

On pens and needles: Treatment strategies for psychological insulin resistance in type 2 diabetes mellitus

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ABSTRACT

Background: Psychological insulin resistance (PIR) refers to psychological opposition towards insulin therapy. Although not a formal psychological diagnosis, PIR is an under-recognized issue clinicians may encounter when treating patients with diabetes requiring insulin therapy.

Methods: Review articles, clinical trials, and practice guidelines were located using online databases. A total of 39 abstracts were reviewed and 11 articles were included in the analysis.

Results: Eleven articles were included. Proposed strategies used to mitigate the occurrence of PIR include: identifying the patient's personal obstacles via administration of PIR questionnaires, use of insulin pens as opposed to conventional syringe and needle, education on the risk of hypoglycemia and continuous emphasis of the importance of self-monitoring of blood glucose (SMBG) readings.

Discussion: The management of type 2 diabetes mellitus (T2DM) in patients requiring insulin may present challenges such as PIR. Tailoring a patient's treatment plan to account for physiological, psychological, social and financial needs may thwart some of these challenges. Other factors to consider include the cost of the agent and/or devices required. Insulin-dependent patients with T2DM should be assessed for both physiological and psychological changes.

Conclusion: Current treatment strategies for clinicians treating T2DM patients with PIR include administering the PIR or BIT questionnaire, initiating lower doses of insulin, switching from insulin vials to insulin pens, including assessment results in individualized treatment plans and using clinical outcomes to screen patients who are at risk for refusing the use of insulin. Further research evaluating clinical outcomes associated with treatment strategies is necessary.

KEYWORDS

Psychological insulin resistance, diabetes mellitus, diabetes, treatment, psychological opposition

INTRODUCTION

According to the Center for Disease Control and Prevention (CDC), about 1.9 million people aged 20 years or older were newly diagnosed with diabetes in 2010 and the majority of these patients being between the ages of 45-64 years old.¹ Typically, treating a patient with type 2 diabetes mellitus (T2DM) encompasses several components that revolve around both non-pharmacologic and pharmacologic options. Per the CDC, among adults with a current diagnosis of type 1 or type 2 diabetes, 58% take oral medication only, 12% take insulin only, 14% take

both insulin and oral medication, and 16% do not take either insulin or oral medication.¹ Therefore, implementing early treatment approaches in patients with T2DM is important in order to prevent complications such as heart disease and stroke, hypertension, blindness and ophthalmic disorders, kidney disease, nervous system diseases (e.g., diabetic peripheral neuropathy), non-traumatic low-limb amputations, and periodontal gum disease.¹ With diabetes being recognized as the seventh leading cause of death based on United States death certificates in 2007, it is important that healthcare

providers seek to ensure that any hindrances to treating these patients should be resolved in a timely manner.¹ The management of diabetes for each patient requires an individualized treatment approach. Thus, it is highly dependent on the patient with both their current personality and psychological factors immensely influencing the ultimate success of the treatment plan.²

The psychological element of T2DM originates from a diagnosis of diabetes triggering feelings of rejection or anger, which is typically seen in chronic and incurable illness.² The use of insulin is often associated with negative perceptions. Moreover, the decision to be compliant with therapy as well as the therapeutic agent itself may present an emotional and logistical obstacle for both the patient and provider.³ Brod and colleagues indicated another reason for the psychological issue is closely related to these patients feeling a sense of personal failure or self-blame about the need for insulin treatment.³ Personal failure is linked to one believing that the initiation of insulin therapy is a result of “failing” other therapies or “failing” to control the chronic illness using exercise, diet, or oral medication alone.³ Diminished compliance is also due to fear of side effects and complications from the use of insulin (e.g., weight gain and hypoglycemia), lifestyle adaptations, restrictions required by insulin use and social stigma.^{3,4} Undoubtedly, the psychological issues these patients cope with may eventually lead to the patient resisting insulin treatment.

Psychological insulin resistance (PIR) can be defined as a psychological disagreement towards the use of insulin in both patients with diabetes and their prescribers.³ The occurrence of PIR may be seen more in patients with T2DM than in those with type 1 diabetes mellitus (T1DM). Rationale includes early initiation of insulin therapy. At the time of diagnosis, most patients with T1DM are children or adolescents, making them more impressionable and less resistant. With an increase in the use of insulin to achieve glycemic control, PIR remains a habitual problem providers encounter during the initiation of insulin therapy and also in the compliance phase.³ Discussing the underlying causes of PIR and methods to overcome this hurdle is essential to both the patient and provider, as it reduces the occurrences of further detrimental complications associated with diabetes in addition to decreasing subsequent medical costs to treat these complications.¹ The aim of this article is to review interventions utilized for the treatment of PIR in patients with type 2 diabetes mellitus (T2DM).

