Design and Development of a Diabetes Communication Skills Training Program for Chinese General Practitioners: Post-Print

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Abstract

General practitioners, as "gatekeepers" of health, play a vital role in primary care diabetes chronic disease management. Chronic disease management for diabetes can delay disease progression, reduce complications, and improve patient health outcomes, necessitating effective communication and mutual collaboration between patients and physicians. Good communication skills enable general practitioners to establish long-term care relationships with diabetes patients and facilitate the development of effective self-management skills. This paper summarizes the design and development of a diabetes communication skills training program for general practitioners guided by multiple theoretical frameworks: based on evidence from systematic reviews, using qualitative research to further explore communication experiences and perspectives of both diabetes patients and general practitioners, and employing a mixed-methods research design to obtain priority rankings for doctor-patient communication training content from the general practice perspective. The aim is to provide solutions for high-quality primary care diabetes management and to serve as a reference for designing evidence-based general practitioner training programs within medical education frameworks.

Full Text

Development of Communication Skills Training in Diabetes Care for General Practitioners in China

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Abstract

General Practitioners (GPs) play a crucial role as health "gatekeepers" in the management of chronic diabetes at the primary care level. Comprehensive diabetes management can delay disease progression, reduce complications, and improve patient outcomes, but requires effective communication and collaboration between patients and physicians. GPs with strong communication skills are better equipped to establish long-term care relationships with diabetic patients and help them develop effective self-management capabilities. This paper summarizes our research team' s design and development of a diabetes communication skills training program for GPs, guided by multiple theoretical frameworks. The program is based on evidence from systematic reviews, supplemented by qualitative research exploring the communication experiences and perspectives of both diabetic patients and GPs, and employs a mixed-methods research design to prioritize training content from the perspective of general practice. Our work aims to provide solutions for high-quality primary diabetes care and offer a model for designing evidence-based GP training programs grounded in medical education frameworks.

Keywords: Communication skills; Training design; Diabetes; General practi-

tioners

Diabetes, as a common chronic disease, carries high prevalence, mortality, and disease burden, posing a serious threat to public health in China [1–3]. Comprehensive and proactive diabetes management is essential to delay disease progression, reduce complications, and improve patient outcomes. High-quality chronic disease management requires effective communication and mutual collaboration between patients and physicians [4-5]. Both parties must work together to identify and discuss problems, establish management goals, and develop treatment plans. Through effective communication and collaboration, patients with diabetes can be empowered to actively participate in self-management, while physicians can more promptly adjust treatment strategies. Numerous cross-sectional studies have demonstrated that good physician-patient communication enhances relationships and collaboration, leading to improved health status, medication adherence, self-management, and patient satisfaction. Guidelines from the American Diabetes Association (ADA), European Association for the Study of Diabetes (EASD), and UK' s National Institute for Health and Care Excellence (NICE) all encourage patient-centered communication approaches [6-8].

Primary care GPs serve a vital function in chronic diabetes management. International and domestic experience shows that a well-trained GP workforce, combined with a tiered healthcare delivery system and essential medical institutions, plays a substantial role in addressing common chronic diseases like diabetes [8-9]. As health "gatekeepers," GPs provide quality, accessible, and cost-effective medical services to diabetic patients through family doctor contracts, offering continuous and comprehensive responsible management [10]. In recent years, China has vigorously developed GP training programs, with plans to cultivate 700,000 GPs by 2030, achieving a ratio of 5 qualified GPs per 10,000 residents in both urban and rural areas. At that point, GPs will become the main force in diabetes chronic disease management [11]. GPs with strong communication skills can better establish long-term care relationships with diabetic patients, help them develop effective self-management skills, build confidence, and ultimately achieve high-quality diabetes management.

