Monaldi Archives for Chest Disease

eISSN 2532-5264 https://www.monaldi-archives.org/

Monaldi Arch Chest Dis 2025 [Online ahead of print]

To cite this Article:
Chitralu SPP, Dsouza PD, Patil CM, et al. **Impact of patient counseling on medication adherence in respiratory tract infection patients in a tertiary care teaching hospital.** *Monaldi Arch Chest Dis* doi: 10.4081/monaldi.2025.3336

Impact of patient counseling on medication adherence in respiratory tract infection patients in a tertiary care teaching hospital

Sai Phalguna Prakash Chitralu, Princy Domnic Dsouza, Chandrashekhar Mallikarjun Patil, Sanatkumar Bharamu Nyamagoud, Vinod Ashok Koujalagi, Agadi Hiremath Viswanatha Swamy

Department of Pharmacy Practice, KLE College of Pharmacy, Vidyanagar, Hubballi, Karnataka, India

Correspondence: Sanatkumar Bharamu Nyamagoud, Department of Pharmacy Practice, KLE College of Pharmacy, Vidyanagar, Hubballi, India.
Tel.: +917795641008. E-mail: dr.sanathnyamagoud@gmail.com

Contributions: each author equally contributed to the study's conception, execution of the literature review, manuscript writing, and revisions. The final draft of the paper was thoroughly reviewed and approved by all authors, who collectively take full responsibility for the integrity and accuracy of the entire project.

Conflict of interest: there is no conflict of interest declared by the authors.

Ethics approval and consent to participate: the KLE College of Pharmacy Ethical Committee gave its approval to the study (IEC Reference Number: KLECOPH/IEC/2023-24/08).

Informed consent: the patients provided written informed consent.

Patient consent for publication: written informed consent was obtained from patients after clearly explaining the objectives of the study and the intention to publish the clinical findings. The patient was assured that participation was entirely voluntary, and that all personal information would remain confidential in accordance with ethical publishing standards.

Availability of data and materials: data and materials are available from the corresponding author upon request.

Funding: this research received no funding from public, commercial, or not-for-profit organizations.

Acknowledgments: the authors are grateful to the KLE Academy of Higher Education and Research, Belagavi, and the patients, physicians, and hospital staff of Vivekanand General Hospital, Hubballi, for their unwavering support and cooperation in completing this study, which was critical to its success.

Abstract

Respiratory tract infections (RTIs) significantly impact public health in India, with high morbidity and mortality rates. Effective management of RTIs relies on medication adherence (MA), which is often challenged by factors like forgetfulness, side effects, and socioeconomic barriers. This study aimed to evaluate the impact of patient counseling on MA among RTI patients and to assess the influence of demographic, socioeconomic, and clinical factors on adherence. A cross-sectional observational study was conducted at Vivekananda General Hospital Hubballi, India, from August 2023 to January 2024, involving 200 RTI patients. MA was measured using the Medication Adherence Report Scale (MARS) before and after patient counseling. Statistical analysis assessed the effect of age, gender, comorbidities, and socioeconomic status on adherence. MA significantly improved following patient counseling, with mean MARS scores increasing from 4.13±1.601 to 6.80±1.592 ($p<0.05$). Age was positively correlated with adherence, while factors like gender, infection type, and socioeconomic status had varied effects. Overall, patient counseling effectively enhanced adherence across all groups. The study underscores the importance of patient counseling in improving MA among RTI patients. Personalized interventions and addressing socioeconomic barriers are crucial for optimizing treatment outcomes.

Key words: respiratory tract infections, medication adherence, patient counselling, MARS scale, socioeconomic factors.