METHODS

Review articles, clinical trials, and practice guidelines

were located using online databases [Cumulative Index of Nursing and Allied Health Literature (CINAHL), Iowa Drug Information Service (IDIS), Ovid, PsycARTICLES, PsycINFO and PubMed]. Some of the search requirements included all articles published in English and no specific time periods were emphasized (Date: up to September 2013). The search for articles was stopped when additional research resulted in articles not relevant to the topic and also when no new articles were being identified. Key words used in the search comprised of the following: “psychological insulin resistance”, “PIR”, “type 2 diabetes mellitus”, “depression”, “insulin treatment”, “insulin barriers”, “insulin compliance”, “needle/injection anxiety/fear/phobia” and “patient preference to insulin.” The study population focused primarily on T2DM patients with no prior and/or current exposure to insulin therapy. A total of 39 abstracts were reviewed, 28 abstracts were rejected due to the lack of relevance and the final analysis included 11 articles.

RESULTS

The management of PIR in patients with T2DM involves the active participation of both patient/caregiver and healthcare provider(s). Table 1 summarizes treatment strategies for psychological insulin resistance in patients with T2DM. During the initiation of insulin in patients with T2DM, PIR tends to be an impediment leading to a delay in the start of insulin. In contrast to PIR, Jenkins et al. discovered another issue to be addressed with some patients included the concept of “psychologically insulin receptive” patients, who are actually willing to initiate insulin because they understand their diabetes has progressed and insulin management is indeed required.⁵ Although these patients are less likely to present with signs of PIR, they still need to be carefully managed to prevent the occurrence of PIR.⁵ The psychological barriers to overcome in the insulin receptive patients can be achieved by encouraging self-monitoring of blood glucose (SMBG) at the time of insulin initiation, educating patients on their target blood glucose (BG) ranges and offering a discussion of A1C results in follow-up visits.⁵ Furthermore, giving patients the option of using insulin pens, lower starting doses and a structured program of support during initiation may help alleviate the anxiety associated with using insulin.⁵

The use of insulin therapy in the management of diabetes can be both beneficial and detrimental, if not used properly. The Outcomes Reduction with an Initial Glargine Intervention (ORIGIN) trial showed that excessive amounts of insulin may increase a patient's risk of developing complications such as severe hypoglycemia

Table 1 – Study summaries of treatment strategies for managing psychological insulin resistance in diabetic patients.^{4,5,7-9}

Author(s)	Purpose	Population	Recommendations to PIR Management
Wang and Yeh (2011)	To describe the phenomenon of psychological resistance to insulin therapy from the perspective of adults with T2DM.	Practitioners residing in Taipei, Taiwan	Develop treatment plan for patient with T2DM Consider perceptions of diabetes as a whole Provide insulin information Deliver cognitive behavioral interventions
Jenkins et al. (2010)	To explore patients' and healthcare professionals' experiences of initiating insulin in psychologically receptive patients in the Treating to Target in Type 2 Diabetes (4-T) randomized controlled trial.	Patients and practitioners residing in the United Kingdom (UK)	Strongly encourage SMBG at early stages of insulin therapy Counsel on normal BG readings and A1C results Use insulin pen with lower starting dose Titrate to target dose using structured insulin management program
Petrak et al. (2007)	To develop a psychometric questionnaire that can be used by both clinicians and researchers to measure psychological barriers in insulin-naïve patients with T2DM.	Patients, clinicians and researchers throughout Germany in 2005	Administer BIT Questionnaire to insulin-naïve patients prior to insulin therapy Develop plan to maximize therapeutic effects and minimize side effects of insulin therapy
Polonsky and Jackson (2004)	To address factors that hinder the initiation of insulin therapy in insulin-naïve patients with T2DM. To recommend intervention strategies for clinicians when they encounter patients with PIR.	Type 2 diabetes patients in the United States (USA)	Identify patient's personal obstacles Restore patient's sense of personal control Enhance self-efficacy as quickly as possible Consider insulin pens Frame the insulin message properly Discuss real risks of hypoglycemia Tackle injection phobias in patients with true fears of needles Share positive outcomes after initiating insulin therapy (e.g., improvements in total A1C levels)
Biggs et al. (1994)	To provide a description of the clinical characteristics that may be observed in women who withhold insulin for weight control from those who do not. Provide assessment tools to help screen for these unique set of patients and prevent the refusal of insulin.	Outpatient female patients with IDDM at The University of Texas Southwestern Medical Center in Dallas	Implement clinical interview Focus on overcoming hurdles associated with insulin refusal Screen for patient characteristics ATT39 Questionnaire – attitude towards diabetes EDI-2 – psychological and symptomatology of eating disorders Total A1C levels – glycemic control Weight – compare IBW to ABW DSM Criteria /SCID-OP – diagnosis of eating disorders

