



Original Research

Psychosocial factors associated with psychological insulin resistance in primary care patients in Hong Kong



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ABSTRACT

Aim: Patients with diabetes mellitus (DM) often delay the initiation of insulin treatment and titration due to psychological factors. This phenomenon is called psychological insulin resistance (PIR). The insulin treatment appraisal scale (ITAS) that was initially developed for Western populations has been translated and validated to measure PIR in Taiwanese populations (C-ITAS). This study aims to estimate the prevalence of PIR in primary care patients with DM in Hong Kong and to examine the relationship between PIR and psychosocial factors.

Method: 402 DM patients from a government-funded general outpatient clinic completed the C-ITAS and a health questionnaire (the Patient Health Questionnaire-9, PHQ-9). Patient demographics were recorded and associations among C-ITAS scores, PHQ-9 scores and demographic data were evaluated.

Results: There was no relationship between the presence of depression and PIR. Furthermore, the prevalence of PIR was 47.2% in insulin-naïve patients but only 8.7% in current insulin users. Tools such as the C-ITAS may help clinicians understand the etiology of PIR, which this study suggests is likely the result of multiple risk factors. Factors associated with a lower prevalence of PIR included current insulin use, a family history of insulin use, a high education level, male sex, and having received counseling from a physician about insulin within the previous 6 months.

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Introduction

Type 2 diabetes mellitus (DM) is a prevalent and increasingly common disease worldwide [1]. Ten percent of the population of Hong Kong (HK) (approximately 700,000 people) is estimated to have DM [2]. Treatment to lower and achieve early good control of glycosylated hemoglobin (HbA1c) can lead to good long-term HbA1c control (known as the ‘legacy effect’). Achieving good DM control early in the disease course can reduce DM-induced microvascular complications and may reduce macrovascular complications [3,4]. Tight DM control after a long duration of hyperglycemia has not shown such beneficial results; it may even result in mortality [5–7]. Therefore, achieving early tight HbA1c control through lifestyle changes and the use of medications, including insulin, is important.

Due to the progressive nature of DM, most patients will eventually require insulin [8]. Despite robust evidence of the benefits of early strict HbA1c control, patients often delay insulin initiation and titration. In a UK study, 50% of DM patients delayed insulin

initiation despite suboptimal control for 5 years, regardless of the presence of complications [9]. The reluctance to initiate insulin use [9–11], as well as to its subsequent titration [12], is termed “psychological insulin resistance (PIR)”. The prevalence of PIR was estimated to be higher in Singapore (70.6%) [10] than in Western countries (approximately 20–40%) [11]. A questionnaire study in Hong Kong involving 97 subjects reported a similarly high PIR prevalence of 72.1% [13]. Previous studies conducted in Western countries have identified several factors that can lead to PIR [10–12]. However, the reasons for PIR may differ in Asian countries [14,15]. Recently, a local primary care research group developed a scale (Ch-ASIQ) to identify barriers to insulin initiation in insulin-naïve DM patients [15]. These investigators found that Asian patients may be more affected by the availability of social support and that cultural differences may also play a role. For example, Chinese patients are more likely to combine Western medical treatments with traditional Chinese medicine [16], and they may believe that hypoglycemic agents cause renal toxicity [17].

Depression, a common co-morbid condition among DM patients, is known to worsen clinical outcomes [18–21]. Depression has been shown to affect patient decision-making [17]. Behaviors such as poor drug compliance may be associated with low

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motivation and drive, which are central to the clinical presentation of depression [20,21]. Alternatively, depression may have a direct biological effect through the stimulation of the sympathetic nervous system, increasing inflammatory and platelet aggregation responses [21]. In addition, depression has been shown to correlate with PIR in Western studies with a variance of 3.8% [11] and a correlation factor of 0.2 [19].

This study aimed to estimate the prevalence of PIR in a clinical setting and to examine the relationship between PIR and psychosocial factors, including depression.

Methods

The Research Ethics Committee, Kowloon West Cluster, Hospital Authority approved this research on 25 April 2013.

Participants

Participants were recruited from a government-funded primary care general outpatient clinic in HK from July to September 2013. Patients who fulfilled the following criteria were recruited: (1) diagnosis of type 2 DM as defined by the World Health Organization [22] for ≥ 6 months; (2) age of 30 years or over; (3) Chinese ethnicity; (4) ability to communicate effectively in Cantonese or Mandarin; and (5) the mental capacity to provide informed written consent. The exclusion criteria were severe sensory deficits and severe mental illnesses (dementia, psychosis and mental retardation) or any other health conditions that compromised the patient's ability to comprehend and complete the questionnaire. Potential subjects were sampled from the clinical appointment database using a random method.