Introduction

Respiratory tract infections are a significant public health issue worldwide, particularly in developing countries like India, where they account for a high burden of morbidity and mortality [1]. RTIs affect approximately 11.3% of the Indian population and are responsible for a lung disease mortality rate of 142.09 per 100,000 people, which is three times the global average [2]. This high mortality rate, coupled with the substantial number of disability-adjusted life years (DALYs) lost, underscores the urgent need for effective management of RTIs [3]. The presence of 34.3 million asthma patients in India further exacerbates the impact of RTIs, highlighting the necessity for stringent adherence to prescribed medications to achieve optimal treatment outcomes [4].

MA is crucial in managing RTIs, as it directly influences the effectiveness of the treatment regimen [5]. Non-adherence can lead to poor health outcomes, increased hospital readmissions, the development of antibiotic resistance, and higher healthcare costs [6]. Common barriers to adherence include forgetfulness, lack of understanding of the treatment regimen, side effects of medications, high medication costs, and cultural beliefs [7]. Additionally, socioeconomic factors such as lower income and education levels significantly influence adherence, often leading to poorer health outcomes due to financial constraints and limited health literacy [8].

Despite the critical importance of medication adherence, there is a lack of standardized tools specifically validated for measuring adherence in RTI patients [9]. MARS is widely used to assess adherence in various conditions, but its validity for RTI patients has not been thoroughly investigated. Validating the MARS scale for RTI patients is essential to ensure it accurately measures adherence, thereby facilitating better monitoring and enabling targeted interventions to improve adherence [10].

Furthermore, ma is influenced by many factors, including demographic, socioeconomic, and clinical characteristics. Understanding the interplay of these factors in RTI patients is key to designing effective, personalized interventions [11]. Variables such as gender, age, income status, education level, length of hospitalization, type of RTI, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and place of residence are all potential determinants of adherence. By exploring these factors, healthcare providers can develop strategies tailored to the specific needs of RTI patients, ultimately improving adherence rates and patient outcomes [12].

This study aims to assess the impact of patient counselling on the MA of patients suffering from RTI. The findings will provide valuable insights into the barriers affecting adherence and

emphasize the development of personalized interventions, enhancing patient outcomes, and optimizing healthcare resources. By addressing the critical issue of medication adherence in RTI patients, this study seeks to contribute to more effective management of RTIs and improve public health outcomes.

Materials and Methods

Study design

A cross-sectional study was conducted from August 2023 to January 2024. A pilot study determined the sample size, after which 200 RTI-diagnosed patients admitted to the pulmonology department at Vivekananda General Hospital, Hubballi, India, were included in the research.

Sample size

In our study, a sample size of 200 participants was determined through a precise calculation, ensuring sufficient power to detect meaningful effects while minimizing errors. This approach optimizes the reliability and validity of the study's findings.

Ethical considerations

The study's purpose was conveyed to the patients and their families. The patients provided written informed consent. The KLE College of Pharmacy Ethical Committee gave its approval to the study. (IEC Reference Number: KLECOPH/IEC/2023-24/08)

Study population

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

Exclusion criteria: patients below 18 years of age, those attending the outpatient department, patients who were not conscious and oriented, patients who did not consent to participate in the study, and pregnant and lactating women were excluded.

Sample size calculation

The sample size of 200 patients 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

Patient counseling

During counselling, we educated patients on medication use, side effects, and the importance of following prescriptions. We explained respiratory infections, their causes, and their risks. Emphasis was on proper antibiotic timing and dosage for effectiveness. Patients were advised on follow-ups, care routines, and educational resources to prevent resistance and promote better health management.

Data collection

The Medication Adherence Report Scale (MARS) was used to assess medication adherence in respiratory tract infection patients. Patients were given verbal counselling on usage and adherence, and a follow-up evaluation was conducted one month later to evaluate any improvements.

MARS scale

The MARS-5 is a self-reported tool designed to assess patient adherence to prescribed medications. It consists of ten questions, with a total score ranging from 0 to 10. A score below 6 indicates poor adherence, while scores above 6 suggest better adherence. In our study, pre- and post-counselling. Pre and post counselling MARS-5 data were collected to evaluate the impact of patient counselling on patient's adherence to prescribed treatments.

