Contents lists available at SciVerse ScienceDirect

Primary Care Diabetes

journal homepage: http://www.elsevier.com/locate/pcd

Original research

Stage of change of 6 health-related behaviors among patients with type 2 diabetes

Hiba Ahmad Bawadi[a,*], *Angela Denise Banks*[b], *Fawaz Ammari*[c], *Reema Fayez Tayyem*[d], *Shatha Jebreen*[a]

[a] *Department of Nutrition and Food Technology, Jordan University of Science and Technology, P.O. Box 3030, Irbid 22110, Jordan*
[b] *Department of Adult Health Nursing, University of San Francisco, 2130 Fulton Street, San Francisco, CA 94117-1080, United States*
[c] *Department of Internal Medicine, Jordan University of Science and Technology, P.O. Box 3030, Irbid 22110, Jordan*
[d] *Department of Clinical Nutrition & Dietetic, The Hashemite University, P.O. Box 150459, Zarqa 13115, Jordan*

ARTICLE INFO

Article history:
Received 14 January 2012
Received in revised form
10 June 2012
Accepted 17 July 2012
Available online 11 August 2012

Keywords:
Stage of change
Diabetes
Jordan
Behavior

ABSTRACT

Aims: Assessing patients' current stage of change toward 6 healthy behaviors related to diabetes control. Behaviors studied were smoking cessation (2) regular exercise; (3) consuming 5 servings or more of fruits and vegetables; (4) decreasing intake of refined sugar; (5) reducing saturated fat; and (6) self monitoring of blood glucose (SMBG).

Methods: Stage of change (SOC) for several diabetes control-related behaviors was assessed for 737 patients with type 2 diabetes using a staging algorithm. Socio-demographic data were collected by a structured interview-based questionnaire.

Results: There was high degree of readiness toward consuming diets with less saturated fat and simple sugar. Very low degree of readiness was reported for self-monitoring of blood glucose on a regular bases and for practicing physical exercise. Half of the participants (50.9%) were in the precontemplation stage for consuming ≥5 servings of fruits and vegetables every day. Significant correlations were obtained between the degree of readiness for several behaviors ($p < 0.01$). Age, gender, income and education were all related to the stage of change of the studied behaviors ($p < 0.01$).

Conclusions: Patients with diabetes in Jordan are still in the pre-action stages for practicing exercise, consuming 5 servings or more of fruit and vegetable, and self-monitoring of blood glucose. The current finding suggests a need for nutritional education and interventions to raise awareness of lifestyle factors influencing glycemic control among diabetics.

1. Introduction

Diabetes is considered the fifth leading cause of death worldwide [1]. In Jordan, the prevalence of diabetes has increased over the last 10 years and is steadily rising due to family history, advancing age and increasing body mass index [2]. The high mortality rate associated with diabetes is attributed to the increased rates of micro- and macro-vascular complications [3]. But cardiovascular disease is the leading cause of

* *Corresponding author*. Tel.: +962 2 720 1000x22263; fax: +962 2 7095069.
E-mail addresses: hbawadi@just.edu.jo (H.A. Bawadi), adbanks@usfca.edu (A.D. Banks), fammaril21@yahoo.com (F. Ammari), rtayyem@hu.edu.jo (R.F. Tayyem), shatha84_j@hotmail.com (S. Jebreen).
1751-9918/$ – see front matter
http://dx.doi.org/10.1016/j.pcd.2012.07.003

morbidity and mortality among patients with diabetes [4]. Current research supports the finding that tight glycemic control is the corner stone of preventing complications associated with diabetes [5].

Glycemic control is related to adopting behaviors contributing to a healthy life style, preventative care and healthy eating. Behavioral changes for patients with diabetes is difficult and often challenging [6]. Healthy behaviors related to glycemic control of diabetes include, but are not limited to, reducing saturated fat intake, engaging in physical activity, and regular self-monitoring of blood glucose [7]. Current research indicates that persistent hyperglycemia increases the risk of microvascular complications, therefore the benefits of maintaining a tight glycemic control is necessary in reducing microvascular risk reduction and end stage organ disease [8].

