Patient Education and Counseling 99 (2016) 1626–1631

Contents lists available at ScienceDirect

Patient Education and Counseling

journal homepage: www.elsevier.com/locate/pateducou

Patient empowerment interacts with health literacy to associate with subsequent self-management behaviors in patients with type 2 diabetes: A prospective study in Taiwan

Ruey-Hsia Wang[a,*], Hui-Chun Hsu[a,b], Yau-Jiunn Lee[b], Shyi-Jang Shin[c], Kun-Der Lin[d], Ling-Wang An[e]

[a] College of Nursing, Kaohsiung Medical University, Kaohsiung, Taiwan
[b] Lee's Endocrinology Clinic, Pingtung, Taiwan
[c] Division of Endocrinology and Metabolism, Department of Internal Medicine, Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung, Taiwan
[d] Division of Endocrinology and Metabolism, Kaohsiung Municipal Ta-Tung Hospital, Kaohsiung, Taiwan
[e] Department of Medical Education, Beijing Ruijing Diabetes Hospital, Beijing, China

ARTICLE INFO

Article history:
Received 16 November 2015
Received in revised form 22 March 2016
Accepted 2 April 2016

Keywords:
Type 2 diabetes
Self-management behaviors
Patient empowerment
Health literacy

ABSTRACT

Objective: To examine association of interactions between patient empowerment (PE) and health literacy with 1-year-later self-management behaviors in patients with type 2 diabetes (T2DM).
Methods: A prospective design was employed in this study. Overall, 395 patients with T2DM completed self-reported questionnaires at baseline and 1 year later. A hierarchical multiple regression was used to identify the association of interactions between PE and health literacy at baseline with the 1-year-later self-management behaviors.
Results: Interactions between PE and communicative and critical health literacy (CCHL) at baseline significantly associated with the 1-year-later global self-management behaviors in patients with T2DM. Among the participants who exhibited high PE at baseline, the scores of 1-year-later global self-management behaviors of the participants with a high CCHL at baseline were significantly higher than those with a low CCHL at baseline. Nevertheless, among the participants who exhibited low PE at baseline, no significant differences were identified in the 1-year-later global self-management behaviors between the participants with high vs. low CCHL at baseline.
Conclusions: PE may improve self-management behaviors in patients with high CCHL, but may prove useless in patients with low CCHL.
Practice implications: Healthcare providers should ensure that patients with T2DM have adequate CCHL prior to empowering them.

1. Introduction

Diabetes has become an epidemic chronic disease in many countries [1]. Approximately 347 million individuals are affected by diabetes worldwide [2]. Type 2 diabetes (T2DM) accounts for approximately 95% of all diagnosed cases of diabetes [3]. It has been estimated that 552 million individuals will suffer from T2DM worldwide by the year 2030 [4]. In Taiwan, diabetes was the fifth leading cause of death in 2014 [5]. Furthermore, the standardized mortality rate of diabetes in Taiwan is higher than the U.S. and other Asian countries, such as Korea and Japan [5]. The prevalence rate of T2DM is 8.9% [6] and accounts for 98.5% of all cases of diabetes in Taiwan [7]. Thus, controlling T2DM is an urgent public health issue in Taiwan.

Self-management behaviors refers to an individual's ability to manage the symptoms, treatment, physical and psychosocial effects and life style changes necessary to adapt to life with chronic disease [8]. Many previous international studies have demonstrated that self-management behaviors influence the glycemic control of patients with T2DM [9,10]. Possession of self-management behaviors is the cornerstone of diabetes care. Educating patients

* Corresponding author at: College of Nursing, Kaohsiung Medical University, 100 Shih-Chuan 1st Road, San-Ming District, Kaohsiung City 807, Taiwan.
E-mail addresses: wrhsia@kmu.edu.tw (R.-H. Wang), huichun.hsu@leesclinic.org (H.-C. Hsu), t3275@ms25.hinet.net (Y.-J. Lee), sjshin@kmu.edu.tw (S.-J. Shin), 890073@ms.kmuh.ors.tw (K.-D. Lin), 962917477@qq.com (L.-W. An).

http://dx.doi.org/10.1016/j.pec.2016.04.001
0738-3991/

with T2DM to improve self-management behaviors is an important issue for healthcare providers to decrease the negative impact of diabetes on public health.