Abbreviations: T2DM = Type 2 Diabetes Mellitus, SMBG = Self-Monitoring of Blood Glucose, BG = Blood Glucose, A1C = Glycated Hemoglobin, BIT = Barriers to Insulin Treatment, IDDM = Insulin Dependent Diabetes Mellitus, ATT39 = Attitudes Toward Diabetes (39-Item), IBW = Ideal Body Weight, ABW = Actual Body Weight, DSM = Diagnostic and Statistical Manual of Mental Disorders, SCID-OP = Structured Clinical Interview for the DSM-III-R Outpatient Version

or permanent brain damage mimicking strokes or death.⁶ As mentioned earlier, patients with PIR present with a reluctance to initiate or continue the use of insulin for several psychological reasons. Biggs et al. demonstrated that insulin withholding for weight control can be observed in women with insulin dependent diabetes mellitus (IDDM) between the ages of 16 to 40 years.⁴ Refusal to use insulin increases their risk of developing severe hyperglycemia, diabetic ketoacidosis (DKA), and long term complications of diabetes.⁴ Management options to alleviate the burden of insulin use as well as increase the rate of compliance with these young women

may be achieved by implementing continuous screening strategies for these patients prior to the initiation of insulin.⁴ A semi-structured clinical interview should also be conducted to assess the patient's attitude toward diabetes (ATT39 Questionnaire), psychological characteristics and symptomatology of eating disorders via the Eating Disorder Inventory 2 (EDI-2) or the Diagnostic Interview for Children and Adolescents, Revised Adolescent Version (DICA-R-A), glycemic control (A1C levels in the preceding 3 months) and weight adjustments comparing ideal body weight (IBW) to actual body weight (ABW).⁴ Those at risk of withholding insulin

for weight control may not have an eating disorder (e.g., anorexia nervosa or bulimia nervosa) but may merely be weight-conscious.⁴ Typically, when compared to patients that do not withhold insulin, these patients tend to present with higher A1C levels (between 9%-22%), lower scores on the ATT39 questionnaire (indicating an increase in a negative attitude towards diabetes), higher mean scores on EDI-2 and higher frequency of lying to physicians with regard to checking BG levels and similar weights.⁴

Correspondingly, Petrak et al. also believes that an effective way to manage patients exhibiting PIR is to provide them with a psychometric questionnaire used to measure psychological barriers to insulin treatment, especially in naïve patients with T2DM.⁷ The ultimate goal of the Barriers to Insulin Treatment (BIT) questionnaire is to measure various aspects of psychological obstacles to insulin treatment in type 2 diabetic patients.⁷ Some of the areas being assessed in the BIT questionnaire include: positive feelings about the benefits of the treatment, fear of the consequences of diabetes, fear of injections, social barriers to the use of insulin, aversion to dependence on the drug, fear of insulin-related side effects and negative feelings about one's competence to manage the insulin treatment.⁷ It is recommended that clinicians and researchers use the BIT questionnaire in insulin-naïve patients with T2DM prior to initiating insulin in order to determine each patient's psychological roadblock(s). Some of the factors may need to be slightly altered depending on the results obtained from the BIT questionnaire. Such factors include variations in the frequency of SMBG, counseling and treatment of hypoglycemic symptoms, education regarding potent therapeutic effects of insulin in comparison to oral antihyperglycemic agents, recommending ways to manage the pain associated with injecting insulin, scheduling insulin injections throughout one's daily routine and providing tools to overcome the embarrassment of using insulin injections in public.⁷

