

The implementation of precision personalized care to improve diabetes patients' self-management at taipei veteran general hospital: an observational study



Satriya Pranata^{1,2*}, Lin Chun Shing³, Aric Vranada^{1,2}, Lee Ya Chun³, Yunie Armiyati², Khoiriyah Khoiriyah²

ABSTRACT

Introduction: Precision Personalized Care (PPC) defines as a new approach to health care service on improving diabetes patients' self-management. To date, Taipei Veterans General Hospital has started implement the program of PPC. The purpose of this study was to observe the implementation of PPC and its' beneficial on the improvement of self-management among diabetes patients at the Taipei Veteran General Hospital, Taiwan.

Methods: This study applied a clinical observational-exploration method such as supervision by visiting the wards, examination rooms and laboratories in the hospital and further discussing with the health professionals' and patients with diabetes by direct interview while observing each PPC implementation from April 18th to May 2nd, 2019. The participants of this observational study included three nurses, a nutritionist, a doctor and 3 patients. Descriptive and explorative methods were attempted to analyze the data.

Results: The comprehensive and continuous implementation of diabetes self-management education (DSME) and diabetes self-management support (DSMS) programs were the target and focus point of activities to improve diabetes patients' self-management. It focused on the patient centered-care, tailored, and more precise to find patients' personal meet as defined as PPC. Clinical laboratory tests (e.g., blood sugar, hemoglobin A1C counts, low-density cholesterol, kidney functions, proteinuria, fundus and peripheral neuropathy examinations) were carried out regularly to support the program. Both programs and clinical assessment test were integrated with the Diabetes Pay for Performance (diabetes -P4P), a large-fund government program which supported by Taiwan National Health Insurance (NHI).

Conclusion: The continuous and comprehensive PPC can successfully reduce the incidence of diabetes complications in Taiwan. The PPC approach can be used as a magnificent reference for the development of quality health services and research development for diabetes patients in Indonesia.

Keywords: Precision personalized care, self-management, diabetes, education, support.

Cite This Article: Pranata, S., Shing, L.C., Vranada, A., Chun, L.Y., Armiyati, Y., Khoiriyah, K. 2021. The implementation of precision personalized care to improve diabetes patients' self-management at taipei veteran general hospital: an observational study. *Bali Medical Journal* 10(3) Special Issue ICONURS: 1304-1307. DOI: 10.15562/bmj.v10i3.2902

¹School of Nursing, National Taipei University of Nursing and Health Sciences, Taiwan;

²Nursing Department, Faculty of Nursing and Health Sciences, Muhammadiyah University of Semarang, Central Java, Indonesia;

³Veteran General Hospital, Taipei City, Taiwan;

*Corresponding author:

Satriya Pranata;
School of Nursing, National Taipei University of Nursing and Health Sciences, Taiwan;
satriya.pranata@unimus.ac.id

Received: 2021-11-03

Accepted: 2021-12-20

Published: 2021-12-30

INTRODUCTION

Before 19-20th centuries, most health workers believe that patients need to control their health status in health care facilities, otherwise malpractice frequently occurred. By mid of 20th century, the condition has changed where most people around the world had been well-educated. They tend to need more information to choose and control their health status and realize that maintaining health status by using health care providers' skills (curative approach) in health care facilities is costed. Further, the world's

view has changed from medical-centre care to patient-centre care.¹

The shifting world's view encouraged many countries to develop and conduct research strategies on investigating the patient-centre care approach as the foundation of health services in hospitals.^{2,3} This approach is known as precision health care or precision medicine or personalized care or precision personalized care (PPC).⁴⁻⁷ PPC recognizes various aspects included patients' preferences, evidence-based practices, big data, genome technology and personal goals. To date, PPC has been

developed to comprehensively be applied to diabetes patients.^{5,8-12}

The health care services in Indonesian hospitals have been based on evidence-based practices and guidelines. However, the individual patient-centre care approach which more focus on patients' preferences, evidence-based practices, big data, genome technology and personal goals has not initiated in Indonesia hospitals. On the other hand, Taipei Veterans General Hospital in Taiwan has successfully implemented PPC which recognizes various aspects included patients' preferences, evidence-based

practices, big data, genome technology and personal goals on health care system for the past 5 years. Thus, through the clinical observational-exploration study process, this study was aimed to explore, identify and observe how the hospital implements the PPC and its' influence on improving self-management activities among diabetes patients at Taipei Veteran General Hospital, Taiwan. We believe, this study is needed in the context of the Indonesian health care system, especially as an effort to improve the self-management activities of diabetes patients. The observation results will be disseminated through various publication media. This study approach may contribute to gain new insights for researchers around the globe to develop PPC through sustainable studies.