Communication skills training can help GPs master effective physician-patient communication methods rather than relying solely on clinical experience to acquire these skills naturally. Previous studies have found that clinicians tend to overestimate their own communication abilities, while patients desire better communication with their doctors. Furthermore, physicians' communication skills often decline over time [12]. Research and reviews on physician-patient communication skills training in China have revealed that such training is rarely implemented in undergraduate medical education, postgraduate training, or continuing medical education [13]. This paper summarizes our research team' s work in designing and developing an evidence-based diabetes communication skills training program tailored for GPs, aiming to provide solutions for high-

quality primary diabetes management and offer a reference model for designing GP training programs based on evidence and medical education frameworks.

1 Theoretical Framework for Diabetes Communication Skills Training

Our team adopted the MRC Complex Intervention Framework, Action Research Theory, and Adult Learning Theory as the theoretical foundations for designing and developing the GP diabetes communication skills training program. We selected these three theories for specific reasons. First, complex interventions typically employ multiple intervention types, involve multi-level target populations, and require corresponding evaluations, making them applicable to medical services, health policy, and medical education research. Communication skills training comprises multiple components, including training content, instructor preparation, and training methods, while also addressing multiple outcomes such as learner experiences and impacts on patient health outcomes [14]. Second, action research is a process-oriented approach where researchers actively participate throughout, identify and solve problems, observe the research process, collect and analyze relevant data, and ultimately explore methods for improving actions. Action research is widely used in healthcare and education, particularly for observing how interventions affect behavior change in specific contexts. Designing and developing GP communication skills training is an educational activity involving interaction among designers, educators, and learners, requiring multi-party collaboration. Understanding participants' feelings and experiences is crucial for training design, and action research theory enables researchers and participants to collaboratively address various issues in communication skills training through continuous reflection [15]. Third, Adult Learning Theory, guided by constructivism, posits that learning is built upon learners' past experiences, knowledge, attitudes, and values. When conducting communication skills training for Chinese GPs, we must consider their previous learning experiences, the problems they encounter when communicating with diabetic patients in clinical practice, and the influence of their work environment [16]. Based on these theories, we constructed a corresponding theoretical framework and selected appropriate research methods, as shown in Figure 1 [Figure 1: see original paper].

2 Research Questions and Methods Under the Theoretical Framework

To design and develop an evidence-based diabetes communication skills training program suitable for GPs, our research team proposed the following core research questions and selected corresponding methodologies based on the theoretical framework described above. First, we conducted a systematic review to summarize existing evidence in the field of diabetes physician-patient communication training [17]. Second, through qualitative research using focus group interviews with both GPs and diabetic patients, we explored their experiences,

feelings, and needs during the communication process [18-19]. Third, based on the systematic review and qualitative studies, we identified feasible training content and methods for GP diabetes communication skills [20]. Fourth, using a mixed-methods approach with the Nominal Group Technique, we prioritized training content according to importance and feasibility, and explored potential training modalities and evaluation tools [20].

2.1 Evidence for Diabetes Communication Skills Training

In our systematic review, we included all randomized controlled trials (RCTs) worldwide related to diabetes communication training to evaluate the impact of communication training for healthcare professionals on health outcomes in diabetic patients. The review identified 7,011 records, from which 19 RCTs were ultimately selected, comprising 785 healthcare professionals and 21,762 diabetic patients. The majority of these RCTs had high risk of bias in design and implementation. The diabetes communication training content in these studies included motivational interviewing, patient-centered communication, cardiovascular risk communication, shared decision-making, and psychosocial communication. Although the training did not demonstrate significant effects on primary clinical outcomes (such as HbA1c, blood pressure, lipids, and weight) or secondary endpoints (such as physician-patient relationships and quality of life), the review identified key success factors: appropriate pedagogical theory, training content, teaching methods, and evaluation tools. Based on these findings, we concluded that training programs should be designed based on the perspectives and needs of both patients and GPs.

