

# Proposed health education pathway among patients with Diabetes Mellitus

Cao, Yu Hui ✉

Graduate School, Lyceum of the Philippines University - Batangas, Philippines

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## Abstract

The purpose of this study is to determine the use of clinical care pathways in health education for patients with diabetes. Specifically, this study will identify demographic information about the respondents, such as age, sex, severity of condition, receptivity to health education and experience; determine the health education knowledge of the participants in terms of their level of health literacy, in terms of their level of disease awareness, lifestyle and dietary habits; assess the participants' diabetes knowledge test in terms of their level of diabetes knowledge, management behaviors, attitudes, and beliefs; propose pathway to improve the participation of people with diabetes in health education. A mixed methods approach was used in this study. This study is descriptive because it describes the personal and health education acceptance and experience of the respondents. This study is quantitative because it also identifies recommendations in health education for people with diabetes. The aim of this study was to evaluate the impact of clinical care pathway application and health education knowledge on the management effect of diabetic patients in Hunan Province. The study subjects were selected from three top medical institutions in Hunan Province: Changsha Central Hospital, Xiangya Hospital of Central South University, and the First Affiliated Hospital of Nanhua University. These hospitals were selected for their excellent quality of healthcare services and broad patient base. A total of 150 diabetic patients will participate in this study. Participants will be randomly selected to ensure the representativeness and scientific validity of the study results. Researchers will fill out two questionnaires: one on the application of clinical care pathways, which aims to understand the implementation of care pathways in actual healthcare and their effectiveness; and the other on health education knowledge, which focuses on evaluating the level of patients' knowledge in diabetes management and the effectiveness of health education. Through these questionnaires, the study hopes to reveal the roles of clinical care pathways and health education in improving the outcomes of treatment and management of diabetic patients, thus providing a basis for future clinical practice and policy development. In addition, the study will explore the differences in the application of care pathways between hospitals and the potential impact of these differences on patient management outcomes. The

majority of respondents were 20 - 25 years old, aged Male, Severity of illness was Type 2 Diabetes and Level of health education was Don't know. The majority of respondents felt that Health Literacy Level had the greatest impact in the Summary Table on Health Education Knowledge. Most of the respondents agreed that Summary Table on Diabetes Knowledge Test, Attitudes and Beliefs most of the respondents agreed. There is a significant relationship between Health Education Knowledge and the Diabetes Knowledge Test. Proposed Health Education Pathway among Patients with Diabetes Mellitus.

**Keywords:** health education, diabetes mellitus, pathway

## Proposed health education pathway among patients with Diabetes Mellitus

### 1. Introduction

Continuous evolution of diabetes disease patterns and advances in medical technology, the traditional individualized treatment model can no longer fully meet the needs of patients (Bai et. al.,2019). Chen (2018) showed that diabetes has become a common chronic disease worldwide, and its incidence and the number of patients are increasing. At the same time, the management and treatment of diabetes has become a global challenge. In China, the high prevalence of diabetes and the increasing number of patients make health education particularly important. First, China's lifestyle and dietary structure are changing, leading to a rapid increase in chronic metabolic diseases, such as diabetes. Therefore, through health education, people can be guided to live healthier lives and prevent chronic diseases. Secondly, Chinese society is increasingly concerned about health, and people's awareness of disease prevention and management has increased significantly. As a result, diabetic patients are more willing to receive health education in order to learn about disease management methods, improve their lifestyles, and enhance their ability to self-manage.

Currently, Chen (2021) study shows that education is an integral and important part of diabetes management. The purpose of health education is to guide diabetic patients to change their bad living habits and develop good self-management skills by providing correct knowledge, so as to effectively control blood glucose levels and reduce the occurrence of complications. However, traditional health education methods often have limited effects, with problems such as untimely information delivery, mismatch between education content and condition, and low patient attendance. Meanwhile, Chen (2018) showed that clinical care pathways have become an important strategy for clinical practice and diabetes management. Clinical care pathway is a standardized, systematic and patient-centred care model that provides a more optimal and standardized approach to diabetes management through clear goals, specific measures and uniform evaluation criteria. However, existing studies have paid little attention to the application of clinical care pathways in conjunction with health education, and there is a lack of evaluation of the effectiveness of this approach in clinical care, health education and diabetes management.

