

A study to assess the impact of glycemic profile on quality of life among type II diabetic mellitus patients in outpatient department of selected hospital, Kolkata, West Bengal

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Abstract:

Background: Diabetes mellitus is a chronic multisystem condition characterised by hyperglycaemia combined with abnormal development of insulin, decreased use of insulin, or both. Now a days, India plays a unique role in the diabetes picture of the world. The aim of the study was assessing the impact of glycemic profile on quality of life among type II Diabetes Mellitus patients attending out patient department of Apollo Gleneagles Hospital, Kolkata.

Materials and Methods: Quantitative approach was adopted with descriptive survey design for this study. The number of participants were 200 type II diabetes mellitus patients selected by nonprobability sampling technique. Data regarding background information was collected from semi-structured questionnaire and value of HbA1c, FBS and PPBS were collected from medical record. Quality of life was assessed using Likert scale on quality of life.

Results: The data were analysed by using descriptive and inferential statistics. Result of the study showed that majority of participants had HbA1c more than 6.5. The mean score of FBS and PPBS were 143.58 ± 49.94 and $212.83.58 \pm 83.58$ respectively. There was association between quality of life and glycaemic profile. The study also showed that association between quality of life and some selected demographic variables i.e., age and occupation.

Conclusion: The present study can be concluded on the basis of the result that the majority of the diabetic patients showed an average quality of life. In this research, the glycaemic profile, age, and occupation were all found to be associated with quality of life. It can be concluded that the better controlled glycaemic profile showed better quality of life.

Key Word: Glycemic Profile, Quality of life, Impact, Diabetes mellitus patients

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I. Introduction

Diabetes mellitus is a chronic, progressive disease that causes hyperglycaemia due to the body's inability to metabolize carbohydrates, fats, and proteins. Diabetes mellitus is sometimes referred to as "high sugars" by both clients and health care providers. The idea of associating glucose with diabetes mellitus is appropriate because of passing of large amounts of urine laced with glucose is specificities of poorly controlled diabetes mellitus. In homeostasis, glycemia is one of the most critical parameters, as glucose is needed to provide the metabolic energy required for many cell functions. The life of every diabetic patient is special, and they feel mentally exhausted by the various laws that the illness imposes upon them. Therefore, assessing patients' quality of life (QoL) is important because each person has his or her own individualized view of their physical, emotional, and social well-being, which includes satisfaction with the cognitive dimension as well as emotional component happiness. [1] Attention to patients' Quality of Life is growing today, rather than the survival of the patient. Therefore, the quality of life of patients with diabetes should be protected as it can aggravate metabolic disorders. There is a growing knowledge that patient satisfaction with Quality of Life and care has been increased despite good glycaemic control. Type 2 DM patient blood sugar levels need to be tested to achieve a better quality of life. Another glycemic parameter that is frequently used as a diagnostic test for long-term glycemic regulation is haemoglobin glycosylated. Glycosylated hemoglobin is a long-term indicator of glycaemic profile. Several studies have shown that patients with type 2 diabetes who receive regular treatment and maintain glycemic control have a higher quality of life. [2]

II. Material And Methods

This descriptive survey study was carried out among 200 type II diabetes mellitus patients attending outpatient Endocrinology and Diabetology department of Apollo Gleneagles Hospitals, Kolkata to assess impact of glycemic profile on quality of life.

Study Design: Descriptive survey research design

Study Location: Endocrinology and Diabetology outpatient department of Apollo Gleneagles Hospitals, Kolkata

Study Duration: 4th January, 2021 to 30th January, 2021

Sample size: 200 type II diabetes mellitus patients

Subjects & selection method:

The subjects were patients with type II diabetic mellitus who attended endocrinology and diabetology outpatient department of Apollo Gleneagles hospitals, Kolkata. A nonprobability purposive sampling technique was used for selection of participants who met the inclusion and exclusion criteria.

