

Association of Family Function, Demographic and Clinical Characteristics with Glycemic Control among Patients with Type 2 Diabetes Mellitus Seen at Primary Care Clinics in Las Piñas City

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Background and Objective: The family plays an important role in the management of patients with Diabetes Mellitus. In this study, the authors determined the association between family function using the APGAR questionnaire with glycemic control among Type 2 diabetic patients. Association between demographic and clinical characteristics with glycemic control was also assessed.

Methods: This was a cross-sectional study of 237 adults ages 18 years old and above with Type 2 Diabetes Mellitus seen in Healthway clinics in Las Piñas between April 2021 to May 2021. Data from participants were obtained through a self-administered questionnaire and review of recent HbA1c results. The questionnaire contained 3 sections which included sociodemographic and clinical characteristics of the participants, their recent HbA1c result, and Family APGAR score. Multiple logistic regression analysis was done to determine the association of glycemic control with family function, demographic, and clinical factors.

Results: Four variables were noted to be significantly associated with glycemic control- family function ($p < 0.0001$), duration of being diabetic ($p = 0.021$), diabetes regimen ($p = 0.013$), and comorbidity status ($p = 0.021$). Respondents with functional families as evaluated from their Family APGAR scores were 6 times more likely to have good glycemic control (OR 6.204) compared to those with dysfunctional families. Respondents with ≤ 10 years duration of diabetes (OR 4.051) and on both oral and insulin therapy (OR 9.639) are more likely to have good glycemic control. Respondents with comorbidities (OR 0.465) are less likely to achieve good glycemic control.

Conclusion: Family APGAR score, duration of diabetes, type of diabetes regimen, and presence of comorbidities should be highlighted in diabetic management as they may influence glycemic control. This supports the need to include family assessment (especially family function) in the routine care of diabetic patients, and to address family issues which may hinder achievement of glycemic targets.

Key words: Glycemic control, diabetes mellitus, primary care clinics

INTRODUCTION

Practicing family medicine requires a thorough awareness of the biopsychosocial perspectives of patients and their families. Family experiences have a significant impact on a person's development and adjustment. The family, moreover, contains an enormous effect on an individual's convictions and set of values. The Family APGAR has long been used as a tool for assessing family functioning.¹ It is outlined to permit subjective estimation of the family member's satisfaction in a 5-item construct (with each item appraised on a 3-point scale) measuring five builds: "Adaptability," "Partnership," "Growth," "Affection," and "Resolve." Since the Family APGAR comprises only five questions, it is relatively simple and speedy to use; this has made it

the favored choice for assessing family function in essential care and primary care settings.

The presence of a chronic illness is well acknowledged as a source of increased anxiety and stress among family members. Family cohesion, family structure, and intrafamilial relationships may all suffer because of this. Studies have consistently demonstrated that family functioning is a powerful determinant of overall quality of life and well-being in patients with chronic medical conditions. Consequently, family functioning in the sense of chronic diseases is a critical area for study and intervention.

Continuous health-care regimens, which are usually complex and taxing, are required for effective diabetic control.² Social support reliably has been connected to better well-being among patients with

long-term health conditions, which includes diabetes. For people with diabetes, family members and friends are especially valuable sources of support. A huge body of evidence shows the associative impact of social support on health outcomes among patients with diabetes. A study by Griffith et al found that at times of high life stress or dysfunction, more prominent social support is linked to better glycemic control, suggesting that family function may play a role in guiding the effect on glycemic control.³ Adults with diabetes receive 10–14 hours of diabetes management support per week on average from family members.⁴ The role of incorporating the assessment of patients' family functioning into clinical decisions is highlighted by a wide body of research documenting the effect of family functioning on health outcomes. According to Staccini, et al. lower recovery rates and adherence to treatment, as well as longer recovery time, lower quality of life, and a higher chance of relapse and dropout, have all been linked to dysfunctional family functioning.⁵

With the importance of the family, a family physician must be able to detect and evaluate family function as well as create a format for data collection, planning, and evaluation. For physicians to properly involve family members in the care of a patient in crisis, through this research the authors can obtain insight into family interaction and investigate the impacts of family function on health outcomes.

