

Association of Physicians' Empathy with Adherence to Treatment among diabetic patients at King Fahd Hospital, Medina, KSA

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Abstract

Objectives: To describe the level of physicians' empathy from the point of view of diabetic patients and to investigate the association between physicians' empathy from diabetic patients' perspectives with their adherence to treatment and clinical outcome.

Methods: This is an analytical cross-sectional study conducted at the diabetic center at King Fahad Hospital, Madinah, KSA from November 2017 till August 2018. A total of 214 participants with type 2 diabetes mellitus were enrolled in this study. Physicians' empathy was measured by Consultation and Relational Empathy(CARE) questionnaire and patients' adherence to treatment was assessed using Hemoglobin A1c(HbA1c) level as the clinical outcome. Univariate analysis was carried out to investigate the association between physicians' empathy and adherence to treatment and multivariate analysis was performed to investigate the factors independently associated with adherence to treatment.

Result: There is a statistically significant association between physicians' empathy as perceived by the patients and adherence to treatment as assessed by HbA1c level $p=0.004$. Predictors of adherence to treatment were: Physicians' empathy score $p=0.049$, age $p=0.043$, duration of illness $p=0.013$ and associated co-morbidities such as eye diseases $p=0.0001$ and heart diseases $p=0.023$

Conclusion: Type 2 diabetic patient's adherence to treatment as indicated by their HbA1c level is associated with higher physician empathy as perceived by these patients and with a more controllable diabetic status as indicated by their HbA1c level.

Key words: Adherence, Empathy, Type 2 Diabetes mellitus

Introduction

Empathy is defined as a concept involving two domains, which are cognitive and affective, or emotional domains. The cognitive domain includes the ability of understanding another person's thoughts and feelings regarding an inner experience and the ability to see the outside world from the other person's perspective. The affective domain involves the capacity to enter into the experiences and feelings of another person which allows clinicians to better understand the emotions and perspectives of patients about their health condition(1).

Empathic involvement has a crucial role as it lays the foundation stone for a trusting relationship which when it is formed, constraints in communication will diminish, and this in turn will lead to a more accurate diagnosis and greater compliance, which ultimately will result in better quality of care (2).

The management of chronic illnesses such as diabetes involves a combination of interventional activities including education, nutritional therapy, physical activity, and drug therapy. Due to the multidimensionality and complexity of management and the complications associated with the disease, self-care and adherence to the different aspects of the treatment regimen are challenging (3). Medication non-adherence rate in diabetes has been reported to range from 36% to 93% leading to a poor metabolic control that results in complications including hospitalizations, nephropathy, retinopathy, neuropathy, myocardial infarction, and stroke (4). In diabetes care, empathy was found to be associated with objective measures of disease management such as blood sugar control and fewer complications (5).

A positive correlation between physicians' empathy and clinical outcome in the diabetic patient has been reported. Physicians' accurate understanding of their diabetic patients' beliefs about their illness, as an indicator of empathic understanding, was associated with better self-care among patients, e.g., improved diet and increased blood glucose self-testing (6). Another study reported a significant association between a validated measure of physician empathy which is "the Jefferson Scale of Empathy" and patient outcomes in diabetic patients (hemoglobin A1c (HbA1c) < 7.0%, and Low-density lipoprotein (LDL) cholesterol < 100) (7).

The World Health Organization (WHO) defines adherence to long term medication as "the extent to which a person's behavior corresponds with agreed recommendations from a health care provider (8). It is reported that approximately 50% of chronic patients do not take their medications as prescribed for various reasons (9). Studies suggest that the most effective way to improve patient's adherence to long-term medications is by establishing a good relationship with the patient and by expressing empathy (10).

The current research aims to explore the relationship between physicians' empathy and the adherence to medication among diabetic patients, aiming to reduce the gap in knowledge regarding the effect of empathy on long term adherence to treatment in these patients.

Research objectives

1. To describe the level of physicians' empathy from diabetic patients' perspectives.
2. To determine the frequency of adherence to treatment among diabetics.
3. To explore the association between physicians' empathy from the point of view of diabetics and adherence to treatment among diabetics.

Methodology

Study design:

This is an analytical cross-sectional study.

Study Setting and period:

The study was conducted in Medina, KSA, at the Diabetic Center affiliated to King Fahad hospital over the period November 2017 to August 2018.

A pilot study was conducted prior to the current study and its results were used to calculate the sample size and to modify some questions accordingly.