2.2 GPs' Feelings and Experiences in Communicating with Diabetic Patients

In the qualitative study, we used focus group methodology and purposive sampling to recruit GPs, with 15 participants contributing to data saturation. The interview guide focused on exploring GPs' feelings and experiences when communicating with diabetic patients, as well as their previous communication skills training. The study identified four main themes: diversity of diabetic patients, communication with patients, physician-patient relationships, and communication skills training. GPs reported encountering a wide variety of diabetic patients in clinical practice and noted that lack of diabetes-related knowledge and misconceptions were common. They described numerous challenges in communication, including limited consultation time, difficulties discussing blood glucose monitoring, and patients' poor understanding of diabetes complication risks. GPs used terms like "blind spots" and "not on the same wavelength" to describe their current communication experiences, believing that mutual understanding and shared knowledge about diabetes were essential for promoting effective physician-patient relationships. Additionally, GPs recognized the importance of communication skills training but reported rarely receiving such training.

2.3 Diabetic Patients' Experiences and Encounters in Communicating with GPs

Our research team also used focus groups to collect and analyze diabetic patients' experiences communicating with GPs. Twenty-two patients with type 2 diabetes participated, achieving data saturation. The study yielded five themes: understanding of diabetes, diabetes medication treatment, communication with GPs, physician-patient relationships, and healthcare environment. Patients typically obtained information online but could not verify its authenticity. They expressed multiple needs during consultations with GPs, including blood glucose monitoring management, medication information, diabetes complication risks, and cardiovascular disease risks. Patients perceived their communication with GPs as overly simplistic and felt their concerns were not addressed; some were even blamed by GPs for poor adherence. Patients understood the communication barriers imposed by the healthcare environment, such as brief consultation times and lack of coordination between community clinics and hospitals. They expressed desire for access to reliable diabetes information and more communication channels with their GPs.

2.4 Core Content for GP Diabetes Communication Skills Training

Based on the systematic review and qualitative research findings, our team summarized core components for GP diabetes communication skills training. We defined and explained each component based on literature review, as detailed in Table 1 .

Table 1 Potential Components for Communication Skills Improvement

Communication Skill Component	Description
Exploring patient ideas, concerns, and expectations	Listen carefully to the patient' s opening statement without interrupting or directing their response. Allow patients thinking space when answering questions.
Non-verbal techniques	Convey and receive information without words, including body language, facial expressions, eye contact, speech rate, tone, and silence.

Communication Skill Component	Description
Negotiating lifestyle behavior changes	Collaborate with diabetic patients to help them modify lifestyle behaviors (such as obesity, smoking, and physical activity) to improve health and adopt healthy lifestyle practices.
Assessing patient confidence and building self-efficacy	Diabetes care involves multiple aspects, and patients need confidence in their ability to complete these tasks and achieve goals. Self-efficacy is a dynamic, variable belief that can be enhanced through behavioral interventions, thereby increasing motivation for behavioral effort. Assessing patient confidence and self-efficacy helps personalize behavioral intervention approaches.

Communication Skill Component	Description
Motivational interviewing	A communication approach using specific conversational techniques to help patients recognize existing or potential problems and enhance their motivation for change. Includes four processes: 1) Engaging—understanding patient perspectives and establishing a collaborative relationship; 2) Focusing—identifying one or more change targets; 3) Evoking—eliciting the patient' s own motivation and ideas for change; 4) Planning—implementing solutions based on patient preferences. Avoid arguing with patients; rather than directly confronting resistance, adjust your approach.

Communication Skill Component	Description
Shared decision-making	Patients and physicians jointly make decisions about examinations, treatments, and care plans. This process is based on best evidence, balancing risks and expected outcomes with patient attitudes, preferences, and values. Four steps: 1) Physician informs patient that a decision is needed and their input matters; 2) Physician explains each option with associated benefits and harms; 3) Physician and patient discuss patient preferences, with physician guiding careful consideration; 4) Physician and patient discuss decision-making preferences, make a decision, and discuss next steps. This may include using decision aids together with patients.

