Research Article

Valuing Out-of-Pocket Expenditure and Health Related Quality of Life of COVID-19 patients from Gujarat, India

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A B S T R A C T

Background: COVID-19 has financially burdened Government's healthcare system as well as households with COVID-19 patients. Present study aims to value the out-of-pocket expenditure and health-related quality of life (HRQOL) using EQ-5D-5L among COVID-19 patients who sought treatment in COVID-19 center of a tertiary hospital in Vadodara, Gujarat.

Methods: The present analysis is a prospective real-world study. The questionnaire included socio-demographic data, health status, out-of-pocket expenses associated with treatment of COVID-19, and EQ-5D-5L scale. The relationships of all factors and the scores of EQ-5D-5L were analyzed. All costs are reported in Indian Rupees and then converted to US dollars.

Result: Out of total 138 participants included in the study, 108 (78.3%) participants had mild to moderate symptoms of COVID-19 infection and were admitted to COVID Care Centre (CCC) while 30 (21.7%) patients had severe disease and were admitted to COVID Intensive Care Unit (ICU). Mean total out of pocket expenditure for the patient admitted to COVID CCC and COVID ICU was INR 11,333.07 (31,707.68) and 27,374.17 (54,205.72) respectively. The respondents obtained a mean EQ-5D-5L index score of 0.755 (±0.180) for patients under COVID CCC and 0.513 (±0.378) for COVID ICU admitted patients. EQ-VAS index was 75.05 (±12.12) and 62 (±16.37) respectively, signifying the HRQoL from patient's perspective.

Conclusion: COVID-19 patients have suffered from significant physical and psychological impairment. It is essential to prospectively monitor the individuals who suffered from COVID-19 to understand the long term impact on HRQoL, as well as to inform prompt and efficient interventions to alleviate suffering.

Keywords: Out-of-Pocket Expenditure, EQ-5D-5L, Health Related Quality of Life, COVID-19

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Introduction

As the world is trying to combat the ongoing COVID-19 pandemic, there were reports of private hospitals charging exorbitantly for treating COVID-19 patients.[1] Government intervened and regulations were imposed on the fees that private hospitals can charge for testing and treating patients for COVID-19.[1] In addition, Government of Gujarat (GoG) also entered into Memorandum of Understanding with 31 private and trust-run hospitals across 26 districts and designated them as COVID-19 center to extend free healthcare services to the patients in the month of April 2020. All the expenses incurred by these COVID-19 centers are borne by the GoG.[2]

As countries have resorted to various approaches, policy makers and health economic evaluation experts argue whether to adopt "whatever it takes'' approach to save lives threatened by the COVID-19 epidemic or to choose an approach keeping economy at the center.[3] Since healthcare resources are limited, it is recommended to adopt a cost/ Quality Adjusted Life-Years (QALY) gained approach for allocation of resources to the interventions that yield greater QALYs at the optimal cost.[4] Thus, to efficiently perform cost-effectiveness analysis, it is imperative to derive the context specific costs as well as HR-QoL for COVID-19 disease. The purpose of the present study was to assess the Out of Pocket Expenditure (OOPEs) incurred by the patients with COVID-19 disease and value their Health-Related Quality of Life (HR-QoL) using EQ-5D-5L from COVID center in Vadodara, Gujarat.

Methodology

All the patients tested positive for COVID-19 and admitted to COVID Care Centre at a tertiary hospital in Vadodara as well as COVID ICU during the 3-month period from May to July 2020constituted the study sample. The patients who died due to COVID-19 were excluded from the sample.

Respondents were contacted over phone twice. The first contact was aimed at identifying the HR-QoL during hospitalization. The next contact was made within one week of the discharge of the patient for collecting the data on OOPEs incurred.

Study Instrument

To identify the financial burden associated with COVID-19 treatment cost, the OOPE included both direct as well as indirect medical costs that the patient incurred. A structured questionnaire was constructed which included patients socio-demographic information, monthly income, cost data - cost incurred towards diagnosis, medication, hospitalization, transportation cost of both the patient and the family member, cost incurred towards boarding and lodging of the family member, expenses made for food and will also incorporate loss of wage of both the patient as well as the accompanying family member.

