2023XY025): Intervention Effect of Nurses on Community Patients with Diabetic High-Risk Foot under the Six-Profession Co-management Model.

Disclosure of conflict of interest

None.

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