Communication Skill Component	Description
Blood glucose monitoring and interpretation	Carefully communicate fasting, postprandial, random blood glucose, and HbA1c values, using evidence to guide patients in understanding the significance of different metrics. Provide comfort and alleviate anxiety, depression, or other emotional responses caused by blood glucose or HbA1c fluctuations.

Communication Skill Component	Description
Diabetes complication and cardiovascular risk communication	Diabetes carries risks of complications and cardiovascular disease, which patients often underestimate. Risk communication can enhance disease awareness and support appropriate decision-making. Healthcare professionals typically use percentages, frequencies, absolute or relative risk, but many patients do not understand numerical concepts. Risk communication may include: providing clear and concise information; using visual risk descriptions; presenting 10-year risk ranges (including risk communication tools). Emphasize benefits of behavior change to enhance motivation.

Communication Skill Component	Description
Medication adherence	Assess adherence when prescribing or during consultations. Poor adherence has many causes: younger age, low education, low income (medication cost), perceived lack of efficacy, treatment burden, or adverse effects (such as hypoglycemia). Communication strategies include: eliciting patient perspectives and beliefs about medications (perceived benefits and harms), assessing adherence, helping patients overcome potential difficulties, and having patients record situations when they do or do not take medications. Note that non-adherence may signal other psychosocial issues.

Communication Skill Component	Description
Referral and follow-up	Know when to refer diabetic patients to endocrinologists and how to communicate appropriately according to guidelines, systems, and patient preferences. Coordinate diabetes treatment plans among different physicians, schedule regular follow-up with specific timelines.
Considering cultural differences and patient background	Patients from different regions (urban vs. rural) may have different perspectives on diabetes and treatment preferences. Consider patient background and how family or economic factors affect diabetic patients. Also note dialect and cultural considerations, as some patients prefer communicating with physicians in their local dialect.

Communication Skill Component	Description
Exploring patient emotions and mental health	Unaddressed emotional and psychological problems are common among diabetic patients and can seriously impact health and quality of life. Patients often feel overwhelmed, frustrated, fatigued, exhausted, angry, or depressed, making it difficult to follow complex treatment regimens. Family and friends may not understand their feelings, dietary restrictions create burden, and some are labeled non-compliant by physicians. Many patients experience anxiety and depression. Physicians need to explore emotional and psychological issues, apply appropriate cognitive-behavioral techniques, and collaborate with mental health specialists when needed.

Communication Skill Component	Description
Online or telephone communication	Digital communication is increasingly common, offering patients more convenient access to physicians, reducing unnecessary travel time and costs, and increasing contact frequency. Online communication differs significantly from face-to-face interaction, making it harder to detect non-verbal cues. Text-based and after-hours communication require active listening, repeated confirmation, and responsive engagement.

Communication Skill Component	Description
Health education	Share diabetes-related health knowledge (diet, exercise, medication, and traditional Chinese medicine) with patients in community clinics using various formats such as written materials and online resources. Understand different knowledge sources and ensure patients access reliable, safe, and up-to-date health education materials. Assess patient knowledge and reference sources when discussing specific topics.
Patient medical records	Ask patients for their outpatient medical record booklet during each visit, review previous visit information, and document current visit details. Encourage patients to use a single medical record booklet across different hospitals to maintain consistent diabetes documentation.

2.5 Priority Ranking of Diabetes Communication Skills Training Content

Building on these core components, our research team further employed the Nominal Group Technique (NGT) decision-making process, inviting GPs to conduct final group prioritization based on importance and feasibility. This phase

combined mixed-methods design with participation from 58 GPs. Initially, participants reviewed research findings and completed first-round individual evaluations. Subsequently, all participants were assigned to eight nominal groups, where they reviewed their first-round assessments under facilitator guidance and engaged in group discussions. Finally, after discussion, participants completed second-round evaluations, yielding quantitative data from aggregated scores and qualitative data from video-recorded discussions that were transcribed. The research team then analyzed and synthesized both qualitative and quantitative data generated during the decision-making process. The findings revealed that GPs prioritized health education, blood glucose monitoring and interpretation, and diabetes complication and cardiovascular risk communication as the most important and feasible training content.

