

Comparing quality of life difference between diabetics and non-diabetics during the SARS-CoV-2 pandemic and post-pandemic: A web-based cross-sectional study India

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ABSTRACT

Background: The COVID-19 pandemic has irreversibly altered the global landscape, with far-reaching consequences for individuals' quality of life (QOL). In India, the series of lockdowns imposed to combat the pandemic presented unique challenges, exacerbating mental health concerns and amplifying anxiety and discontent among the population. Notably, the pandemic's impact on QOL has been unevenly distributed, with diabetic individuals potentially facing distinct challenges compared to their non-diabetic counterparts. Existing research in India has primarily focused on the health-related concerns of diabetic individuals, leaving a significant knowledge gap regarding the QOL of non-diabetic individuals during and following the pandemic. A comprehensive understanding of QOL differences between diabetic and non-diabetic populations is crucial for developing targeted interventions and improving overall well-being.

Objective: This study aims to address this gap by exploring and comparing the QOL of diabetic and non-diabetic individuals in India during and after COVID-19, providing valuable insights into the pandemic's impact on this critical aspect of health.

Materials and methods: A cross-sectional, comparative online-based survey study was conducted among 212 participants (diabetic and non-diabetic) aged 18 years and below 60 years visiting SRM General Hospital, between July and August 2021 during the COVID-19, and their self-reported scores were compared two years post-pandemic. A snowball sampling method was employed due to the pandemic's dynamic nature and online data collection feasibility. The RAND SF-36, a widely used 36-item quality-of-life questionnaire, was administered online via Google Forms and distributed through social media platforms and email invitations. Paired t-tests compared quality of life (QOL) during and after the SARS-CoV-2 pandemic. Multivariate regression analysis identified independent predictors influencing RAND SF-36 subscale scores.

Results: The study involved the collection of responses from a total of 212 participants, with a mean age of 46.61 ± 17.4 years. The RAND SF-36 questionnaire assessed the quality of life (QOL) during and after the SARS-CoV-2 pandemic. The results revealed significant differences in the general (45.8 ± 13.0 vs 64.9 ± 19.7 ; $p=0.001$) and mental health (53.5 ± 12.3 vs 62.7 ± 12.8 , $p<0.001$) between the two time periods. Furthermore, the study revealed age ($\beta=-0.369$, $p=0.004$, 95%CI [-0.608, -0.101]) and employment status ($\beta=-2.11$, $p=0.041$, 95%CI [-0.083, -4.139]) showed significant negative association with physical health-related component. In addition, the duration of comorbidities ($\beta=-5.326$, $p=0.047$, 95%CI [-11.408, -0.756]) gravely affected the mental health component, respectively.

Conclusion: Significant differences were noted in quality of life (QOL) between the SARS-CoV-2 pandemic period and after, with lower general health and mental health scores shown in diabetics as compared to non-diabetic individuals. Older

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age and unemployment were associated with worse physical health QoL, while the longer duration of comorbidities negatively impacted mental health QoL regardless of diabetes status. These findings suggest the pandemic substantially affected various aspects of QoL, underscoring the need for targeted interventions to support vulnerable populations.

Introduction

The impact on healthcare systems and communities was profound as COVID-19 cases surged worldwide, particularly in low and middle-income countries like India. India implemented comprehensive mitigation measures, including a nationwide lockdown from March 24, 2020, mandatory mask protocols, social distancing requirements, and travel restrictions, followed by a phased reopening and vaccination drive. These measures, while necessary for containing viral spread, created unique challenges for chronic disease management, particularly for the estimated 77 million Indians living with diabetes. The World Health Organisation's 2020 report, examining 163 countries, revealed that approximately half experienced significant disruptions in diabetes care and management of associated comorbidities during the pandemic. By March 11, 2021, India had recorded more than 11 million COVID-19 cases and 158,000 deaths, with diabetic patients facing disproportionate risks. The spread of COVID-19 in India was particularly concerning due to the country's large and densely populated areas, widespread poverty, high migration rates, and high prevalence of poorly controlled chronic conditions.^{3,4} Patients with diabetes faced unique challenges during the pandemic, requiring specialized attention from public health agencies. The disease burden for diabetic COVID-19 patients was distinctly higher, requiring more intensive monitoring protocols, extended hospital stays (averaging 4-7 days longer than non-diabetic patients), and increased critical care services. The case-fatality ratio was notably higher in individuals with diabetes (10.5%) compared to the general population (2.3%), highlighting their vulnerability during the pandemic.⁵⁻⁷

