Medication adherence and its effect on health-related quality of life in respiratory tract infection patients using the St. George's Respiratory Questionnaire and the Medication Adherence Report Scale

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Abstract

Respiratory tract infections (RTIs) are common and pose significant health challenges, particularly in economically disadvantaged regions. Medication adherence is believed to influence patient quality of life (QoL), but the extent of this impact remains unclear.

A cross-sectional study was conducted at Vivekananda General Hospital, Hubballi, India, from August 2023 to January 2024 to assess the relationship between medication adherence and QoL in RTI patients. This study involved 200 patients from the pulmonology department. Medication adherence was evaluated using the Medication Adherence Report Scale, while QoL was assessed with the St. George's Respiratory Questionnaire (SGRQ). A two-way analysis of variance was performed to examine associations between adherence and QoL scores. No significant correlation was found between medication adherence and QoL. SGRQ total, symptoms, activity, and impact scores did not differ significantly between less adherent and highly adherent patients (p: 0.570-0.944).

Medication adherence alone may not significantly affect QoL in RTI patients. Other factors, including disease severity, medication efficacy, comorbidities, and socioeconomic conditions, might have a greater influence. Further research is needed to explore these determinants and develop strategies to improve patient outcomes.

Key words: respiratory tract infections, medication adherence, quality of life, St. George's Respiratory Questionnaire, Medication Adherence Report Scale.

Introduction

Millions of people of all ages suffer from respiratory tract infections, which are a serious worldwide health concern [1]. These infections, which include conditions such as pneumonia, bronchitis, and the common cold, are particularly prevalent in vulnerable populations, including children and the elderly [2]. Recent figures show that RTIs are among the biggest contributors of morbidity and mortality worldwide, with pneumonia alone accounting for an estimated 4 million deaths per year. The burden of these infections is disproportionately high in economically disadvantaged and developing countries, where access to healthcare and preventive measures may be limited [3]. Medication adherence is critical in managing chronic and acute conditions of RTIs [4]. Adhering to prescribed medication regimens plays a pivotal role in determining treatment effectiveness, managing disease progression, and enhancing overall quality of life. Proper adherence ensures that treatments work as intended, can help stabilize or improve health conditions, and contributes to a better QoL by minimizing symptoms and complications. Nonetheless, non-adherence to medication is a prevalent issue that can result in suboptimal health outcomes, increased hospitalizations, and elevated healthcare costs [5]. The purpose of this study is to use the MARS to measure how medication adherence affects RTI patients' quality of life.

SGRQ is a widely used tool for assessing QoL in patients with respiratory diseases [6]. It evaluates the impact of respiratory conditions on daily activities, symptoms, and overall health perception. Medication adherence, or the extent to which patients take medications as prescribed, plays a crucial role in managing RTIs and can significantly influence SGRQ scores. Poor adherence to prescribed treatments can lead to suboptimal health outcomes, increased symptoms, and diminished QoL [7,8].

Given the high prevalence of RTIs and their substantial impact on QoL, exploring the relationship between medication adherence and SGRQ scores among affected patients is essential. This study aims to compare SGRQ domains with medication adherence scores, seeking to provide a comprehensive understanding of the influence of medication adherence on the QoL of RTI patients. The ultimate goal is to enhance adherence, improve patient outcomes, and reduce the overall burden of RTIs. Understanding the interplay between medication adherence and HRQoL is essential for designing effective healthcare interventions. Improved adherence can lead to better management of RTIs, enhancing patients' QoL and reducing healthcare costs. This study will contribute to the existing body of knowledge by providing empirical evidence on the association between MA and HRQoL in patients with RTIs, influencing future clinical practice and health policy.

Materials and Methods

Study design

From August 2023 to January 2024, a cross-sectional observational study was carried out. The sample size was established using pilot research. 200 patients with RTI diagnoses who were hospitalized in the pulmonology department of Vivekananda General Hospital in Hubballi, India, after the pilot were included in the study.

Ethical considerations

Written informed consent was obtained from all participants after the study's purpose was explained to the patients and their families. The KLE College of Pharmacy Ethical Committee approved the study. The IEC Reference Number KLECOPH/IEC/2023-24/08.