Study participants and sampling method:

Participants were consecutively selected from the list of patients appointed to the diabetic outpatient clinic of the diabetic center at King Fahad hospital during the period of data collection from 12/3/2018 till 1/4/2018. Inclusion criteria included; patient >18 years old who has confirmed diagnosis of type 2 diabetes mellitus. Exclusion criteria included patients with type 1 diabetes mellitus and those younger than 18 years old.

Abbreviation	Explanation
HbA1c	Hemoglobin A1c
LDL	Low-density lipoprotein
WHO	World Health Organization
CARE	Consultation and Relational Empathy
SPSS	Statistical Package for the Social Sciences
OR	Odds Ratio
CI	Confidence Interval

Sampling size:

Sample size was calculated using OpenEpi for sample size calculation for cross sectional studies (11), hypothesizing good diabetes mellitus control (as evident by a HbA1C level of less than 7), thus considered adequately adherent to treatment, among patients viewing their physicians as empathetic. Patients having a physician's empathy score equal to or higher than the 50th percentile were considered as perceiving their physicians as empathetic. According to the pilot study, 33% of patients who view their physicians as empathetic had good diabetes mellitus control, thus were considered adherent to treatment, compared to only 17% of those who view their physicians as less empathetic, at a 95% confidence interval and 80% statistical power. These inputs yielded a sample size of at least 214 participants to be included in the study (12).

Measurements

Explanatory variables

1. Sociodemographic characteristics: age, sex, residence, marital status
2. Disease-related information: duration of diabetes mellitus type 2 since diagnosis, current treatment, presence of complications, etc.
3. Measurement of physicians' empathy: the Consultation and Relational Empathy (CARE) measurement tool was used to measure physician's empathy from the patient's perspective. It is 10-item self-reported questionnaire assessing empathy of physicians during consultation. Respondents' rating of CARE is done using 5 point scales (0 = doesn't apply, 1= poor, 2= fair, 3= good, 4= very good, 5= excellent). Participants having a CARE empathy score equal to or more than the 50th percentile were considered perceiving their physicians as empathetic while those scoring less than the 50th percentile were considered viewing their physicians as non-empathetic(13,14). The CARE questionnaire was translated to Arabic and then back translated to English and was revised by a community medicine consultant to ensure its validity.

Outcome measure

The outcome measure is adherence of diabetic patients to treatment. This was assessed using HbA1c (%) level as last recorded in the participants' files. HbA1C was measured using standard laboratory procedures at King Fahad hospital's laboratories. HbA1c is a marker of glucose level in blood during the last 60 to 90 days (15) and is used in this study as an indicator for patient adherence to treatment in agreement with previous international similar studies(7). Participants were classified according to their HbA1C level into 3 categories; Good control (less than 7.0%), moderate control (7-9%), and poor control (more than 9.0%) (16,17,18). For the purpose of statistical analysis, these groups were collapsed into only 2 groups: Not-controlled (HbA1C \geq 7%) and controlled (HbA1C less than 7%).

Statistical analysis

Data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 21(19). Descriptive statistics were displayed as frequencies and percentages for categorical variables. Measures of central tendencies (the median), and measures and dispersion (minimum – maximum) were used to summarize continuous variables, as the continuous variables were not normally distributed when tested by Shapiro-Wilk test. Univariate analysis was performed to investigate the association between the exposure factors (age, sex, occupation, duration of illness and presence of complications and perceived physician empathy score) with the outcome (compliance to treatment as measured by the level of HbA1c). This was performed using Chi-squared test and Mann-Whitney test. Multivariate analysis to investigate factors independently associated with adherence to treatment was performed using binary logistic regression. P value was set at a significance level of < 0.05 .

Correlations

A correlation test was done to study the strength and direction of relation between HbA1C level and physician's empathy scoring; the test result showed Pearson's r is -0.235 . This means there is a **negative correlation between HbA1C level and physician's empathy scoring (if one variable increased the other variable will decrease)**; the r value 0.235 number is slightly close to 1. For this reason, we can conclude that there is a weak relationship between HbA1C level and physician's empathy scoring.