For assessing the health-related quality of life (HR-QoL), we adopted a validated and reliable EQ-5D-5L tool developed by EuroQol. A user license was obtained for the purpose of this study. EQ-5D-5L is a widely used generic measure of health status consisting of two parts. The first part (the descriptive system) assesses health in five dimensions (Mobility, Self-Care, Usual Activities, Pain/ Discomfort, Anxiety/ Depression), each of which has five levels of response (no problems, slight problems, moderate problems, severe problems, extreme problems/ unable to). This part of the EQ-5D questionnaire provides a descriptive profile that can be used to generate a health state profile. Each health state was potentially assigned a summary index score based on societal preference weights for the health state.

Health state index scores generally range from less than 0 (where 0 is the value of a health state equivalent to dead; negative values representing values as worse than dead) to 1 (the value of full health), with higher scores indicating higher health utility. The second part of the questionnaire consist of a Visual Analogue Scale (VAS) on which the patient rates his/ her perceived health from 0 (the worst imaginable health) to 100 (the best imaginable health). The EQ-5D questionnaire is cognitively undemanding, taking only a few minutes to complete.[5] The responses on each domain were converted to utility weights for each participant using Thailand valuation of the EQ-5D-5L. Considering the absence of a value set for Indian population, the draft guidelines for health technology assessment (HTA) by the HTA Board recommends the use of Thailand's tariff values till Indian value set is generated.[6]

In general, multidimensional health outcomes are reduced to a single index using health utilities. One of such utility measures include Quality-Adjusted Life-Years (QALYs) that measures the length of life (expressed in life-years [LYs]) using a multidimensional measure of health status, which is weighted by the health-related quality of life valued by a preference-based score.[7] Most of the economic evaluation guidelines are intended to be used for clinical studies and focus on measuring health (i.e., QALYs) as the main (or sometimes only) outcome measure of interest.[8] Since healthcare resources are scare, a cost per Quality Life Year (QALY) approach to COVID-19 is promising. A cost/ QALY approach could target resources to optimally improve quality of life of people under-going or underwent COVID-19 treatment.[9]

Statistical Analysis

Descriptive data were provided as mean (SD) or counts (percentages), as appropriate. Advanced statistical tests such as Pearson's Chi- Square test were used for analyzing

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categorical variables. All costs were in Indian Rupees (INR) and then converted to US dollars (USD).

Result

Of the total 138 participants included in the study during, 108 (78.3%) participants had mild to moderate symptoms of COVID-19 infection and were admitted to COVID Care Centre (CCC) or the isolation Ward of the hospital while 30 (21.7%) patients had severe disease and were admitted to COVID Intensive Care Unit (ICU). The mean age of the participants admitted to CCC was 44.75 (±11.78) years whereas for patients admitted to ICU it was 62.2 (±10.8) years. The mean hospitalization days for patients admitted to CCC was 8.84 while that for ICU was 10.37. The households were divided into income quartiles based on their monthly income. The socio-demographic profile of the participants is shown in Table 1.

More than three-fourth (75.4%) of our study participants were female. Majority of the participants had formal education and belong to the poorest socio-economic strata with family earning less the 20,000 INR per month.

Out of Pocket Expenditure (OOPE) Incurred by COVID-19 Patients

OOPE, direct and indirect expenses, borne by the patient as a result of COVID-19 disease are highlighted in Table 2.

The data reflects the cost details of patients admitted to a tertiary hospital in Vadodara district of Gujarat. For all the cost heads, the patients admitted to ICU incurred greater expenses except for loss of wage of an accompanying family member which was higher in-case of patient admitted

to CCC. The mean total out of pocket expenditure for the patient admitted to COVID CCC and COVID ICU was INR 11,333.07 (±31,707.68) and 27,374.17 (±54,205.72) respectively.