The required sample size was calculated from the estimated prevalence rate of PIR in the primary care setting. With a type I error set at 0.05, a power set at 0.80, and an estimated 70% prevalence of PIR among patients with diabetes in public primary care settings [10,13], the required sample size was 312 people. To compensate for the predicted 20% dropout rate, at least 390 patients were needed.

Demographic data, including age, sex, marital status, employment status, education level, family history of insulin use and general attitudes toward insulin use, were also recorded using a standardized questionnaire. Case records were retrieved for HbA1c measures, the presence of diabetic complications, the presence of treatments for depression and the types of diabetic treatments used (oral agents and/or insulin).

Patients were encouraged to complete the questionnaires on their own, as the C-ITAS and PHQ-9 are self-administered instruments. Because the majority of the patients who attend public primary care clinics are of lower socio-economic statuses and education levels, patients who had difficulty completing the questionnaires were assisted by research assistants who were trained by the principal investigator (PI).

Instruments

Insulin Treatment Appraisal Scale (ITAS)

The ITAS is a 20-item instrument that contains 16 negative and 4 positive statements that provide information regarding a patient's appraisal of insulin treatment. Each statement is ranked on a 5-point Likert-type scale. Positive scores are reversed to allow for summation. The total possible score ranges from 0 to 80. A higher score indicates a more negative appraisal of insulin. The ITAS was developed to measure PIR for clinical use [23]. However, there was no cut-off score for diagnosing PIR.

Patient Health Questionnaire-9 (PHQ-9)

Unlike similar studies that used the Center for Epidemiologic Studies Depression Scale (CES-D) [11,19], the PHQ-9 was used in the present study because it is internationally validated and widely used locally. Furthermore, evidence suggests that higher response rates can be obtained for shorter questionnaires such as the PHQ-9 [24], and the PHQ-9 has been used extensively in many research and clinical settings [24,25].

The PHQ-9 questionnaire contains 9 items. Each item is ranked from 0 (not at all) to 3 (nearly every day), and the total possible score ranges from 0 to 27 [20]. The original group that developed the scale suggested cut-off scores of 5, 10, 15, and 20 to represent mild, moderate, moderately severe, and severe depression [20]; at a cutoff score of 10, the questionnaire exhibits high sensitivity and specificity values of approximately 80–90% for identifying depressive disorders, with reference to the Structured Clinical Interview for DSM-IV [24,25].

Analysis

Patients were classified as having PIR if they responded 'strongly unacceptable' or 'unacceptable' to the question, "Will you agree to start or titrate insulin treatment if advised by your case doctor?"

Differences in demographic data, clinical data, and scores on the PHQ-9 and ITAS in patients with and without PIR were detected using the t-test for continuous variables and the chi-square test for categorical variables, with a significance level set at $p < 0.05$. Each ITAS item was dichotomized. The individual ITAS item responses among patients with and without PIR were compared using the chi-square test.

Results

Participants

A total of 399 insulin-naïve DM patients were randomly selected from the clinical database and approached by the research team. Forty-two patients were excluded for the following reasons: 2 because they were incorrectly diagnosed with DM; 27 because they had severely impaired hearing not compensated for with the use of hearing aids; 3 because they only spoke languages other than Cantonese and Mandarin; 8 due to known severe psychiatric illnesses, such as dementia, psychosis and mental retardation; 1 due to leaving at the beginning of the interview when called into the consultation room; and 1 due to submitting an invalid questionnaire (all of the boxes in the questionnaire were checked).

In addition to insulin-naïve DM patients, current insulin users (47 patients) were invited to participate in this study and were interviewed by phone. In the group of patients who used insulin, three subjects were excluded for the following reasons: 1 for not being able to speak Cantonese or Mandarin; 1 who was not in Hong Kong during the interview period; and 1 whose questionnaire was invalidated due to a missing entry for the subject's case number.

The overall response rate was 89.8% (89.6% for the insulin-naïve patients and 90.9% for insulin users). Most respondents had a household income of less than HKD \$10,000 per month (69.1%) and were elderly (mean 67.7, median 69, range 39–91) and female (60.8%). Many responders had a household income of less than HKD \$5000 (40.2%). Most responders had up to a primary school level of education (71%); only 4.9% had an education at the tertiary level or above, and 23.8% had no formal education. The majority of the patients were married (67.7%) and retired (76.6%). Fully 45.3% of the patients had diabetes for more than 10 years; 47.1% had an HbA1c level lower than 7% (53 mmol/mol), and 16% had an HbA1c level higher than 8% (63.9 mmol/mol). Most patients (59.9%) had LDL levels of less than 2.7 mmol/L, and 12.0% had LDL levels equal to or higher

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