Health literacy (HL) has been increasingly recognized as an important modifiable psychosocial factor that contributes to the self-management behaviors of patients with T2DM [11]. Patients with chronic disease need to apply health information and health resources to appropriately perform self-management behaviors [12]. One of the several definitions of HL is 'the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions' [13]. Accordingly, HL involves not only reading and writing abilities, but also abilities related to effective communicating, critical analyzing, and active engagement to control health determinants. HL is categorized into functional, communicative, and critical HL [14]. Functional HL refers to the reading and writing skills and comprises the simplest HL. Communicative HL refers to the ability to extract meaning from different sources of health information and share the information. Critical HL pertains to the ability to critically analyze health information prior to applying it in the decision-making process and is the highest difficulty level of HL. HL has been demonstrated to positively correlate with self-management behaviors in American and Chinese patients with T2DM [9,15]. However, the associations between HL and self-management behaviors have not been consistently supported in many systematic reviews [11,16]. Contextual factors such as clinical context and patients' characteristics are supposed to modify the associations between health literacy and self-management behaviors [11].

Patient empowerment is a multidimensional concept. One definition proposed by Anderson and Funnel [17] indicated that patient empowerment is a process in which healthcare providers enable patients to think critically and act autonomously to ensure patients can make their own health decisions and take control of their diseases. Previous studies have demonstrated that patient empowerment positively influenced the self-management behaviors of patients with T2DM [18,19]. However, a previous qualitative study demonstrated that lower-educated patients tended to report more negative experiences regarding empowerment, and were more interested in personal relationships. In contrast, more highly educated patients reported a more positive experience regarding empowerment and were more interested in negotiating with healthcare providers for power and additional information [20]. Patients with different literacy levels may respond differently to patient empowerment. The Health Empowerment Model [21] has proposed that patient empowerment is deeply interwoven with HL to affect the health outcomes of patients. Londoño and Schulz [22] demonstrated that empowered asthma patients with adequate judgment skills led the patients to perform relatively appropriate self-management behaviors. Nevertheless, another study indicated that patient empowerment and HL were independent determinants of self-management behaviors in patients with chronic low back pain [23]. Findings of the association of interactions between patient empowerment and HL with health outcome in patients are not consistent. Furthermore, because of the cross-sectional designs of these studies, the findings cannot provide information regarding possible causal associations of the interactions between patient empowerment and HL with subsequent self-management behaviors.

As patient empowerment has been increasingly advocated for application in patients with T2DM [24], understanding whether patient empowerment interacts with HL to associate with subsequent self-management behaviors in patients with T2DM will help healthcare providers design effective educational programs. To our knowledge, no studies have been specifically conducted to examine the associations of interactions between patient empowerment and HL with self-management behaviors in patients with T2DM. The purpose of this study was to examine the association of interactions between patient empowerment and HL with 1-year-later self-management behaviors in patients with T2DM using a prospective design.

2. Methods

2.1. Sampling and data collection procedure

This study employed a prospective design and comprised a follow-up investigation of a cross-sectional study that addressed path model testing [9]. At baseline, patients with a diagnosis of T2DM for >6 months; an age between 20 and 80 years; and an ability to read and communicate (based on the judgment of physicians) were selected from the endocrine outpatient clinics of a medical center and four local hospitals in southern Taiwan via convenience sampling. The physicians referred the eligible participants to a trained research assistant. The research assistant subsequently administered self-report questionnaires to the eligible participants who had provided informed consent. The eligible participants completed the self-report questionnaires independently or with the help of a research assistant in a private room at the clinic. No significant differences in the distributions of study variables were found between participants self-report and with the help of a research assistant by *t*-test.

One year after the baseline measurements (with no intervention conducted during the period), the participants who completed the baseline measurements were subsequently invited to complete the same self-report questionnaires. Of the 492 participants who completed the baseline measurements, 395 participants completed the measurements 1 year later, with a response rate of 80.2%. There were no significant differences between the participants who did and did not complete the 1-year-later measurements regarding the baseline measurement distributions. The G*Power (Germany; version 3.1.1) software was used to estimate the required sample size [25]. Based on a small effect size of the bivariate correlation, power, and α value of 0.2, 0.80, and 0.05, respectively, the sample size of 395 participants was adequate.

The study was approved by the Institutional Review Board of Kaohsiung Medical University, Taiwan. All eligible participants were informed that there was no penalty for refusal to participate in the study and that they were allowed to withdraw from the study at any time.

2.2. Measures

2.2.1. Personal characteristics

Age, sex, substance use habits (any habit of smoking, drinking, or betel quid chewing was categorized "yes") in the previous 6 months, insulin use (no/yes), complications diagnosis by a physician (no/yes), and diabetes duration were self-reported by participants. The body mass index (kg/m ^{2}) and Hemoglobin A1c (HbA1c) levels were collected from the medical records of each participant.

2.2.2. Patient empowerment scale

A 13-item Chinese version of the diabetes empowerment process scale [9] was used to assess the participants' perceptions of empowerment provided by healthcare providers. Each item was rated using a 5-point scale, which ranged from "strongly disagree" (0 points) to "strongly agree" (4 points). The potential scores ranged from 0 to 52, and higher scores indicated that the participants perceived higher patient empowerment. This scale has been previously demonstrated to have satisfactory validity and