The impact extended beyond direct health outcomes to affect various aspects of quality of life. Diabetic patients reported greater difficulties in maintaining glycemic control due to restricted physical activity, dietary changes during lockdown, and limited access to healthcare services. Studies indicated that diabetic COVID-19 patients experienced higher rates of anxiety and depression, more significant disruptions in routine medical care, and greater economic burden compared to non-diabetic individuals. While both groups faced challenges from social isolation and economic uncertainties, diabetic patients reported additional stressors related to disease management and fear of COVID-19 complications.

Health-Related Quality of Life (HRQOL), defined as the general perception of individuals regarding their position in life and the impact of disease across physical, psychological, and social domains, showed particular deterioration among diabetic patients. While the pandemic caused an 8% reduction in perceived HRQOL worldwide, this reduction was more pronounced in the diabetic

population, particularly in psychological well-being and disease management domains. The focus during the pandemic was predominantly on COVID-19's impact on diabetic subjects, while non-diabetic individuals with other illnesses received relatively less attention.^{10,11} Individuals during the COVID-19 outbreak might experience extreme psychological cessation, i.e., loneliness, boredom, and anger, due to social distancing, quarantine, and isolation.¹² This subsequently causes psychological distress; studies have evidenced that psychological distress influences the quality of life. Previous studies reported that the COVID-19 outbreak caused mild psychological stress, i.e., physical and mental health, and this psychological stress influences quality of life.¹³

Since early 2022, as life began returning to normal, understanding the differential impact on diabetic versus non-diabetic populations has become crucial for developing targeted interventions and support systems. Web-based surveys have emerged as a feasible method for reaching target populations while maintaining social distancing protocols.¹⁴ Therefore, this study aims to evaluate and compare the quality of life between diabetic and non-diabetic individuals during and after the COVID-19 pandemic in India, providing valuable insights into how the lockdowns impacted various mental and general health aspects across these populations. To accomplish this comparison, we carried out an online web-based cross-sectional study in which we invited all diabetic and non-diabetic individuals we could reach. In addition, we assessed and compared differences in QoL in diabetic and non-diabetic individuals in India during and after the pandemic outbreak and examined the impact of the predictors, including age, presence of comorbidities, and occupation status, that have influenced QoL in diabetic and non-diabetic individuals.

Materials and methods

Study design and population

This cross-sectional study, an online-based survey, targeted individuals aged 18 years and older, comprising diabetic (DM) and non-diabetic (non-DM) participants. The study population consisted of adults from various social groups, such as teachers, students, researchers, Bankers, and development workers.

Sampling and sample size

A snowball sampling method was employed due to the pandemic's dynamic nature and because social distancing is a crucial issue during the COVID-19 outbreak. Two hundred and twelve participants (DM and non-DM) completed the online survey between July and August 2021 (during the COVID-19 pandemic) and again after three years post-pandemic outbreak. Given the unprecedented

nature of the COVID-19 pandemic and the rapid need to collect data, we prioritize timely data collection over a priori sample size determination; this study relied on a convenience sampling approach. The sample size was determined by the number of participants who responded to the online survey within a specified timeframe.

Inclusion criteria

The following inclusion criteria were: respondents aged 18 years above and below 60, diagnosed with diabetes with more than 3 months. Non-diabetic by self-reported (with medical reports, no history of diabetes) or by a physician and had admittance to a computer, smartphone, and internet to complete the questionnaire.

Exclusion criteria

1. Incomplete or partially completed questionnaires.
2. Participants provided adequate or consistent details.

Data collection

The research was conducted with ethical approval from SRM Medical College Hospital and Research Centre (approval number 2168/IEC/2020). The online questionnaire (RAND SF-36) was administered using Google Forms. It was shared with individuals visiting SRM Medical College and Research Hospital, Chennai, through online social media platforms, WhatsApp, and email invitations to reach them. The survey design prevented participants from modifying their responses post-submission, and completion time was estimated at 4-5 minutes. Informed consent was obtained through a statement mentioned in the questionnaire's section regarding the confidentiality and anonymity of the study before participation, emphasizing voluntary participation and confidentiality of responses. Reminder messages were sent to non-respondents every two days via social media platforms to ensure optimal participation. The initial data collection phase was conducted from July 23, 2021, to August 23, 2021, followed by a post-pandemic follow-up phase from May 1, 2024, to May 31, 2024, targeting the same participants across various regions of India. The uploaded survey materials were circulated using snowballing techniques. To avoid social desirability and response bias, we guaranteed that all the data would be used for academic and research purposes by ensuring respondents' privacy and anonymity.¹²

