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Summary of Diabetes Self-care Activities: A confirmatory factor analytic approach

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ABSTRACT

Diabetes self-care activities is an important aspect for Type 2 Diabetes Mellitus (T2DM) patients. The aim of this study was to examine the construct validity of the Summary of Diabetes Self-Care Activities (SDSCA) measure. This was a cross-sectional study whereby T2DM patients were recruited from endocrine clinics in hospitals. The patients gave their informed consent before the interview. The SDSCA measure was used to gather information about the patients' diabetes self-care. Internal consistency reliability was measured by the Cronbach's Alpha value while the construct validity was measured by Confirmatory Factor Analysis. The fit indices for both the four-factor and five-factor structures were high (CFI >0.90 and GFI >0.90). The interconstruct correlations of the SDSCA scale was found to be highest between general and specific diet. The constructs of the SDSCA demonstrated adequate convergent validities. The SDSCA measure was found to be a valid one.

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1. Introduction

Diabetes self-care, which made up 98% of self-care procedure, is demanding and multifaceted. Its application may also involve other family members. This is especially true for the Type 2 diabetes mellitus (T2DM) patients. The patients have a daily responsibility of managing and controlling the blood glucose level to prevent complications [1]. As such, self-care is a key component in diabetes care procedure [2]. The activities range from blood glucose self-monitoring, low fat diet, daily exercise and checking one's foot and research has found that many of these self-care aspects are independent of one another [3,4]. One of the regimen, which is very difficult to

adhere and to follow is the dietary aspects and physical exercise [3]. The daily intake of oral medications is the easiest to follow by the patients with T2DM [5]. This may be due to the fact that the physician prescribes the medications and it has a positive psychological impact and is more associated with managing their diabetes.

Toobert et al. [6] noted that health care providers and educators need reliable and valid measures of diabetes self-management in order to assess the self-care behavior and analyzing new approaches to self-care. Considerable research and discussions are on-going on how self-care adherence could be measured and reported in the best possible way [2]. Self-care measures are the most inexpensive and practical approach to assess self-care adherence. The traditional practices of measuring patients' self-care, such as glycated hemoglobin or the physicians' judgments have been considered the least defensible compared to self-report measures [7–9]. On the other hand, direct methods such as glucose

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testing and monitoring are tedious for the patients and consequently labor intensive for the health care sector.

The Summary of Diabetes Self-Care Activities (SDSCA) is a self-report measure which rates the frequency of self-care adherence over the past seven days. The original version of the SDSCA consisted of 12 items that assessed five specific diabetes regimen factors: general diet, specific diet, exercise, blood sugar testing and medication [10]. The SDSCA is one of the most commonly and widely used by clinicians [11–14]. Previous studies have shown that SDSCA had four-factor structure: Blood sugar testing, diet, exercise and foot care [1,15,16]. Moreover, SDSCA has demonstrated adequate evidence of reliability [17–21] with a Cronbach's alpha value above 0.50.

Since self-care is a multidimensional concept, therefore it is necessary to analyze each aspect separately rather than combining the score across the components. There is a paucity of well-validated diabetes self-care measures especially in Asia. The aim of this paper is to assess the level of diabetes self-care activities among T2DM patients and to examine thoroughly the construct validation of the Summary of Diabetes Self-Care Activities measure.

2. Methods

2.1. Participants

This study made use of a cross-sectional research design. The T2DM patients were recruited from Sg. Buloh Hospital (H.SgB), Serdang Hospital, Hospital Tengku Ampuan Rahimah (HTAR), and Klinik Kesihatan Botanic (KK Botanic) namely. A convenience sample of 600 patients was recruited for this study. The inclusion criteria for the participants are that the patients were aged above 18 years, diagnosed with T2DM for at least one year, taking T2DM diabetes medications and able to speak, read and write either in English or Malay language. Subjects who were diagnosed with gestational diabetes or mental disorders and who were not able to read in Malay/English language were excluded from this study. During the data collection, information regarding the study and consent form were provided and signed by the participants. Before handing the questionnaire over to the patients, each patient would receive information about the study from the investigator by both formal and verbal explanations, including the purpose and procedure of the study. After the participants agreed to participate, the consent form was given to them and a formal signature was obtained. Participants were also provided the opportunity to ask questions regarding the study. This study was approved under the Medical Research Ethics Committee (MREC) under the National Medical Registry Registration (NMRR) in Malaysia.

2.2. Instrumentation

The Summary of Diabetes Self-Care Activities (SDSCA), a valid and self-reported measure, is a free instrument which can be found in the public domain and has been used over 18 years [6]. It has 5 domains consisting of 11 questions assess-

ing diabetes care; (1) diet; (2) exercise; (3) blood sugar testing; (4) foot care; (5) smoking. The questions are all pertaining to the patients' self-care activities rather than adherence or compliance recommended by healthcare practitioners. The instrument assesses each domain individually and does not compute a total adherence score.

The domain diet comprises of four questions, and specifically two questions are on general eating plan and the remaining questions are on the frequency of servings of fruits and vegetables, and on high-fat food as with for most T2DM patients. The least compliance goes to diet and exercise. The reasons for not complying with a healthy eating plan depends on location of the eating place and what they were eating [5]. Medical Nutrition Therapy (MNT) has a positive impact in reducing weight, thereby decreasing the HbA1c level by 0.9–2% [22]. The quality and quantity of dietary fat are found to affect the metabolic control rate. High fat diet and high saturated fat intake increase the prevalence of T2DM [23]. According to a 14-year follow-up study, Salmerón et al. [24] went further to explain that an increase in trans fatty acids in women increases the risk of T2DM [25]. However polyunsaturated fatty acids reduces the prevalence rate.

There are two questions pertaining to exercise, which has been known to lower the blood glucose levels by increasing the metabolic activity and insulin sensitivity. American Diabetes Association (ADA), suggested that patients with type 2 diabetes are encouraged to have at least 30 min physical activity most days of the week [26]. In Malaysia, for older patients with T2DM, low physical activity is correlated with poor glycemic control [27]. In fact, the Malaysian patients who were not participating in any form of exercise were usually due to lack of time (54.5%) and lack of energy (21.2%).

Blood sugar testing comprises of two questions. As discussed before, the glycemic control is a powerful tool to guide patients towards diabetes care. The monitoring of the blood glucose level is based on the ADA recommendation and the level should be <7.0%. The American Association of Endocrinologists recommends that the HbA1c levels should be <6.5%. Health care providers should be very conscious about monitoring the HbA1c levels of the patients.

Similarly, there are also two questions pertaining to foot care. Many patients with diabetes disregard the importance of foot care as well as many physicians who do not consider it mandatory to have the patient's foot examined regularly [28]. The North-West Diabetes Foot Care Study (NWDFCS) revealed that 2% of the community-based patients with diabetes develop foot ulcer every year [29]. This have led to foot problems being a major cause of distress and emotional problems among patients. The most critical problem is the development of peripheral disease that may lead to a loss of feeling in the patient's foot not until the foot has significant damage from blisters or cuts.

There is one question pertaining to smoking in the questionnaire. Though, smoking does not have any direct connection with diabetes, it is used in many health programs as a predictor of many complications. To make matters worse, the American Diabetes Association (2011) found that only half of the patients with diabetes are advised by their physicians to quit smoking.

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