Statistical analysis

The study used SPSS for statistical analysis, presenting continuous and categorical variables. The association between clinical variables and medication adherence was assessed using t-tests and Pearson's correlation, with a p-value of less than 0.05 indicating significant relationships.

Results

Demographics of RTI patients

Table 1 summarizes the clinical characteristics of the research patients. Of the 200 patients in the inpatient pulmonology department, 141 (70.50%) were male and 59 (29.50%) were female, suggesting a higher incidence of respiratory tract infections (RTIs) among males. The largest group of patients was from the 55-69 years age range, comprising 70 (35%) of the sample, followed by 25-39 years (42 patients, 21%), 40-54 years (41 patients, 20.50%), 70-84 years (26 patients, 13%), 18-24 years (17 patients, 8.50%), and 85-99 years (4 patients, 2%).

Geographically, 124 (62%) patients were from rural areas, while 76 (38%) were from urban areas. Participants had a diverse range of educational qualifications, a small percentage held bachelor's degrees, including Arts (3.00%), Science (2.00%), Commerce (3.00%), and Engineering (1.50%). A few had diplomas in Engineering (1.00%) and Nursing (0.50%). Additionally, 6.00% completed Science, 3.50% Commerce, and 2.00% Arts at the intermediate level. A significant portion, 26.50%, had only schooling, while 40.50% were uneducated. This diversity reflects different socioeconomic backgrounds, which may influence healthcare access and outcomes.

Regarding occupation, farming was the most common job, with 54 (27%) participants engaged in this work. Other common occupations included construction labour (20 patients, 10%), industry workers (22 patients, 11%), and housewives (19 patients, 9.50%). The comorbidities observed in the study included hypertension in 52 participants (26.00%), Type 2 Diabetes Mellitus (T2DM) in 13 (6.50%), and anemia in 8 (4.00%). Ischaemic Heart Disease (IHD) was present in 5 participants (2.50%), while 4 (2.00%) had Alcohol Use Disorder (AUD). Chronic Kidney Disease (CKD) was reported in 6 participants (3.00%). A significant portion, 80 participants (40.00%), had no comorbidities, and 26 participants (13.00%) had other unspecified comorbidities.

A significant portion, 175 (87.50%) patients, belonged to the low-income category. Finally, inflammatory biomarkers such as CRP and ESR showed increased levels, which is common in respiratory conditions, suggesting that RTIs in this population are primarily driven by inflammation.

Impact of patient counselling on medication adherence

The MA scores were measured for all 200 patients. The patients were verbally counselled on the importance of maintaining medication adherence. A month later, the MA of these patients was reassessed. Table 2 shows the MA scores both before and after patient counselling. We noted a significant increase in medication adherence following the counselling session. Specifically, the MA improved from 4.13 ± 1.601 to 6.80 ± 1.592 post-counselling, with p-values < 0.05 for both pre-and post-intervention measurements. This demonstrates that patient counselling had a statistically significant positive effect on medication adherence among the individuals investigated. Medication adherence scores were significantly improved following the intervention, underscoring the efficacy of patient counselling in promoting better adherence to prescribed treatment regimens.

Impact of various factors on medication adherence

The data from Table 3 demonstrates the influence of various demographic and clinical factors on medication adherence (MA) scores before and after counselling. Significant improvements were observed across all age groups, indicating that counselling had a positive effect on MA. Specifically, participants in all age ranges (18-24 years, 25-39 years, 40-54 years, 55-69 years, and 70-84 years) showed substantial increases in their mean MA scores, with p-values less than 0.05, confirming that these changes were statistically significant. This suggests that age played an important role in the response to counselling, with older participants showing notable improvements in adherence.

In terms of gender, both males and females showed improvements in MA scores after counselling, but the changes were not statistically significant, as the p-values for both pre-and post-counselling scores were above 0.05. Similarly, the type of infection (lower respiratory tract infection [LRTI] vs. upper respiratory tract infection [URTI]) did not significantly impact the results, as both groups exhibited improvements but without statistical significance.

