

The Role Of Family Functions On The Quality Of Life Of Type 2 Diabetes Mellitus Patients In Primary Service Facilities Of PUSKESMAS Medan Johor

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Abstract.

The global focus on non-communicable diseases (NCDs) has been growing, particularly chronic degenerative diseases such as Diabetes Mellitus (DM), which is now a serious threat to public health worldwide. According to WHO data from 2008, these diseases account for 55% of total deaths in Southeast Asia. In Indonesia, the prevalence of type 2 DM has significantly increased, with over 10 million sufferers aged 20-79 years in 2017, making it a significant health management challenge. To address this, BPJS Health launched the Chronic Disease Management Program (Prolanis) to optimize patients' quality of life while maintaining healthcare cost efficiency. Families play a crucial role in supporting DM patients in managing their disease effectively, socially, and in healthcare. This study aims to analyze the relationship between family functioning and the quality of life of type 2 DM patients at the Medan Johor Public Health Center (Puskesmas). Using a cross-sectional study design, data were collected through the WHOQOL-BREF questionnaire to measure quality of life and the Family APGAR questionnaire to assess family functioning. The results showed that most respondents were women, had a high school education, and had been suffering from type 2 DM for less than 10 years. Most family functions were classified as highly functional. Still, no significant relationship was found between APGAR scores and quality of life in the four domains (physical health, psychological, social relationships, and environment).

Keywords: Type 2 Diabetes Mellitus, quality of life; APGAR; WHOQOL-BREF and Prolanis.

I. INTRODUCTION

Non-communicable diseases (NCDs) are becoming more common worldwide, raising global attention on them. Chronic degenerative diseases account for 55% of Southeast Asian mortality, according to 2008 WHO data. The rising prevalence of degenerative illnesses increases morbidity, death, and impairment in society and may raise health expenses due to comorbidities. As a precaution against rising health costs, BPJS Kesehatan launched Prolanis, the Chronic Disease Management Program. An integrated proactive health service system was established at the Primary Health Facility (FKTP) level. Prolanis aims to improve patients' quality of life while rationalizing healthcare expenses. This program aims to prevent chronic illness by enhancing the quality of life [1], [2]. Global health is threatened by diabetes mellitus (DM). Half of the illness load causes 70% of global fatalities, according to the 2016 WHO data. Most of the 90-95% are type II DM, which can be prevented with healthy lifestyle choices. Indonesia also struggles with DM. The International Diabetes Federation (IDF) Atlas 2017 reveals Indonesia's diabetes epidemic is growing. With 10.3 million diabetics aged 20–79, this country ranks 6th globally after China, India, the US, Brazil, and Mexico (Haiya & Ardian, 2020). The 10th edition of the IDF Atlas estimates 19,465,100 Indonesian adults aged 20–79 with diabetes. Diabetes is 10.6% in the 20-79 age range, based on the 179,720,500 adult population. Thus, 1 in 9 20-79-year-olds has diabetes [3]. When one family member is hurting, the other members help and support them. One way this manifests is in how one treats and accepts family members going through tough times. A person's family is there for them when they need them, whether those needs are health-related or not.

When help is required, family members know they can count on one another. When one family member is having trouble, the rest help. A family can be defined as a collection of people who are related to one another via marriage, adoption, or blood relations. They share a home and are constantly interacting with one another. When family members behave, think, and accept one another, the family can function [4]. Friedman's five basic family functions are affective, social, health care, reproductive, and economic. In family life, each of these roles is crucial to the health and happiness of everyone involved. According to a

2018 study by Oktowaty and colleagues, family roles are vital in enhancing the quality of life of patients with chronic degenerative diseases at primary health institutions [2]. In addition, with a focus on stroke patients receiving treatment at the medical rehabilitation unit of Dr. Iskak Hospital in Tulungagung, a study by Setyoadi highlighted the association between family support and the level of patient independence [5]. The importance of family support on self-efficacy in older adults with type 2 diabetes mellitus was previously discussed by Ramadhani. According to Ramadhani et al. (2016), gender is one of the demographic variables that can impact the level of self-efficacy in this particular patient group [6]. Successful disease management is essential for managing problems resulting from type 2 diabetes mellitus. Many diabetics report feeling a great deal of stress as a result of their disease. According to Lambrinou, who stated this in a 2019 study, managing diabetes requires a complex process of lifestyle adaptation, which includes implementing customized meal plans, physical activity routines, and medication intake compliance [7].