Inclusion criteria:

- Both adult male and female patients with type II diabetes mellitus.
- Patients with type II diabetes mellitus whose Fasting Blood Sugar and Post Prandial Blood Sugar report were within 1 month back from the day of data collection.
- Patients with type II diabetes mellitus whose glycosylated haemoglobin (HbA1c) report were within 3 months back from the day of data collection.
- Patients, who were diagnosed type II Diabetes Mellitus more than 6 months.
- Patients with type II diabetic mellitus, who could read and write Bengali/ English/Hindi.

Exclusion criteria:

- Patients with type II diabetes mellitus, who were illiterate.
- Patients with type II diabetes mellitus, who were on steroids.
- Patients with chronic liver disease.
- Patients with type II diabetes mellitus, who were physically challenged.

Procedure methodology

Prior the final data collection, clearance from Institutional Ethics Committee, Apollo Gleneagles Hospital, Kolkata, was taken. Self-introduction was given to the patient and the study purpose was explained. Written informed consents were obtained from the participants. Participants were informed and explained regarding data collection tools. Each day the duration of data collection was 8 hours. The background information of the sample was collected by using questionnaire on background information by paper-pencil method. It consisted of two parts. Glycemic profile value was collected by record analysis and quality of life was assessed by using self-reporting Likert scale on quality of life. Code no was given for each participant to maintain anonymity.

Statistical analysis

Data was analysed using SPSS version 26. Frequency and percentage distribution was done of type II diabetic mellitus in terms of glycaemic profile. Chi square test was performed to test association and their significances existing between the glycaemic profile and quality of life. Frequency and percentage distribution was done of type II diabetic mellitus patients based on quality of life score. Chi square test was performed to test association and their significance existing between the quality of life and some selected demographic variables. The level $P < 0.05$ was considered as the significance.

III. Result

The table no 1 represented the data obtained through semi structured questionnaire. The table indicated that majority of participants (50%) belonged to age group 55-69 years and only 10% belonged to age ≥ 70 years and majority of participants (55.5%) were male and the remaining were female. Most of the participants (47%) belonged to nuclear family, majority of the participants (88%) were married and only 3% were single. About 58.5% of the participants lived in urban area. 38.5% of the participants were graduate and only 7.5% had primary education.

Table 1:Frequency and percentage distribution of demographic profile of type II diabetes mellitus patients n=200

| Variables | Frequency (f) | Percentage (%) |
|---------------------------|---------------|----------------|
| Age | | |
| • 25-39 | 21 | 10.5 |
| • 40-54 | 59 | 29.5 |
| • 55-69 | 100 | 50 |
| • ≥70 | 20 | 10 |
| Gender | | |
| • Male | 111 | 55.5 |
| • Female | 89 | 44.5 |
| Family type | | |
| • Nuclear | 94 | 47 |
| • Joint | 75 | 37.5 |
| • Extended | 31 | 15.5 |
| Marital status | | |
| • Married | 176 | 88 |
| • Single | 6 | 3 |
| • Widowed | 18 | 9 |
| Area of living | | |
| • Urban | 117 | 58.5 |
| • Semi urban | 45 | 22.5 |
| • Rural | 38 | 19 |
| Level of education | | |
| • Primary | 15 | 7.5 |
| • Secondary | 52 | 26 |
| • Higher secondary | 26 | 13 |
| • Graduate | 77 | 38.5 |
| • Post graduate and above | 30 | 15 |

Data presented in Table 2 that about 34.5% of the female participants were homemaker and 20.5% male participants were businessman. Most of the participants' (25.5%) family monthly income belongs to 40,000-59,000. Majority of participants (70%) have health insurance scheme, among them 37.5% have govt. health scheme.