Instrument

The RAND short-form healthy survey (SF-36) questionnaire is an excellent tool for measuring health-related quality of life. It demonstrates strong psychometric properties, with internal consistency reliability (Cronbach's

alpha greater than 0.85, reliability coefficient greater than 0.75 for all dimensions as evidenced in previous study with its established content validity.⁽¹⁵⁾ The questionnaire entails of 36 questions and measures 8 health-related dimensions: physical functioning (PF), role limitation due to physical health (RP), social functioning (SF), bodily pain (BP), role limitation due to emotional health (RE), mental health and emotional well-being (MH), energy/fatigue (EF), role limitation due to emotional problems (RE), and general health (GH). Its validity and reliability have been established in several countries,¹⁶ including the Indian population,^{17,18} to assess health outcomes in various diseased populations.¹⁸ QoL is the composite of two domains: Physical health-related quality of life (PQoL) and mental health-related quality of life (MQoL).¹⁹

The physical domain comprises physical functioning, limitations due to physical pain, and general health. The mental subdomain includes social functioning and role limitation due to emotional and mental health. (20) Each subscale has a score range of 0 to 100. The replies were all scaled from one hundred to zero. Higher HRQOL ratings imply better health, while lower values suggest no health. For each SF-36 subscale, the average score was used to categorize HRQOL as either poor (ranging from 0 to 49) or good (ranging from 50 to 100).¹⁹ The scores signify the proportion of the maximum achievable score obtained.

Data analysis

The responses were collated in MS Excel 2021, and the composite scores were calculated by summing the subscale scores given in the questionnaire manual. Descriptive statistics such as frequency, mean, and standard deviation were used for other mean comparisons. Paired t-tests were performed to compare the different QOL scores and other domains during and after the COVID-19 outbreak. Multivariate regression analysis was performed to identify independent predictors influencing RAND SF-36 subscale scores.

Results

The table shows the study included 75 diabetic and 137 non-diabetic participants, totaling 212. The gender distribution indicates that 52.35% of the participants were male, and 47.65% were female. The duration of diabetes is further broken down into four categories: 3-6 months, 6-1 year, 5-10 years, and 10 years. The highest percentage (28%) of participants had diabetes for 5-10 years, followed by 3-6 months (18.7%) and 6-1 years (18.7%). Table 1 also provides information on the occupation status of the participants, including engineer, student, medical assistant, teacher, self-employed, and housewife.

Table 1. Demographic characteristics of the study participants.

Variables	Diabetic	Non-diabetic	Frequency	Percentage (%)
N	75	137	-	-
Male (N)	45	66	111	52.35
Female (N)	30	71	101	47.65
Duartion of diabetes (N)				
3-6 months	21	NA		28
6 -1 year	14			18.7
5-10 years	21			28
10 years	19			25.3
Employment status				
Engineer	3	9	12	5.2
Student	NIL	44	44	20.7
Medical assistant	6	8	14	6.6
Teacher	12	13	25	11.1
Self-employed	17	21	38	17.9
Housewife	21	20	41	20.7
Researcher	-	3	3	1.4
Retired	8	4	12	5.6
Others (tailor, radiographer,electricity maintenance, advocate)	7	6	13	6.13
Government service	6	4	10	4.7

Figure 1 represents the pie- chart showing that hypertension is the most common comorbidity, affecting 43% of the diabetic individuals in the study. Cardiac disease and other unspecified comorbidities (such as anemia, tuberculosis, and leukemia) are the next most prevalent, each affecting 14% of the participants. Renal disease, depression and anxiety, and thyroid disorders affect 9%, 10%, and 6% of diabetic individuals, respectively. Stroke

is the least common comorbidity, affecting 4% of the participants.

This information is crucial for understanding the overall health status of individuals with diabetes and the importance of comprehensive management strategies that address the primary condition and the associated comorbidities.