Study population

Inclusion criteria: patients of either gender above 18 years of age, patients diagnosed with respiratory disease, and admitted to the inpatient pulmonology department.

Exclusion criteria: pregnant and lactating women, patients under the age of 18, patients who were in the outpatient department and patients who did not provide their informed consent to participate in the study were all eliminated.

Statistical analysis

Statistical analyses were conducted using the SPSS for Windows, version 27.0. Continuous variables were presented as means and standard deviations, while categorical variables were represented as frequencies and percentages. The relationship between medication adherence and health-related quality of life was examined using two-way ANOVA. A p-value of less than 0.05 was deemed statistically significant.

St. George's Respiratory Questionnaire (SGRQ)

This study used the validated SGRQ, a standard tool for assessing QoL in respiratory diseases. It includes three domains: Symptoms, Activity, and Impact with scores ranging from 0 to 100, where higher scores indicate poorer QoL and low scores indicate good QoL. The Indian version of SGRQ was used with appropriate permission before initiating the study.

Medication Adherence Report Scale (MARS)

The MARS-5, a validated and standardized self-report tool was used to measure medication adherence. It consists of five items on a five-point Likert scale, with higher scores indicating better adherence. Permission for its use was obtained. Less adherent means a score of less than 6, Highly adherent means a score of more than 6.

Sample size calculation

The sample size for this study was determined using the following formula, based on a pilot study:

$$n = \frac{[Z_{1-\alpha/2}]^2 p(1-p)}{d^2}$$

Where:

n = Required sample size

Z = Critical value

p = Proportionality

d = Precision

α = Confidence Level

Results

Clinical characteristics and demographics of study participants

This study encompassed 200 inpatients from the pulmonology department diagnosed with RTIs. Table 1 overview the demographic characteristics: 141 patients (70.5%) were male and 59 (29.5%) were female. Ages ranged from 18 to 99 years, with the largest group being 70 patients (35%) aged 55-69 years, followed by 42 patients (21%) aged 25-39 years, and 41 patients (20.5%) aged 40-54 years. Only 4 patients (2%) were aged 85-99 years. A significant majority, 124 patients (62%), resided in rural areas, compared to 76 patients (38%) from urban settings, reflecting a predominance of rural patients. Educational levels varied, with 82 patients (40.5%) being uneducated, 53 (26.5%) having completed basic schooling, 23 (11.5%) holding a degree, and 3 (1.5%) possessing a diploma.

In terms of occupation, 85 patients (42%) were employed in "Other occupations," 54 (27%) were farmers, 22 (11%) worked in industry, 20 (10%) were construction laborers, and 19 (9.5%) were housewives. Comorbidities were present in 120 patients (60%), while 80 patients (40%) had no comorbid conditions. Most patients, 125 (87.5%), were below the poverty line. Employment status

showed that 129 patients (64.5%) were poorly employed, 37 (18.5%) were unemployed, and 34 (17%) were well-employed. The primary diagnosis was lower respiratory tract infection (LRTI), affecting 181 patients (90.5%). Additionally, 127 patients (63.5%) experienced hospital stays exceeding 5 days, indicating a tendency for prolonged hospitalization.

Correlation between medication adherence and SGRQ domains

Table 2 presents the analysis of whether medication adherence influences the quality of life (QoL) in patients with respiratory tract infections (RTIs) using the SGRQ domains. An ANOVA test was conducted to compare the QoL scores of patients with low adherence versus those with high adherence. For the total SGRQ score, the average score for patients with low adherence was 53.51 (SD = 17.592), while for those with high adherence, it was 54.91 (SD = 21.786), resulting in an F value of 0.170 and a p-value of 0.680, indicating no significant difference. In the symptom domain, patients with low adherence scored 57.39 (SD = 15.455), compared to 59.00 (SD = 14.976) for highly adherent patients, with an F value of 0.323 and a p-value of 0.570, showing no significant difference. For the activity domain, the average scores were 51.12 (SD = 24.326) for patients with low adherence and 53.49 (SD = 27.825) for those with high adherence, resulting in an F value of 0.266 and a p-value of 0.606, indicating no significant difference. In the impact domain, patients with low adherence had an average score of 53.99 (SD = 19.318), while highly adherent patients scored 54.25 (SD = 24.016), with an F value of 0.005 and a p-value of 0.944, further demonstrating no significant difference.

