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Health Related Quality of Life in Adult with Type 2 Diabetes Mellitus

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Abstract

Introduction: The health related quality of life (HRQoL) has an important role in adults suffering from diabetes. **Objective:** To assess the health related quality of life in adult with type 2 diabetes mellitus. **Materials and methods:** A cross-sectional study was conducted to assess diabetic patient's HRQoL on 119 purposively selected type-2 DM patients (aged ≥ 18 years and duration of diabetes ≥ 1 year). Data were collected by face-to-face interview and by medical record review through a Bangle version of SF-36 semi-structured questionnaire and a checklist. **Place and period of study:** The study was conducted at outpatient department in Gopalganj 50 bedded diabetic hospital from 1st January, 2018 to 31st December 2018. **Results:** The mean age of the respondents was 52.34 (SD ± 10.19) years. Age group shows a significant difference associated with all domains of quality of life except role emotion (>0.05), gender shows the significant in social and pain domain (<0.05). Physical functioning and role physical also show the significant associated with education. Duration of diabetes and use of oral hypoglycemic agent shows the significant difference (<0.05) associated with all domains of quality of life except role physical and role emotion (>0.05) respectively co-morbidity shows the significant difference with all domains expect pain (>0.05). Physical functioning, emotional, pain and general health of the quality of life show the significant difference associated with use of insulin (<0.05). **Conclusion:**

The overall QoL of type-2 DM patients was poor and had lower score of health related quality of life.

Keywords

Type 2 Diabetes Mellitus, Health Related Quality of Life, Diabetes Mellitus

1. Introduction

An especially essential aspect of life for persons with diabetes mellitus is quality of life. Diabetes influences almost every facet of life; contain food, activity, work, and daily routines [1]. Type 2 diabetes mellitus place greater world-wide health threaten, particularly in improved and underdeveloped countries [2]. The world-wide predominance of diabetes mellitus in adults has been growing over modern decades [3].

According to the International Diabetes Federation report of 2015, around 415 million nations have DM globally, with the figure projected to have increased to 642 million by 2040 or possibly even twofold by the year 2040. The greatest extent will be in underdeveloped countries (69%) compare with developed countries (20%), with the non-communicable disease (NCDs) accounting for up to 80% of deaths among underdeveloped countries [4].

According to the IDF Diabetes Atlas, almost one-fifth of the world population with diabetes mellitus lives in South East Asia country. This report indicates that the number of people with DM will increase to 120.9 million by 2030 that is 10.2% of the adult population will have diabetes. The predominance of DM is higher in upper-middle-income countries (10.1%) compare to lower middle-income countries (8.6%) and it is described that four out of five people with DM live in low- and middle-income countries. About 291 million out of the 3.6 billion adults with diabetes are generally living in low- and middle-income countries, compared to 75 million in high-income countries [5].

In Bangladesh, the total count of people with DM is designed to rise from 3.2 million in 2000 to 11.1 million in 2030 [6]. Another study shows that diabetes patients were 5.10 million in Bangladesh in 2013, which is expected to increase to 8.20 million by 2035 [6]. In the case of uncontrolled diabetes, it chronically increased blood sugar concentrations, which, if left untreated, can result in impairing blood vessels and nerves. This increases the risk of co-morbidities and complications such as macro-vascular complications (e.g. myocardial infarct, angina pectoris, stroke, renal dysfunction and diabetic foot syndrome and amputation) and microvascular complications (e.g. neuropathy, renal disorder, and retinopathy) Diabetes mellitus induces to limitations in attribute of life and in life expectation [4] [5].

Diabetes mellitus is a type of chronic illnesses as the management is troublesome, and the complications are a life-threatening character to the quality of life of the patient [2]. The main purpose of using and measuring health-related

quality of life (HRQoL) is to contribute a more exhaustive assessment, oblation a more perfect and valid evaluation of the health of an individual (or group), as well as a more correct estimation of the possible profit and danger of medical consideration [3].

Quality of life (QOL) is a central issue for patients, providers, and policy makers, and interest in health-related quality of life (HRQOL) has increased markedly in recent years [7]. Against this background, the present study was conducted to assess the HR-QoL of Bangladeshi patients with type 2 diabetes.