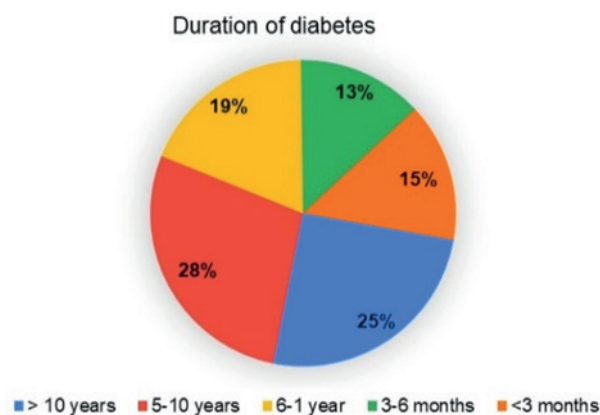


Figure 1. The prevalence of comorbidities among individuals with diabetes.

Figure 2 illustrates the duration and prevalence of pre-existing comorbidities among non-diabetic individuals. Figure 2A shows the pie chart depicting the duration of pre-existing comorbidities among non-diabetic participants. The distribution shows that 38% of participants reported comorbidities lasting 6-1 year, followed by 21% reporting conditions of <3 months duration, 17% with >10 years duration, 16% with 5-10 years duration, and 8% with 3-6 months duration. The distribution of self-reported

comorbidities among non-diabetic participants during the COVID-19 pandemic. Hypertension was the most prevalent condition (21%), followed by liver disease (16%), renal disease (15%), and equal proportions (13% each) of cardiac disease, depression & anxiety, and stroke. Thyroid disorders accounted for 5%, while other conditions (including anemia, TB, and leukemia) comprised 4% of reported comorbidities, as shown in Figure 2B.

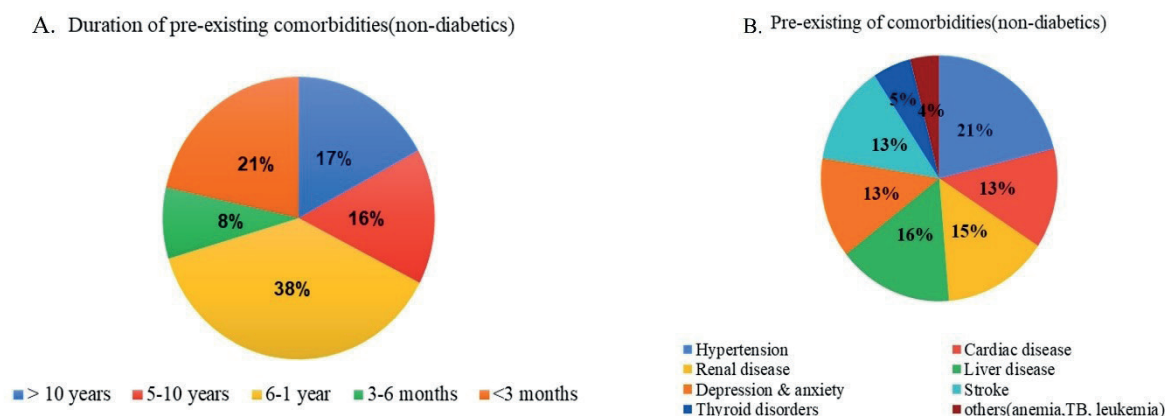


Figure 2. Duration of pre-existing comorbidities and prevalence of comorbidities among individuals with non-diabetics.

Table 2 represents a comparative analysis of the quality of life (QoL) domains in diabetic individuals during and after the SARS-CoV-2 outbreak. The data is organized into three primary columns: QoL during SARS-CoV-2, QoL after SARS-CoV-2, and the corresponding *p* value. The QoL domains assessed include general health (GH), physical functioning (PF), role limitation due to physical health (RP), role limitation due to emotional health (RE), energy/fatigue, mental health (MH), social functioning (SF), and bodily pain (BP).