Regarding comorbidities, both individuals with and without comorbidities showed improvements in their MA scores, but again, these changes were not statistically significant, suggesting that the presence of comorbid conditions did not significantly alter the effect of counselling on adherence. The economic status of participants (below the poverty line [BPL] vs. above the poverty line [APL]) also did not significantly affect the post-counselling improvements, indicating that counselling was equally effective across different socioeconomic statuses.

Educational qualifications showed a mixed result: educated individuals did not demonstrate statistically significant improvements in MA scores, while uneducated individuals had a significant increase in their scores post-counselling ($p < 0.05$). This suggests that uneducated individuals might benefit more from counselling, possibly due to a greater need for education on the importance of medication adherence.

The residence status (urban vs. rural) and length of hospitalization (less than 5 days vs. more than 5 days) did not significantly influence the results, with no significant differences in MA scores across these groups. This implies that the positive effects of counselling on medication adherence were consistent regardless of where participants lived or how long they were hospitalized.

In conclusion, the analysis highlights that while counselling led to significant improvements in medication adherence across most variables, the most notable factors influencing these improvements were age and education. Other factors, such as gender, infection type, comorbidities, economic status, and residence, did not show a strong association with the effectiveness of counselling on medication adherence.

Discussion

Our study analyzed 200 patients from the in-patient pulmonology department of Vivekananda General Hospital Hubballi, focusing on the critical role of patient counselling in improving MA among patients with RTIs. Patient counselling, an essential intervention, significantly enhanced adherence rates, with the mean medication adherence score increasing from 4.13 ± 1.601 before counselling to 6.80 ± 1.592 after counselling (p-value = 0.05). The counselling sessions provided detailed discussions about patients' conditions, medication importance, correct usage, and strategies to overcome adherence barriers. This approach helped patients understand their treatment plans better and fostered a sense of responsibility and empowerment in managing their health. The findings align with existing literature, such as studies by Cutler and Everett (2010) and Conn et al. (2016), which emphasize the positive impact of patient counselling on medication adherence [13,14]. Additionally, Venkatesan et al. (2014) highlighted the effectiveness of structured counselling in improving adherence among chronic disease patients [15]. Our study demonstrates that incorporating structured patient counselling into routine clinical practice is crucial for enhancing medication adherence, ensuring optimal treatment outcomes, reducing complications, and improving the overall quality of life for patients.

It also revealed a higher incidence of RTIs among males compared to females. The age group with the highest occurrence was 55-69 years, aligning with findings by Antje Hader et al. which identified individuals aged 55 and above as being at higher risk of severe respiratory infections due to age-related changes [16,17]. Patients from rural areas (124 or 62%) outnumbered those from urban areas (76 or 38%), consistent with a study by Hassanat et al. reported that rural children are more affected by acute respiratory infections (ARIs) compared to urban children [18]. The majority of patients were uneducated, which could contribute to their poor quality of life (QoL). This finding is supported by Tomas M.L. Eagan et al., who concluded that higher education levels help individuals prevent infections [19]. Most participants worked in farming, exposing them to mold spores, pesticide vapors, and dusty conditions. T. Sigsgaard et al. reported that agricultural professions, as well as construction, mining, glass/ceramic/mineral work, fur/leather work, and metal work, are associated with an increased risk of respiratory infections [20].

A significant portion of patients (120 or 60%) had comorbid conditions, which substantially increased the risk, severity, and mortality associated with RTIs in adults. This is similar to the results of a study by Ejaz H et al. [21]. Additionally, 175 patients (87.5%) had lower annual incomes, and comparable findings by Adam G et al. indicated that lower income is associated with higher respiratory symptoms [22]. The financial burden of medical bills is significant as most patients were unemployed or poorly employed (166 or 83%) [23]. Furthermore, 181 patients (90.5%) were diagnosed with LRTIs, corroborating the findings of David Lieberman et al., who also reported a higher incidence of LRTIs compared to URTIs [24].