Table 2:Frequency and percentage distribution of demographic profile of type II diabetes mellitus patients n=200

| Variables | Frequency (f) | | Percentage (%) | |
|---|---------------|--------|----------------|--------|
| | Male | Female | Male | Female |
| Occupation | | | | |
| • Homemaker | - | 69 | - | 34.5 |
| • Private employee | 10 | 2 | 5 | 1 |
| • Govt. employee | 10 | 2 | 5 | 1 |
| • Retired | 40 | 4 | 20 | 2 |
| • Businessman | 41 | 1 | 20.5 | 0.05 |
| • Teacher | 10 | 11 | 5 | 5.5 |
| Family Monthly Income | | | | |
| • 20,000-39,000 | 38 | | 19 | |
| • 40,000-59,000 | 51 | | 25.5 | |
| • 60,000-79,000 | 46 | | 23 | |
| • 80,000-99,000 | 20 | | 10 | |
| • ≥1,00,000 | 45 | | 22.5 | |
| Health Insurance Scheme | | | | |
| • No | 60 | | 30 | |
| • Yes | 140 | | 70 | |
| ➤ Govt. Health Insurance Scheme | 75 | | 37.5 | |
| ➤ Private Health Insurance Scheme | 53 | | 26.5 | |
| ➤ Govt. Health Insurance Scheme and Private Health Insurance Scheme | 12 | | 6 | |

Table no 3 depicted that among the study population, 51.5% participants have no family history of diabetes and 76% never smoked. 30 % participants were smoking for 25-30 years. Only 6.5% consumed alcohol, among them 38.46% were consuming alcohol for 6-10 years. 29.5 % of the participants were living with type 2 Diabetes mellitus for 5 years 1 day to 10 years.

Table 3: Frequency and Percentage distribution of diabetes mellitus health related profile of type II diabetes mellitus patients n=200

| Variables | Frequency (f) | Percentage (%) |
|---|---------------|----------------|
| History of diabetes in family | | |
| • Yes | 97 | 48.5 |
| • No | 103 | 51.5 |
| Smoking history | | |
| • Never smoker | 152 | 76 |
| • Former smoker | 33 | 16.5 |
| • Current smoker | 15 | 7.5 |
| Duration of smoking (in years) | | |
| • 5-9 | 2 | 13.3 |
| • 10-14 | 2 | 13.3 |
| • 15-19 | 3 | 20 |
| • 20-24 | 2 | 13.3 |
| • 25-30 | 6 | 40 |
| Consume alcohol | | |
| • Never | 170 | 85 |
| • Former | 17 | 8.5 |
| • Current | 13 | 6.5 |
| Duration of consuming alcohol (in years) | | |
| • 1-5 | 3 | 23.07 |
| • 6-10 | 5 | 38.46 |
| • 11-15 | 2 | 15.38 |
| • 16-20 | 3 | 23.07 |
| Diagnosed as Diabetes mellitus | | |
| • 6months 1day-1year | 21 | 10.5 |
| • 1year 1day -5years | 38 | 19 |
| • 5years 1day-10 years | 59 | 29.5 |
| • 10year 1day-15 years | 43 | 21.5 |
| • >15years | 39 | 19.5 |

Data represented in Table no 4 showed that about 38% participants do self-monitoring of blood glucose level and most of participants (75%) were on oral hypoglycaemic agent. Nearly 27.5 % participants walked for life style modification and only 11% participants were on walking, exercise and dietary modification. Majority of the participants (57.5%) had no complication, 18% participants had blurring of vision.

Table 4: Frequency and Percentage distribution of diabetes mellitus health related profile of type II diabetes mellitus patients n=200

| Variables | Frequency (f) | Percentage (%) |
|--|---------------|----------------|
| Self-monitoring of blood glucose level | | |
| • Yes | 76 | 38 |
| • No | 124 | 62 |
| Treatment | | |
| • Oral hypoglycaemic agent | 150 | 75 |
| • Insulin therapy | 17 | 8.5 |
| • Oral hypoglycaemic agent and Insulin | 33 | 16.5 |
| Life style modification for diabetes | | |
| • Walking | 55 | 27.5 |
| • Exercise | 20 | 10 |
| • Dietary modification | 37 | 18 |
| • Exercise and dietary modification | 27 | 13.5 |
| • Walking and dietary modification | 24 | 12 |
| • Walking, exercise and dietary modification | 22 | 11 |
| • Walking and exercise | 15 | 7.5 |
| Complications | | |
| • No complication | 115 | 57.5 |
| • Heart disease | 9 | 4.5 |
| • Kidney disease | 8 | 4 |
| • Delayed wound healing | 1 | 0.5 |
| • Tingling sensation in lower limb | 12 | 6 |
| • Blurring of vision | 36 | 18 |
| • Delayed wound healing, tingling sensation and vision | 2 | 1 |
| • Delayed wound healing and vision | 1 | 0.5 |
| • Heart disease and vision | 4 | 2 |
| • Tingling sensation and vision | 6 | 3 |
| • Heart disease, kidney disease, foot ulcer and vision | 1 | 0.5 |
| • Kidney disease and tingling sensation | 1 | 0.5 |