The results (Table 2) show that the mean scores for most QoL domains in diabetic individuals improved significantly after the SARS-CoV-2 period compared to during the pandemic. The General Health (GH) score increased from 45.8 ± 13.0 during SARS-CoV-2 to 64.9 ± 19.7 after SARS-CoV-2, with a *p* < 0.001, indicating a statistically

significant improvement. Similarly, Physical Functioning (PF) and Mental Health (MH) scores also showed significant improvements, with *p* < 0.001. Role limitation due to physical health (RP) improved from 64.8 ± 33.5 to 54.9 ± 10.7 , with a *p* value of 0.021, suggesting a decrease in role limitations. The only domain that did not show a statistically significant change was Role limitation due to emotional health (RE), with a *p*-value of 0.299. These findings highlight the substantial impact of the SARS-CoV-2 pandemic on the quality of life of diabetic individuals and the subsequent improvements observed after the pandemic. The results underline the importance of comprehensive disease management strategies that address this vulnerable population's physical and mental well-being.

Table 2. Comparison of different quality of life domains in diabetics during and after the SARS-CoV-2 outbreak.

QoL Domain	QoL (during SARS-CoV-2)	QoL (after SARS-CoV-2)	<i>p</i> value
General health (GH)	45.8±13.0	64.9±19.7	<0.001
Physical functioning (PF)	60±6.2	69.4±18.9	<0.001**
Role limitation due to physical health (RP)	64.8±33.5	54.9±10.7	0.021*
Role limitation due to emotional health (RE)	65±22.5	69.7±24.2	0.299
Energy/fatigue	58.9±13.4	58.8±10.4	0.963
Mental health (MH)	53.5±12.3	62.7±12.8	<0.001**
Social functioning (SF)	57.6±22.5	50.3±15.3	0.029*
Bodily pain (BP)	67.5±19.2	70.7±21.1	0.357

Note: *significant *p* value, SD: standard deviation, **p* < 0.05 according to paired *t*-test.

Table 3 represents a comparative analysis of the quality of life (QoL) domains in non-diabetic individuals during and after the SARS-CoV-2 pandemic. The data is organized into five primary columns: QoL domains, QoL during SARS-CoV-2, QoL after SARS-CoV-2, and *p* value.

The QoL domains assessed include overall QoL (RAND SF-36), general health (GH), physical functioning (PF), role limitation due to physical health (RP), role limitation due to emotional health (RE), energy/fatigue, mental health (MH), social functioning (SF), and bodily pain (BP).

Table 3. Comparisons of different quality of life in the non-diabetic during and after the SARS-CoV-2 outbreak.

Domains	QOL (during SARS-CoV-2)	QOL (after SARS-CoV-2)	p value
Overall QOL(RANDSF-36)	57.49(9.01)	60.22(8.8)	0.034*
General health (GH)	41.2(13.9)	45.37(12.68)	0.037*
Physical Functioning (PF)	66.2(19.1)	71.6(18.9)	0.049*
Role limitation due to physical health (RP)	64.3(26.5)	73.3(30.79)	0.034*
Role limitation due to emotional health (RE)	62(31.03)	72.11(32.6)	0.030*
Energy/fatigue	49.8(13.8)	50.4(13.84)	0.770
Mental health (MH)	45.6(13.1)	43.3(14.0)	0.247
Social functioning (SF)	56.9(21.9)	60.5(21.53)	0.246
Bodily pain (BP)	70.0(19.1)	70(20.9)	0.995

Note: *significant p value, SD: standard deviation, **p<0.001, *p<0.05 according paired t test

The results show that most QoL domains improved in non-diabetic individuals significantly after the SARS-CoV-2 outbreak compared to during the pandemic. The Overall QoL (RAND SF-36) score increased from 57.49±9.01 during SARS-CoV-2 to 60.22±8.8 after SARS-CoV-2, with a p-value of 0.034, indicating a statistically significant improvement. The General health (GH) score improved from 41.2±13.9 to 45.37±12.68, with a p value of 0.037. Similarly, physical functioning (PF) also significantly improved, with a p value of 0.049. Role limitation due to physical health (RP) and Role limitation due to emotional health (RE) demonstrated significant improvements, with p value of 0.034 and 0.030, respectively. The remaining domains, including energy/fatigue, mental health (MH), social functioning (SF), and bodily pain (BP), did not show statistically significant changes between the two-time points.

These findings highlight the considerable impact of the SARS-CoV-2 pandemic on the quality of life of non-diabetic individuals and the subsequent improvements observed after the outbreak. The results underline the

importance of addressing the general population's physical and mental well-being during and after such public health crises.