Patients, particularly those without sufficient family support, may feel overwhelmed by its intricacy. Indeed, there is strong evidence that family engagement can impact diabetes patients' actions. According to Elliott (2018), family traditions and cultural norms can significantly motivate individuals with diabetes to make positive behavioral adjustments [8]. The majority of people who suffer from type 2 diabetes mellitus often feel gloomy regarding their chances of getting well. This sense of acceptance of one's health problems frequently leads to a marked decline in quality of life, as shown in Jing's 2018 study [9]. Low quality of life, according to Almasri in 2020, might lead to a mindset of giving up on the disease, shorten life expectancy, and make diabetes management more difficult. Patients' already difficult situations are made worse when they do not have the support of their loved ones [10]. Because of the absence of encouragement and support from those around, the desire to attain the best possible therapy is diminished. In a study conducted in 2022, Yuliastuti reiterated that the involvement of family members has the most significant impact on diabetes patients' ability to self-care. According to Yuliastuti, one of the most important ways to improve diabetes care and control is for families to participate actively [11]. Corales and Medina, two Filipino researchers, came up with a novel evaluation instrument to gauge the functioning of families dealing with cancer in children in 2011. This tool is an amalgamation of two other surveys that were already in existence. Panganiban-Corales and Medina merged the Family APGAR and the SCREEM questionnaires, the former looking at internal and external factors. In light of the foregoing, research into the connection between family function and quality of life among patients with type 2 diabetes mellitus at the Medan Johor Health Center's primary care facility is required [12].

II. METHODS

Utilizing a cross-sectional methodology, this study employs an analytical observational approach. This study used the WHOQOL-BREF questionnaire and the family APGAR, which have been validated, to gather data [13]. Quality of life was measured using the WHOQOL-BREF, while family functioning was assessed using the family APGAR. It can be interpreted as a variable that varies [14]. So the APGAR category is used to measure DM patients. The two instruments were selected due to their demonstrated validity in multiple prior investigations. Without the necessity for longitudinal observations, researchers can analyze the relationship between the variables investigated by collecting data at a given point in time using a cross-sectional approach. Patients of the PUSKESMAS Medan City, located at Padang Bulan, Kampung Baru, and Teladan, were eligible to participate in this study if they agreed to fill out the questionnaire between August and September of 2024. It is believed that the research sample, a subset of the population under investigation, is representative of the whole.

III. RESULT AND DISCUSSION

Univariate Analysis

The univariate analysis of respondent characteristics included 70 participants who matched the inclusion criteria for this study. The participants were DMT2 patients who received treatment at the PUSKESMAS Medan Johor.

Table 1. Characteristics of the Frequency Distribution of DMT2 Patients

Characteristic		APGAR Category				Total
		High		Moderate		
		(n)	%	(n)	%	
Gender	Male	23	95,8	1	4,2	24
	Female	43	93,5	3	6,5	46
Education	High School	44	95,7	2	4,3	46
	Bachelor	22	91,7	2	8,3	24
Duration	<10 years	52	95,5	3	5,5	55
	>10 years	14	93,3	1	6,7	15
DM Family History	Yes	18	100	0	0	18
	No	48	92,3	4	7,7	52
Currently Working	Yes	33	94,3	2	5,7	35
	No	33	94,3	2	5,7	35
Marital Status	Married	2	100,0	0	0	2
	Unmarried	64	94,1	4	5,9	68
Income	Income	36	94,7	2	5,3	38
	No income	30	93,7	2	6,3	32
Body Mass Index	Low	2	100	0	0	2
	Normal	20	95,2	1	4,8	21
	Risk of DM	14	87,5	2	12,5	16
	Obesity I	18	94,7	1	5,3	19
	Obesity II	12	100	0	0	12

Note: High (Highly Functional), Moderate (Moderately Dysfunctional)

Bivariate Analysis

The bivariate analysis results show the relationship between APGAR score and WHOQL-Brief Quality of Life domains 1, 2, 3, and 4 (physical health) in patients with Type 2 diabetes mellitus (T2DM) who received treatment at the primary PUSKESMAS of Medan Johor.