METHODS

The purpose of the study was to identify and observe the perception of diabetes patients and health care providers on the implementation of PPC for improving self-management activity among diabetes patients. The exploration methods were attempted through clinical observational approach by visiting the wards, examination rooms and laboratories in the hospital and further discussing with the health professionals' and patients with diabetes by direct interview while observing each PPC implementation. The observation and interview about the PPC implementation program were conducted from April 18th to May 2nd, 2019 at the Taipei Veteran General Hospital. The participants of this observational study included three nurses, a nutritionist, a doctor and 3 patients. The health professionals who were observed and interviewed were experts that had been appointed by the hospital because of their expertise in their field and able to communicate in English. We conducted interviews with respondents assisted by the health worker as a translator. Respondents who happened to control their health and coincided with our observation activities were made as respondents. Previously we have informed respondents that we protect their confidentiality and security data with anonymity. In addition, respondents also have the independence to refuse if they feel uncomfortable during the interviews and observations process.

RESULTS

Two main efforts of the hospital on improving self-management among diabetes patients were through the continuous implementation of diabetes self-management education (DSME) and diabetes self-management support (DSMS) programs. Both of those programs are focused on the patient-centre, tailored, and more precise to find patients' personal meet, as defined as precision personalized care.

DSME

The implementation of DSME to diabetes patients in the Taipei Veterans Hospitals was using the diabetes federation of China (Taiwan) guidelines. In general, the guidelines contain examinations, interventions and the types of information provided to diabetes patients. It was compiled and developed by experts in Taiwan and used by veteran hospitals to recent date. Steps for DSME consist of two steps included big and small group discussion with the support group.

a. Big group education

Big group education in diabetes patients is carried out three or four times a year. The activity is implemented in a huge room with 40-60 patients. Health information provision activities are delivered by all expert teams in the hospital. The expert team consists of endocrine and metabolic doctors, nurse educators, nutritionists, eye specialist doctors and neurologist specialists. The education implementation activities are carried out approximately four hours. Each session needs around 30 minutes with questions and answers. The question-and-answer activity usually takes longer depends on the participants' cooperation. This activity requires to be carried out frequently to improve patients' knowledge. By improvement of patients' knowledge, patients will have independent ability to implement self-management at home.

b. Small group discussion with support group

The next step is to separate patients into a small group based on their level of self-management. Patients with good

self-management will be grouped with those same level and vice versa. The small group discussion implementation activities included support groups and involved discussions for less than 10 patients. Each participant will share their experience about self-management at home and the participants will learn from other's experiences. The implementation of this activity and its' evaluation are carried out three times a year, and the nurse educators take full responsibility for the activity. Implementation of the education process is not only indoor activities but also outdoors. Outdoor activities are simple exercise which they can do while at home.

In addition, DSME is necessary and effective, but it does not guarantee that diabetes self-management is "lifetime" effective. Participants in the Metabolism and Other Department were usually disappeared after six months the initial improvement results have been released. To maintain effective long-term control of diabetes and prediabetes patients, continuous DSMS program is required.

DSMS

The DSMS activities assist diabetes patients to continuously practice their self-management for behavior changes. It is based on continuously exceeding or exceeding the scope of existing self-management training. The type of supports provided by DSMS included behavioral, educational, psychosocial and clinical supports.

In DSMS, patients are the center of service. The service provider team for patients included nurses, doctors, nutritionists, cardiologists, ophthalmologists and nephrologists. The activities advise the patients to check and assess their condition to the hospital at least four times a year or every three months. During the assessment, the patient will be advised to check their health status through following clinical laboratory tests such as fasting glucose sugar, Hemoglobin A1C counts, complete blood count (CBC), creatinine, alanine transaminase, low and high-density lipoprotein counts, triglycerides and microalbumin. After

the tests have been obtained, the patients will meet the doctor, nurse educator, and nutritionist for consultation procedure (medication explanation, home-self-management evaluation). The evaluation of self-management among diabetes patients included diet management, medication procedures (drug and insulin), foot care and exercises.

The category of good or bad self-management among diabetes patients can be evaluated from the results of patients' clinical laboratory tests. Furthermore, examination of retinopathy, foot examination and neuropathy examination: ankle brachial index (ABI), R-R interval variability (RRIV), sympathetic skin response (SSR), DAN-cerebrovascular reactivity (DAN-CVR) needs to be conveyed out regularly every once a year.