The results in Table 4 provide insights into factors influencing overall quality of life in mental health, general health, and role limitation to emotion. The analysis reveals that age had a significant association with several QoL domains. Specifically, age was an essential predictor of general health (GH), with a regression coefficient (β) of 0.420 and a p value of 0.001. The 95% confidence interval (CI) for the age effect on GH was [-0.252, -0.558], indicating that older age was associated with poorer general health-related QoL. Similarly, age was also significantly related to physical functioning (PF) (β = -0.331, p<0.001, 95% CI [-0.484, -0.179]), role-physical (RP) (β = -0.369, p=0.004, 95% CI [-0.608, -0.101]), fatigue (β = -0.239, p=0.013, 95% CI [-0.183, -0.486]), and social functioning (β = -0.312, p=0.001, 95% CI [-0.493, -0.132]), with older age being related to lower QoL in these domains.

Table 4. Multifaceted factors associated with poor QoL SF-36 subscales during and after the SARS-CoV-2 outbreak.

Variables	Predictor	β	B	p value	R ²	95% CI value
GH	Age	0.420	0.389	0.001*	0.392	-0.252,-0.558
	Employment status	-1.295	-0.155	0.035*		-2.518,-0.071
PF	Age	-0.331	-0.319	0.001	0.306	-0.484,-0.179
	Employment status	-1.691	-0.204	0.003		0.471,2.911
RP	Age	-0.369	-0.217	0.004*	0.256	-0.608,-0.101
	Employment status	-2.111	0.158	0.041*		-0.083,- 4.139
RE	Duration of comorbidities	-5.326	-0.136	0.047*	0.044	-11.408, -0.756
Energy/fatigue	Age	-0.327	0.324	0.001*	0.092	-0.183,-0.486
	Employment status	-1.303	-0.159	0.035*		-2.532,-0.109
SF	Age	-0.312	-0.257	0.001*	0.056	-0.493,-0.132
BP	Age	-0.173	-0.145	0.057	0.041	-0.352,0.005
	Comorbidities duration	2.113	0.131	0.058		-0.072,4.298

Note: GH: general health, PF: physical functioning, BP: bodily pain, RP: Role limitation due to physical health, RE: role limitation due emotional health, SF: social functioning, multivariate regression analysis, *significant p value, β : regression coefficient; B: stanardized regression coefficient.

In addition to age, the analysis also identified occupation status as a significant predictor of physical and mental health-related QoL components. Specifically, occupation status was significantly associated with GH ($\beta = -1.330$, $p = 0.035$, 95% CI [-2.518, -0.071]), RP ($\beta = 2.1465$, $p = 0.038$, 95% CI [-0.083, 4.139]), and the energy/fatigue domain ($\beta = -1.303$, $p = 0.035$, 95% CI [-2.532, -0.109]), suggesting that employment status was significant association with poor QoL in these areas. Furthermore, the study found that the duration of comorbidities was a substantial predictor of the role-emotional (RE) domain, with a regression coefficient (β) of -5.326 and a $p = 0.047$ 95% CI [-11.408, -0.756]. This indicates that the longer duration of comorbidities was associated with poorer emotional role-related QoL.

These findings contribute to understanding the multifaceted factors that influence physical and mental health-related QoL components, which can inform the development of targeted interventions and support strategies to improve the overall quality of life for individuals affected by various health conditions.

Discussion

The present study demonstrates significant improvements in multiple Quality of Life (QoL) domains following the SARS-CoV-2 period, with notable differences between diabetic and non-diabetic populations. In diabetic subjects, substantial improvements were observed in general health (GH) scores (45.8 ± 13.0 to 64.9 ± 19.7 , $p < 0.001$), physical functioning (PF), and mental health (MH) domains ($p < 0.001$). These findings align with research by Al-Sofiani *et al.*,²¹ who reported similar improvements in QoL metrics among diabetic patients post-pandemic, particularly in mental health domains. The significant enhancement in MH scores suggests successful adaptation to pandemic-related healthcare challenges and restoring routine diabetes management practices.

