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EFFECT OF SELF-CARE MANAGEMENT ON QUALITY OF LIFE AMONG CHRONIC OBSTRUCTIVE PULMONARY DISEASE PATIENTS: A PROSPECTIVE STUDY FROM CENTRAL INDIA

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ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) is a leading cause of morbidity and mortality globally, placing a substantial burden on patients and healthcare systems. In India, the prevalence of COPD ranges from 3.49% to 16.05%, with projections indicating a rise from 9 lakh to 16 lakh cases between 2005 and 2030. COPD profoundly impairs quality of life (QoL) across physical, psychological, and social domains. Self-care management—encompassing medication adherence, pulmonary rehabilitation, nutritional optimization, and lifestyle modification—has emerged as a cornerstone intervention to mitigate disease burden and improve QoL. Despite robust international evidence, data from resource-limited Indian settings remain limited, highlighting the need for context-specific investigation. **Objectives:** This study aimed to assess baseline self-care practices and QoL among COPD inpatients, and to evaluate the impact of structured self-care counselling on QoL after three months of home-based follow-up.

Materials and Methods: A prospective observational study was conducted at the School of Excellence in Pulmonary Medicine (SEPM), Netaji Subhash Chandra Bose Medical College and Hospital, Jabalpur, Madhya Pradesh, from December 2023 to May 2024. Fifty COPD inpatients diagnosed per GOLD criteria were enrolled using consecutive sampling. Data were collected using a structured sociodemographic and self-care questionnaire and the validated St. George's Respiratory Questionnaire (SGRQ). After baseline assessment, patients received individualized self-care counselling and were followed up at three months. Pre- and post-intervention self-care scores and SGRQ scores were compared using paired t-test and Wilcoxon signed-rank test. Pearson's correlation coefficient assessed the relationship between self-care scores and SGRQ scores.

Results: All 50 patients (90% male; 100% aged >40 years) were enrolled. Significant improvements were observed in self-care practices: yoga (14% to 86%), regular walking (34% to 88%), adequate sleep (56% to 88%), water intake (56% to 88%), avoidance of processed food (28% to 82%), and indoor irritant management (50% to 92%) ($p<0.001$ for each). The mean self-care score increased from 15.18±1.56 to 19.62±1.19 ($p<0.001$). Total SGRQ score declined from 63.1 (IQR: 47.20–72.40) to 41.3 (IQR: 31.23–48.83) ($p<0.001$), reflecting significant QoL improvement. Counselling was very efficacious in 68%, moderately efficacious in 8%, and had no effect in 18% of participants. A statistically significant negative moderate correlation was identified between self-care score and total SGRQ score ($r = -0.542$, $p<0.001$).

Conclusion: Structured self-care counselling and home-based follow-up significantly improved self-care practices and quality of life among COPD patients in a resource-limited Indian setting. Integration of self-care education

into routine clinical practice represents a cost-effective strategy to reduce disease burden.
Keywords: COPD, self-care management, quality of life, SGRQ, pulmonary rehabilitation, India.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is defined by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) as a common, preventable, and treatable disorder characterized by persistent respiratory symptoms and airflow limitation attributable to airway and alveolar abnormalities, usually caused by significant exposure to noxious particles or gases and influenced by host factors including abnormal lung development.[1] According to the Global Burden of Disease Study 2019, COPD was responsible for approximately 3.23 million deaths globally, making it the third leading cause of mortality worldwide with a prevalence of 12.2%.[2]

India bears a disproportionate burden of this condition. National studies have reported COPD prevalence ranging from 3.49% to 16.05%, with projections forecasting an increase from 9 lakh to 16 lakh affected individuals between 2005 and 2030.[3,4] Contributing risk factors in the Indian context include biomass fuel combustion, indoor air pollution from traditional cooking practices, occupational dust and fume exposure, tobacco use, and poorly ventilated housing—factors that are particularly prevalent among lower socioeconomic strata in regions such as Madhya Pradesh.[5,6]

COPD significantly degrades quality of life (QoL) across multiple domains. Patients experience progressive dyspnoea, productive cough, and exercise intolerance, leading to reduced mobility and dependence in activities of daily living. The chronic and progressive nature of the disease also gives rise to psychological comorbidities, including anxiety and depression, which further compound functional decline.[7] Sleep disturbances, social withdrawal, and the burden of polypharmacy collectively diminish overall wellbeing.

