

Assessment of Health Promotion Strategies and Self-Management Plan for Asthma Patients in Rural Areas in Jhunjhunu Rajasthan: A pilot study

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Abstract

Background: Asthma continues to be a significant public health problem, particularly in rural India where limited awareness and poor disease management contribute to decreased quality of life. Self-management using peak flow meters and structured health promotion strategies can empower patients to monitor and control their symptoms effectively.

Materials and Methods: A quasi-experimental study with a control and experimental group was conducted among 20 asthma patients selected through purposive sampling. Data were collected using a socio-demographic proforma, pulmonary function assessment protocol, and Asthma Quality of Life Questionnaire (AQLQ). The intervention group received structured health promotion sessions and training on the use of a peak flow meter for self-monitoring. Data were analyzed using descriptive and inferential statistics, including paired *t*-tests and Pearson correlation.

Results: Post-intervention, the experimental group showed a significant improvement in pulmonary function scores (mean 17.2 ± 1.4) compared to the control group (mean 12.6 ± 1.6) ($p < 0.001$). The AQLQ mean scores increased from 4.2 ± 0.8 to 5.9 ± 0.9 in the experimental group ($p < 0.001$), indicating better symptom control, emotional well-being, and activity tolerance. A moderate positive correlation was observed between education level and AQLQ scores ($r = 0.62$).

Conclusion: Structured health promotion strategies combined with self-management using peak flow meters significantly enhance the quality of life and pulmonary function among asthma patients in rural settings. The study underscores the importance of patient-centered educational interventions and the need for larger studies to validate these findings.

Keywords: Asthma, Health Promotion, Self-Management, Peak Flow Meter, Pulmonary Function, Quality of Life, Rural Health, Jhunjhunu, Quasi-Experimental Study

Introduction

Access to specialty healthcare services remains a major challenge in rural regions due to inadequate medical

infrastructure and workforce shortages. Chronic diseases like asthma are particularly affected by this gap, resulting in higher morbidity and poorer health

outcomes among rural populations. Limited diagnostic facilities, unavailability of trained healthcare professionals, and poor access to medicines further compound the problem.

Environmental exposures such as dust, smoke, and biomass fuel use are common in rural areas and contribute significantly to asthma exacerbations. These factors, coupled with poor ventilation and lack of awareness about environmental triggers, make asthma control more difficult in underdeveloped regions. Addressing these factors through community-based interventions is crucial for reducing asthma burden.

A successful example comes from Colorado, USA, where a primary care asthma control program was implemented across several rural counties. The initiative focused on aligning local healthcare practices with evidence-based asthma management guidelines. As a result, both healthcare provider knowledge and patient outcomes improved, showing the value of structured interventions in remote settings.

Among the elderly, allergic diseases such as asthma, rhinitis, and dermatitis are emerging as major health concerns, often associated with neurological disorders like Alzheimer's disease. Research in Poland revealed a significant link between long-term allergic inflammation and cognitive decline, suggesting that chronic allergies may worsen neurodegenerative conditions.

With global aging trends, allergic and respiratory diseases in the elderly are gaining attention as an important public health issue. Studies show that older adults experience these conditions differently due to immunosenescence and other comorbidities. Understanding these variations helps healthcare providers develop targeted, age-appropriate management strategies.

Asthma–COPD overlap (ACO) has been identified as a distinct clinical entity characterized by symptoms of both asthma and chronic obstructive pulmonary disease. Research in Turkey and Australia indicates that ACO patients face greater disease burden, poorer lung function, and more frequent exacerbations than those with asthma or COPD alone. This highlights the need for accurate diagnosis and individualized treatment.

Globally, asthma affects more than 300 million people, and the burden continues to rise due to pollution, urbanization, and changing lifestyles. In India, environmental pollution, tobacco smoke, and poor access to healthcare services are major contributors to increasing asthma prevalence and severity, particularly among low-income and rural populations.

In Rajasthan's rural districts like Jhunjhunu, asthma patients face multiple challenges, including delayed diagnosis, inadequate treatment, and environmental exposure to dust and allergens. Limited awareness among patients and healthcare providers further contributes to poor disease control and reduced quality of life. Addressing these gaps through education and local interventions is essential.

Health promotion and self-management strategies play a vital role in controlling asthma symptoms, preventing exacerbations, and improving quality of life. These include proper inhaler use, adherence to medication, monitoring symptoms with tools like peak flow meters, and avoiding triggers. However, their success depends on continuous education and patient motivation.

The present study focuses on assessing existing health promotion efforts and self-management practices among asthma patients in rural Jhunjhunu, Rajasthan. By identifying gaps in awareness, access, and adherence, the study aims to develop culturally appropriate, sustainable interventions that empower patients, strengthen healthcare delivery, and enhance long-term asthma outcomes in rural communities.

