



Treating psychological insulin resistance in type 2 diabetes

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ARTICLE INFO

Article history:

Received 27 September 2016

Received in revised form 23 November 2016

Accepted 25 November 2016

ABSTRACT

Aims: The phenomenon of psychological insulin resistance (PIR) has been well documented for two decades, but interventions to treat PIR have not been well described. The aim of this study was to describe interventions used to treat psychological insulin resistance by certified diabetes educators (CDE's).

Methods: A secondary data analysis study using empirical data from a trial (N = 234) that included four CDEs providing counseling for psychological insulin resistance. Participants not currently using insulin completed the 10-item Barriers to Insulin Therapy measure. The four CDE interventionists documented their approach to addressing participants' barriers to taking insulin using a standard form. Recommendations were collated and summarized.

Results: Strong PIR was shown by 28.4% of participants reporting that they "would not start insulin" and a moderate degree of PIR was shown by 61.2% who said they "would be upset, but would start insulin." The CDE's treated PIR with four primary interventions: 1) teaching and providing explanations, 2) demonstrations and sharing examples of success using insulin therapy, 3) return demonstrations, and 4) addressing feelings and positively managing expectations.

Conclusion: This is the first study to describe in some detail potentially effective patient management strategies for PIR. A randomized controlled trial testing the efficacy of PIR interventions is needed.

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Introduction

Diabetes, which is characterized by high blood glucose levels and microvascular complications, can result in damage to the cardiovascular system, eyes, kidneys, and lower limbs, resulting in high personal and societal costs [1]. Insulin therapy is a highly effective treatment for diabetes that reduces hyperglycemia and its associated medical complications [2]. The Diabetes Control and Complications Trial [3] and the United Kingdom Prospective Diabetes Trial (UKPDS) [2] have demonstrated the benefits of tight glycemic control in individuals with type 1 (T1DM) and type 2 diabetes (T2DM). For example, the UKPDS showed that a 1% decrease in HbA1c was associated with a 37% reduction in the risk of microvascular complications and a 14% reduction in the risk of macrovascular complications [4]. Although insulin therapy is highly effective in helping patients achieve tight glycemic control, this treatment benefit is often delayed in individuals with T2DM. This delay is frequently attributed to psychological insulin resistance (PIR), a term coined in 1994 to describe both provider-

patient-level barriers to initiating and maintaining insulin therapy [5]. Since then, aspects of PIR and its management have been well described in literature reviews [6,7].

Among the principal factors contributing to PIR, the foremost is patients' lack of accurate knowledge and understanding about diabetes and insulin therapy [8,9]. For example, patients may believe that insulin is only appropriate for individuals with severe disease; thus, patients with PIR will interpret a new prescription for insulin therapy negatively as a sign that their diabetes is getting worse rather than a necessary next step in treatment to protect their health and quality of life [8,9]. Another component of PIR is a patient's negative perception that a transition to insulin therapy is a personal failure as a result of inadequate disease self-management efforts, which is associated with guilt and remorse [9–13]. Other negative self-perceptions include feeling overwhelmed and unable to manage the complexity and daily self-management demands of insulin therapy [14], as well as fears that starting insulin therapy represents a loss of normalcy [15] and the risk of being viewed differently by others [13]. Using syringes in a public place may result in feeling socially embarrassed and rejected, leading to feeling that daily insulin injection routines

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must be hidden from others [16,17]. These perceptions can lead to omissions, delays, or early injections.

Individuals may also fear injecting insulin [9–13,18], including concerns about inability to self-administer injections [19], pain associated with injections [11,20], or general uneasiness or specific phobias about being injected [20,21]. Patients may also have concerns about the lifestyle changes imposed by insulin therapy, including concerns around its inconvenience [11,17], time-consuming aspects [22], complexity [17,23,24], and loss of personal freedom [25,26]. Additionally, patients may simply be unwilling to take on the new responsibilities associated with insulin therapy [24]. PIR may also result from potential physiological side effects of insulin [16], with the two most commonly cited problems being fear of hypoglycemia [17,27] and weight gain [28].

This accumulated body of clinical reports clearly shows that PIR can negatively affect a patient's ability to successfully incorporate insulin therapy into daily life. However, few trials have described interventions used to treat PIR. To fill this gap in knowledge, this secondary analysis study explored how PIR was managed by certified diabetes educators (CDEs) in a large-scale behavioral intervention trial [29].

Materials and methods

For this secondary analysis study, we used empirical data from a behavioral intervention trial (N = 234) that included skills training for four CDEs in diabetes self-management education (DSME) [29]. The purpose of the trial was to determine whether glycemic control (HbA1c) is improved in Type 2 diabetes when DSME is used with Motivational Interviewing versus DSME alone. Trial participants were recruited from adult patients with T2DM and in the patient population of a large hospital medical center. Patients were included if they were 30–70 years old, had poorly controlled blood glucose (HbA1c \geq 7.5%), and were able to speak and write English. The full results of this trial are described elsewhere [29].