The main objective of this research was to determine the perception of family function using the Family APGAR questionnaire in patients with Type 2 Diabetes Mellitus seen in primary care settings in Las Piñas City and its association with their glycemic control.

METHODS

A cross-sectional analytical study design was employed to investigate the relationship between glycemic control with family function, demographic and clinical characteristics. The study was conducted on adults aged 18 and above with Type 2 Diabetes Mellitus seen at five operational Healthway Clinic branches in Las Piñas City between April to May 2021.

The following are the criteria for inclusion of respondents in the study: patients aged 18 years old and above living in Las Piñas City who came in for a consultation at any of the five operational Las Piñas cluster clinic branches from April to May 2021 and are willing to participate with signed informed consent; patients who had been diagnosed and treated for Type 2 Diabetes Mellitus at least 3 months before the study; patients with available HbA1c result (whether from a printed result or their electronic medical record) after having been treated for at least 3 months. Criteria for exclusion were patients with Type 1 Diabetes Mellitus, gestational diabetes, prediabetic patients, clinically unstable patients, caregiver dependent or those with an urgent or emergent medical concern.

A self-administered survey questionnaire was utilized as a research instrument. The survey questionnaire was composed of 3 sections. Part I was the sociodemographic profile and clinical characteristics of the participants which include age, sex, marital status, educational attainment, occupation, monthly household income, BMI (calculated according to weight in kilograms and height in centimeters), duration of diagnosis of Diabetes Mellitus, type of treatment regimen and if with concomitant comorbidities present. Part II was the determination of the

current blood sugar control of the respondents composed of the recent laboratory result of their HbA1c. Lab results above the target HbA1c of 7% were classified as 'poor glycemic control' and those within or less than the specified targets were classified as 'good glycemic control'. Part III tackled family functioning and was composed of the Family APGAR tool. This is a family assessment tool consisting of 5 parameters: Adaptability, Partnership, Growth, Affection, and Resolve. Satisfaction response to each parameter is weighted on a Likert rating scale ranging from 0 (hardly ever) to 2 (almost always). A score of 0-3 denotes severely dysfunctional family functioning, 4-7 is moderately dysfunctional and 8-10 means a highly functional family.

A total of 237 respondents were analyzed with the level of significance set at 5% (two-tailed) and power set at 80%. A 20% contingency was added to the minimum sample size to account for non-response. The researchers utilized convenience sampling to recruit respondents into the study. Descriptive statistics using frequency distribution were performed for sociodemographic and clinical characteristic values and multiple logistic regression analysis to determine independent significant associations of family function, sociodemographic and other characteristics with glycemic control with a significant p-value at <0.05. Odd-ratios (OR) and 95% confidence intervals (CI) were estimated. IBM SPSS Statistics v21.0 was used for data processing and analysis.

This research was given final approval for implementation after review by Medical Director, Residency Training Chair, Training Officer, Data Privacy Officer and Legal Officer of Healthway. Informed consent was obtained prior to participation in the study. Information regarding the following parameters (among others) were included in the consent: participant anonymity, freedom to refuse and/or withdraw, freedom from coercion, and how information obtained will only be used for research purposes. Responses were encoded, processed, and analyzed accordingly via Google Forms and Google Sheets with restricted access to the researchers. The authors' inclusions limit respondents who cannot afford an HbA1c test. No intervention was administered to the respondents. The study respondents did not receive any remuneration for participation.

RESULTS

A total of 237 participants were included in the study, 112 cases (47%) had good glycemic control and 125 (53%) had poor glycemic control. The following is the distribution of respondents according to family function: 185 (78.1%) were from functional families, 47 (19.8%) were from moderately dysfunctional families, and 5 (2.1%) were from severely dysfunctional families. The total percentage of respondents who are from dysfunctional families is 21.9%.

Table 1 shows the sociodemographic and clinical characteristics of survey respondents. From the 237 respondents in the study, the mean age of the population is 56 years old with a standard deviation of ± 11 . Most of them are females (58.6%) and most of them are married (69.2%). As to their educational attainment, the majority went to college which represents 56.5% of the population. Although with college degrees, most of them are unemployed (49.4%) with a household income of less than 10,000 per month (47.3%).