This current study uses the Transtheoretical Model (TTM) as a conceptual framework to guide the study. TTM is a behavioral change theory based on the premise that individuals are not all ready and motivated at the same time to change their behaviors toward better management of their health conditions [9]. Instead each individual is at a different stage and the interventions to motivate their behavior are most effective when matched with the individual's current stage of change. TTM allocates individuals into 5 different stages according to their readiness to adopt behavioral change. The first stage is precontemplation (individuals are unaware of the consequences or the need to change); the second stage is the contemplation stage (individuals are aware of the need for behaviors change and intend to take action within the next six months); the third stage is preparation (individuals are committed to take action within a month); the fourth stage is action (individuals have changed their lifestyle within the past six months); and the final stage is maintenance (individuals have been practicing new behaviors for more than six months) [9].

The application of TTM in the care of diabetics was first introduced in 1993 [10]. Several studies have documented that TTM interventions for patients with diabetes resulted in better outcomes when compared to usual care approaches [6,11]. Most of the published studies investigated the stage of change of a single diabetes related behavior. However, controlling diabetes is a function of many different behaviors. Therefore, the stage of change may be better understood when considering several behaviors associated with glycemic control.

The uniqueness of this study is that it is the first study aimed at assessing patients' current stage of change toward 6 healthy behaviors related to diabetes. Including: (1) smoking cessation; (2) regular exercise; (3) consuming 5 servings or more of fruits and vegetables; (4) decreasing intake of refined sugar; (5) reducing saturated fat; and (6) self monitoring of blood glucose (SMBG).

2. Materials and methods

2.1. Setting

This cross-sectional study was conducted at the out-patient endocrinology clinics in the King Abdullah University Hospital (KAUH) in Ramtha/Jordan. The study was evaluated and approved by the IRB committee in Jordan University of Science and Technology.

2.2. Participants

All patients diagnosed with type 2 diabetes, visiting the clinic were invited to participate in the study and were informed about the objectives of the study. Patients who accepted the invitation were asked to carefully read and sign a consent form. A total of 737 male and female patients were enrolled.

2.3. Data collection

The data were collected by a structured interview-based questionnaire. The interview was completed by trained interviewers. Demographic data collected included gender, age, educational level and income.

Participants' stage of change (SOC) was assessed using a staging algorithm adopted from the literature [6,15–25]. The stage of change for smoking behavior was assessed by asking participants if they were smokers at the time of the study? Participants were provided 4 responses: yes, I smoke (precontemplation, contemplation, and preparation stage); no, I quit within the last 6 months (action stage); no, I quit more than 6 months ago (maintenance stage); and no I do not smoke. This question aimed to classify patients to smokers (pre-action stages), quitters (action and maintenance), and nonsmokers.

Pre-contemplators, contemplators, and preparers were asked if they were seriously thinking of quitting smoking? Responses were: yes, within the next 30 days (preparation stage); yes, within the next 6 months (contemplation stage); and no, not thinking of quitting (precontemplation stage) [12].

Regular exercise was defined as 3 or more episodes of recreational exercise per week for 20 min or longer each time [13]. Participants were asked if they exercise 3 times or more per week for 20 min or longer, and provided 5 statements that described their status. For example: yes, I have been doing so for more than 6 months (maintenance stage); yes, I have been doing so for less than 6 months (action stage); no, but I intend to do so in the next 30 days (preparation stage); no, but I intend to do so in the next 6 months (contemplation stage); and no, and I do not intend to do so (precontemplation stage) [14]. Similar staging responses were used for fruits and vegetables consumption. For example: reducing saturated fat intake, decreasing simple sugar consumption, and self-monitoring of blood glucose.

Fruits and vegetables consumption was defined as consuming 5 or more servings of fruits and vegetables (F&V) everyday [15]. Examples of one serving of fruits and vegetables were provided (i.e. one medium size apple, one-half cup of orange or other fruit juice; 1 cup of raw salad; ½ cup cooked vegetables). Stage of change of consuming diets low in saturated fat was assessed by asking the participants if they consistently avoid eating foods high in saturated fat content such as (butter, margarine, chicken skin, fatty meat, fried foods, mayonnaise; and creams) [16].

Patients were also assessed for their readiness to consume diets low in simple sugar (unsweetened beverages, and foods with no added sugar). In addition patients were asked if they consistently avoid consuming foods with added sugar and