The promotion of health education has been widely observed in China. National and local governments promote health education through a variety of channels, including medical institutions, community services and media campaigns. Secondly, public attention to health issues has increased, with people placing more emphasis on prevention and self-management and actively participating in health education activities. In addition, Wu (2020) stated that the reform of the health care system has facilitated the development of health education, making it easier for patients to access relevant information and keep abreast of the latest advances in disease management. Meanwhile, as health education continues to deepen, people's lifestyles and health concepts are gradually changing, with increasing emphasis on both physical and mental health. Health education not only imparts knowledge about disease prevention, but also teaches people how to practice these healthy behaviors in their daily lives. This model of health education, which involves the participation of all people and is promoted in an all-round way, has undoubtedly laid a solid foundation for building a healthy China.

The results of this study provided a reference for health education and provide scientific and personalized health education services for diabetic patients. In addition, this study has certain theoretical significance. By analyzing and summarizing the theoretical foundation of clinical nursing pathway and the theoretical framework of health education knowledge, this study enriched and deepened the theoretical knowledge in related fields and provide theoretical basis and methodological reference for further research. By combining domestic and international research results and practical experience, this study promoted the application and promotion of the combination of clinical nursing pathway and health education in diabetes management, and promoted the physical and mental health of diabetic patients. This study explored and evaluated the application of the combination of clinical nursing pathway and health education in diabetes management, which not only improved

the therapeutic effect and quality of life of diabetic patients, but also provided a theoretical basis and practical experience for guiding the development of clinical nursing and health education. This study was expected to have a positive impact on research and practice in related fields, and has certain academic and social value.

**Objectives of the Study** - The purpose of this study was to determine the use of clinical care pathways in health education for patients with diabetes. Specifically, this study determined the health education knowledge of the participants in terms of their level of health literacy, in terms of their level of disease awareness, lifestyle and dietary habits; assessed the participants' diabetes knowledge test in terms of their level of diabetes knowledge, management behaviors, attitudes, and beliefs; proposed pathway to improve the participation of people with diabetes in health education.

## 2. Method

**Research Design** - A mixed methods approach was used in this study. This study is descriptive because it described the personal and health education acceptance and experience of the respondents. This study was quantitative because it also identified recommendations in health education for people with diabetes.

**Participants of the Study** - The aim of this study was to evaluate the impact of clinical care pathway application and health education knowledge on the management effect of diabetic patients in Hunan Province. The study subjects were selected from three top medical institutions in Hunan Province: Changsha Central Hospital, Xiangya Hospital of Central South University, and the First Affiliated Hospital of Nanhua University. These hospitals were selected for their excellent quality of health care services and broad patient base. A total of 150 diabetic patients participated in this study. Participants were randomly selected to ensure the representativeness and scientific validity of the study results. Researchers filled out two questionnaires: one on the application of clinical care pathways, which aimed to understand the implementation of care pathways in actual health care and their effectiveness; and the other on health education knowledge, which focused on evaluating the level of patients' knowledge in diabetes management and the effectiveness of health education. Through these questionnaires, the study hoped to reveal the roles of clinical care pathways and health education in improving the outcomes of treatment and management of diabetic patients, thus providing a basis for future clinical practice and policy development. In addition, the study explored the differences in the application of care pathways between hospitals and the potential impact of these differences on patient management outcomes.