The clinical characteristics of patients are described in terms of the number of years they have been diabetic, their treatment regimen,

Table 1. Sociodemographic and clinical characteristics of survey respondents (N=237).

Sociodemographic and Clinical characteristics		n	%
Age (Mean, median)	55.76, 56		
Sex	Female	139	58.6
	Male	98	41.4
Civil Status	Single	37	15.6
	Married or Living-In	164	69.2
	Separated or divorced	9	3.8
	Widowed	27	11.4
Educational Attainment	Elementary	13	5.5
	High school	75	31.6
	College	134	56.5
	Masters or Doctorate	6	2.5
	Vocational or no formal schooling	9	3.8
Occupation	Employed	53	22.4
	Self-employed	67	28.3
	Unemployed or retired	117	49.4
Monthly Household Income	Less than Php 10,000	112	47.3
	Php 10,001 - Php 50,000	107	45.1
	Php 50,001 - Php 100,000	16	6.8
	More than Php 100,000	2	0.8
Duration of being Diabetic	>10 years	27	11.4
	≤10 years	210	88.6
Diabetes Regimen	On oral medications only	216	91.1
	On oral medications and insulin	19	8.0
	On insulin therapy only	2	0.8
Comorbidity Status	With comorbidities	148	62.4
	No comorbidities	89	37.6
Body Mass Index	Underweight	2	0.8
	Normal weight	33	13.9
	Overweight	39	16.5
	Obese I	100	42.2
	Obese II	63	26.6

comorbidity status, and body mass index. Respondents mentioned most of them are diabetic for less than or equal to 10 years (88.6%), the majority of which are taking oral medications alone for diabetic control (91.1%). The data also shows that most of them have other comorbidities (62.4%) with hypertension as the leading comorbidity. As the respondents provided their height and weight, BMI was calculated and most of them are Obese I which represent more than 25 to 29.9 BMI (42.2%).

Multiple logistic regression was performed to assess the association of several factors on the respondents' glycemic control. The model contained ten independent variables (family function, sex, marital status, educational attainment, occupation, household income, duration of diabetes, type of diabetes regimen, comorbidity status, and body mass index).

Table 2 provides the regression coefficient (B), the Wald statistic (to test the statistical significance), odds ratio, and confidence interval for variable categories. Four independent variables noted a statistically significant contribution to glycemic control- family function (p<0.0001), duration of being diabetic (p=0.021), diabetes regimen (p=0.013), and comorbidity status (p=0.021). Among these four variables, the diabetes regimen of insulin therapy alone has the highest OR (202.93). This means that patients who are on insulin therapy are more likely to have good glycemic control compared to those on oral medications alone.

Respondents with functional families as evaluated from their Family APGAR scores were 6.204 times more likely to have good

Table 2. Results of multiple regression analyses (N=237).

Characteristics	B	Wald	p-value	OR	95% CI
Family Function (Family APGAR)					
Functional	1.825	15.816	<0.0001*	6.204	(2.52, 15.25)
Dysfunctional					
Diabetes Duration					
≤10 years:	1.399	5.329	0.021*	4.051	(1.235, 13.286)
>10 years					
Diabetes Regimen					
On oral medications only (Reference)	-	-	-	-	-
On oral medications and insulin	2.266	6.102	0.013*	9.639	(1.60, 58.18)
On insulin therapy only	5.313	7.525	0.006*	202.932	(4.55, 9033.93)
Comorbidity Status					
With comorbidities:	-0.765	5.342	0.021*	0.465	(0.24, 0.89)
No comorbidities					

*Significant at 5% level

glycemic control than those with dysfunctional families. Respondents with ≤ 10 years duration of diabetes are 4.051 times more likely to have good glycemic control. With regards to diabetes regimen, patients on both oral and insulin therapy are 9.639 times more likely to achieve good glycemic control than those on oral hypoglycemic agents alone. Lastly, respondents with comorbidities are 54% less likely to achieve good glycemic control compared to those without comorbidities.