2. Methods and Materials

A hospital-based cross-sectional study was conducted in the outpatient department (OPD) of Gopalganj 50 bedded diabetic hospital. The study was conducted from 1st January, 2018 to 31st December, 2018. The study population consisted of 119 type 2 diabetes patients (aged ≥ 18 years and above and duration of diabetes ≥ 1 year) including both male and female attending at OPD and willing to give informed consent. Not willing to participate in this study, severe ill patients and Diabetes with pregnancy were not included in this study. Respondents were selected by a purposive sampling method. Data were collected by face-to-face interview and by medical record review through a Bangle version of SF-36 semi-structured questionnaire and a checklist to assess the health-related quality of life. IBM-SPSS version 21 was used for the analysis of data. Descriptive statistics including frequency, percentage, means, medians, mode, and standard deviation were done. To compare the group mean differences, inferential statistics including t-test and one-way ANOVA test were done. For in all the tests, $p < 0.05$ was considered to be statistically significant. Ethical clearance was obtained from the Institutional Review Board (IRB) of NIPSOM.

3. Results

Out of (119) patients with T2DM, mean age was 52.34 ± 10.19 years (SD). Male were 53% and rest were female (47%). Majority of the respondent's educational qualification were secondary level education (37.0) and rest of the respondent's educational qualification were graduation and above (10.1%). Mean duration of the diabetes were 5.55 ± 4.43 years (SD). Most of the respondents follow diet & exercise (88.2%) and rest of the respondents do not maintain diet & exercise discipline (11.8%). Majority of the respondents used oral hypoglycemic agent (56.3%) for diabetes control and rest of the respondents use insulin (43.7%). Among the respondents, 76.5% had co-morbidities and rest of the respondents had no any co-morbidity (23.5%) (**Table 1**).

The significant difference of mean score of physical functioning in relation to sociodemographic characteristics are found in age group (F = 3.728, P = 0.013) and level of education (F = 3.313, P = 0.013). Role limitations due to physical health were statistically significant in relation to level of education (F = 3.177, 0.016) of the respondents. Mean score of energy/fatigue in relation to age group

Table 1. Socio-demographic and clinical characteristics of study participants.

Variables	Characteristics	Frequency	Percentage
Age group (years)	30 - 40	10	8.4
	40 - 50	33	27.7
	50 - 60	40	33.6
	≥60	36	30.3
Sex	Male	63	53
	Female	56	47
Educational Qualification	Illiterate	16	13.4
	Up-to Primary	34	28.6
	Secondary	44	37
	Higher Secondary	13	10.9
	Graduation & Above	12	10.1
Duration of diabetes	1 - 4	61	51.3
	5 - 9	35	29.4
	≥10	23	19.3
Diet and exercise	Yes	105	88.2
	No	14	11.8
Treatment profile	Oral Hypoglycemic Agent (metfomin, gliclazide)	67	56.3
	Insulin	52	43.7
Co-morbidities	Yes	91	76.5
	No	28	23.5

of the respondents (F = 4.634, P = 0.004) was significant. Age (F = 3.206, P = 0.026) of the respondents (F = 2.776, P = 0.030) were significant related to emotional well-being. Social functioning was significant in relation to age group of the respondents (F = 4.989, P = 0.003) and sex of the respondents (t = −2.015, P = 0.046). The test statistics showed that the significant difference of mean score of pain in relation to sociodemographic characteristics are found in the age group (F = 3.928, P = 0.010) and sex of the respondents (t = 2.408, P = 0.018). The significant difference of mean score of general health in relation to sociodemographic characteristics is found in age group (F = 4.442, P = 0.005) and sex (between male and female) of the respondents (t = 2.01, P = 0.046) (Table 2).

Duration of diabetes and use of oral hypoglycemic agent shows the significant difference (<0.05) associated with all domain of quality of life except role physical and role emotion (>0.05) respectively co-morbidity shows the significant difference with all domain expect pain (>0.05) and following diet and exercise also shows the significant difference associated with domain of energy (<0.05). Physical functioning, emotional, pain and general health of the quality of life shows the significant difference associated with Use of insulin (<0.05) (Table 3).

Table 2. Association of health related quality of life and socio-demographic characteristics.