Objectives

1. To evaluate the impact on quality of life of asthma patients using health promotion initiatives and peak flow meter self-management plans.
2. To compare control and experimental groups' quality of life and overall health before and after the intervention.
3. To compare mean pulmonary function scores between control and experimental groups.
4. To assess the perception of the experimental group toward the use of peak flow meters for self-management.
5. To identify the correlation between AQLQ scores and selected demographic factors.

6. To compare pre- and post-self-management plan AQLQ scores with selected clinical factors.

Alternative Hypotheses (H₁)

- **H₁:** Asthma patients receiving structured health promotion strategies and a self-management plan will demonstrate a statistically significant improvement in pulmonary function compared to those not receiving the intervention.
- **H₂:** Asthma patients receiving structured health promotion strategies and a self-management plan will have significantly higher post-intervention AQLQ scores compared to pre-intervention scores.
- **H₃:** There will be a statistically significant positive correlation between exposure to health promotion strategies and adherence to self-management practices among asthma patients in rural Jhunjhunu.

Methodology

Research Approach: A **quantitative research approach** was used to objectively measure improvements in pulmonary function and quality of life.

Research Design: **mA quasi-experimental pre-test and post-test design with control and experimental groups.** **Symbol Description** E Experimental Group C Control Group O₁ Pre-test Observation X Intervention (Health Promotion + Self-Management Plan) O₂ Post-test Observation **Design Pattern:** E: O₁ → X → O₂

C: O₁ → — → O₂

Research Setting: Selected **rural healthcare centers in Jhunjhunu district, Rajasthan.**

Population and Sample: The target population included asthma patients residing in rural Jhunjhunu.

- **Sample size:** 20 (10 control, 10 experimental)
- **Sampling technique:** Non-probability purposive sampling

Inclusion Criteria

- Diagnosed asthma patients aged 18–60 years
- Willing to participate in the study
- Residing in selected rural areas

Exclusion Criteria

- Patients with chronic obstructive pulmonary disease (COPD) or other lung diseases
- Unwilling to participate

Data Collection Tools

Part I – Socio-Demographic Data Sheet:

Collected information on age, gender, marital status, education, occupation, income, family history, environmental exposure, and access to healthcare.

Part II – Pulmonary Function Assessment Protocol:

Five parameters (Forced Inspiratory Volume, Peak Expiratory Flow Rate, Oxygen Saturation, Chest Expansion, Breath-Holding Time) scored on a 4-point scale.

Part III – Asthma Quality of Life Questionnaire (AQLQ):

23 questions under four domains: Symptoms, Activity Limitation, Emotional Function, and Environmental Exposure, scored on a 7-point scale.

Intervention

- **Health Promotion Program:** Structured teaching on asthma pathophysiology, triggers, lifestyle modifications, and inhaler use.
- **Self-Management Training:** Demonstration and practice of **peak flow meter** monitoring and recording.

Data Collection Procedure

- **Pre-test:** Assessment of pulmonary function and AQLQ in both groups.
- **Intervention:** Conducted for 2 weeks with follow-up reinforcement.
- **Post-test:** Conducted after 4 weeks using the same tools.

Data Analysis

Data analyzed using descriptive statistics (mean, SD, frequency) and inferential statistics (*t*-test, Pearson correlation).

Significance level: $p < 0.05$.

Results

Table 1: Socio-Demographic Characteristics (n = 20)

Variable	Category	Frequency	Percentage (%)
Age (Years)	21–30	5	25
	31–40	7	35
	41–50	6	30
	51–60	2	10
Gender	Male	12	60
	Female	8	40
Marital Status	Married	15	75
	Single/Widowed	5	25
Education	Primary	6	30
	Secondary	8	40
	Higher Secondary & above	6	30
Occupation	Farmer/Laborer	10	50
	Private/Govt Job	6	30
	Others	4	20