**Data Gathering Instruments** - This research instrument has three sections, the first section is Personal Information which contains Age, Sex, Severity of illness, Level of health education. The second part is Health Education Knowledge, which is recognized from Health Literacy Level, Disease Awareness Level, and Lifestyle and dietary habits. Adapted from: Xu et. al.,(2024). Analysis of Traditional Chinese Medicine Nursing Care and Health Education Nursing Model to Enhance the Satisfaction of Patients with Cervical Spondylosis. The third part is the Diabetes Knowledge Test Questionnaire (DKT), which contains Diabetes Knowledge Level, Management Behaviours, Attitudes and Beliefs, adapted from: Haiyan (2022). Sinicization and clinical application of a questionnaire on heart disease knowledge in patients with type 2 diabetes mellitus.

**Table 1**  
*Reliability Testing*

Indicators	Cronbach Alpha	Remarks
Health Literacy Level	0.880	Good
Disease Awareness Level	0.882	Good
Lifestyle and dietary habits	0.941	Excellent
Diabetes Knowledge Level	0.865	Good
Management Behaviours	0.889	Good
Attitudes and Beliefs	0.923	Excellent

George and Mallery (2003) provide the following rules of thumb: “\_ > .9 – Excellent, \_ > .8 – Good, \_ > .7 – Acceptable, \_ > .6 – Questionable, \_ > .5 – Poor, and \_ < .5 – Unacceptable”

Table 1 summarized the results of the reliability test, which involved a number of indicators such as health

literacy level, disease awareness level, lifestyle and eating habits, diabetes knowledge level, management behaviors, and attitudes and beliefs. The test results showed that the internal consistency of all these indicators was high, with the Cronbach Alpha coefficient of 0.941 for lifestyle and eating habits performing particularly well, and the rest of the indicators reached good or excellent levels, indicating that the test instrument has a high degree of reliability and was able to effectively measure diabetic patients' performance in these areas.

**Data Gathering Procedure** - When designing the "Proposed Health Education Pathway for Diabetic Patients", the researchers were aware of the importance of data accuracy and credibility, and therefore consulted experts in the fields of diabetes, health education, public health and other related fields. These experts not only provided valuable professional advice, but also helped the researchers verify and calibrate the accuracy of the data, thus ensuring the scientific validity of the study. At the same time, the researchers also attached great importance to the protection of respondents' privacy. Prior to data collection, the researchers clearly informed all respondents of how their data would be used, and promised to anonymize their personal information and strictly guarantee the confidentiality of the data. This was done not only to comply with research ethics, but also to build trust with the respondents and ensure that they were able to provide their information and opinions truthfully and without fear. In concrete terms, the researchers took a variety of measures to protect the data. For example, all data collected are stored in encrypted electronic devices that are accessible only to core members of the research team. In addition, we backed up the data on a regular basis in case any unforeseen circumstances led to data loss.

**Data Analysis** - In the study of creative teaching ability, motivation, and self-efficacy of art and design teachers in Chinese universities, quantitative data were collected by designing a validated questionnaire. These data were statistically analyzed, including correlation and regression analyses, to explore the relationship between teaching ability, motivation, and self-efficacy. In this study, data analysis was done using quantitative statistics to assess the association between health education knowledge and diabetes knowledge test results. First, correlation analyses were utilized to explore the relationship between the dimensions of health education knowledge and knowledge of diabetes management. In addition, the causal relationship between these variables was further examined through regression analysis to assess the strength of the effect of health education level on diabetes knowledge and management behaviors. To ensure the reliability and validity of the statistical results, the researcher conducted a hypothesis test in which the level of significance is set at 0.05. This means that the researcher considered the statistical results as significant only if the p-value of the test results is less than 0.05. In addition, in order to deal with possible missing data or outliers, appropriate statistical techniques for correction and sensitivity analysis was used in the study to ensure rigor in data analysis.