Self-care management has been recognized as an essential pillar of COPD management. It encompasses patient education, medication adherence, correct inhaler technique, pulmonary rehabilitation, nutritional optimization, smoking cessation, adequate physical activity, and symptom monitoring with personalized action plans.[8] International evidence consistently demonstrates that structured self-care interventions reduce exacerbation frequency, hospitalizations, and mortality while improving QoL.[9,10] However, research specifically examining the impact of self-care interventions on QoL in Indian inpatient settings—particularly in central India—remains sparse.

This prospective study was conducted at the School of Excellence in Pulmonary Medicine (SEPM), N.S.C.B. Medical College and Hospital, Jabalpur, Madhya Pradesh, to assess the baseline self-care practices and QoL of COPD inpatients, provide structured self-care counselling, and evaluate the impact on QoL at three months through a structured home-based follow-up protocol.

MATERIALS AND METHODS

Study Design and Setting

This was a prospective observational study conducted at SEPM, N.S.C.B. Medical College and Hospital, Jabalpur, Madhya Pradesh, over a six-month period from December 2023 to May 2024. Ethical approval was obtained from the Institutional Ethics Committee, and written informed consent was secured from all participants prior to enrollment.

Participants

All COPD inpatients diagnosed per GOLD criteria who were residents of Jabalpur and admitted to SEPM during the first three months of the study (December 2023 to February 2024) were eligible for inclusion (n=50). Patients were excluded if they were unable to be contacted after three follow-up attempts, had migrated out of the study area, had a terminal illness, were on immunosuppressant therapy, or had significant comorbidities independently impairing QoL. Consecutive sampling was employed.

Data Collection Instruments

Three validated instruments were employed: (i) a structured sociodemographic and behavioural questionnaire capturing age, sex, occupation, socioeconomic status per Kuppuswamy classification,[11] housing type, environmental exposures, smoking history (expressed as pack-years), alcohol consumption, BMI, and physical activity; (ii) a 23-item self-care practices checklist covering oxygen safety, medication adherence, MDI technique, respiratory equipment hygiene, environmental control, breathing techniques, nutrition, hydration, yoga, exercise, and sleep hygiene; and (iii) the validated St. George's Respiratory Questionnaire (SGRQ), which quantifies health impairment across three domains—Symptoms, Activity, and Impact—and a Total Score, with higher scores reflecting worse health status.[12]

Intervention

Following baseline assessment during inpatient admission, each participant received individualized structured self-care counselling delivered by the principal investigator. Counselling encompassed oxygen safety education, proper MDI technique demonstration, guidance on indoor air quality

management, nutritional advice (high-fibre, high-protein, low-fat diet with adequate calcium and vitamin D), hydration recommendations (2–3 litres/day), sleep hygiene, breathing exercises (pursed lip breathing, diaphragmatic breathing), yoga, and moderate physical activity (minimum 30 minutes of walking, 5 days per week).

Follow-up

A structured home-based follow-up was conducted between March and May 2024, three months after initial counselling. During follow-up, self-care practices and QoL were reassessed using the same instruments. Patients who could not be visited in person were contacted telephonically. Tobacco cessation, alcohol reduction, and changes in BMI, physical activity, sleep, and dietary behaviour were documented.

Statistical Analysis

Data were entered into Microsoft Excel and analysed using SPSS version 26.0. Descriptive statistics (frequencies, percentages, mean ± standard deviation, median with interquartile range) were used for baseline characteristics. McNemar's test was applied to compare paired proportions of self-care practices before and after counselling. The paired t-test compared mean self-care scores. Because SGRQ domain scores were non-normally distributed, the Wilcoxon signed-rank test was used to compare pre- and post-intervention SGRQ scores. Pearson's correlation coefficient evaluated the association between self-care scores and total SGRQ scores. A p-value of <0.05 was considered statistically significant.

Scoring of Self-Care Effectiveness

The effectiveness of counselling was classified based on the change in total SGRQ score: a reduction of <4 units was classified as no effect; 4–8 units as slightly efficacious; 8–12 units as moderately efficacious; and ≥12 units as very efficacious.[12]

RESULTS

Sociodemographic and Behavioural Characteristics. [Table 1]

All 50 enrolled patients were aged above 40 years, and male predominance was pronounced (90%). Only 10% of patients remained employed at the time of enrolment, and 50% belonged to the upper middle socioeconomic class per Kuppuswamy classification, while 42% belonged to the lower middle class. A strong family history of COPD was noted in 72% of participants.