3 Discussion

Physician-patient communication in diabetes is a complex process occurring across multiple domains, including diabetes prevention, diagnosis, glycemic target setting, behavior change, medication selection and adherence, risk management, complication management, and health education. Risk communication, for example, emerged repeatedly in focus groups with both GPs and diabetic patients as an important component. Extensive previous research has found that diabetic patients in developing countries commonly lack awareness of diabetes-related risks (such as cardiovascular risk), while GPs face numerous difficulties in communicating risks and providing personalized risk assessments [21-23]. Risk communication itself is a complex process requiring GPs to provide clear, simple information using language and methods patients can understand. Recent studies have employed visual graphics for risk communication between physicians and patients, demonstrating positive effects on disease prevention and treatment when based on risk awareness [24-25]. Risk communication is not completed in a single consultation but may require multiple interactions between physician and patient over time. For Chinese GPs, training must equip them with appropriate risk communication skills, and subsequent observation of resulting patient health outcomes is needed.

Diabetes physician-patient communication is influenced by multiple factors. Our qualitative and mixed-methods findings categorize these into three aspects: patient-related factors, GP-related factors, and healthcare environment factors. Patient factors include health literacy, understanding of risks and complications, and emotional-psychological issues. GPs recognize that patients' diabetes knowledge is often inadequate, influenced by education level and sociocultural background. GP-related factors include rushed communication due to time constraints, blaming diabetic patients, and using overly technical medical terminology. GPs need to provide support during communication, allowing patients time to ask questions and express emotions. Environmental factors include brief consultation times, high patient volumes, and poor healthcare processes and experiences. Without addressing these multifactorial issues,

communication skills training alone will be unlikely to achieve desired effects.

Designing and developing communication skills training is a systematic process. A good training program must be evidence-based while considering both effectiveness and feasibility. For medical education programs, four essential elements are required: first, clear objectives; second, meeting the needs of learners, patients, and the healthcare system; third, demonstrating post-intervention outcomes; and fourth, employing a logical, systematic approach to dynamically and gradually achieve ultimate goals [26]. For diabetes communication skills training, beyond general communication skills, special attention must be paid to the complexities specific to GP-diabetic patient communication. Therefore, our research employed multiple theoretical frameworks to guide study design, used qualitative methods to explore experiences of both diabetic patients and GPs, and applied the nominal group technique to finalize GP prioritization of training content. Additionally, we observed that GPs desire continuous communication skills training integrated with clinical practice with timely feedback. Compared to traditional lectures, they prefer flexible and diverse formats such as role-playing and case scenarios. For training evaluation, they want both immediate and long-term assessments, such as direct observation of behavioral changes post-training, evaluation of clinical practice and patient communication, patient feedback surveys, and assessment of patient health outcomes [27]. These insights will benefit future clinical trial designs to evaluate whether training GPs in communication improves diabetic patients' health outcomes.

Our study is the first to explore the design and development of GP diabetes communication skills training guided by multiple theoretical frameworks, based on evidence from systematic reviews, qualitative findings about experiences and perspectives of diabetic patients and GPs, and mixed-methods research to identify training content priorities from a general practice perspective. We emphasize the importance of enhancing GPs' communication skills in diabetes care and provide evidence for designing relevant continuing medical education content that integrates GPs' actual needs with healthcare system requirements. This model also offers a scientific research paradigm for exploring GP training to improve management of other chronic diseases at the primary care level. We believe that communication skills training can help GPs master effective physician-patient communication methods, facilitate long-term care relationships with diabetic patients, help patients develop effective self-management skills and build confidence, and ultimately achieve high-quality collaborative diabetes management.

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Note: Figure translations are in progress. See original paper for figures.