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Health-related Quality of Life Among Patients with Type 2 Diabetes Mellitus, Hypertension and Both:

A cross sectional study in a Tertiary Healthcare Centre, Kolkata.

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Abstract

Introduction: Diabetes and hypertension are two major non communicable diseases which influenced daily life of individual both physically and mentally.

Objectives: The objectives were to assess the socio-demographic profile & HRQol of the study participants and their general health condition as per their perception.

Materials and Methods: The descriptive cross –sectional study conducted on adult out patient department of Medicine in Calcutta National Medical College, Kolkata from 11th March2024 to 7th April 2024 with help of predesigned pretested semi-structured schedule by face to face interview. Data compilation and analysis were done by Microsoft Office excel and IBM SPSS version 2019.

Results: From the present study it was seen that among 113 participants, 27.4% were between 50–59 years of age, 53.1% were female, 52.2% were from rural areas and 52.2% were Hindu. 45.1% of the participants belonged to lower socio economic class. 45.1% had addiction history, 62.8% had hypertension, 57.5% had diabetes while 92.2% adhered to medication. 60.2% of the study participants reported being *"limited a little"* in moderate physical activities due to physical health, 31% felt calm and peaceful *"a good bit of the time"*, 44.2% indicated that emotional problems interfered with their social activities *"some of the time"*. 27.4% participants perceived pain moderately impacted their daily work while 16.8% perceived their general health was poor. PCS-12 scores were 44.87±11.27 and MCS-12 score 46.76±10.21 among study participants. Among older study participants (>50yrs) had significantly lower PCS score (t-3.268, p-0.001) than younger one and longer duration (≥10yrs) of morbidities had also significantly lower PCS (t-5.205, p-0.01) & MCS score (t-3.441, p-0.01) than those who had less duration of morbidities.

Conclusion: From this study it is concluded that older age group and longer duration of morbidities significantly impacted HRQoL.

INTRODUCTION

Diabetes Mellitus is a long-term condition arising when the body cannot effectively use insulin. India has one of the highest diabetes burdens globally. Recent national surveys show self-reported diabetes affecting around 9-11% of adults aged 18-69, though undiagnosed cases push the total closer to 15% or higher in high-risk groups.[1] According to the NFHS 5 data approximately 15.6% to 21.3% of men, and 13.5% to 17.5% of women in West Bengal have elevated blood glucose levels.[2]

Concurrently, hypertension, characterized by blood pressure exceeding 140/90 mmHg, over 30% of Indian adults in recent national estimates. Recent studies up to 2025 indicate around 35.5% of adults (roughly 315 million people) have hypertension.[3] In West Bengal, the prevalence of measured hypertension (systolic ≥140 mmHg or diastolic ≥90 mmHg) is estimated to be around 13.3%.[4]

Keywords: HRQol, SF-12, Hypertension, Diabetes

While dangerous individually, the impact of having both diabetes and hypertension is profound compared to having either condition alone. Patients with this comorbidity require long-term adherence to treatment and face significant difficulties in terms of work, physical, and psychological well-being. Health, as per the World Health Organisation, is defined not merely as the absence of disease, but as the ability to lead a socially and economically productive life.[5] This perspective emphasizes "Perceived Health" and Quality of Life (QoL), defined as an individual's perception of their position in life relative to their culture and goals.[6] Health-related quality of life (HRQoL) specifically encompasses physical, mental, and the social dimensions.

The SF-12 Health Survey is a widely used, validated questionnaire designed to assess health-related quality of life (HRQoL). It is a shorter version of the SF-36 questionnaire and was developed to provide a brief yet reliable measure of general physical and mental health status.[7] By employing the SF-12 questionnaire, the present study aims to assess the general health perception of patients with hypertension, diabetes, or both, facilitating better disease prevention interventions.

MATERIALS AND METHODS

Type and Study Design: This study was a descriptive with cross sectional design.

Study Setting: The research was conducted at the Calcutta National Medical College & Hospital, specifically within the Medicine Outpatient Department.

Study Population: The study population consisted of patients attending the Medicine O.P.D. of Calcutta National Medical College & Hospital.

- **Inclusion Criteria:**
  - ◊ Patients diagnosed with hypertension, diabetes, or both.
  - ◊ Patients who provided informed consent to participate in the study.
- **Exclusion Criteria:**
  - ◊ Patients who were severely ill or those with whom communication was not possible.