All DSME sessions were conducted by a CDE, and all patients received four DSME sessions within the 6-month intervention period. Participants were randomly assigned to four intervention conditions: DSME alone, DSME with motivational interviewing, DSME with a summary of participants' barriers to diabetes self-management from the computerized Diabetes Self-Care Profile (DSCP) questionnaire, or DSME with motivational interviewing and the DSCP one-page clinical summary. The DCSP was found to improve patient-provider communication about diabetes-related lifestyle changes [29]. Participants not currently using insulin completed the 10-item Barriers to Insulin Therapy measure, which is part of the DSCP and includes 10 common barriers to initiating insulin therapy such as erroneous beliefs, negative self-perceptions, concerns about lifestyle adjustments, and fear of injections. The four CDE interventionists documented their approach to addressing participants' barriers to taking insulin. Specifically, CDEs used a standard form we provided to record retrospectively their treatment recommendations (n = 1–3) used for each of the 10 barriers. Recommendations were collated and summarized.

Statistical analysis

Data were analyzed using descriptive statistics. Continuous variables (age, diabetes duration, body mass index, HbA1c, CDE visits) were described by means, standard deviations (SDs), and ranges. Categorical variables (gender, race/ethnicity, education level, marital status, use non-insulin diabetes medications, insulin use, barriers questions, and CDE recommendations) were described by number and percent.

Results

Of the 234 participants enrolled in the study, 119 were in the two intervention conditions whose CDEs received DSME skills training. Participants' mean \pm SD age was 56.6 \pm 10.6 years, and 58% were women. Most participants were white (83.5%), 13% self-identified as Hispanic, and 41% had graduated from high school or had some high school education. They had been diagnosed with diabetes on average for 8.4 \pm 7.4 years and their baseline HbA1c was 8.8 \pm 1.1% (Table 1).

The majority of participants were not using insulin (59%), and only 10.4% reported being "OK with starting insulin." A majority of participants also reported they "would be upset, but would start" insulin (61.2%), and 28.4% "would not start" insulin (Table 2).

Participants endorsed a mean (\pm SD) of 4.1 \pm 2.1 insulin therapy barriers. The top three barriers to starting insulin therapy were "I would want to try all other options first" (89.6%), "It would mean my diabetes was getting worse (83.6%)" and "Reluctance to give myself insulin shots in public" (43.4%). Moderately endorsed barriers were "I would be scared of needle pain (38.8%)", "I would be worried about gaining weight" (38.8%), and "I would be worried about getting low blood sugars" (35.8%). Less commonly endorsed barriers included "I am too busy to add another big demand to my life right now" (19.4%), "Health insurance/financial difficulties would make it hard to afford," (16.4%), and "I have seen people develop serious complications after going on insulin" (11.9%) (Table 3).

The majority of CDEs' 45 treatment recommendations to overcome/minimize insulin therapy barriers consisted of first exploring reasons why participants did not think they could take insulin, then teaching and explaining (Table 4). Education examples included teaching about progression of diabetes, causes of hypoglycemia, prevention of hypoglycemia, injection techniques in public places, the benefit of practicing, the benefits of insulin, and strategies to prevent weight gain. Other educational points are to teach that people may develop... serious complications when they start insulin because the insulin was started too late not because the insulin caused the complication and teaching about strategies to get insulin if they can't afford it. Explanation examples included distinguishing between the natural progression of diabetes and complications due to high glycemic levels, and explaining insulin action times to prevent hypoglycemia.

The other treatment recommendations included demonstrations and sharing examples of insulin therapy success, return demonstrations (e.g. participants' successful demonstration of taking an insulin injection as taught by the CDE), addressing participants' feelings about insulin therapy and positively managing their expectations. Examples of demonstrations or sharing experiences of insulin therapy success (n = 8) included showing how easy it is to give an insulin injection, talking about how many people give themselves injections at dinner tables or in bathroom stalls, discussing different ways to give injections in these places, and

Table 1
Characteristics of the study sample at baseline (n = 119).

Characteristic	Mean (SD)	Range	n (%)
Age, years	56.6 (10.6)	31.0–80.0	
Female			69 (58.0)
Married			71 (59.7)
\leq High school graduate			48 (40.3)
White race			96 (80.1)
Hispanic ethnicity			12 (10.1)
Duration of diabetes, years	8.4 (7.4)	0.5–38.0	
Body mass index, kg/m ²	34.5 (6.6)	21.3–57.4	
Hemoglobin A1c, %	8.8 (1.1)	7.5–12.0	
Use non-insulin diabetes medication			102 (85.7)

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