We found that patient counselling and informative sessions helped participants to be more adherent to their medications. The p-value was <0.05 which signifies that there is a significant difference between the two groups. Another study by Su Y et.al reveals that patient counselling and education significantly improve medication adherence, emphasizing the role of clinical pharmacists in optimizing medication use and improving health outcomes, particularly in patients with respiratory tract infections and chronic conditions [25].

We found that age had a statistically significant impact on MARS scores ($p<0.05$), in the age group of 55-69 years and 85-99 years were less adherent to medications. On patient counselling mean scores in all age groups were significantly increased. A comparative study by Yin YH et.al stated that motivational interviewing dramatically raised the mean MARS score, indicating improved drug adherence after counselling in patients with COPD and asthma also a study by Wang C et.al

stated similar results where age affects medication adherence of patients due to structural and physiological changes with age [26,27].

There was no statistically significant correlation found between MARS score and various clinical characteristics of patients like gender, diagnosis, comorbidities, income, education, residency, and days of hospitalization. Pre- counselling females (3.86±1.559) were less adherent than males (4.23±1.611), post counselling both genders were adherent to their medications (6.89±1.725), Mahmoodi H et.al studies reveal that because of the complexity of treatments, increased side effects, and gender variations in health-seeking behaviours, women routinely take longer to adhere to prescriptions for chronic diseases [28]. Patients with no comorbid conditions (4.18±1.338) were more adherent to medications than those who had existing comorbid conditions (4.10±1.725). An absolute study by Franssen et.al stated that patients with comorbid conditions were less adherent to medications [29].

Educated patients were more adherent (4.18±1.588) than uneducated patients with respiratory disease (4.04±1.626), Homętowska H et.al stated similar findings [30]. When income was compared with MARS scores patients above the poverty line weren't adherent to medications but below the poverty line patients were adherent. Ali MM et.al stated that income significantly affects medication adherence in patients [31]. Our results state that APL patients too sometimes struggle with medication costs, forgetfulness, poor communication, and practical barriers that can hinder adherence.

When residence was considered, patients at rural residency (4.15±1.671) were more adherent to medications than urban residence patients (4.09±1.489). An opposite study by Yuri Sasaki et.al found that the risk of poor adherence was higher in rural areas compared to urban areas [32]. Later we considered diagnosis, patients with URTI (4.68±1.376) were adherent to their medications as compared to LRTI patients (4.07±1.615). Post counselling patient's average adherence mean was (7.32±1.416). A comparative study by Khan FU et.al stated similar results, where patients with URTIs exhibit greater treatment adherence because of things like knowing what their illness is, communicating clearly, receiving educational interventions, and the psychological effects of their symptoms [33].

Days of hospitalization were categorised into two groups, patients admitted for less than six days and patients admitted for more than six days. Where patients admitted for less than six days (4.21±1.767) were more adherent than those patients admitted for more than six days (4.08±1.514). Our study concludes shorter hospitalizations are associated with higher adherence

scores. Dong Y-H et.al stated that non-adherence to medication leads to the increased severeness of existing disease condition [34].

Conclusions

Our study found that patient counselling significantly improved medication adherence among respiratory tract infection (RTI) patients in a tertiary care teaching hospital setting. By educating patients on the importance of their medications, addressing individual concerns, and providing personalized strategies to overcome barriers, we observed enhanced patient understanding, better adherence, and improved health outcomes. We evaluated several factors, including age, gender, occupation, income, employment status, length of hospital stay, comorbidities, and residence. Our findings underscore the value of incorporating tools like MARS in clinical practice and highlight the critical role of patient counselling in promoting medication adherence. Additionally, our study emphasizes the need for personalized interventions, addressing socioeconomic barriers, and tailoring care to individual patient needs to optimize RTI management.