On condition of kidney problems, heart problems or other serious complications are found, the patient's intervention then is not only implemented by nurse educators, dietitians, metabolism and endocrine doctors but also need to be considered by cardiologist, kidney or eye specialists depend on the type of complication. In addition to the diabetes shared-care system, Veteran Hospitals also utilizes ICT Based Smart Healthcare System to Support DSMS for improving diabetes patients' Self-Management at home. Patients can capture the pictures of each food they consumed every day, or measure the blood sugar then upload the pictures or results on the web system. All information provided by patients will automatically be integrated with the information system platform in the hospital as big data. Nurse educators, nutritionists and doctors can directly control the patient's condition through the system and can provide advice online.

DISCUSSION

DSME is a principal and essential education program required to elevate diabetes patients' knowledge. Education contributes to escalate knowledge and change individual's behaviour.¹³⁻¹⁵ However, previous studies revealed that merely knowledge would not sufficient enough for continuous and long-term behaviour change, it needs another important support systems including

family and health care providers' support system.¹⁶ That support system defined as self-management support activities to assist diabetes patients to continuously implement self-management at home.^{17,18} Furthermore, educational resources provided to diabetes patients should contemplate various important aspects such as how to identify the signs and precise intervention of elevating and decreasing blood sugar, select the appropriate variety of foods and exercises, manage medications therapy (e.g. dosage, oral intake or injection, medication benefit and mechanism of action), maintain blood-sugar self-monitoring at home, prevent and detect acute comorbidities along with the treatment, integrate psychosocial adjustment for daily life, and provide suggestions for problem-solving.¹⁹⁻²² Those aspects constructed based on individual personal needs. Moreover, each of patients' achievement of the educational program should also ground on their needs and desires. It would build a sense of responsibility towards patients' health. Diabetes patients tend to escalate their health responsibility when they allowed choosing autonomy preferences on their own personal goals.²³

One of the DSMS activities provided to diabetes patients is continuous and sustainable health consultation. The health consultation is provided and delivered by health care providers based on their expertise. The implementation of DSMS at Taipei Veteran Hospital was provided by diabetes certified care nurse educators, dietitians and physicians. Furthermore, the availability of clinical laboratory test (e.g., hemoglobin A1C, blood sugar, triglyceride count, etc.), physical assessment, heart and kidney function test, and eyes examination can increase diabetes patients' awareness because they received direct examination data and explanation from health care providers about their health development status.¹³ In addition, diabetes patients will notice that better diabetes self-management will influence their body metabolism process, hence their enthusiasm will be increased to improve their self-management in their daily life.^{24,25} Finally, giving reinforcement to diabetes patients is also a key aspect when they can accomplish their targets

because it can motivate them to maintain their better self-management in their daily life.

CONCLUSION

Health education and support provided by Taipei Veteran General Hospital to diabetes patients was focused on the patients' preferences, evidence-based practice, big data, genome technology and the personal goals. This approach well-known as precision personalized care and it was continuously applied in the hospital. This approach showed a significant effect to reduce the number of diabetes complications. For the future implication, a study about precision personalized care is needed in Indonesia as an effort to improve the diabetes patients' self-management activity.

CONFLICT OF INTEREST

The author declared there was no conflict of interest regarding publication of this article.

FUNDING

This study did not receive any specific grant from the government or any private sectors.

ETHIC APPROVAL

not applicable.

AUTHOR CONTRIBUTION

All authors were responsible for data gathering, supervision, and writing the original draft. All authors had reviewed the final version of the manuscript.

REFERENCES

1. World Self-medication Industry. The story of self-care and medication 40 years of progress, 1970-2010. *Wsmi* 1-17 (2010).
2. Havas, K., Douglas, C. & Bonner, A. Person-centred care in chronic kidney disease: a cross-sectional study of patients' desires for self-management support. *BMC Nephrol.* **18**, 1-9 (2017).
3. Hertroijs, D. F. L., Elissen, A. M. J., Brouwers, M. C. G. J., Schaper, N. C. & Ruwaard, D. Relevant patient characteristics for guiding tailored integrated diabetes primary care: A systematic review. *Prim. Heal. Care Res. Dev.* **19**, 424-447 (2018).