Variables	Physical Functioning	Role Physical	Role Emotion	Energy	Emotional	Social	Pain	General Health
Age (Years)								
30-40	51.12 ± 23.43	57.50 ± 23.71	53.33 ± 23.30	48.50 ± 24.15	54.60 ± 11.93	67.50 ± 27.76	59.00 ± 26.48	38.50 ± 17.80
40-50	59.57 ± 29.61	52.27 ± 28.20	51.51 ± 22.19	54.24 ± 15.81	57.93 ± 9.70	71.96 ± 20.97	53.78 ± 23.20	36.96 ± 16.10
50-60	52.87 ± 27.05	56.25 ± 21.54	55.83 ± 25.47	49.37 ± 15.56	53.40 ± 9.08	55.62 ± 21.91	45.81 ± 21.69	36.33 ± 15.81
≥60	41.40 ± 21.47	41.66 ± 21.54	47.22 ± 24.39	39.44 ± 17.10	50.88 ± 9.30	55.55 ± 17.78	37.91 ± 21.68	25.97 ± 12.11
p-value	**0.013**	**0.064**	**0.485**	**0.004**	**.026**	**0.003**	**0.010**	**0.005**
Gender								
Male	56.04 ± 26.79	53.96 ± 21.15	53.96 ± 21.15	47.61 ± 18.09	54.53 ± 10.09	57.34 ± 22.18	51.50 ± 26.56	30.87 ± 14.46
Female	48.40 ± 28.98	47.32 ± 29.64	47.32 ± 29.64	47.67 ± 17.39	53.42 ± 9.60	65.40 ± 21.31	41.38 ± 17.85	36.60 ± 16.57
p-value	**0.138**	**0.159**	**0.159**	**0.985**	**0.541**	**0.046**	**0.018**	**0.046**
Education								
Illiterate	36.87 ± 28.97	31.25 ± 21.40	43.75 ± 26.44	50.93 ± 16.35	55.50 ± 9.67	64.84 ± 19.48	42.18 ± 22.05	36.25 ± 14.20
Primary	49.44 ± 25.41	55.14 ± 27.37	53.92 ± 23.23	50.29 ± 14.92	53.41 ± 9.28	62.86 ± 23.12	44.33 ± 16.81	32.79 ± 16.84
SSC	60.23 ± 25.30	51.13 ± 24.68	52.27 ± 22.03	46.59 ± 17.77	53.27 ± 9.40	63.35 ± 22.45	50.96 ± 28.15	34.31 ± 16.62
HSC	42.69 ± 31.66	55.76 ± 23.17	51.28 ± 25.87	40.38 ± 18.87	52.92 ± 6.76	50.96 ± 20.06	40.19 ± 16.90	30.38 ± 12.49
Graduation & above	63.75 ± 29.16	58.33 ± 22.19	55.55 ± 29.58	47.50 ± 24.44	57.66 ± 15.29	54.16 ± 21.54	51.25 ± 27.10	32.91 ± 15.44
p-value	**0.013**	**0.016**	**0.674**	**0.459**	**0.631**	**0.282**	**0.428**	**0.881**

*Data presented as Mean ± SD, P < 0.05 is considered as statistical significant value.

Table 3. Association of health related quality of life and clinical variables.

Variables	Physical Functioning	Role Physical	Role Emotion	Energy	Emotional	Social	Pain	General Health
Duration of diabetes								
1 - 4	56.66 ± 28.61	52.04 ± 27.11	49.18 ± 22.44	49.26 ± 17.22	54.75 ± 9.39	65.57 ± 22.55	50.36 ± 25.21	37.29 ± 16.37
5 - 9	60.28 ± 21.34	52.85 ± 24.07	58.09 ± 27.22	50.14 ± 18.08	56.22 ± 9.69	60.35 ± 19.52	46.50 ± 18.67	31.28 ± 14.10
≥10	29.34 ± 23.65	44.56 ± 23.78	49.27 ± 22.17	39.56 ± 16.71	48.69 ± 9.69	50.54 ± 21.47	37.50 ± 22.93	27.17 ± 13.88
p-value	**<0.001**	**0.424**	**0.186**	**0.048**	**0.011**	**0.019**	**0.078**	**0.017**
Diet and exercise								
Yes	52.34 ± 27.71	50.47 ± 26.16	50.47 ± 24.07	48.90 ± 17.36	54.28 ± 9.99	59.76 ± 22.46	46.61 ± 22.86	32.71 ± 15.17
No	53.21 ± 31.10	53.57 ± 21.61	61.90 ± 22.09	38.21 ± 17.93	52.00 ± 8.59	71.42 ± 15.83	47.67 ± 27.69	40.00 ± 18.50
p-value	**0.914**	**0.673**	**0.095**	**0.033**	**0.416**	**0.063**	**0.874**	**0.103**
Treatment profile								
Oral Hypoglycemic Agent (OHA)								
Yes	60.16 ± 27.33	52.61 ± 24.66	51.74 ± 24.81	50.59 ± 18.05	56.47 ± 9.73	64.55 ± 22.46	51.94 ± 23.50	36.26 ± 15.74