References

1. Mirzayev F, Viney K, Linh NN, et al. World Health Organization recommendations on the treatment of drug-resistant tuberculosis, 2020 update. Eur Respir J 2021;57:2003300.
2. India State-Level Disease Burden Initiative Collaborators. Nations within a nation: variations in epidemiological transition across the states of India, 1990-2016 in the Global Burden of Disease Study. Lancet 2017;390:2437-60.
3. GBD 2016 DALYs and HALE Collaborators. Global, regional, and national disability-adjusted life-years (DALYs) for 333 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet 2017;390:1260-344.
4. Salvi S, Apte K. The burden of chronic respiratory diseases and their heterogeneity across the states of India: the Global Burden of Disease Study 1990-2016. Lancet Glob Health 2018;6:e1363-74.
5. Vrijens B, De Geest S, Hughes DA, et al. A new taxonomy for describing and defining adherence to medications. Br J Clin Pharmacol 2012;73:691-705.
6. Osterberg L, Blaschke T. Adherence to medication. N Engl J Med 2005;353:487-97.

7. Brown MT, Bussell JK. Medication adherence: WHO cares? Mayo Clin Proc 2011;86:304-14.
8. Goldman DP, Joyce GF, Zheng Y. Prescription drug cost sharing: associations with medication and medical utilization and spending and health. JAMA 2007;298:61-9.
9. Nguyen TMU, La Caze A, Cottrell N. What are validated self-report adherence scales really measuring? A systematic review. Br J Clin Pharmacol 2014;77:427-45.
10. Chan AHY, Horne R, Hankins M, et al. The Medication Adherence Report Scale: a measurement tool for eliciting patients' reports of nonadherence. Br J Clin Pharmacol 2020;86:1281-8.
11. Anand R, Kharbanda S. Health-related quality of life in patients with chronic obstructive pulmonary disease: a hospital-based study. Indian J Med Res 2021;153:459-64.
12. Branche AR, Falsey AR. Respiratory syncytial virus infection in older adults: an under-recognized problem. Drugs Aging 2015;32:261-9.
13. Abdel-Aziz HR, Atia NS. Respiratory infections prevention in rural older adults: an interventional study. Clin Nurs Res 2022;31:1445-53.
14. Eagan TML, Gulsvik A, Eide GE. The effect of educational level on the incidence of asthma and respiratory symptoms. Respir Med 2004;98:730-6.
15. Dickie HA, Rankin J. Farmer's lung: An acute granulomatous interstitial pneumonitis occurring in agricultural workers. J Am Med Assoc 1958;167:1069-76.
16. Ejaz H, Alsrhani A, Zafar A, et al. COVID-19 and comorbidities: deleterious impact on infected patients. J Infect Public Health 2020;13:1833-9.
17. Gaffney AW, Himmelstein DU, Christiani DC, Woolhandler S. Socioeconomic inequality in respiratory health in the US from 1959 to 2018. JAMA Intern Med 2021;181:968-76.
18. Jaakkola MS, Lajunen TK, Rantala AK, et al. Occupation and occurrence of respiratory infections among adults with newly diagnosed asthma. BMC Pulm Med 2023;23:140.
19. Lieberman D, Lieberman D, Korsonsky I, et al. A comparative study of the etiology of adult upper and lower respiratory tract infections in the community. Diagn Microbiol Infect Dis 2002;42:21-8.
20. Jimmy B, Jose J. Patient medication adherence: measures in daily practice. Oman Med J 2011;26:155-9.

