Original Article
Effect of motivational interviewing and phased intervention on the self-nursing ability and QOL of patients with a diabetic foot

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Abstract: Objective: This study was designed to assess the effect of motivational interviewing and phased intervention on the self-nursing ability and quality of life (QOL) of patients with a diabetic foot. Methods: They were divided into the control group for routine health education and the observation group for motivational interviewing and phased intervention according to nursing mode, and compared for changes in Blood Sugar Level (BSL), the Summary of Diabetes Self Care Activities (SDSCA) score and QOL score before and after intervention. Results: (1) Intervention resulted in PBG2h and FBG of (8.52±4.12) mmol/L and (7.15±1.08) mmol/L, respectively, in the observation group, which were lower than the control group (P<0.05); (2) the observation group also excelled the control group in terms of foot nursing, blood sugar monitoring, smoking state, reasonable movement and alimentary control with scores of (6.23±0.58), (6.38±0.52), (6.29±0.42), (6.33±0.35) and (6.52±0.18) (*P*<0.0), respectively; (3) compared with the control group, the observation group attained higher QOL scores in physiology, societal functioning, psychology and treatment, which were (52.36±2.86), (18.88±2.88), (29.99±3.85), (13.69±1.58) and (112.25±6.32), respectively (P<0.05). Conclusion: Patients with a diabetic foot benefited from the motivational interviewing and phased intervention in terms of effective control of BSL, and improved self-management ability and QOL.

Keywords: Diabetic foot, routine nursing, motivational interviewing, phased intervention, self-nursing ability

Introduction

Diabetic foot has been a severe complication of diabetes with a rising incidence as the number of patients with diabetes increases [1, 2]. The foot is a complicated target organ (TO) of the multisystem disease of diabeties. Patients with diabetes have excessively high mechanical pressure caused by peripheral vascular diseases (PVDs) and peripheral neuropathies (PNP), resulting in damage to the bones and joint systems and soft tissue of the feet, and a series of other feet problems [3, 4]. If such complications and syndromes of the lower limbs are not solved in a timely manner, disastrous consequences are expected [5].

Diabetic foot, once set in, will seriously affect the life of patients, including increasing pains and medical expenses [6, 7]. Most patients with a diabetic foot may treat wounds on their feet improperly as they know little about this disease, which will worsen the festering and thanatosis, and even result in amputation in some cases [8, 9]. Therefore, to effectively prevent diabetic foot and improve patients' self-nursing and self-care ability, patients in the observation group received motivational interviewing and phased intervention.

In this study, the effect of motivational interviewing and phased intervention on the self-nursing ability and QOL of patients with diabetic feet were specifically analyzed. Patients were divided into two groups, the control group for routine nursing and the observation group for motivational interviewing and phased intervention. With little knowledge and understanding about diabetic feet, a common complication of diabetes, or due to fear of it, some patients are compromised in self-nursing. For this reason, the study adopted motivational interviewing and phased intervention measures in nursing, which, differ from routine

nursing measures, where more targeted, stage-wise and innovatively significant nursing methods are implemented. The study was conducted with the expectation to reinforce the recovery of patients with a diabetic foot, and improve their QOL and self-nursing abilities.

Materials and methods

Materials

A total of 112 diabetic foot patients who underwent treatment in our hospital from January 2018 to May 2019 were selected for retrospective analysis. They were divided into two groups according to the nursing mode. The study obtained informed consent from all patients and approval from the ethics committee of the hospital. The control group (n=54) included 30 males and 24 females aged between 42 and 78 for routine nursing. The observation group (n=58) included 32 males and 26 females aged between 43 and 80 for motivational interviewing and phased intervention. (1) Inclusion criteria: included patients were not troubled by cognitive dysfunction nor mental disorder, have provided informed consent and agreed with the follow-up. (2) Exclusion criteria: some patients were excluded because they were suffering from combined severe infection, communication and cognitive dysfunction, severe complications in the heart, brain and kidney, and other complications of diabetes, or showed low compliance.