Table 2. Relationship between APGAR Score and Quality of Life Domain (WHOQL-Brief) in DMT2 patients

Physical Health	Status	APGAR Characteristic								p-Value
		Enough		Good		Very Good		Total		
		n	%	n	%	n	%	n	%	
Domain 1	H	9	13,6	44	66,7	13	19,7	66	100	0,558
	M	1	25,0	3	75,0	0	0,0	4	100	
Domain 2	H	5	7,6	40	60,6	21	31,8	66	100	0,481
	M	1	25,0	2	50,0	1	25,0	4	100	
Domain 3	H	5	7,6	50	75,8	11	16,7	66	100	0,367
	M	1	25,0	3	75,0	0	0,0	4	100	
Domain 4	H	7	10,6	41	62,1	18	2,3	66	100	0,558
	M	1	25,0	2	50,0	1	25,0	4	100	

Note: H (Highly Functional), M (Moderately Dysfunctional)

Discussion

1. Analysis of the relationship between gender and APGAR scores in DMT2 patients who received treatment at the primary PUSKESMAS in Medan Johor

Table 1 shows that research found that while a tiny percentage of families with DMT2 patients experienced mild dysfunction, most families had highly functional family functions (>90%). While 4.2% of males and 6.5% of women experience moderate dysfunction, the former group is slightly higher. According to the statistics, patients receiving DMT2 at the Medan Johor PUSKESMAS tend to have supportive loved ones. These findings demonstrate that most DMT2 patients treated at the Medan Johor PUSKESMAS have excellent family function. Because having loved ones there is crucial when dealing with long-term health issues, this is encouraging news for those dealing with DMT2. When it comes to managing the health of people with Type 2 Diabetes Mellitus (DM), the engagement and support of family members are crucial.

Family members can better adjust to their health situations if optimal family function is maintained throughout the disease's progression [11], [15]. Type 2 diabetes mellitus (T2DM) is influenced by social and demographic characteristics, including gender, age, and degree of education, according to recent research (Purnama et al., 2023). Consistent with the idea that women are more likely to develop type 2 DM, this study found that female patients constituted the majority of the participants. The two primary causes are hormonal changes that might impact glucose metabolism, and women tend to have a higher body mass index (Mirza et al., 2020).

2. Analysis of the relationship between education and APGAR scores in DMT2 patients who received treatment at the primary PUSKESMAS in Medan Johor

Table 1 shows that 65.7% of those who participated in the survey had completed high school. The proportion of "very functional" graduates was high (>90%) among both high school and college graduates. The proportion of persons with moderate dysfunction varied little between the two groups; specifically, 4.3% of high school graduates and 8.3% of college graduates. It is worth noting that there was a marginally higher prevalence of mild dysfunction among college graduates. According to this study, there was no statistically significant relationship between education level and family function. However, family function was considerably improved (>90%) in both educational groups. These results suggest that all levels of education can achieve good family function. There is evidence that teaching people with type 2 diabetes mellitus how to self-manage their condition is a beneficial strategy, which agrees with the findings of Ernawati's research [16].

3. Analysis of the relationship between Duration of Suffering and APGAR scores in DMT2 patients who received treatment at the primary PUSKESMAS in Medan Johor

The majority of respondents (78.6%) suffered from T2DM for fewer than 10 years, according to the study results in Table 1. A large percentage of both time groups were classified as "very functional" (>93%). The rate of moderate dysfunction varies minimally, specifically 5.5% in duration <10 years and 6.7% in duration ≥ 10 years. Our findings also disprove the hypothesis that there is a correlation between the length of time a person has been sick with T2DM and changes in family dynamics. No matter how long the illness lasts, family function is excellent. So, even though the length of the disease varies, family support is constant. This finding is encouraging because it demonstrates the durability of family function across time. The data analysis revealed that the majority of respondents had encountered Type II Diabetes Mellitus (DM) for less than ten years. Since DMT2 is a degenerative disorder that often follows patients for a very long time, a time frame of less than ten years is nevertheless seen as a minor stage in the progression of this illness. The control of blood glucose levels is an essential part of diabetes management. Previous studies have shown that having family support helps diabetics control their blood sugar levels. When this is the case, family members are there to lend a helping hand to those dealing with the disease [17].