21. Gellad WF, Grenard JL, Marcum ZA. A systematic review of barriers to medication adherence in the elderly: looking beyond cost and regimen complexity. Am J Geriatr Pharmacother 2011;9:11-23.
22. Edworthy SM, Devins GM. Improving medication adherence through patient education: distinguishing between appropriate and inappropriate utilization. J Rheumatol 1999;26:1793-801.
23. Conn VS, Ruppar TM, Enriquez M, Cooper PS. Patient-centered outcomes of medication adherence interventions: systematic review and meta-analysis. Value Health 2016;19:277-85.
24. Tolley A, Hassan R, Sanghera R, et al. Interventions to promote medication adherence for chronic diseases in India: a systematic review. Front Public Health 2023;11:1194919.
25. Su Y, Wang X, Cai B, et al. The analysis of factors affecting medication adherence in patients with myasthenia gravis: a cross-sectional study. Ther Adv Neurol Disord 2023;16:175628642312060.
26. Wang C, Liu K, Sun X, Yin YH, Tang T. Effectiveness of motivational interviewing among patients with COPD: a systematic review with meta-analysis and trial sequential analysis of randomized controlled trials. Patient Educ Couns 2022;105:3174-85.
27. Silva Almodóvar A, Nahata MC. Medication adherence in Medicare-enrolled older adults with chronic obstructive pulmonary disease before and during the COVID-19 pandemic. J Clin Med 2022;11:6985.
28. Mahmoodi H, Jalalizad Nahand F, Shaghaghi A, et al. Gender-based cognitive determinants of medication adherence in older adults with chronic conditions. Patient Prefer Adherence 2019;13:1733-44.
29. Franssen FME, Rochester CL. Comorbidities in patients with COPD and pulmonary rehabilitation: do they matter? Eur Respir Rev 2014;23:131-41.
30. Homętowska H, Świątoniowska-Lonc N, Klekowski J, et al. Treatment adherence in patients with obstructive pulmonary diseases. Int J Environ Res Public Health 2022;19:11573.
31. Ali MM, Taha MM, Ahmed AE, et al. Psychotropic medication adherence and its associated factors among schizophrenia patients: exploring the consistency of adherence scales. Cureus 2023;15:e46118.

32. Nagamine Y, Shobugawa Y, Sasaki Y, et al. Associations between socioeconomic status and adherence to hypertension treatment among older adults in urban and rural areas in Myanmar: a cross-sectional study using baseline data from the JAGES in Myanmar prospective cohort study. BMJ Open 2023;13:e065370.
33. Khan FU, Fang Y. Effectiveness of pharmacist-led brief educational intervention for adherence to the antibiotics for lower respiratory tract infections (EATSA) in post-conflict rural areas of Pakistan: study protocol for a randomized controlled trial. Antibiotics 2021;10:1147.
34. Dong Y-H, Choudhry NK, Krumme AK et al. Impact of hospitalization on medication adherence estimation in claims data. J Clin Pharm Ther 2017;42:318-28.

Table 1. Clinical characteristics of RTI patients.

Sl. No	Categories	Number of subjects N (%)
1	**Gender**	
	Male	141 (70.50)
	Female	59 (29.50)
2	**Age 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**	
	Bachelor of Arts (BA)	8 (3.00)
	Bachelor of Science (BSc)	5 (2.00)
	Bachelor of Commerce (BCom)	7 (3.00)
	Engineering Degree	3 (1.50)
	Diploma	
	Diploma in Engineering	2 (1.00)
	Diploma in Nursing	1 (0.50)
	Diploma in Pharmacy	0 (0.00)
	Other Diplomas	0 (0.00)
	Twelfth Grade	
	Science (Intermediate)	12 (6.00)
	Commerce (Intermediate)	7 (3.50)
	Arts (Intermediate)	4 (2.00)
	Other Intermediate Courses	0 (0.00)
	Schooling	53 (26.50)
	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**	
	Hypertension	52 (26.00)
	Type 2 Diabetes Mellitus (T2DM)	13 (6.50)
	Anemia	8 (4.00)
	Ischaemic Heart Disease (IHD)	5 (2.50)
	Alcohol Use Disorder (AUD)	4 (2.00)
	Chronic Kidney Disease (CKD)	6 (3.00)
	No Comorbidities	80 (40.00)
	Others	26 (13.00)
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	**Social habits**	
	Smokers	58 (29)
	Non-Smokers	142 (71)
	Alcoholic	56 (28)
	Non-Alcoholic	144 (72)

