Predicting Self-Efficacy in Managing Type 2 Diabetes: Results from a Low-Income, Less Educated Community of Quetta City, Pakistan

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Introduction

Self-efficacy is an individual's belief in their ability to perform a specific task or achieve a desired outcome successfully. Self-efficacy plays a significant role in developing health sensibility in chronic patients. Within this context, low income and lack of education are important social determinants of health, overwhelmingly affecting overall well-being and health outcomes. We therefore conducted this study to establish the self-efficacy profile and identify the predictors of self-efficacy in a low-income, less-educated cohort of diabetes patients in Quetta city, Pakistan.

Methods

A cross-sectional study was conducted among established Type 2 Diabetes patients approaching Sandeman Provincial Hospital, Quetta, from January 2024 to December 2024. In addition to the demographics, the validated Urdu version of the Diabetes Management Self-Efficacy Scale (DMSES) was used to assess diabetes patients' self-efficacy in managing Type 2 Diabetes Mellitus (T2DM). Self-efficacy was measured as proposed by the developers. The chi-square test identified the relationships, and significant associations were interpreted through Cramér's phi where applicable. Binary logistic linear regression was used to highlight the predictors of self-efficacy. For all analyses, $p<0.05$ was considered significant.

Results

In this study, 6951 patients were enrolled. Three thousand and eighty-seven (44.5%) patients were above 47 years of age, and males (58%) dominated the cohort. Fine thousand one hundred and forty-three (74%) patients had uncontrolled blood glucose levels (>199 mg/dl), while 81.5% had HbA1c values > 6.5%. Poor self-efficacy was reported for the entire scale and the five domains of the DMSES (≤ 10). Six out of the twelve (income, education, duration of disease, treatment module, fasting blood sugar, and HbA1c) independent variables were significantly associated with self-efficacy, with a φc of ≤ 0.495. The strongest predictor of self-efficacy reported by the regression model was education, with an odds ratio of 2.250, indicating an increase in self-efficacy to 2.250 times while controlling for all other factors in the model.

Table 1: Demographic and disease-related characteristics of the study respondents (n = 6951)

Characteristics	Frequency	Percentage
Age in years (45.89±6.80)		
28-37	1113	16.0
38-47	2751	39.6
> 47	3087	44.4
Gender		
Male	4032	58.0
Female	2919	42.0
Income in Pakistan Rupees		
Nil	1995	28.7
< 20,000	3276	47.1
> 20,000	1680	24.2
Education		
None	2583	37.1
Primary	1365	19.6
Secondary	3003	43.2
Marital status		
Married	3759	54.1
Single	3192	45.9
Residence		
Urban	2373	34.1
Rural	4578	65.9
Occupation		
None	1554	22.3
Govt employee	1764	25.3
Private employee	2247	32.3
Business	1386	19.9
Duration of Type 2 Diabetes Mellitus		
1-5 years	6111	63.4
> 5 years	840	36.6
Treatment module		
OHA*	1470	55.2
Insulin	3885	28.7
Both	1596	16.1
Family history of Type 2 Diabetes Mellitus		
Yes	4200	71.3
No	2751	28.7

Table 2: Blood glucose and glycated hemoglobin profiles (n = 6951)

Random Blood Glucose*	Frequency	Percentage	Status
< 140 mg/dl	1258	18.1	Normal
140-199 mg/dl	549	7.9	Impaired tolerance
> 199 mg/dl	5143	74.0	Diabetic
Glycated hemoglobin*	Frequency	Percentage	Status
< 5.7%	735	10.6	Normal
5.7 – 6.5%	546	7.8	Prediabetic
> 6.5%	5670	81.5	Diabetic

Table 3: Association between demographic variables and self-efficacy domains

Characteristics	P value				
	Specific Nutrition Factor	General Nutrition Factor	Blood Glucose Control Factor	Physical Activity and Weight Control Factor	Medical Control Factor
Age	0.145	0.258	0.399	0.147	0.544
	Φc = N/A	Φc = N/A	Φc = N/A	Φc = N/A	Φc = N/A
Gender	0.088	0.149	0.577	0.366	0.545
	Φc = N/A	Φc = N/A	Φc = N/A	Φc = N/A	Φc = N/A
Income	0.004**	0.009**	<0.001**	<0.001**	<0.001**
	Φc = 0.452[I]	Φc = 0.320[I]	Φc = 0.400[I]	Φc = 0.388[I]	Φc = 0.390[I]
Education	0.001**	0.005**	0.001**	0.001**	0.002**
	Φc = 0.354[I]	Φc = 0.445[I]	Φc = 0.480[I]	Φc = 390[I]	Φc = 0.400[I]
Marital status	0.256	0.127	0.257	0.077	0.448
	Φc = N/A	Φc = N/A	Φc = N/A	Φc = N/A	Φc = N/A
Residence	0.330	0.450	0.072	0.885	0.288
	Φc = N/A	Φc = N/A	Φc = N/A	Φc = N/A	Φc = N/A
Occupation	0.344	0.412	0.557	0.668	0.214
	Φc = N/A	Φc = N/A	Φc = N/A	Φc = N/A	Φc = N/A
Duration	0.001**	0.001**	0.002**	0.004**	0.001**
	Φc = 0.380[I]	Φc = 0.410[I]	Φc = 0.400[I]	Φc = 0.420[I]	Φc = 0.495[I]
Treatment module	0.004**	0.002**	0.024**	0.012**	0.001**
	Φc = 0.425[I]	Φc = 0.430[I]	Φc = 0.480[I]	Φc = 0.420[I]	Φc = 0.430[I]
HbA1c	0.005**	0.002**	0.007**	0.001**	0.001**
	Φc = 0.395[I]	Φc = 0.405[I]	Φc = 0.410[I]	Φc = 0.390[I]	Φc = 0.405[I]

Predictors of Self-Efficacy

Binary logistic regression was performed to assess the impact of independent factors on self-efficacy. The model contained ten independent variables. The full model containing all the predictors was statistically significant ($p < 0.001$), indicating that the model was able to distinguish between respondents who had good self-efficacy and those who had poor self-efficacy. The model explained between 30.5% (Cox and Snell R square) and 45.8% (Nagelkerke R squared) of the variance in self-efficacy and correctly classified 65% of the cases. The strongest predictor of self- efficacy was education, with an odds ratio of 2.250. This indicated that respondents' improved education can increase self-efficacy by 2.250 times when all other factors are controlled for in the model.

Conclusion

The overall self-efficacy of our study population was low. Significant associations between self-efficacy and various variables were observed; educational status was identified as a predictor of self-efficacy among those. Enhancing self- efficacy through enhanced education must be considered in diabetes management plans. The present study's findings also provide a theoretical basis for governments, public health agencies, and healthcare professionals to develop effective educational-based policies and interventions to improve self-efficacy, which will result in improved disease management.