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Impact of health literacy on diabetes outcomes: a cross-sectional study from Lahore, Pakistan

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ABSTRACT

Objectives: To evaluate the functional health literacy of patients with type 2 diabetes in Lahore and its impact on glycaemic control.
Study design: A six-month cross-sectional study.
Methods: Health literacy in 204 patients with diabetes was evaluated using a validated questionnaire (Short Test of Functional Health Literacy [s-TOFHLA]).
Results: The frequency distribution among various age groups ($P = 0.003$), education levels ($P = 0.0005$), socio-economic status levels ($P = 0.0005$) and glycated haemoglobin (HbA_{1C}) levels ($P = 0.0005$) differed significantly with health literacy level. The majority of patients with diabetes (86.1%) with poor glycaemic control (HbA_{1C} >9%) had inadequate health literacy and were more likely to have retinopathy (odds ratio = 13.1, $P = 0.003$). Health literacy levels were not significantly different when compared for antidiabetic therapies ($P = 0.234$). Significant associations were observed between predictors of glycaemic control (s-TOFHLA score [$P = 0.0005$], education status [$P = 0.0005$] and disease risks [$P = 0.005$]) and $HbA_{1C,}$ level. However, after adjusting for basic characteristics, only s-TOFHLA score had a significant association with HbA_{1C} level ($P = 0.001$).
Conclusions: These data suggest that inadequate health literacy is potentially associated with poor glycaemic control, and microvascular and macrovascular complications, particularly retinopathy. As such, educational and training programmes should be introduced to improve functional health literacy of patients with diabetes for better glycaemic control.

Introduction

Health literacy (i.e. a constellation of skills required to obtain, process, understand and communicate health-related information to make informed health decisions) has received much attention and is considered a risk factor for poor medication adherence, improper drug usage and adverse outcomes.[1–3] Studies have shown that patients with poor health literacy have difficulties in reading drug labels, dosing schedules, educational brochures related to health, and

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informed consent forms; interpreting self-managed laboratory values; processing oral communication; and conceptualising disease and therapy risks.[4,5] Similarly, low health literacy has been documented as a stronger predictor of a person's health than age, education, socio-economic status and employment status affecting health care and disease management outcomes.[6,7] In this context, poor health literacy is observed more frequently in minority populations, people with English as a second language, elderly people, and people with a low income and poor education.[7,8]

Interestingly, the same populations (i.e. elderly, low income and poorly educated) with low health literacy carry the highest burden of chronic conditions, such as diabetes and hypertension.[5,8] Diabetes is a chronic disease with profound complexity requiring rigorous self-care, education and management, often relying on printed education materials regarding diet and self-care practices complemented by verbal instructions, and therefore requiring advanced health literacy skills.[9] Studies in patients with diabetes have shown that limited health literacy coupled with poor knowledge of the disease is associated with a poorer outcome.[10,11] Similarly, studies have shown that adherence to diet, exercise and pharmacotherapy is pivotal for optimal glucose control in patients with diabetes and is related to patient knowledge about self-care, self-efficacy and self-management of diabetes.[12,13] More precisely, differences in self-care and self-management are associated with inconsistencies in treatment outcomes.[14]

In developing countries, such as Pakistan, where the majority of people have low incomes and do not have easy access to education, health literacy is an unexplored entity, created and refined by the developed world. The literature indicates that the prevalence of diabetes is higher in South Asians compared with Caucasians, and the estimated prevalence of diabetes in Pakistan is 7.1%, placing this in the seventh highest position globally.[15–17] However, to the authors' knowledge, no studies to date have evaluated the association between functional health literacy and diabetes outcomes in Pakistan. Therefore, the authors used Short Test of Functional Health Literacy (s-TOFHLA) to assess the impact of health literacy on glycaemic control of patients with diabetes in Lahore, Pakistan, and estimated the relationships between patient characteristics and glycated haemoglobin (HbA_{1C}) level.

Methods

Ethical approval

Ethical approval for this study was obtained from the Ethics Committee of University College of Pharmacy, University of the Punjab (Reference No. EC/UCP/092/2015) and Hospital Committee of Ethics on Human Research.

Study design

Two hundred and four patients with diabetes were enrolled into this six-month cross-sectional study from hospitals in Lahore, Pakistan. Patients with diabetes of more than 12 months' duration were identified from four tertiary care hospitals based on clinician reports. Type 2 diabetes was defined using the criteria of the American Diabetes Association (i.e. HbA1c level of 6.5% or higher, fasting plasma glucose of 126 mg/dl or higher and random plasma glucose of 200 mg/dl or higher). Data were collected from four tertiary care hospitals: Services Hospital Lahore, Mayo Hospital, Sheikh Zayed Hospital and Nobel Hospital Lahore.

Study population

Potential subjects were identified from the hospital clinical databases. Subjects were screened using the inclusion and exclusion criteria for suitability for inclusion in this study.

Inclusion criteria

All patients with type 2 diabetes (controlled or uncontrolled), older than 30 years, speaking Punjabi, Urdu or English, with or without complications and without any mental health issues were included in the study. As per the database records, the participant should have visited a primary care physician at least once in the six months preceding their enrolment in the study in an attempt to ensure that subjects were routinely and uniformly managed by healthcare professionals.

Exclusion criteria

Participants with end-stage renal disease, blindness, compromised mental health and any health condition that can hinder or interfere with the accurate measurement of health literacy were excluded from the study. In addition, participants who were unable or unwilling to provide informed consent were excluded from the study.

Socio-economic status was classified as follows:

Lower: lived in rural area, informal occupation, no formal education, and annual income of 0–299,999 PKR.

Middle: lived in urban area, early-stage professionals, formal education (college/university), and annual income of 300,000–999,999 PKR.

Upper: lived in urban area, inherited income-generating assets, minimum bachelor's degree from top-tier university or foreign university, a certain lifestyle and annual income of $\geq$1000,000 PKR.

Data collection

Between August 2015 and January 2016, three Pharm D students, adept in data collection and with comprehensive knowledge of the disease and the project, administered the s-TOFHLA to assess the health literacy levels of patients.[18] For Urdu-speaking participants, the English version of the s-TOFHLA (36 items) was translated into Urdu (the national language of Pakistan) by a language qualified exegete and was translated back into English for content verification and to attain concordance in meaning between English and Urdu versions. A pilot study was conducted to estimate the level of concordance by comparing data obtained from both the English and Urdu versions. No major differences were observed in the information obtained from the two versions of the questionnaire, so the data provided have a concordance level exceeding 97%. The s-TOFHLA is administered as a timed reading comprehension test with four multiple choice