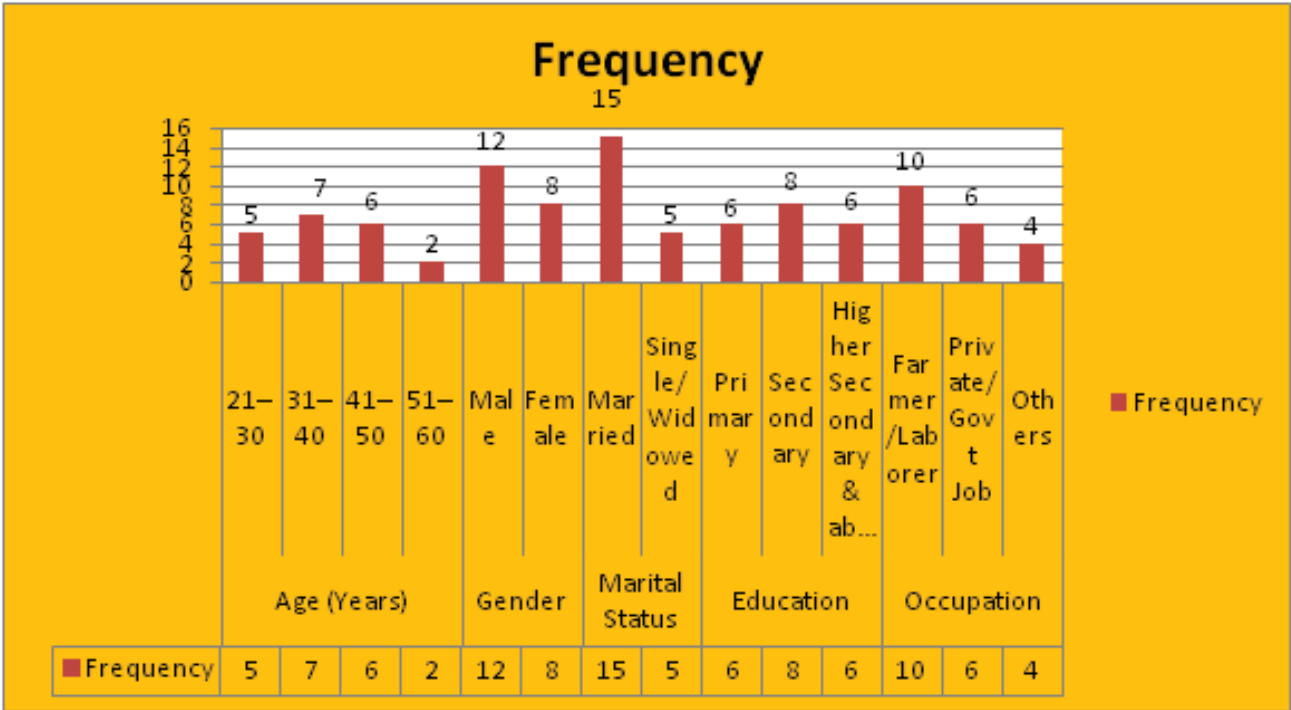


Figure 01: Socio-Demographic Characteristics (n = 20)

Table 2: Comparison of Mean Pulmonary Function Scores

Group	Pre	Post-test Mean ± SD	t-value	p-value
Experimental		17.2 ± 1.4	6.42	0.001*
Control	12.1 ± 1.9	12.6 ± 1.6	1.02	0.31 (NS)

*Significant at $p < 0.05$

Table 3: Comparison of Mean AQLQ Scores

Domain	Control (Post-test)	Experimental (Post-test)	t-value	p-value
Symptoms	4.1	5.8	3.12	0.002*
Activity Limitation	4.3	5.9	2.88	0.005*
Emotional Function	4.5	6.1	2.76	0.006*
Environmental Exposure	4.0	5.7	3.01	0.004*
Overall AQLQ Mean	4.2 ± 0.8	5.9 ± 0.9	4.65	0.001*

Table 4: Correlation between AQLQ Scores and Selected Demographic Variables

Variable	r-value	Interpretation
Education Level	0.62	Moderate Positive Correlation
Income Level	0.58	Moderate Positive Correlation
Distance to Health Facility	- . . .	Negative Correlation

The study found that structured health promotion and self-management plans significantly improved pulmonary function and quality of life among asthma patients in rural Jhunjhunu, Rajasthan.

Discussion

This pilot study demonstrated that structured health promotion and self-management interventions lead to significant improvements in pulmonary function and quality of life among asthma patients. The findings support previous evidence that educational interventions and the use of self-monitoring tools increase patient awareness, adherence, and control of asthma symptoms.

Patients with higher education and income levels showed better outcomes, indicating that socio-economic and literacy factors influence disease management. Distance from healthcare facilities negatively correlated with AQLQ scores, emphasizing the importance of local healthcare accessibility.

Conclusion

The study concludes that implementing structured health promotion and peak flow meter-based self-management plans significantly improves both pulmonary function and quality of life in asthma patients living in rural Jhunjhunu. Empowering patients through education and self-monitoring contributes to better asthma control and reduced disease burden.

Recommendations:

- Integrate self-management education into routine asthma care in rural clinics.
- Conduct larger, multi-site studies to confirm long-term benefits.
- Train healthcare workers to deliver continuous patient-centered asthma education.

Financial support and sponsorship: Nil

Conflicts of interests: There is no conflict of interest

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