Continued

No	42.50 ± 25.83	48.55 ± 26.84	51.92 ± 23.25	43.84 ± 16.61	50.84 ± 9.11	56.73 ± 20.92	40.04 ± 21.56	30.09 ± 15.06
p-value	**0.001**	**0.394**	**0.968**	**0.038**	**0.002**	**0.055**	**0.005**	**0.033**
Insulin								
Yes	65.38 ± 23.49	50.96 ± 25.70	55.12 ± 24.59	49.13 ± 19.14	56.69 ± 10.58	64.42 ± 22.33	51.68 ± 22.07	37.98 ± 18.18
No	42.41 ± 27.20	50.74 ± 25.73	49.25 ± 23.46	46.49 ± 16.53	51.94 ± 8.73	58.58 ± 21.67	42.91 ± 23.74	30.14 ± 12.55
p-value	**<0.001**	**0.964**	**0.187**	**0.421**	**0.008**	**0.153**	**0.042**	**0.006**
Co-morbidities								
Yes	46.76 ± 26.76	48.35 ± 25.22	49.45 ± 23.49	45.54 ± 16.92	52.70 ± 9.42	57.28 ± 21.00	44.72 ± 23.37	30.65 ± 14.32
No	70.92 ± 23.94	58.92 ± 25.65	59.52 ± 24.60	54.46 ± 18.72	58.28 ± 10.12	73.66 ± 21.06	53.30 ± 22.41	43.03 ± 16.46
p-value	**<0.001**	**0.056**	**0.052**	**0.019**	**0.008**	**<0.001**	**0.089**	**<0.001**

*Data presented as Mean ± SD, P < 0.05 is considered as statistical significant value.

4. Discussion

The study showed that the majority of the respondents were within the age group 50 to 60 years (33.6%) and mean age was 52.34 ± 10.19 years (SD). Similar study showed that the incidence of type 2 diabetes is low before age 30 years but increases rapidly and continuously with older age [4] [6]. More than half of the respondents were male (53%) and rest were female (47%). A study in Pakistan showed that out of 209 diabetic patients, 121 (57.9%) were males and 88 (42.1%) females [6].

Among the respondents most of them were secondary level education (37.0). The study from Greece showed that primary school education was 42.6%, middle school 19.4%, high school 18.5%, college/university 13.9% and master's degree were 1.9% [8].

Majority of the respondent's duration of diabetes were ≥1 - 4 years (51.3%), 5 - 9 years duration were 29.4% and rest of the respondents duration of diabetes were ≥10 years (19.3%). Mean duration were 5.55 ± 4.43 years (SD). Study on assessing health related quality of life in diabetic subjects by SF 36 questionnaire in a tertiary care diabetes unit of Karachi, Pakistan shows that duration of diabetes was <5 years, 5 - 10 years, >10 years [9].

In this study most of the respondents followed diet & exercise (88.2%) and rest of the respondents did not maintain diet & exercise discipline (11.8%). Majority of the respondents used oral hypoglycemic agent (56.3%) for diabetes control and rest of the respondents use insulin (43.7%). Similar study of health related quality of life shows that out of 108 respondents 4.6% follow diet, 45.4% use oral hypoglycemic agent and 21.3% use insulin [8]. Among the respondents 76.5% were presence of co-morbidities.

The current study finding showed that the significant difference of mean score of physical functioning were in relation to age group ($f = 3.728$, $p = 0.013$). Similar findings were reported in a study from Portuguese the significant difference of physical functioning were in age ($p < 0.001$) [10]. Another study in Pakistan

showed the difference in age ($p = 0.001$) [9]. Company showed that there is no any difference in age ($p = 0.205$) [11]. The current study also showed the difference in marital status ($t = 2.488$, $p = 0.014$), level of education ($F = 3.313$, $p = 0.013$).There is no any significant difference in sex ($t = 1.495$, $p > 0.05$), religion ($t = -0.209$, $p > 0.05$) and family members ($F = 0.614$, $p > 0.05$) of the respondents. Similar finding of non-significant in sex were reported in a study from turkey ($p = 0.080$) [12]. But another study showed the significant difference in sex ($p \leq 0.001$) [9].