Table 1: Sociodemographic Characteristics and Family History of Study Participants (n=50)

Variable	Category	N (%)	Key Observation
Age (years)	>40	50 (100%)	All patients >40 yrs
Sex	Male	45 (90%)	Male predominance
	Female	5 (10%)	
Currently Working	Yes	5 (10%)	90% not working
SES (Kuppuswamy)	Upper Middle	25 (50%)	50% upper middle class
	Lower Middle	21 (42%)	
Family History COPD	Present	36 (72%)	Significant risk factor

SES = Socioeconomic Status; Kuppuswamy classification used.

Environmental and Behavioural Risk Factors. [Table 2]

The majority of patients resided in kaccha houses (56%) with overcrowding (74%). More than half (52%) used biomass fuel (chulha) for cooking, and 60% reported regular use of mosquito coils or repellents that produce indoor fumes. Occupational smoke, dust, or fume exposure was reported by 52% of participants. These environmental factors collectively indicate a high-risk exposure profile consistent with COPD aetiology in this population.[5]

Table 2: Distribution of Environmental and Behavioural Risk Factors (n=50)

Variable	Category	N	%
Type of House	Kaccha	28	56%
	Pakka	20	40%
Ventilation	Good (cross)	37	74%
Overcrowding	Present	37	74%
Cooking Fuel	Chulha (biomass)	26	52%
Mosquito Coil/Repellent Use	Yes	30	60%
Occupational Smoke/Dust Exposure	Yes	26	52%

Impact of Counselling on Self-Care Practices. [Tables 3 and 4]

Significant improvements were recorded across multiple self-care domains following the structured counselling intervention (Table 3). Prior to counselling, none of the patients knew the safe placement distance for oxygen delivery systems; post-counselling, all 50 patients (100%) had this knowledge (p<0.001). Correct MDI technique improved from 78% to 100% (p=0.001). The proportion of patients managing indoor irritants increased from 50% to 92% (p<0.001), and avoidance of processed food increased from 28% to 82% (p<0.001). Meaningful gains were also observed in adequate water intake (56% to 88%), yoga practice (14% to 86%), regular walking (34%

to 88%), and sufficient sleep (56% to 88%) ($p \leq 0.001$ for all).

Certain self-care behaviours showed no statistically significant change, as most patients were already adhering to these practices at baseline—including regular SpO2 monitoring, cleaning of respiratory equipment, pursed lip breathing, adequate dietary fibre and calcium intake, and multivitamin supplementation. Notably, no patient used an air purifier (HEPA filter) either before or after counselling, reflecting the economic constraints of this population.

Table 3: Comparison of Self-Care Practices Before and After Counselling (Selected Significant Items; n=50)

Self-Care Domain	Before n (%)	After n (%)	p-value	Significance
O2 system placement safety knowledge	0 (0%)	50 (100%)	<0.001	Significant
Correct MDI technique	39 (78%)	50 (100%)	0.001	Significant
Management of indoor irritants	25 (50%)	46 (92%)	<0.001	Significant
Avoiding processed food	14 (28%)	41 (82%)	<0.001	Significant
Adequate water intake (2–3 L/day)	28 (56%)	44 (88%)	<0.001	Significant
Yoga practice	7 (14%)	43 (86%)	<0.001	Significant
Regular walking (≥30 min, 5 days/week)	17 (34%)	44 (88%)	<0.001	Significant
Adequate sleep (≥7–8 hrs/day)	28 (56%)	44 (88%)	0.001	Significant

MDI = Metered Dose Inhaler; McNemar's test; *p<0.05 significant.