Table 1. Socio-demographic Characteristics of COVID-19 patients

	Frequency	Percentage
Gender		
Male	34	24.6
Female	104	75.4
Age		
Less than or equal to 18 years	0	0
19-59 years	111	80.4
60 years and above	27	19.6
Level of education		
Primary	48	34.8
Secondary	36	26.1
Under Graduate	43	31.2
Graduate and Above	6	4.3
Illiterate	5	3.6
Family's Monthly Income (INR) - self reported		
Poorest (<20,000)	78	56.5
Poor (20,000-40,000)	48	34.8
Rich (40,000-60,000)	5	3.6
Richest (>60,000)	7	5.1

Table 2. OOPEs incurred by COVID-19 patients

Type of Cost	Cost Heads	No of patients admitted in CCC incurring the cost (%) N=108	No of patients admitted in ICU incurring the cost (%) N=30	Median Cost-Ward* (INR)	Median Cost-Ward* (in USD)	Median Cost-ICU* (INR)	Median Cost-ICU* (in USD)
Direct Medical Costs	Hospitalization Cost	6 (5.5%)	3 (10%)	80000	1090.10	120000	1635.16
	Cost incurred to-wards Diagnosis	20 (18.5%)	2 (6.7%)	2750	37.47	3000	40.88
	Cost of Medicines	3 (2.7%)	2 (6.7%)	150	2.04	50062.5	682.17
Indirect Medical Costs	Travelling Cost (Patient)	84 (77.8%)	11 (36.7%)	500	6.81	1200	16.35
	Travelling Cost (Family Member)	62 (57.4%)	9 (30%)	450	6.13	1000	13.63
	Loss of Wage (Pa-tient)	51 (47.2%)	16 (53.4%)	4000	54.51	5000	68.13
	Loss of Wage (Fami-ly Member)	18 (16.7%)	6 (20%)	3550	48.37	4400	59.96

*The median cost is calculated for the patients who have incurred the cost.

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Table 3.Correlation between levels of problem across all five dimensions among COVID-19 patients admitted to ICU and CCC

Dimension	ICU Frequency (%)	CCC Frequency (%)	p-value
Mobility			
Level 1 (no problems)	4 (13.3)	47 (43.5)	<0.0001
Level 2 (slight problems)	15 (50)	46 (42.6)	
Level 3 (moderate problems)	5 (16.7)	12 (11.1)	
Level 4 (severe problems)	3 (10)	3 (2.8)	
Level 5 (extreme problems/ unable to do)	3 (10)	0 (0)	
Self- Care			
Level 1 (no problems)	3 (10)	62 (57.4)	<0.0001
Level 2 (slight problems)	14 (46.7)	35 (32.4)	
Level 3 (moderate problems)	8 (26.7)	9 (8.3)	
Level 4 (severe problems)	1 (2.2)	2 (1.9)	
Level 5 (extreme problems/ unable to do)	4 (13.3)	0 (0)	
Usual Activities			
Level 1 (no problems)	3 (10)	57 (52.8)	<0.0001
Level 2 (slight problems)	12 (40)	35 (32.4)	
Level 3 (moderate problems)	10 (33.3%)	15 (13.9)	
Level 4 (severe problems)	1 (3.3)	1 (0.9)	
Level 5 (extreme problems/ unable to do)	4 (13.3)	0 (0)	
Pain/ Discomfort			
Level 1 (no problems)	2 (6.7)	45 (41.7)	<0.0001
Level 2 (slight problems)	14 (46.7)	51 (47.2)	
Level 3 (moderate problems)	9 (30)	9 (8.3)	
Level 4 (severe problems)	2 (6.7)	2 (1.9)	
Level 5 (extreme problems/ unable to do)	3 (10)	1 (0.9)	
Anxiety/ Depression			
Level 1 (no problems)	2 (6.7)	19 (17.6)	0.033
Level 2 (slight problems)	11 (36.7)	20 (18.5)	
Level 3 (moderate problems)	8 (26.7)	45 (41.7)	
Level 4 (severe problems)	5 (16.7)	20 (18.5)	
Level 5 (extreme problems/ unable to do)	4 (13.3)	4 (3.7)	

*at 5% level of significance.