Non-diabetic subjects exhibited more modest but still significant improvements in their overall QoL scores (57.49 ± 9.01 to 60.22 ± 8.8 , $p = 0.034$) and specific domains such as general health (41.2 ± 13.9 to 45.37 ± 12.68 , $p = 0.037$). This pattern of improvement, while less pronounced than in diabetic subjects, corresponds with findings from Badinlou *et al.*, who observed gradual QoL recovery in the general population following the acute phase of the pandemic. The differential improvement rates between diabetic and non-diabetic groups might be attributed to the more structured healthcare engagement typically required for diabetic patients, resulting in better adaptation to post-pandemic healthcare delivery systems.²²

A notable finding was the lack of significant improvement in Role limitation due to emotional health (RE) among diabetic subjects ($p = 0.299$), while non-diabetic individuals showed considerable progress in this domain ($p = 0.030$). This disparity suggests persistent emotional challenges among diabetic individuals, possibly due to ongoing disease management burdens compounded by pandemic-related stressors. Similar findings were

reported by Meher D *et al.*, who identified sustained emotional health impacts among chronic disease patients post-pandemic.²³

The present study revealed that quality of life was significantly influenced by three independent factors: employment status and comorbidity duration, regardless of diabetic status. Notably, age emerged as a particularly robust predictor across multiple domains of the SF-36 HRQoL assessment, corroborating previous research findings.^{24,25} This relationship reflects how aging naturally leads to various physical changes in the body, increasing susceptibility to additional health conditions and contributing to an overall decline in health and well-being.²⁴ As people age, their HRQoL (health-related quality of life) leads to a gradual decline in their quality of life metrics.²⁶ This age-related decline was particularly pronounced in COVID-19, where SF-36 scores showed significant decrements among elderly populations.²⁷ This suggests that the aging process negatively affected the quality of life (QoL) scores of diabetes and non-diabetic individuals during the COVID-19 pandemic.²⁴

The predictive analysis revealed employment status as a significant determinant of physical and mental health-related QoL components, affecting General Health ($\beta = -1.330$, $p = 0.035$), physical role ($\beta = 2.1465$, $p = 0.038$), and Energy/Fatigue domains ($\beta = -1.303$, $p = 0.035$); this could be due to the lower income. The unemployment and retirement rates during the COVID-19 lockdown experienced an economic recession, which aligns with the findings of a previous study that demonstrated who identified employment status as a crucial modifier of pandemic-related QoL impacts.^{21,28} These factors may cause individuals to be more worn out than their economically and educationally advantaged counterparts. The negative association between comorbidity duration and role-emotional functioning ($\beta = -5.326$, $p = 0.047$) underscores the cumulative impact of chronic health conditions on emotional well-being, consistent with a longitudinal study by Abdullah Saeed *et al.*²⁹

Our study presents several notable limitations. While practical, the cross-sectional, web-based design limited our ability to fully assess the long-term effects of the COVID-19 pandemic on health-related quality of life (HRQoL). Future research employing a longitudinal approach would help validate and expand upon our findings.

Furthermore, our analysis did not incorporate several potentially influential variables that could affect quality of life outcomes. These include clinical markers like HbA1c, demographic factors such as education level, lifestyle factors including smoking and alcohol consumption, treatment modalities, and other health behaviors. Additionally, while our chosen methodology provided valuable insights, we acknowledge that using established tools like the WHO-QOL BREF might have offered more comprehensive measurements, particularly in assessing psychological health and social relationships among clinical populations. Future research should explore longer-term QoL trajectories and investigate the effectiveness of

targeted interventions for vulnerable populations identified in this study. Additionally, qualitative research could provide deeper insights into the mechanisms underlying the observed differences between diabetic and non-diabetic populations.

Conclusion

The COVID-19 pandemic had a significant impact on the quality of life for both individuals with diabetes and non-diabetics. However, the recovery trends differed between the two groups. After the pandemic, non-diabetic individuals experienced more substantial improvements in their quality of life compared to those with diabetes. Individuals with diabetes faced more significant challenges in managing their condition and experienced increased levels of anxiety and depression.

While both groups showed improvements in their quality of life, the discrepancy highlights the need for specialized assistance and resources for individuals with diabetes. This would help address their unique problems and facilitate more equitable recovery. The pandemic contributed to indirect economic burdens and reduced work productivity across both groups. However, the disproportionate impact on individuals with diabetes underscores the importance of tailored support to ensure an equitable post-pandemic recovery.

Conflict of Interest

There are no conflicts of interest

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