Methods

The observation group received motivational interviewing and phased intervention, which requires paramedics from the Department of Diabetes being professionally trained for motivational interviewing techniques before implementing any interventional measures. When patients with a diabetic foot were educated for motivational interviewing, a one-on-one nursing intervention mode and standardized and unified educational terms were relied on to explain the objectives and significance of motivational interviewing education for patients; in the process of interviewing, a targeted education plan was formulated according to the patients' motivation to increase the patients' motivation of making better choices; the intervention was divided into 5 stages based on the patients' intention of changing individual behaviors, at different stages, different induction

approaches of motivational interviewing were employed for 2 to 3 interviews educating each patient. Each class last 20 to 30 min. Those stages include (1) Pre-intention stage: at this stage, nurses communicated with patients face to face to earn their trust and establish an amicable relationship. It is also a process answering questions from patients, including the mechanism of diabetic feet, hazards, blood sugar monitoring approaches, correct alimentary control and movement methods, food knowledge, and structuring of health faith, etc. (2) Intention stage: at this stage, workers guided patients to meet their specific intentions and make correct choices according to the doctor's plan. Patients were informed of the adverse consequences arising from adverse behaviors, and the benefits of correction them. (3) Preparation stage: patients were guided to make a plan for behavioral changes based on their problems at this stage, and monitored for action. (4) Action stage: problems observed when the patients changed behaviors were analyzed for better understanding and flexible adjustment of the plan as a guarantee of its normal progression. (5) Maintenance stage: with full consideration of the patients' family environment and economic conditions, paramedics cooperated with the doctor to create a harmonious environment for the patients, and assisted them in changing adverse behaviors and habits. Patients were followed-up for 6-months to understand their phased intentions after discharge, or interviewed on the phone once per week in the 1st month, and twice per month in the following 2nd to 6th months after discharge.

The control group received routine health education: during hospitalization, nurses arranged more health education activities for patients, including introduction of knowledge related to diabetic feet in the forms of videos, photos, and models, in order to improve the knowledge about diabetic feet and mastery of various preventative and control measures. Each class last 40 to 60 min. In addition, nurses established and strictly complied with a 6-month follow-up schedule.

Observation indices

(1) BSL: the two groups were compared for changes in PBG2h and fasting blood glucose (FBG) before nursing.
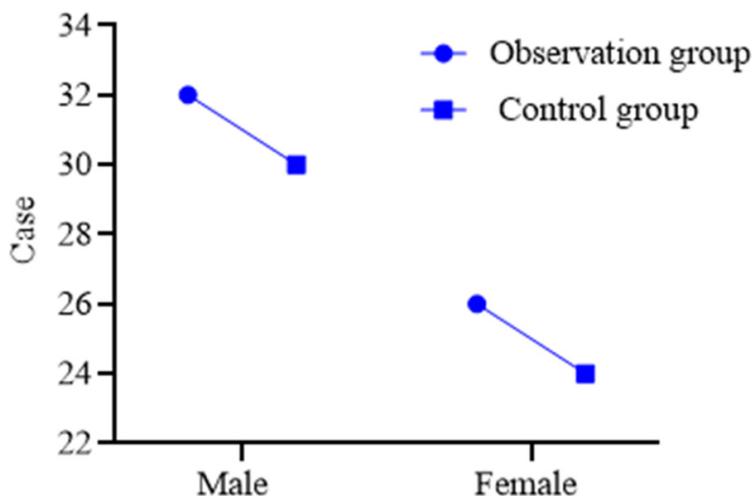
Figure 1. Male-female ratio in the observation group and the control group. Male and female patients accounted for 55.17% and 44.83% in the observation group, 55.56% and 44.44% in the control group (P>0.05).