| Variables | Frequency (f) | Percentage (%) |
|--|---------------|----------------|
| • Heart disease, kidney disease and tingling sensation | 2 | 1 |
| • Kidney disease and vision | 1 | 0.5 |
| • Heart disease and tingling sensation | | |

Data presented in Table 5 showed that most of the participants' (58.5%) HbA1c level was more than 6.5 was, 41.5% participants had HbA1c level less than equal 6.5. Majority of the participants (59.5%) had fasting blood sugar more than 126. About 56.5% participants had post prandial blood sugar level less than or equal 200.

Table 5: Frequency and Percentage of glycosylated haemoglobin values, fasting blood sugar and post prandial blood sugar n=200

| Variables | Frequency(f) | Percentage (%) |
|----------------------------------|--------------|----------------|
| Glycosylated haemoglobin | | |
| HbA1c ≤6.5 | 83 | 41.5 |
| HbA1c >6.5 | 117 | 58.5 |
| Fasting blood sugar | | |
| Less than or equal 126 | 81 | 40.5 |
| More than 126 | 119 | 59.5 |
| Post prandial blood sugar | | |
| Less than equal 200 | 113 | 56.5 |
| More than 200 | 87 | 43.5 |

Data presented in Table 6 showed that mean and standard deviation of fasting blood sugar are 143.58 and 49.94 and also showed that mean and standard deviation of post prandial blood sugar are 212.43 and 83.58.

Table 6: Mean and standard deviation of fasting blood sugar and post prandial blood sugar level n=200

| Variables | Mean | Standard deviation |
|---------------------------|--------|--------------------|
| Fasting blood sugar | 143.58 | 49.94 |
| Post prandial blood sugar | 212.43 | 83.58 |

This table 7 showed that mean and standard deviation of diet, sleep and rest, mobility and energy, therapeutic compliance, emotional well-being, social well-being, total quality of life score were (16.97±3.29), (11.14±2.51), (13.63±3.55), (31.28±3.98), (18.32±3.66), (16.51±3.23), (107.80± 11.287) respectively. Mean percentage was higher in therapeutic compliance (78.2).

Table 7: Mean, range mean percentage and standard deviation of each domain of Quality of life score n=200

| Variables (Domain) | Range | Mean | Mean percentage | Standard deviation |
|-----------------------------|------------|--------|-----------------|--------------------|
| Diet | 16(8-24) | 16.97 | 67.88 | 3.29 |
| Sleep and rest | 12(3-15) | 11.14 | 74.26 | 2.51 |
| Mobility and energy | 16(4-20) | 13.63 | 68.15 | 3.55 |
| Therapeutic compliance | 19(21-40) | 31.28 | 78.2 | 3.98 |
| Emotional well-being | 17(8-25) | 18.32 | 73.28 | 3.66 |
| Social well-being | 19(6-25) | 16.51 | 66.04 | 3.23 |
| Total quality of life score | 61(79-140) | 107.80 | 71.86 | 11.287 |

According to Table 8, most of type II diabetic patients (74%) had average quality of life.