4. Analysis of the relationship between Family History of DMT2 and APGAR scores in DMT2 patients who received treatment at the primary PUSKESMAS in Medan Johor

Table 1 shows that most people who took the survey did not have a history of DMT2 in their family (74.3%). All patients with a DMT2 family history had a very functional family function, which is an intriguing finding in our study. While 92.3% of the group without a DMT2 family history still has excellent function, 7.7% of that group has moderate dysfunction. This study's findings also reveal an intriguing variation in family function across the two categories. Optimal family function is more common in families where DMT2 has been detected. Possible causes include familiarity with DMT2 symptoms and their treatment from caring for loved ones with the disorder, increased understanding of the disease, and preparedness for coping with DMT2 disorders within the family. Consistent with Ernawati's findings and Sastrika's findings, fewer people will suffer from diabetes mellitus if more people are educated about how to prevent and manage the disease [16], [17].

5. Analysis of the relationship between Working and APGAR scores in DMT2 patients who received treatment at the primary PUSKESMAS in Medan Johor

According to the study's findings in Table 1, there is an equal proportion of patients between those who work and those who do not. Very functional (94.3% of the time) and moderately dysfunctional (5.7%)

are the percentages of APGAR categories that are the same for the two groups. Regarding family function, there is no distinction according to employment level. In DMT2 patients, family function is unaffected by employment status. Both groups demonstrated excellent family function. This proves that family support is constant irrespective of one's employment status, that family function is independent of one's employment status, and that the capacity of families to support DMT2 patients is unaffected by one's employment status.

6. Analysis of the relationship between Married and APGAR scores in DMT2 patients who received treatment at the primary PUSKESMAS in Medan Johor

According to the study's results in Table 1, most extremely dominating patients are married (97.1%). The "very functional" category had a high percentage in both the married group (94.1%) and the single/unmarried group (100%). Among all groups, only those who were married had moderate dysfunctional instances (5.9%). The study found no statistically significant variation in family function according to marital status. Due to the highly imbalanced number of samples, statistical comparisons were rendered less meaningful. Both groups maintained a high level of family function.

7. Analysis of the relationship between Income and APGAR scores in DMT2 patients who received treatment at the primary PUSKESMAS in Medan Johor

The study's findings in Table 1 show that the distribution of patients is fairly even amongst those with and without money. In the income group, 94.7% of patients and in the non-income group, 93.8% fell into the "very functional" category. There is a tiny difference in the percentage of patients with moderate dysfunction between those with and without income: 5.3% and 6.3%, respectively. This study found no statistically significant difference in family function according to income level. Family function is excellent in both groups. The results show that family support is independent of income level, that family function is optimal in all economic situations, and that family support for DMT2 patients is not significantly affected by family income level.

8. Analysis of the relationship between Body Mass Index and APGAR scores in DMT2 patients who received treatment at the primary PUSKESMAS in Medan Johor

According to the study data in Table 1, most patients had a BMI above normal (67.1%). All body mass index categories had a high percentage of "very functional" people. Moderate dysfunction was most prevalent among those at risk for obesity (12.5%). Obesity II and a body mass index (BMI) below 30 demonstrated optimal familial functioning. This study failed to find a correlation between body mass index and family functioning. Regardless of body mass index (BMI), family function was excellent (>87%), and moderate dysfunction was present in a small but consistent percentage.

9. Analysis of the Relationship between APGAR Score and Quality of Life Domain 1 (WHOQL-Brief) in DMT2 patients who received treatment at primary care services PUSKESMAS in Medan Johor.

Table 2 shows that the study found no statistically significant link between the APGAR score and the physical health domain quality of life ($p_value = 0.558, > 0.05$). Both groups of patients have what is considered a "good" quality of life according to the APGAR scale. Patients reporting a "excellent" quality of life are only in the highly functional group. Among those with moderate dysfunction, a more significant proportion reported a "fair" quality of life. The highly functional group generally has a better quality of life distribution. Even though it's not statistically significant, there are some interesting patterns. One of them is that an "excellent" quality of life can be achieved with excellent family function. On the other hand, the moderately dysfunctional group does not achieve an "excellent" quality of life. Lastly, most patients have a "good" quality of life regardless of family function. According to Friedman, family support can be categorized as attitude, action, appraisal, emotional, and instrumental. Family support can benefit patients' mental and physical health [4].