(2) SDSCA score: diabetes SDSCA scoring written in Chinese was adopted for assessment, which included 11 items in 5 categories of smoking, foot care, blood sugar monitoring, reasonable movement and alimentary control. Each item may be scored between 0 and 7. The SDSCA score was calculated by dividing the sum of scores for all items by their number, and the Cronbach's α was 0.918 [10, 11].

(3) QOL: diabetes specific quality of life assessment scale (A-DQOL) was used to assess the QOL of both groups before and after nursing. The scale consisted of 27 items covering 4 aspects of physiology, society, psychology, and treatment. Each item was assessed by 5-grades scoring method with total score ranging from 27 to 135. The QOL is positively correlated to the score. The Cronbach's α of the scale was 0.91 [12, 13].

Statistical analysis

Statistical analysis was performed with SPSS 22.0. In case of numerical data expressed as Mean ± Standard Deviation, comparison studies were carried out through independent-samples T test for data which were normally distributed, and Mann-Whitney U test for data which were not normally distributed, paired test for pre-and-pro comparison in the group; in case of nominal data expressed as [n (%)], comparison studies were carried out through X^2 test for

intergroup comparison. For all statistical comparisons, significance was defined as P<0.05.

Results

Comparison between the 2 groups in general information

The observation group included 32 males (55.17%) and 26 females (44.83%), while the control group had 30 (55.56%) and 24 (44.44%) (*P*>0.05, **Figure 1**); patients in the observation group were aged between 43 and 80 years with a mean of (62.58±2.69), while the control group were 42 and 78 years old with a mean of (62.19±2.58) (*P*>0.05); patients in the observation group had been suffering from the disease for 1 to 12 years with mean of (6.52±0.62), while the control group were suffering 2 to 13 years with mean of (6.58±0.59) (*P*>0.05); for Wagner classification, the observation group reported 34 patients (58.62%) at class 1, 20 at class 2 (34.48%) and 4 at class 3 (6.90%), while the control group was 32 (59.26%), 19 (35.19%) and 3 (5.56%), respectively (*P*>0.05, **Figure 2**) (**Table 1**).

Comparison between the 2 groups in BSL before and after intervention

Both groups experienced reduction of PBG2h and FBG after intervention (*P*<0.05) which was more significant in the observation group (*P*<0.05) though no statistical difference was observed before intervention (*P*>0.05) (**Table 2** and **Figure 3**).

Comparison between the 2 groups in SDSCA scores before and after intervention

Both groups experienced an increase in SDSCA scores after intervention (*P*<0.05) which was more significant in the observation group (*P*<0.05) in terms of smoking state, foot care, blood sugar monitoring, reasonable movement and alimentary control though no statistical difference was observed before intervention (*P*>0.05) (**Table 3** and **Figure 4**).
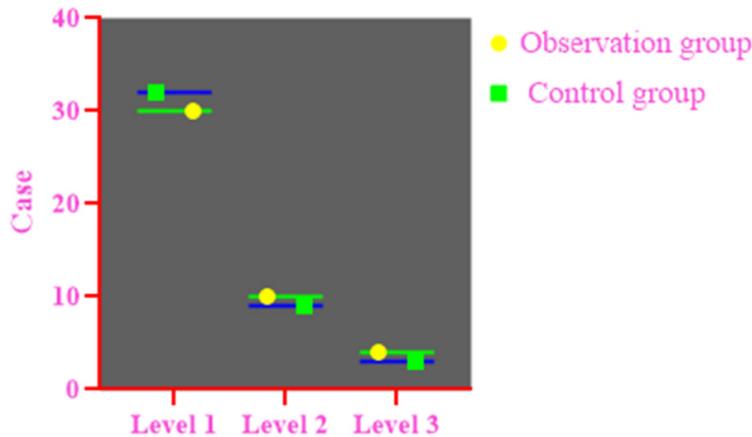
Figure 2. Comparison of Wagner classification in the observation group and the control group. Class 1, class 2 and class 3 patients accounted for 58.62%, 34.48% and 6.90% in the observation group, 59.26%, 35.19% and 5.56% in the control group (*P*>0.05).