10	**CRP**	
	Normal Range (<10 Mg/L)	20 (10)
	Mild Range (10- 40 Mg/L)	133 (66.50)
	Moderate Range (40- 100 Mg/L)	24 (12)
	Severe Range (>100 Mg/L)	23 (11.50)
	Normal Range (>10 Mm/Hr)	5 (2.50)
11	**ESR**	
	Mild Range (10-40 Mm/Hr)	77 (38.50)
	Moderate Range (40-70 Mm/Hr)	55 (27.50)
	High Range (> 70 Mm/Hr)	63 (31.50)
12	**Diagnosis**	
	Lower respiratory tract infection	181 (90.50)
	Upper respiratory tract infection	19 (9.50)

Table 2. Impact of patient counselling on medication adherence

Sl. No	Medication adherence	Mean ± SD	*p*-value
01	Pre-counselling	4.13±1.601	0.05*
02	Post counselling	6.80±1.592	
* Statistically Significant $p < 0.05$			

Table 3. Influence of multiple factors on medication adherence.

Sl. No	Variables	Mean ± Standard Deviation (SD)	*p*-value
1	**Age**		
	18-24 years		
	Pre-counselling	4.24±1.348	0.05*
	Post counselling	7.29±1.649	0.05*
	25-39 years		
	Pre-counselling	4.36±1.722	0.05*
	Post counselling	7.17±1.208	0.05*
	40-54 years		
	Pre-counselling	4.20±1.600	0.05*
	Post counselling	6.37±1.529	0.05*
	55-69 years		
	Pre-counselling	3.91±1.576	0.05*
	Post counselling	6.46±1.674	0.05*
	70-84 years		
	Pre-counselling	4.31±1.644	0.05*
	Post counselling	7.50±1.606	0.05*
2	**Gender**		
	Male		
	Pre-counselling	4.23±1.611	0.137
	Post counselling	6.89±1.529	0.133
	Female		
	Pre-counselling	3.86±1.559	0.176
	Post counselling	6.56±1.725	0.200
3	**Type of infection**		
	LRTI		
	Pre-counselling	4.07± 1.615	0.134
	Post counselling	6.74± 1.603	0.110
	URTI		
	Pre-counselling	4.68±1.376	0.110
	Post counselling	7.32±1.416	0.080
4	**Comorbidities**		
	Present		
	Pre-counselling	4.10±1.725	0.745
	Post counselling	6.78±1.705	0.856
	Absent		
	Pre-counselling	4.18±1.338	0.725

	Post counselling	6.82±1.360	0.846
5	**Economic status**		
	BPL		
	Pre-counselling	4.15±1.637	0.527
	Post counselling	6.82±1.611	0.489
	APL		
	Pre-counselling	3.96±1.338	0.583
	Post counselling	6.60±1.472	0.514
6	**Qualification**		
	Educated		
	Pre-counselling	4.18±1.588	0.529
	Post counselling	6.98±1.574	0.531
	Uneducated		
	Pre-counselling	4.04±1.626	0.05*
	Post counselling	6.53±1.591	0.05*
7	**Residence**		
	Urban		
	Pre-counselling	4.09±1.489	0.821
	Post counselling	6.79±1.445	0.969
	Rural		
	Pre-counselling	4.15±1.671	0.816
	Post counselling	6.80±1.682	0.968
8	**Days of hospitalization**		
	Less than 5 days		
	Pre-counselling	4.21±1.767	0.609
	Post counselling	6.79±1.671	0.996
	More than 5 days		
	Pre-counselling	4.08±1.514	0.627
	Post counselling	6.80±1.557	0.996
* Statistically Significant $p<0.05$			