Study Period: The study was conducted over a period of approximately one month, from March 11, 2024, to April 7, 2024.

Sample Size: All 113 patients, fulfilling the inclusion and exclusion criteria during the three consecutive days of data collection were included in the study (total enumeration)

Study Technique: The study employed an interview-based technique. Patients were interviewed directly to collect data using the study tools.

Study Tools and Variables: Data collection was performed using a predesigned, pretested, semi-structured schedule. The key tools and variables included:

- **Socio-demographic Profile:** Assessment of age, gender, religion, region, total family members, total family income, occupation, and substance use (tobacco, alcohol, etc.).
- **Socio-economic Status:** Evaluated using the Modified B.G. Prasad Scale (2023).[8]
- **Morbidity Profile:** Documentation of hypertension and diabetes, including disease duration and medication history.
- **Health-Related Quality of Life (HRQoL):** Assessed using the SF-12 Questionnaire, a 12-item Short Form Survey.[9]

Operational Definitions:

- **SF-12 Questionnaire:** A general health questionnaire drawn from the 8 dimensions of the Medical Outcomes Study (MOS) SF-36 survey. It is designed to holistically assess HRQoL.
- **Scoring Components:** The survey yields two summary scores: a Mental Component Score (MCS-12) and a Physical Component Score (PCS-12).
- **Z-Scores:** Scores are reported as Z-scores, which represent the difference compared to the population average measured in standard deviations.
- **Reference Standards:** The scores are calculated in reference to the United States population profile (1994), where the average for both PCS-12 and MCS-12 is 50 points, with a standard deviation of 10 points.

Statistical Methods: Data compilation and analysis were performed using MS Office Excel. Results were interpreted using appropriate tables and diagrams. The SF-12 scores were analyzed based on the standard scoring algorithms where every 10-point increment above or below 50 corresponds to one standard deviation away from the average.

Ethical Issues: Permission was obtained from the associated department prior to the commencement of the study. Informed consent was obtained from all patients before they were included in the study.

RESULT

The study included 113 participants, predominantly in the 50–59 age group (27.4%) and with a slight female majority (53.1%). Most participants lived in rural areas (52.2%) and were Hindu (52.2%). Regarding socio-economic status, the largest group belonged to the Lower Class (45.1%). Homemakers constituted the largest occupational group (40.1%), followed by skilled workers (30.1%). **(Table 1)**

Hypertension was the most common condition (42.5%), followed by Diabetes Mellitus (37.2%). The majority of patients (63.8%) had their disease for 2–10 years, and medication adherence was high at 92.2%. Nearly half (45.1%) reported an addiction history, with tobacco smoking being the most prevalent habit (41.2%). **(Table 2)** Most patients (60.2%) reported being *"limited a little"* in moderate physical

health. While 31% felt calm and peaceful "*a good bit of the time",* 44.2% indicated that emotional problems interfered with their social activities *"some of the time"*. **(Table 3)**

PCS & MCS scores of study participants were 44.87±11.21 & 46.76 ±10.21 respectively **(Table 4)**. Among different socio-demographic profile, upper age group (>50yrs) had significantly lower PCS score (41.59±9.77, t-3.268, p-0.001) than younger age group (≤50yrs, 48.21±11.67) and duration of having type 2 DM and or hypertension (≥10yrs) showing significantly lower PCS score (42.04±9.89, t-5.205, p-0.01) and MCS score (44.95±9.42, t-3.441, p-0.01) than who have lower duration of same morbidities. **(Table 4)**

Participants' perception of their general health was mixed, with the majority rating it as either "Good" (28.3%) or "Fair" (28.3%). Smaller groups rated their health as "Very Good" (16.8%) or "Poor" (16.8%). **(Figure 1)**. Pain significantly impacted daily work, with 31% of patients experiencing *"a little bit"* of interference and 27.4% reporting "moderate" interference. Only 8% of participants reported no pain interference at all. **(Figure 2)**

DISCUSSION

The present cross sectional study was conducted among adult patients having either type2 diabetes or hypertension or both attending at Medicine OPD of Calcutta National Medical College, Kolkata to assess HRQoL

From this study it was found 26.5% study participants perceived their general health condition was poor to very poor and 61% study participants felt pain interfering their normal work moderate to extreme level.