The aggregate self-care practice score (maximum 23) increased significantly from a mean of 15.18 ± 1.56 at baseline to 19.62 ± 1.19 post-intervention (paired t-test: $t = -20.924$, $p<0.001$), confirming an overall, statistically robust improvement in self-care adherence. [Table 4]

Table 4: Comparison of Mean Self-Care Practice Scores Before and After Counselling (n=50)

Variable	Before Mean ± SD	After Mean ± SD	t-value	p-value
Self-care Practice Score (out of 23)	15.18 ± 1.560	19.62 ± 1.193	-20.924	<0.001*

Table 5: Association of anemia and IDA with acute bronchiolitis (n=120)

Variables	Cases (N=60) Frequency (%)	Controls (N=60) Frequency (%)	OR	95% CI Lower	Upper	P value
Anemia Present	42 (70.0%)	24 (40.0%)	3.50	1.68	7.28	0.001
Absent	18 (30.0%)	36 (60.0%)				
IDA Present	36 (60.0%)	16 (26.7%)	4.12	1.87	9.06	<0.001
Absent	24 (40.0%)	44 (73.3%)				

SD = Standard Deviation; Paired t-test; *p<0.05 significant.

Quality of Life (SGRQ) Outcomes. [Tables 5 and 6]

All four SGRQ domains showed statistically significant reductions in score (lower score = better QoL) following the self-care intervention (Table 5). The median total SGRQ score declined from 63.1 (IQR: 47.20–72.40) at baseline to 41.3 (IQR: 31.23–48.83) post-intervention ($Z = -5.845$, $p<0.001$). Symptom scores showed the most dramatic reduction—from a median of 72.65 to 45.35. Activity and Impact scores also declined significantly.

Table 5: Comparison of SGRQ Domain Scores Before and After Self-Care Counselling (n=50)

SGRQ Domain	Before Median (IQR)	After Median (IQR)	Z-value	p-value
Symptoms	72.65 (64.50–77.10)	45.35 (24.65–52.58)	-5.840	<0.001*
Activity	77.2 (35.98–78.0)	52.1 (29.20–63.83)	-3.777	<0.001*
Impact	62.5 (27.95–67.90)	34.5 (30.75–42.10)	-4.175	<0.001*
Total Score	63.1 (47.20–72.40)	41.3 (31.23–48.83)	-5.845	<0.001*

IQR = Interquartile Range; Wilcoxon signed-rank test; *p<0.05 significant.

Table 6 presents the effectiveness of counselling categorised by SGRQ change thresholds. Overall, counselling was very efficacious (SGRQ reduction ≥12 units) in 68% of patients, moderately efficacious (8–12 units) in 8%, slightly efficacious (4–8 units) in 6%, and had no discernible effect in 18%. Symptom management showed the highest rate of very efficacious outcomes (82%), while activity improvement was predominantly moderately efficacious (62%), reflecting the more challenging nature of reversing physical deconditioning in established COPD.

Table 6: Effectiveness of Self-Care Counselling Based on SGRQ Score Change (n=50)

SGRQ Domain	Very Efficacious (≥12)	Moderately Efficacious (8–12)	Slightly Efficacious (4–8)	No Effect (<4)
Symptoms	41 (82%)	1 (2%)	2 (4%)	6 (12%)
Activity	1 (2%)	31 (62%)	2 (4%)	16 (32%)
Impact	32 (64%)	2 (4%)	1 (2%)	15 (30%)
Overall	34 (68%)	4 (8%)	3 (6%)	9 (18%)

SGRQ change thresholds: <4 = no effect; 4–8 = slightly efficacious; 8–12 = moderately efficacious; ≥12 = very efficacious.

Correlation between Self-Care Score and SGRQ Score

Pearson's correlation analysis demonstrated a statistically significant, moderate, negative correlation between the aggregate self-care score and the total SGRQ score ($r = -0.542$, $p<0.001$), confirming that higher levels of self-care adherence were consistently associated with better quality of life, lending biological plausibility to the observed improvements.

DISCUSSION

This prospective study examined the impact of structured self-care counselling on COPD patients in a tertiary care public hospital in central India and demonstrated significant improvements in self-care practices and QoL over a three-month follow-up. The findings are consistent with and extend the existing literature in several important dimensions.

The sociodemographic profile of our cohort—predominantly middle-aged males from lower and lower-middle socioeconomic strata living in poorly ventilated, overcrowded kaccha houses with widespread biomass fuel use—mirrors findings from prior Indian epidemiological studies.[3,13] Male predominance has been consistently attributed to higher smoking rates and greater occupational dust and fume exposure in men,6 while biomass fuel combustion in poorly ventilated kitchens disproportionately affects women in lower socioeconomic groups, contributing to non-smoker COPD—a phenomenon well-documented by Salvi and Barnes.[14]