This agrees with Suardana's study at the South Denpasar PUSKESMAS, which included 40 participants, suggesting that family support can enhance one's quality of life [18]. Family support for people with diabetes mellitus involves more than just meeting material needs; it also consists of attending to emotional and mental well-being and understanding the disease, as stated by Cobb and Jones [19]. The remark is backed by research conducted by Tamara at the Arifin Achmad Hospital in Riau Province. The

study found a relationship between family support and quality of life, as indicated by a p-value of $0.030 < 0.05$ [20]. In light of this, it is essential to inform the patient's loved ones about diabetes mellitus and its symptoms. Remind them to monitor the patient's food, lifestyle, medication schedule, and foot care, and teach them about the dangers of the disease and the significance of early detection through monitoring blood sugar levels. Lastly, make sure they know how important it is to pay attention to the support of every family member to improve the patient's condition. According to Ulfani research, people with type II diabetes mellitus might find psychological and practical motivation and impetus from their families' support for their quality of life [21].

10. Analysis of the Relationship between APGAR Score and Quality of Life Domain 2 (WHOQL-Brief) in DMT2 patients who received treatment at primary care services PUSKESMAS in Medan Johor

There is no statistically significant link between the APGAR score and the psychological domain quality of life, according to the study results in Table 2, where the p-value is $0.481 (> 0.05)$. Both groups of patients have what is considered a "good" quality of life according to the APGAR scale. The proportion of people reporting an "excellent" quality of life is higher in the highly functional group. Among those with moderate dysfunction, a more significant proportion reported a "fair" quality of life. Within the moderately dysfunctional group, there is a more uniform distribution of psychological quality of life.

Individuals with high levels of family functioning often report higher levels of psychological well-being. Both APGAR groups rated psychological quality of life as "very good." A smaller proportion of people in the very functional category report a "fair" quality of life. A more excellent positive distribution is observed in the psychological domain compared to the physical health domain. According to Bao's study, positive views of family support significantly impact patients' well-being. Interventions that foster mental resilience can greatly enhance patients' physical and emotional well-being and ability to self-manage their diabetes [22]. Additionally, research conducted by Nurasiah suggests that families dealing with illness can benefit from assessment/appreciation support, a type of family emotional function [23].

11. Analysis of the Relationship between APGAR Score and Quality of Life Domain 3 (WHOQL-Brief) in DMT2 patients who received treatment at primary care services PUSKESMAS in Medan Johor.

Table 2 displays the study's results, which show a p-value of $0.367 (> 0.05)$. This means that the APGAR score is not significantly related to the social connection quality of life. Both groups had nearly the same proportion of "good" quality of life ($\pm 75\%$), which is highly dominant. "Excellent" quality of life is only reported by patients in the highly functional group. The moderately dysfunctional group had a higher percentage of people reporting a "sufficient" quality of life. In general, the distribution is more positive in the highly functional group. Having "excellent" social ties is possible when families are functioning well. No matter the role of family in a patient's life, most have "good" quality social ties. A higher standard of social relations is often linked to a more functional household. The "good" category is more prevalent in social relationships than in other domains. A better quality of life is associated with a patient's improved family role (Saudah et al., 2019). For people with type 2 diabetes mellitus to feel more confident in their ability to manage their condition, they need the support of their families. As a result, more people will feel motivated to take their diabetes medication [24].

Family support is a crucial part of managing diabetes therapy. Proper and consistent self-care management ensures that patients do not let diabetes weigh them down and may continue to enjoy their everyday activities without fear. According to Nuraisyah's research, this will affect the standard of living for individuals with good DM [23]. The efficiency of managing diabetes mellitus (DM) is predicted by the quality of family engagement in caring for patients with this disease. The impact of family members on patients' ability to self-manage and enhance their quality of life is substantial in research [25]. According to Yamin and Sari (2018), families play a crucial role in the health of diabetes mellitus (DM) patients. They help care for and control the disease, provide moral support and motivation, make patients feel valued and included in the family, and set a good example for successful DM management [26]. The impact on DM patients' quality of life reflects the importance of family involvement. Patients with the full backing of their

loved ones are likely to stick to their treatment plans. Research also shows that patients whose families are actively involved in their care are more likely to successfully shift to healthier habits than those whose families are less involved.