Table 8: Frequency and Percentage distribution of quality of life score n=200

| Variables | Frequency(f) | Percentage (%) |
|----------------------|--------------|----------------|
| Good quality of life | 31 | 15.5 |
| Average | 148 | 74 |
| Belowaverage | 21 | 10.5 |

From the table 9, Chi-square value (6.683) was computed. Hence, computed Chi-square (6.683) was more than the table value at 0.05 level of significance. So, it was significant. Hence, there was association between the glycosylated haemoglobin value and quality of life of patients with type II diabetic mellitus patients.

Table 9: Chi square test of association between quality of life score and glycosylated haemoglobin value
n=200

| Variable glycosylated haemoglobin value | Quality of life score | | | Calculated χ^2 | df |
|---|-----------------------|-------------------------|-------------------------------|---------------------|----|
| | Good quality of life | Average quality of life | Below average quality of life | | |
| HbA1c ≤6.5 | 17 | 62 | 4 | 6.683* | 2 |
| HbA1c >6.5 | 14 | 86 | 17 | | |

χ^2 value at df (2) = 5.99, p<0.05 *Significant

From the table 10, Chi-square value (13.558) was computed. Hence computed Chi-square (13.558) was more than the table value at 0.05 level of significance. So, it was significant. Hence, there was association between the fasting blood sugar and quality of life of patients with type II diabetic mellitus patients.

From the table 10, Chi-square value (9.946) was computed. Hence computed Chi-square (9.946) was more than the table value at 0.05 level of significance. So, it was significant. Hence, there was association between post prandial blood sugar and quality of life of patients with type II diabetic mellitus patients.

Table 10: Chi square test of association between quality of life score and fasting blood sugar and post prandial blood sugar
n=200

| Variables | Quality of life score | | Calculated χ^2 | df |
|----------------------------------|-----------------------|---------------|---------------------|----|
| | ≤Median (108) | >Median (108) | | |
| Fasting blood sugar | | | | |
| Less than or equal 126 | 31 | 50 | 13.558* | 1 |
| More than 126 | 77 | 42 | | |
| Post prandial blood sugar | | | | |
| Less than equal 200 | 50 | 63 | 9.946* | 1 |
| More than 200 | 58 | 29 | | |

χ^2 value at df (1) = 3.84, p<0.05 *Significant

Based on the above study finding, hypothesis derived as-

H₁= There is a significant association between quality of life and glycosylated hemoglobin value at 0.05 level of significance.

H₂= There is a significant association between quality of life and fasting blood sugar at 0.05 level of significance.

H₃= There is a significant association between quality of life and postprandial blood sugar at 0.05 level of significance.

From the above table 11, in case of age Chi-square value (9.962) was computed. Hence computed Chi-square (9.962) was more than the Table value at 0.05 level of significance. So, it was significant. Hence, there was association between age and quality of life of patients with type II diabetic mellitus patients.

From the above table 11, in case of occupation Chi-square value (14.369) was computed. Hence computed Chi-square (14.369) was more than the Table value at 0.05 level of significance. So, it was significant. Hence, there was association between occupation and quality of life of patients with type II diabetic mellitus patients.

Table 11: Chi square test of association between quality of life and selected demographic variables
n=200

| Variables | Quality of life score | | Calculated χ^2 | df |
|---------------|-----------------------|---------------|---------------------|----|
| | ≤Median (108) | >Median (108) | | |
| Age | | | 9.962* | 3 |
| 25-39 | 11 | 10 | | |
| 40-54 | 36 | 23 | | |
| 55-69 | 45 | 55 | | |
| ≥70 | 16 | 4 | | |
| Gender | | | 1.989 | 1 |
| Male | 55 | 56 | | |
| Female | 53 | 36 | | |