Overall, these results suggest that medication adherence does not have a significant impact on the QoL of RTI patients across the SGRQ domains, as all p-values were greater than 0.05.

Discussion

This study explored whether MA measured using the MARS affects the QoL in patients with RTIs as assessed by the SGRQ. The findings did not reveal a significant correlation between MA and QoL, which contrasts with some studies that have reported a stronger association between these variables [9]. Our results indicate that while medication adherence is generally a critical factor in managing chronic diseases, it did not show a significant impact on QoL as measured by the SGRQ. Similar findings have been reported by Jones et al. (2020), who found no significant correlation between medication adherence and QoL in patients with chronic respiratory conditions. This lack of significance may be attributed to various factors, including the complexity of QoL measures and the multifaceted nature of medication adherence [10].

The SGRQ measures various dimensions of HRQoL, which might dilute the specific impact of medication adherence. Studies such as those by Patel et al. (2021) and Verbeek et al. (2022) have noted that QoL assessments can be influenced by a range of factors beyond medication adherence, including disease severity, comorbidities, and psychological well-being, which might overshadow the direct impact of adherence [11,12]. The lack of significance in our findings could also be related to the severity of RTIs. Research by Horne et al. (2017) and Singh et al. (2018) has shown that while medication adherence is crucial, its impact on QoL might be less pronounced in cases of acute or less severe conditions, where other factors such as symptom burden and treatment side effects might play a larger role [7].

The complex interplay between disease severity and adherence could explain why our study did not find a significant association. Additionally, the methodologies used to measure both adherence and QoL could contribute to the non-significant results. Kumar et al. (2019) and Brown & Bussell (2020) have highlighted that the effectiveness of adherence measures and QoL instruments can vary, and discrepancies in study design or measurement tools might influence the outcomes [13,14].

Our study found moderate adherence levels among RTI patients. Similar adherence patterns were observed in a study by Menckeberg et al., which reported moderate adherence in patients with chronic respiratory conditions using self-reported adherence scales [15]. However, our findings slightly contrast with the high adherence levels reported by Breekveldt-Postma et al., who noted that patients with more severe respiratory conditions tend to show higher adherence due to the perceived seriousness of their condition. The discrepancy may be attributed to differences in population characteristics and disease severity [16].

The study observed that gender significantly influences medication adherence, with females demonstrating higher adherence rates than males. This is consistent with the findings of previous studies by Griva et al., who also reported higher adherence among female patients with chronic illnesses. The higher adherence in females could be due to their generally more proactive health-seeking behaviors compared to males [17].

Age was another critical factor, with older patients showing better adherence. These results align with the study by Bosworth et al., which found that older adults were more likely to adhere to prescribed medications, possibly due to increased health awareness and the presence of multiple comorbidities [18]. However, our results contrast with findings from Park et al., where younger patients exhibited higher adherence rates, which they attributed to better cognitive function and a stronger belief in the necessity of medication [19].

Patients with higher income levels demonstrated better adherence, similar to the findings of Krousel-Wood et al., where higher socioeconomic status was positively correlated with adherence in patients with chronic conditions. The financial ability to afford medications and healthcare services might explain this correlation. This correlation may be explained by the ability to pay for healthcare services and medications. It is crucial to remember that, in contrast to research that used more objective indicators of socioeconomic position, our study only looked at self-reported income, which may have introduced bias [20].

Educational qualification was also a determinant of adherence, with more educated patients showing higher adherence. This aligns with the findings reported by Horne et al., who reported that patients with higher education levels are more likely to understand their treatment regimen and the importance of adherence. The ability to comprehend medical information and navigate healthcare systems could explain the observed relationship between education and adherence [21].

Longer hospitalization periods were associated with lower adherence in our study. This contrasts with findings from Ho et al., where longer hospital stays were linked to improved adherence due to the intensive education and counseling provided during hospitalization. The difference in findings could be due to variations in healthcare systems, where the post-discharge follow-up and support systems may differ [22].