Table 1. Comparison between the observation group and control group in general materials [n (%)]/($\overline{x} \pm s$)

Materials		Observation group (n=58)	Control group (n=54)	t/X^2	P
Gender (n)	M	32 (55.17)	30 (55.56)	0.002	0.967
	F	26 (44.83)	24 (44.44)		
Age (year)		62.58±2.69	62.19±2.58	0.782	0.436
Course of disease (year)		6.52±0.62	6.58±0.59	0.524	0.602
Wagner classification					
Class 1		34 (58.62)	32 (59.26)		
Class 2		20 (34.48)	19 (35.19)	12.789	0.002
Class 3		3 (6.90)	3 (5.56)		

Comparison between the 2 groups in QOL scores before and after intervention

Both groups experienced increases in QOL scores after intervention (*P*<0.05) which were more significant in the observation group (*P*<0.05) in terms of physiology, society, psychology, treatment and total QOL score, although no statistical difference was observed before intervention (*P*>0.05) (**Table 4**).

Discussion

Diabetic foot is one of the most important causes for amputation in patients with diabetes, and its incidence is closely associated with ulcer, infection, Charcot arthritis, and toe deformities [14, 15]. Diabetic foot is clinically expressed in diversified forms, with ankle sock expression in the early stages, which involves the distal ends of limbs first and then the proximal ends [16, 17]. In advanced stages, in addition to syndromes arising from early neuropathies, other syndromes such as osteomyelitis, infection and ulcers were also observed [18, 19]. This disease seriously affects the normal life of patients and may also threaten their life if not intervened in a timely manner.

Clinically, most patients with diabetic feet have neglected their diets and they are greatly deficient in knowledge related to the disease. Delayed or incorrect intervention will result in delayed treatment and severe adverse consequences in some cases [20, 21]. In the routine health education mode, counselors focused more on drug treatment and blood sugar monitoring approaches with little attention to the effect of patients' behaviors and motivation on prognosis [22, 23]. In the combined treatment of motivational interviewing and phased intervention, patients were interviewed in a one-on-one basis according to their family conditions and personalities, and on the principle of progressive development. The whole course consisted of 5 stages, i.e., pre-intention, intention, preparation, action and maintenance. Targeted intervention and guidance for patients were reinforced based on their specific conditions in each stage to help them understand the possible adverse consequences from adverse habits and behaviors and the benefits of their correction. After comparison, patients were guided to make the correction choice and improved in autonomy [24, 25]. Next, in the interventional model, patients were guided to review problems that occurred during the behavioral change process, against which, targeted solutions were proposed to ensure a good and active psychological state of the patients, improve their self-management ability and QOL, and effectively control BSL.

Table 2. Comparison between the observation group and the control group in blood Sugar before and after intervention ($\overline{x} \pm s$, mmol/L)