DISCUSSIONS

Glycemic management is an important objective in diabetes treatment since it helps to prevent and delay complications of diabetes, lowering morbidity and mortality. The results of the study show that perceived family function as measured by the Family APGAR is significantly associated with glycemic control. This finding is consistent with literature, where family function and quality of health outcomes are highly correlated. Other associated factors with significant association with glycemic control include duration of diabetes, type of diabetes regimen, and comorbidity status.

Association of Family Function and Glycemic control

The findings of this study reveal the significant relationship between perceived family function and good glycemic control. Research by Rismayanti, et al. have found moderate correlation between diabetic patients' quality of life (with HbA1c as indicator) and family function⁷, and this study adds to that evidence. As the Filipino family is considered the most powerful social group, family support is a strong force that will keep people with Type 2 Diabetes attentive and in control of their psychosocial well-being, reducing feelings of inferiority due to physical limits caused by their disease. Cerda, et al. in 2009 explored the increased risk of poorly controlled Type 2 Diabetes among adults from dysfunctional families and determined the strength of this relationship.⁸ Diabetic patients with dysfunctional families have poorer blood sugar management than diabetic individuals with functional families. The quality of a patient's familial ties may have a significant impact on a patient's adherence to a diabetic treatment plan.

Association of Demographics and Glycemic Control

From the results, sociodemographic factors did not reach statistical significance. Other studies have reported contradicting data on the role of sociodemographic factors in glycemic control.^{9,10,11,12}

Association of Health Characteristics and Glycemic Control

The study reveals there is a significant association between diabetes duration, type of diabetes regimen, and the existence of comorbidities towards glycemic control. Longer diabetes duration has been linked to poor glycemic control, presumably due to progressive insulin secretion impairment related to beta cell loss¹³, compounding the negative consequences of insulin resistance. Since type 2 diabetes frequently has a gradual beginning, it is difficult to determine how glycated hemoglobin changes over time. From the study results, oral hypoglycemic agents (OHA) plus insulin or insulin therapy alone are

more likely to have good glycemic control than those on OHA alone. This could be related to OHA therapy failure because of increasing loss of beta-cell function or deterioration of insulin resistance induced by prolonged hyperglycemia¹⁴, as well as the development of medication resistance. Since this is a gradual process, combining OHA therapy with the smallest possible insulin dose may be a rational treatment plan at the intermediate stage of diabetes, when some OHA response is still present. Lastly, the existence of comorbidities is significantly associated with glycemic control probably because the presence of comorbidities in diabetic patients worsens the long-term course of diabetic control.

Limitations

The participants were chosen using convenience sampling so that sample size can be achieved easily and timely, considering the limitations in the number of patients seen at the clinics due to the pandemic. This may have resulted in selection bias due to the lack of random selection. The study did not look at other clinical characteristics that could affect glycemic control (such as medication adherence, the number of oral hypoglycemic drugs being taken, and so on) and factors that could influence HbA1c measurement (such as anemia, hypertriglyceridemia, malnutrition, or chronic liver disease). Limitation of the Family APGAR tool includes being restricted to what respondents are willing to disclose about themselves and their families. The study did not verify being categorized as a dysfunctional family based on other family members' APGAR responses.

CONCLUSION AND RECOMMENDATIONS

Family function based on the Family APGAR score, duration of diabetes, type of diabetes regimen, and comorbidity status is significantly associated with glycemic control. The findings highlight the necessity of undertaking family screenings, with a focus on family functioning, to identify diabetic individuals at risk for poor glycemic control. This study identifies a need for tailored approaches and strategies in diabetes care detailing family support and associated factors in achieving the intended glycemic target for diabetic patients.

Given ample time, doing random selection will decrease selection bias. The sample size can still be increased in future studies to validate the results of this research. Although possible confounders were already controlled by using logistic regression, future researchers should look at other clinical variables that could affect glycemic control. All data was gathered using the Family APGAR and the delivery of a survey at a specific point in time. Family function as observed thru Family APGAR scores can change over time. Future studies can verify if a change in APGAR scores and family function also affects glycemic control. It would also be better to include other family members which are living in the same household in assessing dysfunctional families.

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