Descriptive statistics

	Mean	Std. Deviation	N
HbA1C	8.431	1.8936	214
Total score	37.7103	9.96803	214

Correlations			
		HbA1C	Total score
HbA1C	Pearson Correlation	1	-.235**
	Sig. (2-tailed)		.001
	N	214	214
Total score	Pearson Correlation	-.235**	1
	Sig. (2-tailed)	.001	
	N	214	214

Results

In this study, the aim was to investigate the association of physician's empathy from diabetic patients' perspectives with patients' adherence to treatment as indicated by their HbA1C level. In total, 214 participants diagnosed with type 2 DM patients were consecutively recruited from the diabetic center outpatient clinics, during the period from 12\3\2018 to 1\4\2018.

Socio-demographic characteristics, clinical history and physician empathy score of the studied group

Males represented 48.1% of the studied group. Most of the participants were Saudis (93.9%) and living in Medina city (87.9%). The age ranged from 24 years up to 98 years with a median of 60 years. According to marital status of the participants, most of them were married (73.4%) or widowed (13.6%). The majority (81.8%) were diagnosed for a period of ≥ 12 months. As regards treatment, 57.5% were on oral hypoglycemic tablets, 15.9% were on insulin injections and 26.6% were on both. Considering the last HbA1c measurement; 24.3% of patients were considered to be well controlled (HbA1c is less than 7%) 46.3% of patients were moderately controlled (HbA1c is $\geq 7.0\%$ - $\geq 9.0\%$) and 29.4% of patients poorly controlled (HbA1c is $>9.0\%$). The study identified diabetic complications during the last years; eye diseases and hypertension were the most frequent complications at 37.4% and 34.1% of the participants reported them respectively, followed by diabetic foot (17.3%), hyperosmolar hyperglycemic status (14.5%), heart diseases (14%), kidney diseases (9.8%) and hypoglycemic coma (4.7%). The physician empathy score ranged from 16 points up to 50 points with a median score of 40 points. (Table 1).

Physician empathy and factors associated with diabetic patients' adherence to treatment

Table 2 shows a statistically significant association between physician's empathy as perceived by the patients and their

adherence to treatment. Patients adherent to treatment had a higher median perceived physician empathy score compared to those who were non-adherent ($p=0.004$).

As regards other determinants of adherence to treatment, univariate analysis revealed a statistically significant association between adherence to treatment and a longer disease duration of ≥ 12 months as 88.9 % of patients who were non-adherent to treatment had a disease duration of ≥ 12 months compared to 59.6 % of those who were adherent ($p=.000$, Odds Ratio(OR) 0.185; 95% Confidence Interval(CI) = .088 - .387). There was also a statistically significant association between some diabetes mellitus co-morbidities and non-adherence to treatment. The frequency of those who reported having eye diseases ($p=.000$), hypertension ($p=.000$), diabetic foot ($p=.035$), reporting at least one attack of hyperosmolar hyperglycemic state ($p=.001$) as well as having heart disease ($p=.004$) was significantly higher among the non-adherence to treatment group compared to the adherence to treatment group. Age was not significantly associated with adherence to treatment ($p=0.072$) in univariate analysis. Also, there was no statistically significant difference between the 2 comparison groups as regards having kidney diseases ($p=0.096$) as well as reporting at least one attack of hypoglycemic coma ($p=0.280$).

Multivariate analysis revealed the variables independently associated with diabetic patients' adherence to treatment. These are presented in Table 3. A higher physician's empathy score ($p=0.049$, OR 1.050; 95% CI 1.000 – 1.102), age ($p=0.043$, OR 1.045; 95% CI 1.001 – 1.090), disease duration ($p=0.013$, OR 0.284; 95% CI 0.104 – 0.769), eye disease complications ($p=0.000$, OR 0.145; 95% CI 0.052 – 0.404) and heart disease ($p=.000$, OR 0.145; 95% CI 0.052 – 0.404) significantly contributed to the prediction of adherence to treatment.

Table 1: Socio-demographic and clinical characteristics of the participants

Variables		No. (=214)	%
Sex	Male	103	48.1
	Female	111	51.9
Nationality	Saudi	201	93.9
	Non-Saudi	13	6.1
Residence	Medina	188	87.9
	Outside Medina	26	12.1
Marital status	Single	9	4.2
	Married	157	73.4
	Divorcee	19	8.9
	Widowed	29	13.6
Duration of illness	< 12 months	39	18.2%
	≥ 12 months	175	81.8%
Type of treatment	Oral hypoglycemics	123	57.5%
	Insulin injections	34	15.9%
	Both Insulin injections and oral hypoglycemics	57	26.6%
Diabetic status	Good control	52	24.3%
	Moderate control	99	46.3%
	Poor control	63	29.4%
Diabetes complications and associated co-morbidities	Eye complications	80	37.4%
	Hypertension	73	34.1%
	Diabetic foot	37	17.3%
	Hyperosmolar hyperglycemic state	31	14.5%
	Heart diseases	30	14%
	Kidney diseases	21	9.8%
	Hypoglycemic coma	10	4.7%
		Median	Min-Max
HbA1C		8.0	5.5 – 14.0
Age (in years)		60.0	24.0 – 98.0
Physician empathy score		40.0	16.0 – 50.0