**Ethical Considerations** - Before the data collection commenced, the study was submitted to and approved by the Ethics Review Board of LPU-Batangas, ensuring all ethical guidelines were thoroughly addressed. During the distribution of the questionnaires, the researchers clearly communicated the purpose of the study and its potential benefits to both the researchers and the respondents. Additionally, consent was obtained from the Graduate Studies Department of LPU-Batangas, underscoring the study's relevance and importance. Ethical standards were rigorously maintained throughout the study. All participant information was collected with informed consent, and confidentiality was strictly upheld. The researcher emphasized that participation was entirely voluntary and that participants could withdraw at any time without any consequences. Furthermore, it was assured that the participants would not experience any harm from participating, and that all collected data would be used exclusively for academic purposes and to advance the understanding of the topic.

### 3. Results and discussion

In Table 2, the Summary Table on Health Education Knowledge is presented, with a composite mean of 3.17, with which the respondents agreed. Among these, Health Literacy Level (3.18) ranked first, followed by Disease Awareness Level and Lifestyle and Dietary Habits. This score ranked highest among the components listed and reflects respondents' understanding of basic health concepts and ability to access, process, and understand basic health information and services in order to make appropriate health decisions. A score of 3.18 is a relatively

positive score indicating that respondents have some confidence in their health literacy, but it still emphasized the need for ongoing education to strengthen their ability to effectively ability to navigate health information. This category may assess how well respondents understand the impact of lifestyle choices (including diet, exercise, and other daily habits) on overall health. The positioning of this score suggests that respondents generally recognize the connection between lifestyle choices and health, but also points to potential gaps in the practical application of this knowledge to maintain or improve health.

**Table 2***Summary Table on Health Education Knowledge*

Key Result Areas	Composite Mean	VI	Rank
Health Literacy Level	3.18	Agree	1
Disease Awareness Level	3.17	Agree	2.5
Lifestyle and Dietary Habits	3.17	Agree	2.5
Grand Composite Mean	3.17	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

In Table 3, the Summary Table on Diabetes Knowledge Test of the respondents is presented, with a combined mean of 3.18, with which the respondents agreed. Among them, Attitudes and Beliefs (3.19) followed by Diabetes Knowledge Level (3.17) and Management Behaviors (3.17). This passage outlined respondents' positive attitudes and beliefs about diabetes management and how this knowledge influenced their treatment behaviors. First, respondents held relatively positive views and beliefs about diabetes itself, diabetes treatment, and the importance of adhering to diabetes management. Such positive attitudes and beliefs are critical because they influence the degree to which respondents strive to follow their treatment plan, including adherence to diet, exercise, and medication use. Chen (2020) study, noted that respondents' knowledge of diabetes (including its causes, effects, and lifestyle modifications needed for effective management) was at a moderate level. This basic knowledge is critical for patients to understand why specific treatments and behaviors are recommended and how these can help them manage the disease. Finally, the actual behaviors and practices that respondents adopt in managing their diabetes. This includes how accurately they monitor their blood glucose levels, take their medications on time, and adopt recommended diet and exercise habits. In short, the respondents had positive attitudes towards diabetes management, they had some knowledge of diabetes and these attitudes and knowledge together influenced their behaviors in managing diabetes in real life.

**Table 3***Summary Table on Diabetes Knowledge Test*

Key Result Areas	Composite Mean	VI	Rank
Diabetes Knowledge Level	3.17	Agree	2.5
Management Behaviors	3.17	Agree	2.5
Attitudes and Beliefs	3.19	Agree	1
Grand Composite Mean	3.18	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

As seen in table 4, the computed rho-values ranging from 0.776 to 0.826 indicated a strong to very strong direct relationship among the sub variables of health education knowledge and diabetes knowledge test. There was a statistically significant relationship between health education knowledge and diabetes knowledge test because the obtained p-values were less than 0.01. Rho values ranging from 0.776 to 0.826 indicate correlation coefficients derived from Spearman's rank correlation test, a non-parametric measure used to assess the strength and direction of the association between two ranked variables. Jia et. al.,(2020) indicated that values in this range indicate a strong to very strong direct correlation, which implies that as knowledge of health education increases, knowledge of diabetes also tends to increase. This strong correlation underscores the effectiveness of health education in increasing diabetes knowledge, suggesting that educational interventions and programs aimed at improving general health literacy can have a significant and positive impact on specific diabetes-related knowledge.