From the present study it was found PCS & MCS scores are 44.87±11.21 & 46.76 ±10.21 respectively and these values are lower than original SF-12 PCS (50±10) and MCS (50±10).[7] In a study in Pakistan conducted by Al-Mandhari A et al.,[12] found PSC mean 39±11 and MSC mean 44±10 among study participants. In another study in Pakistan done by M.Riaz.,[10] PSC mean value was 38.02±10.56 and MSC mean value was 36.5±10.34.

In the present study older study participants have significantly lower PCS (p-0.001) and MCS (p-0.014) mean value than younger one study participants and significantly lower value of PCS score (p-0.01) and MCS score (0.01) among study participants who have longer duration (>10yrs) of Type 2 DM and or hypertension than lower duration of the same. Male, rural & addicted study participants have more value of PCS score & MCS score than their counter part but that are not significant.

In a study conducted by M. Riaz.,[10] in Pakistan, Males have significantly higher MCS (p-0.0001) score and PCS (p-0.0001) score than female study participants but both scores difference are not significantly related with age groups. In another study conducted by AM. Ahmed.,[12] in Pakistan, found PCS score and MCS score are significantly more among male (p-0.001, p-0.005), lower age group (p-0.001, p-0.043) and non smoker (p-0.002, p-<0.001) study participants than female, higher age group and smoker respectively.

In another study in India conducted by Pyo E et al.,[11] it was found that men showed significantly higher PCS score (p-<0.0001) and MCS score (p-0.001), PCS (p-0.03) score was significantly lower in higher age group than younger group but MCS (p-0.22) score was not significantly different among age groups.

LIMITATIONS

This is single institution based and convenient study, hence limited scope of generalizability of the result . Sample size is small. Multicenter study or community based study would be better option.

CONCLUSION

From the present study it was concluded that health related quality of significantly lower among older group of persons than younger one and those who have longer duration of morbidities than shorter duration of the same. Though perception about own self general health are fair to good, physical and mental health quality level among Indian lower than US population.

CONFLICT OF INTEREST

None Declared

FUNDING

Not declared

Table 1: The socio-demographic characteristics of participants (n=113)

Characteristics	Category	Frequency (n)	Percent (%)
Age Group (years)	30-39	21	18.6
	40-49	30	26.6
	50-59	31	27.4
	60-69	20	17.7
	70-79	11	9.7
Gender	Male	53	46.9
	Female	60	53.1
Region	Rural	59	52.2
	Urban	54	47.8
Religion	Hindu	59	52.2
	Islam	49	43.4
	Christian	5	4.4
(Modified BG Prasad 2023)	Upper Class	12	10.6
	Upper Middle Class	14	12.4
	Middle Class	19	16.8
	Lower Middle Class	17	15.1
	Lower Class	51	45.1
Occupation	Professional	13	11.5
	Business Owner	10	8.9
	Skilled	34	30.1
	Unskilled	10	8.9
	Homemaker	46	40.1
Total		**113**	**100**

Table 2: The clinical characteristics and habits of participants (n=113)

Clinical Characteristics	Category	Frequency (n)	Percent (%)
Type of Morbidity	Hypertension	48	42.5
	Diabetes Mellitus	42	37.2
	Both	23	20.3
Duration of Disease	< 2 years	25	22.2
	2 to 10 years	72	63.8
	> 10 years	16	14
Medication Status	On Medication	104	92.2
	No Medication	9	7.8
Addiction History	Yes	51	45.1
	No	62	54.9
Pattern of Addiction (among those with addiction)	Smoking Tobacco	21	41.2
	Chewing Tobacco	12	23.5
	Alcohol	13	25.5
	Others	5	9.8
Total		**113**	**100.0**

Table 3: Health-Related Quality of Life (HRQoL) indicators (n=113)

HRQoL Domain	Response Category	Frequency (n)	Percent (%)
Physical Health			
Limitation in Moderate Activities	Yes, Limited a lot	15	13.3
	Yes, Limited a little	68	60.2
	No, Not limited at all	30	26.5
Physical Role Functioning			
Accomplished less than usual	Yes	68	60.2
Limited in kind of work	Yes	58	51.3
Pain			
Pain Interference with Work	Not at all	9	8
	A little bit	35	31
	Moderately	31	27.4
	Quite a bit	30	26.5
	Extremely	8	7.1
Emotional Health			
Felt Calm & Peaceful	A good bit of time	35	31
Felt Downhearted & Blue	A little of the time	28	24.6
Emotional problems interfering with social activities	Some of the time	50	44.2

Table 4: Differences of SF-12 scores among socio-demographic profile & morbidities of the study subjects (n-113)