Table 2: Determinants of adherence to treatment among the studied group

Variables	Non-adherent to treatment		Adherent to treatment		P
	N (=162)	%	N (=52)	%	
Male sex	78	48.1	25	48.1	.993
Married	118	72.8	39	75	.759
Resident in Medina	141	87	47	90.4	.520
Duration of illness \geq 1 year	144	88.9	31	59.6	.000*
Diabetes mellitus co-morbidities					
1. Eye diseases	72	44.4	8	15.4	.000*
2. Hypertension	66	40.7	7	13.5	.000*
3. Diabetic foot	33	20.4	4	7.7	.035*
4. Hyperosmolar Hyperglycemic status	31	19.1	0	0.0	.001*
5. Heart diseases	29	17.9	1	1.9	.004*
6. Kidney diseases	19	11.7	2	3.8	.096
7. Hypoglycemic coma	9	5.6	1	1.9	.280
	Median (Min-Max)		Median (Min -Max)		P
Age (in years)	55.5 (24.0-98.0)		60.0 (39-88.0)		0.072
Physicians' empathy score	37.0 (16.0-50.0)		44.0 (19.0-50.0)		0.004*

Table 3: Factors independently associated with adherence to treatment among the studied group

Variables	P	Exp (B)	95% CI
Physicians' empathy score	.049*	1.050	(1.000 – 1.102)
Age	.043*	1.045	(1.001 – 1.090)
Sex	.989	1.006	(.444 – 2.276)
Married	.236	.680	(.359 – 1.287)
Resident in Medina	.864	.1127	(.287 – 4.420)
Duration of illness	.013*	.284	(.104 - .769)
Heart diseases	.023*	.083	(.010 - .714)
Eye diseases	.0001*	.145	(.052 - .404)
Hypertension	.073	.346	(.109 – 1.102)
Diabetic foot	.563	.670	(.172 – 2.606)
Kidney diseases	.990	.988	(.154 – 6.332)
Hypoglycemic coma	.118	.147	(.013 – 1.622)

Discussion

This study investigated the level of physician empathy as perceived by diabetes mellitus type 2 patients and its relation to patient adherence to treatment (measured by HbA1C level). Empathy must be seen as a component of the physician's competence. Hojat et al, 2011 surveyed 535 patients by mail, measuring their overall satisfaction with their primary care physicians. A significant association was found between patient satisfaction and physician empathy with a total score of 0.93 (the total score of the survey ranged from 0.85 to 0.96)(20).

The current study showed a statistically significant association between physician empathy in diabetes management and patient adherence to treatment ($p=0.004$) and this finding is consistent with a study done by Hojat et al, 2011 that investigated clinical outcomes of diabetic patients in relation to physician's empathy and reported that patients of physicians with low empathy scores were significantly more likely to have higher levels of HbA1c compared to patients of physicians with high empathy scores ($p < .001$) (7). Another study done by Del Canale et al, 2012 in Parma, Italy, studied the relation between physician's empathy score and the possibility of developing long term complications in type 2 diabetic patients and showed that patients treated by physicians with low to moderate empathy scores had a significantly higher rate of developing diabetes complications compared to patients treated by physicians with higher empathy scores ($p < .05$) (5).

In addition to physician empathy, the present study shows that there are other factors independently associated with patient's adherence to treatment such as the participants' age. According to the National Diabetes Statistics Report in 2017, diabetes is an age-related disease where the percentage of adults with diabetes increased with age, reaching a high of 25.2% among those aged 65 years or older in the United States (21). The American Diabetes Association (ADA) has recommended screening all adults for diabetes mellitus beginning at age 45 years, regardless of weight (22). Berkowitz et al, 2013 showed that the age of diagnosis was associated with HbA1c and that a younger age at diagnosis (those <65 years) is associated with a worse subsequent glycemic control level (p value <0.001)(23). Older patients have characteristics that make glycemic control a difficult process. Geloneze et al, 2014 found that both aging and diabetes affect insulin production and sensitivity (24). The duration of illness was one of the factors independently associated with adherence to treatment in the current study. This is in agreement with a study conducted in Stockholm, Sweden, which reported that HbA1c ≥ 6.5 % was associated with the duration of diabetes ($p < 0.001$) and concluded that long disease duration corresponds to the decline and deterioration in β cell function and subsequent increase in HbA1c (26). Hsieh et al, 2014 found that better glycemic control is achievable in those who were diagnosed later in life with short duration of illness ($p < 0.0001$) while earlier age of