**Table 4**  
*Relationship Between Health Education Knowledge and Diabetes Knowledge Test*

Variables	rho	p-value	Interpretation
<b>Health Literacy Level</b>			
Diabetes Knowledge Level	0.820**	< .001	Highly Significant
Management Behaviours	0.791**	< .001	Highly Significant
Attitudes and Beliefs	0.794**	< .001	Highly Significant
<b>Disease Awareness Level</b>			
Diabetes Knowledge Level	0.787**	< .001	Highly Significant
Management Behaviours	0.822**	< .001	Highly Significant
Attitudes and Beliefs	0.787**	< .001	Highly Significant
<b>Lifestyle and Dietary Habits</b>			
Diabetes Knowledge Level	0.826**	< .001	Highly Significant
Management Behaviours	0.776**	< .001	Highly Significant
Attitudes and Beliefs	0.822**	< .001	Highly Significant

\*\* . Correlation is significant at the 0.01 level

Furthermore, the significance of these correlations was confirmed by a P value of less than 0.01, which is a reliable indicator of statistical significance. In the statistical analysis, a p-value of less than 0.01 means that the chance probability of the observed correlations occurring is less than 1%, thus strongly supporting the hypothesis that there is a true relationship between health education knowledge and diabetes knowledge. This statistically significant relationship suggests that efforts to improve health education may be an important strategy for enhancing diabetes management and individual knowledge of diabetes, potentially leading to better health outcomes and more effective disease management strategies.

**Table 4**  
*Propose Recommendations to Improve the Participation of People with Diabetes in Health Education*

Key Result Area	Plan Objective	Strategies/Activities	Success Indicators	Persons Involved
Health Literacy Level	To enhance the participation of diabetic patients in self-management education and improve their health literacy and disease management skills.	Design a personalized health education program based on the patient's specific needs and preferences, including diet, exercise and blood glucose monitoring. Promote the use of health apps and online platforms to educate patients on how to monitor blood glucose and manage their diets, as well as to interpret sugar content on food labels. Seminars and workshops are held regularly on topics such as dietary management, exercise programs, blood glucose monitoring techniques and recognizing the effects of alcohol on diabetes.	Increased patient participation and satisfaction with self-management education. Significant improvement in patient knowledge and skills in dietary management, glycaemic control and lifestyle modification. Patients' self-management skills increased through the use of health apps and support groups.	Teachers Students
Disease Awareness Level	To raise the level of disease awareness among people with diabetes and ensure that they understand the basics of diabetes, its management and strategies to prevent complications	Regularly conduct diabetes awareness campaigns through online and offline channels, covering topics such as the basics of the disease, lifestyle modification, and dietary management. Produce easy-to-follow brochures, videos and online tutorials covering diabetes identification, management and monitoring methods. Invite diabetes experts and doctors to organize talks and seminars for in-depth discussions on disease management techniques and the latest research advances.	Patients have a demonstrable knowledge and understanding of the basics of diabetes and how to manage it. Improve patients' ability to recognize and respond to symptoms of hyperglycaemia and hypoglycaemia. Increase the frequency and motivation of patients to participate in health education activities.	Teachers Students
Lifestyle and Dietary Habits	Through education and support, we help people with diabetes to improve their lifestyle and diet to better control their blood sugar levels and prevent complications	Provide personalized dietary counselling services to develop customized dietary plans based on the patient's health condition and lifestyle habits. Organize a series of workshops to educate patients on how to manage diabetes through daily exercise and healthy eating. Develop and promote online platforms and applications to help patients track their diet, exercise and blood glucose levels.	Patients demonstrate significant improvement in dietary control, exercise and daily life management. Increase in the number of patients using the online health management platform and patient feedback showing positive comments about the platform. Participation in community health activities increases and patient satisfaction with activities is high.	Teachers Students