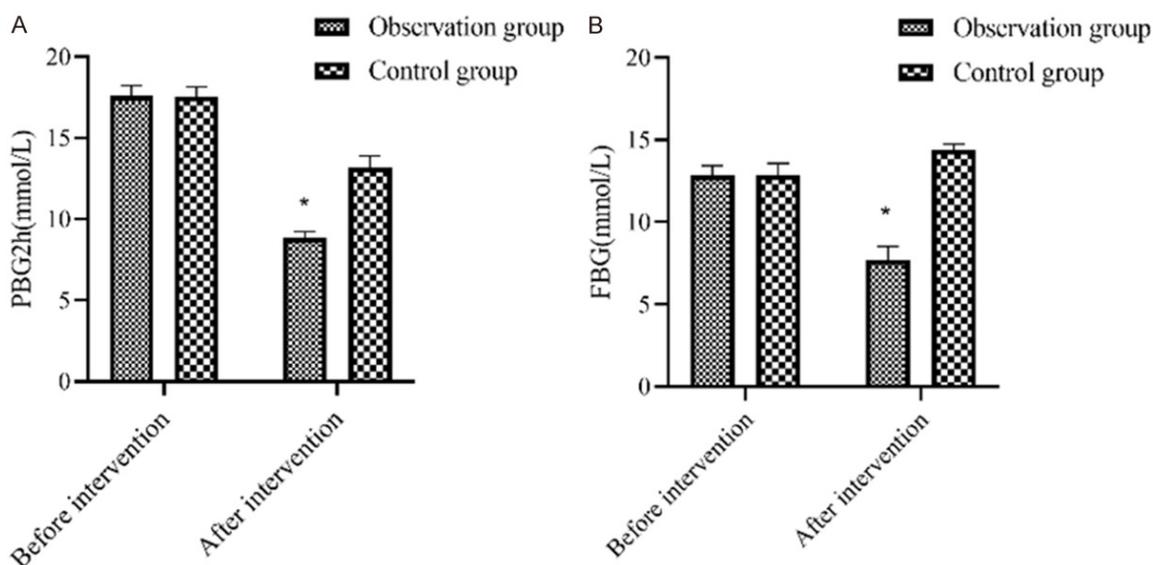| Group	PBG2h		FBG	
	Before intervention	After intervention	Before intervention	After intervention
Control group (n=54)	17.15±6.52	12.65±5.22	12.36±4.85	14.15±3.22
Observation group (n=58)	17.19±6.49	8.52±4.12	12.39±4.82	7.15±1.08
t	0.029	4.120	0.034	15.965
P	0.977	0.000	0.973	0.000

Figure 3. Comparison between the observation group and the control group in BSL before and after intervention. The two groups were compared for PBG2h and FBG before intervention (A) and after intervention (B), as the observation group was lower than the control group. *P<0.05.

Table 3. Comparison between the observation group and the control group in SDSCA score ($\overline{x} \pm s$, score)

Time	Foot nursing	Blood sugar monitoring	Smoking state	Reasonable movement	Alimentary control
Before intervention					
Control Group (n=54)	2.15±0.25	2.18±0.15	3.11±0.18	3.08±0.23	3.02±0.58
Observation Group (n=58)	2.19±0.22	2.19±0.12	3.12±0.16	3.09±0.22	3.04±0.46
t	0.930	0.403	0.322	0.243	0.209
P	0.354	0.688	0.748	0.808	0.835
After intervention					
Control Group (n=54)	3.25±0.18	4.52±0.08	4.11±0.12	3.69±0.36	3.18±0.22
Observation Group (n=58)	6.23±0.58	6.38±0.52	6.29±0.42	6.33±0.35	6.52±0.18
t	38.010	27.385	38.658	40.728	52.632
P	0.000	0.000	0.000	0.0000	0.000