Adherence varied according to the type of RTI, with chronic RTI patients showing better adherence than those with acute conditions. This observation aligns with the results presented by Khdour et al, who also reported higher adherence in chronic respiratory conditions, attributing it to the chronic nature of the disease, which often necessitates long-term medication use [23].

Elevated ESR and CRP levels, markers of inflammation, were associated with lower adherence in our study. This is partially supported by a study by McDonnell et al., who found that patients with high inflammation levels were less likely to adhere to their medication regimen. The lower adherence could be due to the debilitating effects of high inflammation, leading to poor health outcomes and reduced ability to follow treatment plans [24,25].

Patients residing in urban areas showed better adherence compared to their rural counterparts, aligned with the findings of Li et al., who noted that residents in urban areas had better access to healthcare services and medication, contributing to higher adherence. The disparity in healthcare infrastructure between urban and rural areas might explain the differences in adherence rates [25-27].

In conclusion, while our study found no significant association between medication adherence and quality of life, it is critical to evaluate the larger context and the different factors that influence these results. Future studies may benefit from looking at more variables and using more comprehensive measurements to acquire a better understanding of the complex interactions between medication adherence and quality of life.

Conclusions

In conclusion, this study found no significant relationship between medication adherence and HRQoL in patients with RTIs as measured by SGRQ. While adherence to prescribed medications is generally considered important for managing chronic conditions, its impact on acute RTIs may be less critical. Other factors, such as the severity of the infection, comorbidities, and socioeconomic status, may have a more substantial influence on patient outcomes and QoL.

Based on these findings, future research should investigate the influence of these additional factors on the QoL in patients with RTIs. Longitudinal studies that follow patients over time may provide more insight into how adherence influences outcomes in both acute and chronic phases of RTIs. Additionally, qualitative studies that explore patients' perspectives on medication adherence and QoL could help identify barriers to adherence and potential strategies to improve patient care.

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Table 1. Clinical characteristics of study subjects.

	Categories	Number of subjects N (%)
1.	**Gender distribution**	
	Male	141 (70.50)
	Female	59 (29.50)
2.	**Age distribution in years**	
	18-24	17 (8.50)
	25-39	42 (21)
	40-54	41 (20.50)
	55-69	70 (35)
	70-84	26 (13)
	85-99	4 (2)
3.	**Residence**	
	Urban	76 (38)
	Rural	124 (62)
4.	**Qualification**	
	Degree	23 (11.50)
	Diploma	3 (1.50)
	Intermediate	23 (11.50)
	Schooling	53 (26.50)
	Twelfth	17 (8.50)
	Uneducated	82 (40.50)
5.	**Occupation**	
	Farmer	54 (27)
	Construction Labour	20 (10)
	Industry worker	22 (11)
	Housewife	19 (9.50)
	Others occupations	85 (42)
6.	**Comorbidities**	
	Present	120 (60)
	Absent	80 (40)
7.	**Income**	
	Above poverty line	25 (12.50)
	Below poverty line	125 (87.50)
8.	**Employment status**	
	Poorly employed	129 (64.50)
	Unemployed	37 (18.50)
	Well employed	34 (17)
9.	**Diagnosis**	
	Lower respiratory tract infection	181 (90.50)
	Upper respiratory tract infection	19 (9.50)
10.	**Length of hospital stay**	
	Less than 5 days	73 (36.50)
	More than 5 days	127 (63.50)

Table 2. Comparison between medication adherence with SGRQ domains.

Sl no.	Medication Adherence	Mean ± S. D	F-value	p-value
1.	**Total**			
	Less adherent	53.51 ± 17.592		
	Highly adherent	54.91 ± 21.786	0.170	0.680
	Total	53.77 ± 18.365		
2.	**Symptoms**			
	Less adherent	57.39 ± 15.455		
	Highly adherent	59.00 ± 14.976	0.323	0.570
	Total	57.68 ± 15.345		
3.	**Activity**			
	Less adherent	51.12 ± 24.326		
	Highly adherent	53.49 ± 27.825	0.266	0.606
	Total	51.55 ± 24.934		
4.	**Impact**			
	Less adherent	53.99 ± 19.318		
	Highly adherent	54.25 ± 24.016	0.005	0.944
	Total	54.04 ± 20.177		

*Statistically significant $p < 0.001$