Attitudes and Beliefs	To change the attitudes and beliefs of people with diabetes about disease management and health education, leading to more active participation in self-management.	Enhance patients' knowledge of the importance of diabetes and its management and change possible false beliefs through educational sessions and information distribution. Patients who have successfully managed their diabetes are regularly invited to share their experiences and insights, providing practical role models to inspire other patients. Psychological counselling and support groups are provided to help patients overcome their fears and anxieties about disease management and develop positive attitudes.	Patients have more positive attitudes towards self-management and health education and are willing to participate in management programs. Patients' anxiety and fear are reduced and their confidence increased through psychological support. Family and community involvement is increased, creating a positive environment that supports the patient's disease management.	Teachers Students
Management Behaviors	Promote the adoption and maintenance of effective disease management behaviors among people with diabetes, including proper diet, regular exercise, blood glucose monitoring and the use of medications when appropriate.	We work with patients to develop personalized disease management plans based on their lifestyle habits and preferences to ensure that the plans are feasible and long-lasting. Educate patients on blood glucose monitoring, dietary adjustments, medication management and physical activity through workshops and online courses to enhance their self-management skills. Use telephone follow-up, mobile apps or online platforms to track patients' management behaviors on a regular basis and provide immediate feedback and advice to help patients adjust their management strategies.	Patients are able to consistently follow a personalized disease management plan. Significant improvement in patient self-management of diet, exercise, blood glucose monitoring and medication use. Patients' management behaviors become more regular and effective through regular follow-up, and their level of glycaemic control improves. Support networks and incentives increase patient engagement and satisfaction and reduce interruptions to the management programme	Teachers Students
Diabetes Knowledge Level	Significantly improve the disease-related knowledge of people with diabetes, including pathology, management practices, strategies to prevent complications, and knowledge of applications in daily life.	Organize regular health education talks by inviting diabetes experts to explain the basics of diabetes, the latest research advances and management techniques. Provide easy-to-understand books, manuals and online resources covering diabetes management, diet, exercise guidance and medication use. Develop an interactive e-learning platform with diabetes education programs and self-quizzes to enhance patient motivation and learning.	Patients have an in-depth understanding and knowledge of the basics of diabetes and management strategies. Patients' knowledge test scores improve significantly through participation in educational activities and learning platforms. Patients are able to effectively apply what they have learned about diabetes management in their daily lives.	Teachers Students

#### 4. Conclusions and recommendations

The majority of respondents felt that Health Literacy Level had the greatest impact in the Summary Table on Health Education Knowledge. Most of the respondents agreed that Summary Table on Diabetes Knowledge Test, Attitudes and Beliefs most of the respondents agreed. There is a significant relationship between Health Education Knowledge and the Diabetes Knowledge Test. Proposed Health Education Pathway among Patients with Diabetes Mellitus.

Patients may actively participate in health education activities and actively ask questions of their health care providers to improve their understanding of diabetes and its management. Hospitals may provide individualized health education programs based on the patient's age, gender, severity of condition and level of health education. Medical and nursing students may include diabetes management and patient education in their course work to better support patients in clinical practice in the future. It is recommended that closer collaboration be established between hospitals, schools and community organizations to develop and promote comprehensive health education programs for people with diabetes. Future studies may assess the impact of different health education approaches on the health outcomes of patients with diabetes, especially for different age groups, genders and levels of health education. This will help to further optimize health education strategies to improve the quality of life and management outcomes of patients with diabetes. For diabetic patients, we propose a comprehensive health education pathway. The pathway will cover a wide range of educational content from basic knowledge of the disease to daily diet, exercise, medication and mental health. Through the personalized guidance provided by our professional medical team, we aim to help patients gain an in-depth understanding of



diabetes and learn self-management, including proper diet, regular exercise, correct use of medication, and maintaining a positive mindset, so as to effectively control their disease and improve their quality of life.

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