HR-QoL of COVID-19 Patients

A Pearson's Correlation test was run to assess the presence of significant difference between patients admitted to ICU and CCC across all five dimensions at 5% level of significance and 95% Confidence Interval. It was found that there was a statistically significant difference in reporting of mild to severe problems between patients admitted to ICU and CCC. The test results are shown in Table 3.

The Table 3 highlights the majority of the patients admitted to CCC report no to moderate issues across all the five dimensions which is contrary in cases of patients of ICU.

Table 4.Index Values and EQ- VAS Scores of COVID-19 patients

	ICU	CCC
EQ-5D-5L Index		
Mean (SD)	0.513 (0.378)	0.755 (0.180)
EQ-VAS		
Mean (SD)	62 (16.37)	75.05 (12.12)

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The index values obtained by descriptive system of the EQ-5D-5L tool and utility scores as per the patients rating of their health status on visual analogue scale are illustrated in Table 4.

Our findings helped quantify the deteriorated health state of COVID-19 patients. The index scores for ICU patients ranged from -0.421 to 0.881 while that for CCC ranged from -0.026 to 1.

Discussion

Out-of-pocket expenditure is already a common concern in India, particularly for people without insurance, and those in worse health. According to Pandey A et al.[10] out of pocket medical expenses make up about 62% of all healthcare costs in India. The National Health Policy 2017.[11] estimated that 7% of the Indian population is pushed into poverty each year because they are not able to afford the OOP costs. It is of even greater concern in the time of COVID-19 pandemic.

Although Government is bearing COVID Care cost, out-of-pocket costs is very high; INR 11,333.07 for patients in COVID Care Centre and INR 27,374.17 for patients admitted in COVID Intensive Care Unit. The cost in private sector is estimated to be alarmingly higher. We failed to find such similar studies and this could be a maiden attempt to evaluate the OOPE among COVID-19 patients.

It shows that people have to pay for individual healthcare from their own pockets rather than from insurance or government-aided health schemes.[8] Therefore, the cost of illness is affected by a household's economic status and by the type, severity, and duration of the illness.[12] This increase chances of "distressed health care financing" or "hardship financing".[10,13]

The index scores for ICU patients ranged from -0.421 to 0.881 while that for CCC ranged from -0.026 to 1 with a mean EQ-5D-5L index score of 0.755 and 0.513 respectively. A study done in France by Garrigues E et al. has estimated the HRQoL of COVID-19 patients 100 days post-discharge and found EQ-5D index score of 0.86 in patients admitted to ward and 0.82 in patients admitted to COVID-ICU. These index scores highlight morbidity in patients even after 100 days of discharge.[14] However, the perceptions of HRQoL vary across country and settings, thus it is important to have country –specific values for evidence based decision making.

To the best of our knowledge, this is the only study which attempts to calculate OOPE of COVID-19 treatment and HRQoL index scores for the Indian Context. Second, the costs and health outcome data were drawn directly from the study participants categorized as patients who sought treatment at COVID-ICU unit and at COVID-CCC.

Limitations of the study include sample only from one tertiary care hospital of Gujarat District which restricts the generalizability of the cost data. To derive utilities, we have used value sets of Thailand which is recommended by Department of Health Research, Government of India.9 Our analysis relied on estimating costs associated with health care utilization hence cost and HR-QoL of patients taking home-treatment were not included in the study. In addition, we did not include the productivity losses associated with prolonged bed rest if required in some cases. We only measured cost for the duration of hospitalization when the treatment ceased and therefore do not know the long-term cost.

Conclusion

The study provides important evidence on direct and indirect out-of-pocket expenditure and HRQoL in patients underwent COVID-19 treatment. COVID-19 patients have suffered from significant physical and psychological impairment. It is essential to prospectively monitor the individuals who suffered from COVID-19 to understand the long-term impact on HRQoL, as well as to inform prompt and efficient interventions to alleviate suffering.

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