| | | | | |
|---------------------------|----|----|---------|---|
| Family type | | | | |
| Nuclear | 51 | 43 | 0.516 | 2 |
| Joint | 42 | 33 | | |
| Extended | 15 | 16 | | |
| Marital status | | | | |
| Married | 95 | 81 | 0.168 | 2 |
| Single | 3 | 3 | | |
| Widowed | 10 | 8 | | |
| Area of living | | | | |
| Urban | 58 | 59 | 3.093 | 2 |
| Semi urban | 25 | 20 | | |
| Rural | 25 | 13 | | |
| Level of education | | | | |
| Primary | 11 | 4 | 5.362 | 4 |
| Secondary | 30 | 22 | | |
| Higher secondary | 11 | 15 | | |
| Graduate | 43 | 34 | | |
| Post graduate and above | 13 | 17 | | |
| Occupation | | | | |
| Homemaker | 41 | 28 | 14.369* | 5 |
| Private employee | 8 | 4 | | |
| Govt. employee | 1 | 11 | | |
| Retired | 20 | 24 | | |
| Businessman | 26 | 16 | | |
| Teacher | 12 | 9 | | |

χ^2 value at df (3) = 7.82, χ^2 value at df (5) = 11.07, $p < 0.05$ *Significant

Based on the above study finding, hypothesis derived as-

H₄= There is a significant association between quality of life and age and occupation at 0.05 level of significance.

IV. Discussion

In this present study showed that 41.5% type II diabetes mellitus patients who were on treatment had HbA1c level less than equal 6.5 and 58.5% type II diabetes mellitus patients had HbA1c level more than 6.5. This was supported by a study which was conducted by WH WF, Juni MH, Salmiah MS, Azuhairi AA, Zairina AR. among 324 type 2 diabetes mellitus patients where 33.6% patients had HbA1c level more than 6.5 and 66.4% patients had HbA1c more than equal 6.5. [3]

In this study mean and standard deviation of fasting blood sugar of type II diabetes mellitus patients are 143.58 and 49.94. These findings were supported by a study done by George M, Joseph L, Koshy LV. where they showed that mean of fasting blood sugar was 157.74 and standard deviation of fasting blood sugar was 55.35. [4] These findings also were supported by Niaz F, Basir F, Shams N, Shaikh Z, Ahmed I. in their research article where mean and standard deviation of fasting blood sugar were 156 and 50 respectively. [5]

In this study mean and standard deviation of post prandial blood sugar of type II diabetes mellitus patients are 212.43 and 83.58. These findings also were supported by Jain V, Shivkumar S, Gupta O. In their research article they had shown mean and standard deviation of post prandial blood sugar were 242.5 and 84.37 respectively. [6]

The study result showed that mean and standard deviation of quality of life were 107.80 and 11.287 respectively among type II diabetes mellitus patients. Findings of the study supported by a study conducted by George M, Joseph L, Koshy LV., the study result showed that mean of quality of life is 108.4 and standard deviation is 20.74. [4]

In the present study, the data showed that 15.5% type II diabetes mellitus patients had good quality of life, 74% had average quality of life and 10.5% had below average quality of life. These findings were supported by the findings of the study conducted by Kumar P, Agarwal N, Singh CM, Pandey S, Ranjan A, Kumar D. In this study majority of the participants (56.5%) had average quality of life, 32.9% had good quality of life and 10.6% participants had bad quality of life. [7]

Findings of this study showed that there was a statistically significant association between quality of life score and glycosylated haemoglobin value, at 0.05 level of significance. This finding was supported by a study conducted by PrasannaKumar HR, Mahesh MG, Menon VB, Srinath KM, Shashidhara KC, Ashok P. among 200 type 2 diabetes mellitus patients. [8]

In this study result, there was a statistically significant association between quality of life and fasting blood sugar at 0.05 level of significance. Finding of this study supported by a article presented by Kumar R,

Krishan, Jhaji R. where they had shown that quality of life was significantly associated with fasting blood sugar. [9]

In this study result, there was a statistically significant association between quality of life and age and occupation at 0.05 level of significance. This result was supported by a study conducted by Prasannakumar HR, Mahesh MG, Menon VB, Srinath KM, Shashidhara KC, Ashok P among 200 type 2 diabetes mellitus patients. [8]

V. Conclusion

The present study can be concluded on the basis of the result that the majority of the diabetic patients showed an average quality of life. In this research, the glycaemic profile, age, and occupation were all found to be associated with quality of life. It can be concluded that the better controlled glycaemic profile showed better quality of life.

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