12. Analysis of the Relationship between APGAR Score and Quality of Life Domain 4 (WHOQL-Brief) in DMT2 patients who received treatment at primary care services PUSKESMAS in Medan Johor

This study found no statistically significant link between the APGAR score and the environmental domain quality of life ($p\text{-value} = 0.677, > 0.05$), as shown in Table 1. The vast majority of patients in both categories report a "good" standard of living. Nearly identical percentages ($\pm 25\text{-}27\%$), indicating a "very good" quality of life, are seen in both groups. The moderately dysfunctional group had a higher percentage of people reporting a "sufficient" quality of life. Compared to other domains, the distribution of quality of life in the environmental domain is more uniform. This study's findings show that both APGAR groups can attain an "excellent" environmental quality of life. There is a correlation between a high percentage of "good" quality of life and highly functional families. In terms of the environment, there is less of a gap between the two APGAR categories. Family function has a minor impact on the environmental quality of life compared to other domains.

As stated by Smeltzer in 2010 in the book "Handbook for Brunner & Suddarth's Textbook of Medical-Surgical Nursing", DM2 is a chronic disease and requires years of treatment. Standards of care for patients with diabetes mellitus include diet management, activity, medication, and glycemic control [27]. Research has shown that patients have a hard time receiving treatment on their own. Therefore, they require support from various sources, including their families. Patients with diabetes mellitus who receive their care at home often receive assistance from loved ones. Patients are more likely to comply with their home care plans when they have the support of their families. Help with food, health care, finances, attention, problem solving, medicine, and monitoring blood glucose levels are all things that people with diabetes mellitus require at home. Patients with diabetes mellitus benefit from the behavioral and emotional support they receive from their relatives. There is a strong correlation between the family's health status and the process within it. Everyone in the family plays an important role, from providing for the family's financial needs to taking care of the home and children, from interacting with others to promoting gender roles, and from nurturing to providing therapeutic care. Each family member adapts and solves difficulties uniquely, depending on the family's developmental conditions. One such problem is health concerns.

IV. CONCLUSION

The study found that most families with Type 2 Diabetes Mellitus (DMT2) patients have highly functional family functions ($>90\%$), with supportive loved ones playing a crucial role in managing their condition. The study also found that female patients are more likely to develop DMT2 due to hormonal changes and higher body mass index. The majority of respondents (78.6%) had experienced T2DM for less than 10 years, with a large percentage of both time groups classified as "very functional" ($>93\%$). The study also revealed that family support is constant regardless of employment status, demonstrating the durability of family function across time. The study suggests that more people should be educated about DMT2 prevention and management, and that family function is independent of one's employment status. The study found that most patients with diabetes mellitus are married (97.1%), with a high percentage of "very functional" individuals in both the married and single/unmarried groups. Family function was excellent in both groups, regardless of income level. The study also found no significant difference in family function according to BMI, with 67.1% of patients having a BMI above normal.

Family support for patients with diabetes mellitus involves more than just meeting material needs; it also consists of attending to emotional and mental well-being and understanding the disease. Both highly functional and moderately dysfunctional patients reported a "good" quality of life, with a more positive distribution in the psychological domain. Positive views of family support significantly impact patients' well-being, and interventions that foster mental resilience can greatly enhance their physical and emotional well-being and self-management of diabetes. The study found no significant link between the APGAR score and

the social connection quality of life for patients with type 2 diabetes mellitus (DM). Both groups had nearly the same proportion of "good" quality of life ($\pm 75\%$), with "excellent" quality of life only reported by patients in the highly functional group. Family support is crucial for managing diabetes therapy and maintaining a healthy lifestyle. The study also found no statistically significant link between the APGAR score and the environmental domain quality of life. Both APGAR groups can attain an "excellent" ecological quality of life, with a correlation between a high percentage of "good" quality of life and highly functional families. Studies have shown that health care providers in Medan City would benefit from regularly surveying their patients to gauge their level of satisfaction with the services they receive. This would help them fine-tune their offerings to meet the needs of all their patients, but particularly those with diabetes [28].

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