Socio-demographic profile& Morbidities		PCS score		MCS score	
		Mean± SD	t, p	Mean± SD	t, p
All		44.87±11.21		46.76±10.21	
Age (yrs)	≤50	48.21±11.67	3.268, 0.001*	49.13±10.41	2.498, 0.014*
	>50	41.59±9.77		44.44±9.53	
Gender	M	45.7476±11.65	1.101, 0.273	47.4729±10.43	0.981,0.328
	F	43.3351±10.33		45.5126±9.81	
Religion	Hindu	44.01±10.88	0.81, 0.42	46.2±10.5	0.573, 0.568
	Muslim	45.72±11.55		47.31±9.97	
Residence	Urban	44.41±11.43	0.558, 0.578	46.33±10.17	0.575, 0.566
	Rural	45.62±10.93		47.47±10.34	
Addiction	Absent	43.39±10.7	1.278, 0.204	46.83±9.84	0.065, 0.948
	Present	46.09±11.55		46.7±10.57	
DM	Absent	46.62±11.72	1.303, 0.195	47.31±11.12	0.445, 0.657
	Present	43.80±10.83		46.42±9.67	
HTN	Absent	43.6±11.78	0.942, 0.348	47.02±9.62	0.211, 0.833
	Present	45.65±10.85		46.6±10.62	
Duration	≥10yrs	42.04±9.89	5.205, 0.010*	44.95±9.42	3.441, 0.010*
	<10yrs	53.48±10.69		52.25±10.68	

**Statistically significant*

Figure 1: Distribution of Perceived General Health (n=113)

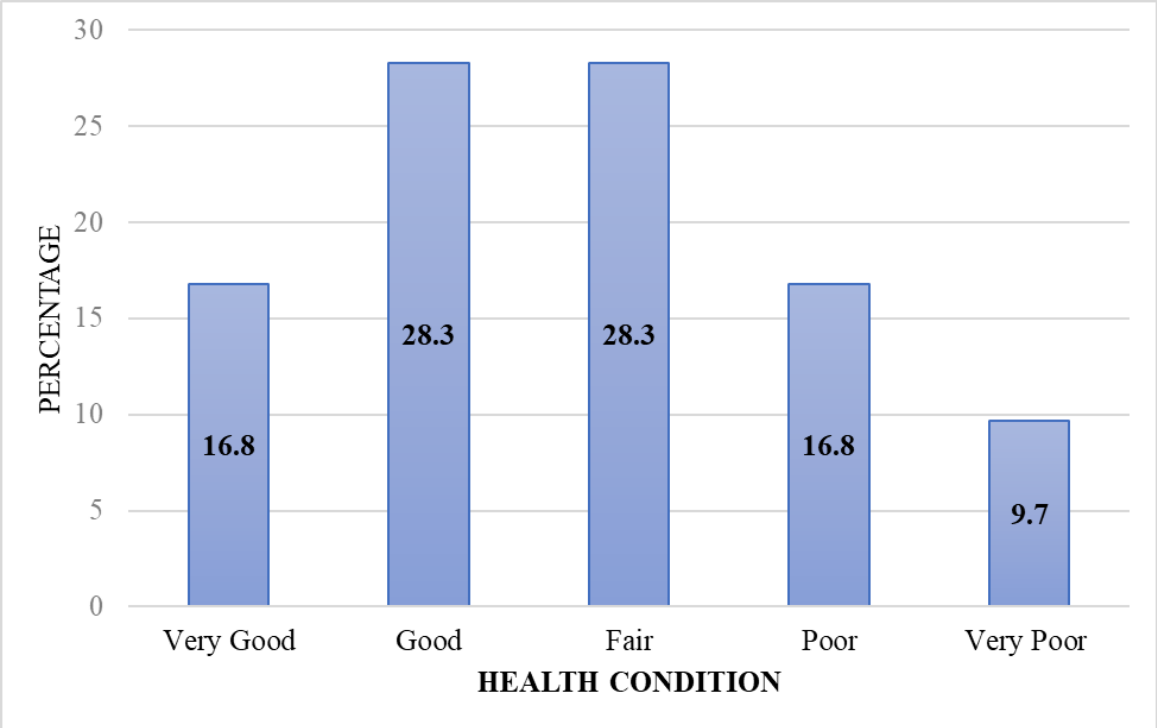

Figure 2: Pain interfering with normal work (Last 4 weeks) (n=113)

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