4. Bittencourt, M. S. From evidence-based medicine to precision health: Using data to personalize care. *Arq. Bras. Cardiol.* **111**, 762–763 (2018).
5. Vorderstrasse, A. A., Hammer, M. J. & Dungan, J. R. Nursing implications of personalized and precision medicine. *Semin. Oncol. Nurs.* **30**, 130–136 (2014).
6. Corwin, E., Redeker, N. S., Richmond, T. S., Docherty, S. L. & Pickler, R. H. Ways of knowing in precision health. *Nurs. Outlook* **67**, 293–301 (2019).
7. Mohan, V. & Radha, V. Precision Diabetes Is Slowly Becoming a Reality. *Med. Princ. Pract.* **28**, 1–9 (2019).
8. AL-Dewik, N. I. & Qoronfleh, M. W. Genomics and Precision Medicine: Molecular Diagnostics Innovations Shaping the Future of Healthcare in Qatar. *Adv. Public Heal.* **2019**, 1–11 (2019).
9. Rich, S. S. & Cefalu, W. T. The impact of precision medicine in diabetes: A multidimensional perspective. *Diabetes Care* **39**, 1854–1857 (2016).
10. Jameson, J. L. & Longo, D. L. Precision medicine—Personalized, problematic, and promising. *N. Engl. J. Med.* **372**, 2229–2234 (2015).
11. Groop, L. Genetics and neonatal diabetes: Towards precision medicine. *Lancet* **386**, 934–935 (2015).
12. Floyd, J. S. & Psaty, B. M. The application of genomics in diabetes: Barriers to discovery and implementation. *Diabetes Care* **39**, 1858–1869 (2016).
13. Araújo-Soares, V., Hankonen, N., Presseau, J., Rodrigues, A. & Sniehotta, F. F. Developing Behavior Change Interventions for Self-Management in Chronic Illness: An Integrative Overview. *Eur. Psychol.* **24**, 7–25 (2019).
14. Sherifali, D., Viscardi, V., Bai, J. W. & Ali, R. M. U. Evaluating the Effect of a Diabetes Health Coach in Individuals with Type 2 Diabetes. *Can. J. Diabetes* **40**, 84–94 (2016).
15. Cimo, A. & Dewa, C. S. Tailoring Diabetes Education to Meet the Needs of Adults With Type 2 Diabetes and Mental Illness: Client and Health-Care Provider Perspectives From an Exploratory Pilot Study. *Can. J. Diabetes* **43**, 421–428.e3 (2019).
16. Pranata, S. & Yi Huang, X. Self-Management Experience of Patient With Type 2 Diabetes in Sumbawa Besar, West Nusa Tenggara: a Qualitative Study. *Nurs. Curr. J. Keperawatan* **8**, 19 (2020).
17. Kasteleyn, M. J., Vos, R. C., Rijken, M., Schellevis, F. G. & Rutten, G. E. H. M. Effectiveness of tailored support for people with Type 2 diabetes after a first acute coronary event: A multicentre randomized controlled trial (the Diacourse-ACE study). *Diabet. Med.* **33**, 125–133 (2016).
18. Thojampa, S. Effects of self-management support and family participation enhancing program for delayed progression of diabetic nephropathy in Thai adults with type 2 diabetes. *Int. J. Africa Nurs. Sci.* **7**, 50–54 (2017).
19. Funnell MM, Brown TL, Childs BP, Haas LB, Hosey GM, Jensen B, Maryniuk M, Peyrot M, Peitte JD, Reader D, Siminerio LM, W. K. & W. National standards for diabetes self-management education. *Diabetes Care* **33**(Suppl. 1), S89–S96. (2010).
20. Barlow J, Wright C, Sheasby J, Turner A, H. J. Self-management approaches for people with chronic conditions: a review. *Patient Educ Couns.* **48**(2):177–87. (2002).
21. Mertig, R. *The Nurse's Guide to Teaching Diabetes Self-Management. United States of America: Springer Publishing Company.* (2007).
22. Suhl, E. B. P. Diabetes Self-Management Education for Older Adults: Diabetes Self-Management Education for Older Adults: *Diabetes Spectr.* **19**, 234–240 (2006).
23. Pranata, S. *et al.* Precision Health Care Elements, Definitions and Strategies for Patients with Diabetes: A Literature Review. 1–14 (2021).
24. Lai, P. C. *et al.* Factors influencing self-efficacy and self-management among patients with pre-end-stage renal disease (Pre-esrd). *Healthc.* **9**, 1–12 (2021).
25. Pranata, S. & Hei-fen, H. THE IMPLEMENTATION OF DIABETIC SELF-MANAGEMENT IN INDONESIA AND TAIWAN HOSPITAL: A CASE STUDY DESIGN. **10**, 1–17 (2021).



This work is licensed under a Creative Commons Attribution