The mean score of role limitations due to physical health in relation to socio-demographic characteristics are found only in level of education ($F = 3.177$, 0.016) of the respondents. Similar finding was also reported in a study they showed there was no significant difference in age and sex [9] [12]. Similar finding in age ($p > 0.05$) and sex ($p > 0.05$) was reported in a study on assessing health related quality of life in diabetic subjects by SF 36 questionnaire in a tertiary care diabetes unit of Karachi, Pakistan [9]. Another study showed the significant difference were in sex ($p = 0.016$) but non-significant in age ($p = 0.289$) [11].

The significant difference of mean score of energy/fatigue in relation to socio-demographic characteristics were found in only age group of the respondents ($F = 4.634$, $p = 0.004$). A study by shaheen and basit showed that the significant were in sex ($p = 0.041$) but there were no any relation between energy and age ($p = 0.396$) [9]. Another study showed the similar finding was found in age ($p < 0.05$) [11].

Mean score of emotional well-being were lower in age ≥ 60 than other age group ($F = 3.206$, $p = 0.026$). Others study reported that there were no significant difference in age ($p > 0.05$) but they found significant in sex ($p < 0.05$) [9]. There is no significant difference in sex ($t = 0.613$, $p = 0.541$), religion ($t = 0.059$, $p = 0.953$), marital status ($t = 1.075$, $p = 0.285$) of the respondents in related to social functioning. The significant difference of mean score of social functioning in relation to socio-demographic characteristics are found in age group of the respondents ($F = 4.989$, $p = 0.003$) and sex of the respondents ($t = -2.015$, $p = 0.046$). The similar study on health related quality of life showed that the significant difference was not found in age and sex ($p > 0.05$) [13]. Another study showed the similar finding in sex ($p = 0.000$) [14].

The significant difference of mean score of pain in relation to socio-demographic characteristics are found in the age group ($F = 3.928$, $p = 0.010$) and sex of the respondents ($t = 2.408$, $p = 0.018$). Similar finding also found in a study by Morales *et al.* they showed the significant in age and sex ($p < 0.001$) [8]. There is no significant difference in religion ($t = -0.153$, $p = 0.878$) and education ($F = 0.969$, $p = 0.428$) in related to mean score of pain.

The significant difference of mean score of general health in relation to socio-demographic characteristics are found in age group ($F = 4.442$, $p = 0.005$) and sex (between male and female) of the respondents ($t = -2.01$, $p = 0.046$). The

study from Pakistan by shaheen and basit showed no significant in age ($p = 0.697$) but significant in sex ($p < 0.001$) [9].

Relationship between duration of diabetes > 10 and physical functioning ($p = 0.000$), energy/fatigue ($p = 0.048$), emotional well-being ($p = 0.011$), social functioning ($p = 0.019$), and general health ($p = 0.017$) were significant. Another study showed the similar finding was found in general health (0.048) [9]. The significant difference were found in relation between use of oral hypoglycemic agent and physical functioning ($p = 0.001$), energy/fatigue ($p = 0.038$), emotional well-being ($p = 0.002$), pain ($p = 0.005$), general health ($p = 0.033$).

Relation between use of insulin and physical health ($p = 0.000$), emotional well-being ($p = 0.008$), pain, ($p = 0.042$) and general health ($p = 0.006$) were significant. The significant difference in diet and exercise was related to energy/fatigue ($p = 0.033$). Mean score of respondents with presence of co-morbidities in physical functioning ($p = 0.000$), energy/fatigue ($p = 0.019$), emotional well-being ($p = 0.008$), social functioning ($p = 0.000$) and general health ($p = 0.002$) were lower than those in without co-morbidities.

5. Conclusion

The overall QoL of type-2 DM patients was poor and had a lower score of health related quality of life. Considering these related variables could lead to effective control of diabetes complications and improvement of the patients' QoL.

Statement of Ethics

Ethical clearance was taken from the IRB of NIPSOM.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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