In this study, compared with the control group, the observation group was lower in PBG2h and FBG, and higher in SDSCA score including smoking state, foot care, blood sugar monitoring, reasonable movement and alimentary control, physiology, society, psychology, treatment and total QOL score (*P*<0.05), indicating that the mode of motivational interviewing and
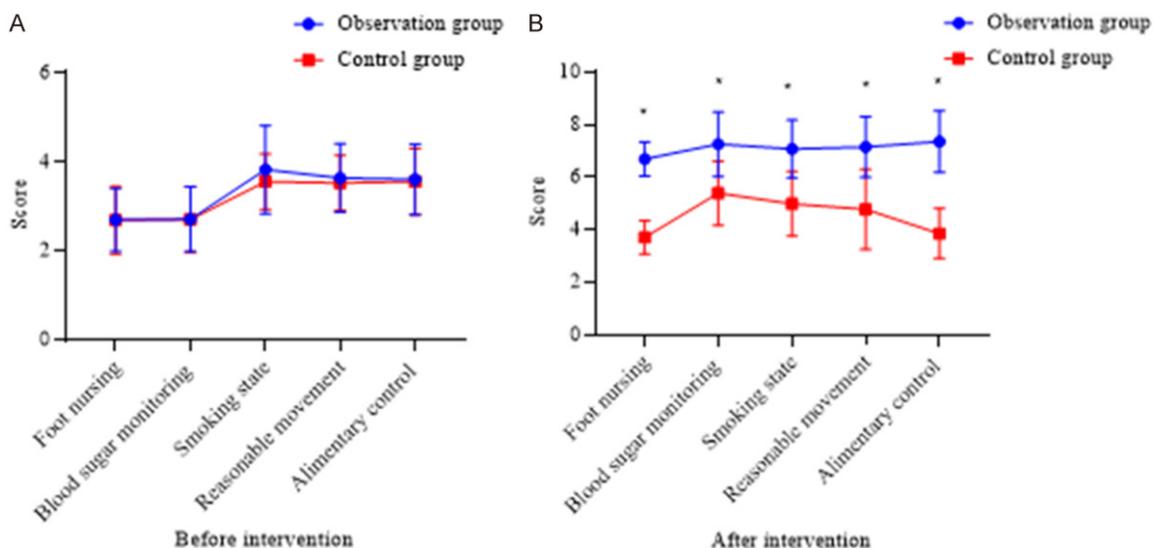
Figure 4. Comparison between the Observation Group and the Control Group in SDSCA before and after Intervention. The two groups were compared for SDSCA score including smoking state, foot care, blood sugar monitoring, reasonable movement and alimentary control before intervention (A) and after intervention (B) as the observation group was higher than the control group. *P<0.05.

Table 4. Comparison between the observation group and the control group in QOL score ($\bar{x}$ ± s, score)

Time	Physiology	Society	Psychology	Treatment	Total
Before intervention					
Control Group (n=54)	41.12±2.52	14.52±2.52	22.96±2.15	11.18±1.05	85.42±5.12
Observation Group (n=58)	41.29±2.46	14.58±2.63	22.99±2.09	11.19±1.06	85.38±5.09
t	0.374	0.128	0.078	0.052	0.043
P	0.709	0.879	0.938	0.959	0.966
After intervention					
Control Group (n=54)	45.26±3.26	15.36±2.85	24.52±3.02	11.96±1.26	90.05±5.69
Observation Group (n=58)	52.36±2.86	18.88±2.88	29.99±3.85	13.69±1.58	112.25±6.32
t	12.682	6.729	8.659	12.326	11.328
P	0.000	0.000	0.000	0.000	0.000

phased intervention can effectively control the BSL in patients with diabetic feet and improve their self-management ability and QOL. The reason lies possibly in the role of motivational interviewing and phased intervention helping patients with a diabetic foot establish a self-management behavior model. Generally, routine health education neglects the analysis of patients' actual conditions, and its content is more general and less targeted. In contrast, in the mode of motivational interviewing and phased intervention, the interviewing results of each patient with a diabetic foot is based on the formulated targeted solution, and patients are guided at each stage to correct their adverse behaviors and improve self-manage-

ment ability. Next, on the basis of routine health education, motivational interviewing and phased intervention require counselors guiding patients to correct their adverse behaviors. It is a long-term effective solution allowing patients to master correct blood sugar monitoring approaches and diabetic foot nursing approaches unconsciously, effectively controlling BSL and improving QOL consequently [26, 27].

In conclusion, patients with diabetic feet benefited from the motivational interviewing and phased intervention in terms of effective control of BSL, and were improved in self-management ability and QOL. However, given the small sample size and limited time frame in this

study, future studies shall further explore the effect of motivational interviewing and phased intervention on patients with a diabetic foot.

Disclosure of conflict of interest

None.

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