The high prevalence of tobacco use in our cohort (64% smokers at baseline, including 32% heavy smokers) is consistent with the well-established causal relationship between tobacco and COPD. Encouragingly, post-counselling follow-up revealed cessation in 36% of smokers and 62% of alcohol consumers, consistent with findings that brief physician-initiated counselling can significantly motivate behaviour change in inpatient settings.[15]

The baseline self-care assessment revealed several important gaps. While the majority of patients were already adherent to pursed lip breathing, fibre-rich diet, and SpO2 monitoring (practices reinforced at inpatient admission), domains such as yoga (14%), regular exercise (34%), adequate hydration (56%), and avoidance of processed food (28%) were markedly deficient. These findings parallel those reported by Bourbeau et al,[16] who identified physical activity and dietary behaviours as the most underimplemented self-care components in COPD patients, often due to misconceptions about the safety of exertion and limited health literacy.

Significant improvements in physical activity were observed: yoga practice increased from 14% to 86%, and regular walking from 34% to 88% following counselling. This aligns with meta-analytic evidence by Desveaux et al,[17] demonstrating that yoga and structured exercise improve QoL in COPD without adverse events, and with American Thoracic Society guidelines recommending moderate-intensity exercise as a core component of COPD management.18 The mechanisms underlying these improvements include enhanced respiratory muscle strength, improved diaphragmatic mobility, and reduced dynamic hyperinflation, all of which contribute to reduced dyspnoea and improved exercise tolerance.

Nutritional interventions yielded notable gains. The proportion of patients achieving normal BMI (18.5–24.99 kg/m²) increased from 32% to 58%, and the prevalence of underweight status fell from 60% to 36%. Malnutrition is a recognized independent predictor of poor outcomes in COPD, and high-protein, antioxidant-rich diets have been shown to reduce systemic inflammation and preserve respiratory muscle mass.[19]

The improvement in sleep quality (56% to 88% achieving ≥7–8 hours) is clinically significant, given the bidirectional relationship between sleep and COPD outcomes. Poor sleep amplifies sympathetic tone and inflammation, worsening lung mechanics, while COPD-related nocturnal hypoxaemia and cough further disrupt sleep architecture.[20]

The marked reduction in total SGRQ scores—from a median of 63.1 to 41.3 (a decline of approximately 21.8 units)—substantially exceeds the established minimal clinically important difference (MCID) of 4 units for the SGRQ.[12] These improvements are consistent with systematic reviews of self-management education programs in COPD by Effing et al,[21] and Lacasse et al,[8] which reported significant reductions in SGRQ total scores and domain scores following structured interventions.

The moderate negative correlation between self-care score and SGRQ score ($r = -0.542$) provides important supporting evidence for the dose-response relationship between self-care adherence and health outcomes. Patients who adopted more self-care behaviours experienced greater QoL gains, a finding aligned with Lorig et al.'s seminal work demonstrating that self-efficacy—the confidence to carry out self-management tasks—is a key mediator of health outcomes in chronic disease.[22]

That 18% of patients showed no effect from counselling reflects the multifactorial barriers to behaviour change in this population. Low health literacy, socioeconomic constraints, persistent environmental exposures (e.g., continued biomass fuel use), and entrenched habitual behaviours are recognized barriers.[23,24] These findings underscore the need for community-level interventions, financial support, and policy reform in addition to individual-level counselling.

Limitations of this study include the small sample size (n=50), single-centre design, and short three-month follow-up. The study lacked a concurrent control arm, preventing causal attribution of improvements solely to the intervention rather than natural disease fluctuation or regression to the mean.

Self-reported outcomes and the potential for social desirability bias must also be acknowledged. Future research should employ randomized controlled designs with longer follow-up, larger samples, and objective lung function parameters to confirm and expand these findings.

CONCLUSION

This prospective study demonstrates that structured, individualized self-care counselling supplemented by home-based follow-up significantly improves self-care adherence and quality of life among COPD inpatients in a resource-limited central Indian setting. Gains were observed across physical, nutritional, psychological, and behavioural domains, with improvements in total SGRQ scores far exceeding the minimal clinically important difference. The strong negative correlation between self-care score and SGRQ score reinforces the primacy of patient-centred education and support in COPD management. Integration of structured self-care programs into routine clinical practice—alongside policy interventions addressing air pollution, tobacco use, and health literacy—represents a cost-effective strategy to reduce COPD-related morbidity, hospitalizations, and healthcare costs in India.

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