Overcoming PIR in insulin-naïve patients with T2DM can be successfully achieved when clinicians are able to recognize the personal obstacles the individual may face and focus on helping the patient view insulin as a friend instead of an enemy.⁸ Recommended interventions that should be considered when a clinician encounters a patient with PIR are as follows: identify the patient's personal obstacles through a conversation or self-report PIR questionnaire, restore the patient's sense of personal control by giving them the choice to use insulin temporarily for a short duration of time, or enhance self-

efficacy as quickly as possible with the support and encouragement of caring clinicians utilizing hands-on techniques to administer insulin in the clinician's office.⁸ Other methods to alleviate PIR include considering the use of insulin pens rather than the traditional insulin vial and syringe. Insulin pens are typically easier to maneuver and more patient-friendly than the commonly used vials and syringes. The use of insulin pens is preferred in insulin-naïve patients presenting with PIR characteristics.⁸ It is also important to frame the insulin message in a manner that focuses primarily on glycemic outcomes (e.g., A1C goals) and ensure patients understand they have not "failed" in the management of their diabetic disease state. Many of the insulin-naïve patients are concerned about the side effects of insulin, especially severe hypoglycemia. Discussing the factual risks of hypoglycemia may alleviate one's apprehension and decrease the occurrence of PIR.⁸ In the event the patient truly has a fear of needles, initiating systematic desensitization may help ease the needle phobia.⁸ Finally, after initiating insulin therapy in these patients, it is important to pass along the positive outcomes associated with being adherent to insulin therapy (e.g., improvements in mood, sleep, energy level, A1C levels, blood pressure control).⁸

Several studies confirmed that most diabetic patients requiring the initiation of insulin therapy may be at risk of PIR. Wang and Yeh confirmed a commonly observed barrier among diabetic patients needing insulin therapy includes the presence of PIR, but other barriers specific to the study population (e.g., immigrant and low income ethnic minority groups) should be taken into consideration.⁹ Cultural barriers may present several obstacles when treating immigrant and minority patients; therefore, it is essential the healthcare provider accounts for these factors when developing an individualized treatment plan.⁹ One's point of view about psychological resistance to insulin therapy consists of multidimensional constructs involving both cognitive appraisal and emotional reaction.⁹ Each patient's current understanding of diabetes and treatment should be assessed to ensure the medical recommendations being implemented take into account their perceptions.⁹ By providing patients with T2DM information about the effects of insulin, psychological concerns may be lessened. Finally, the use of cognitive behavioral interventions tends to be most beneficial in these patients, because their views tend to consist of both cognitive and emotional origins.⁹

DISCUSSION

Psychological insulin resistance (PIR) refers to

psychological opposition towards insulin therapy in both patients with diabetes and their prescribers.³ The occurrence of PIR occurs more often in patients with T2DM than in those with T1DM. The management of T2DM in patients requiring insulin remains a struggle in the healthcare community. Healthcare professionals may optimize patient care by using a comprehensive treatment plan which accounts for physiological, psychological, social, and financial needs. Other factors to consider when enhancing compliance rates in patients using therapeutic agents such as insulin include the cost of the agent and/or devices required. For each patient, the clinician should strive to prescribe an agent that delivers the maximal therapeutic benefit with minimal side effects and is cost-effective.¹⁰ Emphasis should be placed on assessing T2DM insulin-dependent patients for the usual physiological changes (e.g., macrovascular and microvascular complications) as well as the psychological changes (e.g., depression and PIR) that may be a persistent problem throughout the management of this rampant chronic and incurable illness.¹¹

Several studies summarized in Table 1 note strategies to help mitigate the obstacle of PIR. Most of the clinical recommendations noted in Table 1 were derived from uncontrolled non-blinded studies. These studies have the ability to provide practical information, especially in chronically ill patients who may present recruitment challenges for a controlled study. Because the efficacy of the proposed interventions reported has not been validated with clinical research, further research evaluating clinical outcomes associated with treatment strategies is warranted.¹² Well-controlled studies are preferred in order to provide definitive dose-response and efficacy data in T2DM patients.

CONCLUSION

PIR is an under-recognized issue clinicians may encounter when treating patients with T2DM requiring insulin therapy. A treatment plan for this patient population should focus on the pharmacologic and non-pharmacologic components as well as the psychological factors that may obstruct implementation. Requiring the clinician to recognize the individual patient's personal obstacles through conversation or the administration of the PIR or BIT questionnaire, initiating lower doses of insulin, switching from insulin vials to insulin pens, including the results of assessments in individualized treatment plans and using clinical outcomes (e.g., A1C levels, SMBG target ranges, blood pressure readings, body weight comparisons) to screen patients who are at risk for refusing the use of insulin have all shown benefit

in lessening PIR.⁴⁻⁹ Further research evaluating clinical outcomes associated with treatment strategies is necessary.

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