diabetes diagnosis and long duration are associated with increasing HbA1c ($p < 0.0001$)(). Also, Unnikrishnan et al, 2017 showed that individuals with young-onset type 2 diabetes mellitus (age at onset 25 years or below) need to be identified early and treated aggressively so as to prevent or delay complications of diabetes (27).

In this current study, non-adherence to treatment was found to be associated with the presence of some diabetic complications. Several studies reported a relationship between poor glycemic control and diabetic complications. Alduraywish et al, 2015 showed that high prevalence of advanced disease complications reflected poor glycemic control (28). Leasher et al, 2016 reported that from 1990 to 2010, around 0.8 million of 3.9 million had visual impairment due to diabetic retinopathy (29). Hayward et al, 2016 conducted a clinical trial including 1791 participants and showed that good glycemic control will improve cardiovascular outcomes (30). Patel et al, 2008 and Turnbull et al, 2009 showed that a high incidence of hypertension is associated with diabetes mellitus (31,32). On the other hand, there is no significant association between nephropathy and diabetic control in the current study contrary to other studies that showed a strong relationship between nephropathy and diabetes control, for example Huang et al, 2011 and Kayar et al, 2017 showed that there is a significant relationship between poor glycemic control and nephropathy (32,33,34). However, this may be attributed to the low prevalence of kidney complications among the studied group.

In a study conducted by Kayar et al, 2017 in Istanbul, Turkey, to estimate the risk factors of poor glycemic control, 757 patients with type 2 DM were followed for 2 years (2013-2015). It was found that marital status had a significant correlation with glycemic control (p value 0.034)(32). Similarly, in Northern Ireland, United Kingdom, a study was done by Berry E et al, 2018 and followed up 75 couples for 12 months and found that marital status contributed to a well-controlled HbA1c (7%) and that this may be due to support that came from a partner which improved disease related distress (35). On the contrary, in the current study, marital status was not related to a well-controlled HbA1C level as an indicator for adherence to treatment ($P= 0.759$). This difference may be attributed to the long follow-up period in later studies, being prospective studies.

The present study has a design limitation being a cross-sectional one while a longitudinal study design would have been more suitable to establish a causal relationship of physician empathy with HbA1c levels but this was not feasible due to time constraints. On the other hand, the present study's strengths are the 100% response rate by the participants who were approached to share in this study.

Conclusion

The study findings show that type 2 diabetic patient's adherence to treatment as indicated by their HbA1C level is associated with higher physician empathy as perceived by these patients. A higher physician empathy is associated to a more controllable diabetic status as indicated by the HbA1C level and subsequently lower complications. It is recommended to provide healthcare workers with specific training programs on patient communication and effective patient-physician relationship skills to enhance their attitudes and skills concerning empathy with their patients, being an important component of their overall competence. It is also needed to support diabetic patients by awareness programs concerning adherence to treatment and follow-up visits. Physicians' empathy is an area of further research. Replication of this study in multiple hospitals, across different caregiver staff is recommended, thus putting empathy in the domain of evidence-based medicine.

Recommendation

It is recommended to provide healthcare workers with specific training programs on patient communication and effective patient-physician relationship skills to enhance their attitudes and skills concerning empathy with their patients, being an important part of their overall competence.

It is also needed to support diabetic patients through awareness programs concerning adherence to treatment and the importance of follow-up visits. Physicians' empathy is an area of further research work. Replication of this study in multiple hospitals, across different caregiver staff is recommended, thus putting empathy in the domain of evidence-based medicine.

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Ethical considerations

Ethical approval was obtained from the research ethical committee at the faculty of medicine, Taibah University prior to conduction of the study. Administrative approvals were obtained from the authorities at King Fahad Hospital. Informed consent was obtained from the participants. All the study procedures conformed with the declaration of Helsinki on ethical principles for medical research involving human subjects().

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