



Original Research Article

MEDICATION ADHERENCE AND SELF-MEDICATION PRACTICES AMONG ADULTS WITH BRONCHIAL ASTHMA: A SINGLE-CENTRE OBSERVATIONAL STUDY

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ABSTRACT

Background: Medication adherence is essential for effective long-term management of bronchial asthma. Non-adherence may compromise treatment effectiveness, while unsupervised self-medication may increase the risk of adverse effects and drug interactions. This study evaluated medication adherence, self-medication practices and the potential for clinically significant drug interactions among adults with bronchial asthma.

Materials and Methods: A quantitative, single-centre observational study was conducted among 100 ambulatory patients aged ≥ 20 years with bronchial asthma attending the respiratory outpatient department of a tertiary-care government teaching hospital in Pune. Participants were selected using computer-generated random numbers. Data were collected using a semi-structured interview conducted using a study-specific questionnaire and review of medical records. Information regarding demographic characteristics, prescribed anti-asthmatic medications, medication adherence, reasons for non-adherence, self-medication, comorbidities, concomitant medications and adverse effects was recorded. Prescribed and self-medicated medicines were reviewed for potential clinically significant interactions. Institutional Ethics Committee approval was obtained, and written informed consent was obtained from all participants.

Results: Among the 100 participants, 62 (62.0%) were males and 38 (38.0%) were females. Overall, 89 (89.0%) participants were adherent and 11 (11.0%) were non-adherent to prescribed therapy. Non-adherence was more frequently observed among older participants, while difficulty in understanding or appropriately using inhaled medication was reported as a reason for non-adherence. Montelukast was the most frequently prescribed anti-asthmatic medication, used by 73 (73.0%) participants. Self-medication was reported by 16 (16.0%) participants, with omeprazole, pantoprazole and ranitidine being the most frequently used medicines. Fifteen participants had comorbid conditions requiring additional medications. No clinically significant potential drug interaction was identified among the documented medication combinations assessed. No adverse effect attributable to self-medication, aggravation of asthma symptoms or medication-related hospitalization was reported; mild gastritis was the only adverse effect noted in the study.

Conclusion: Medication adherence was relatively high, but non-adherence related to older age and difficulty with inhaler use remained important concerns. Self-medication was present in 16% of participants. Routine adherence assessment, inhaler-technique education and comprehensive medication review should be incorporated into asthma care.

Keywords: Bronchial asthma; medication adherence; non-adherence; self-medication; drug interactions; inhaler technique.

INTRODUCTION

Bronchial asthma is a chronic disorder of the airways characterized by increased responsiveness of the tracheobronchial tree and variable respiratory symptoms such as dyspnoea, wheezing and cough.^[1,2] Pharmacological management of asthma includes bronchodilators such as β 2-agonists, anticholinergics and methylxanthines, as well as leukotriene antagonists, mast cell stabilizers, inhaled and systemic corticosteroids and IgE monoclonal antibodies.^[1] Despite the availability of effective pharmacological therapies, optimal asthma control depends not only on appropriate prescribing but also on patients' adherence to the recommended treatment regimen.

Medication adherence refers to the extent to which patients follow prescribed treatment instructions.^[3] Non-adherence may involve failure to obtain medicines, failure to take medicines as prescribed, premature discontinuation of treatment or inappropriate use of medicines.^[3,4] It may be intentional or unintentional.^[5] Poor adherence is an important barrier to effective management of chronic diseases, particularly when long-term treatment is required.^[4,6] In asthma, non-adherence has been reported in approximately 28–70% of patients and may increase the risk of severe exacerbations requiring hospitalization.^[4] Factors associated with poor adherence include low educational and socioeconomic status, inadequate doctor-patient communication, difficulty following treatment instructions, problems with inhaler devices, complexity of treatment regimens, self-medication, psychological factors and comorbidities.^[5,6]

Self-medication represents another important aspect of medication use in patients with chronic diseases. It is defined as medication taken on the patient's own initiative or on the advice of a pharmacist or layperson.^[7,8] It may include obtaining medicines without a prescription, reusing previous prescriptions, sharing medicines with relatives or friends, or using leftover medicines.^[9] Over-the-counter (OTC) medicines are commonly used for self-medication and may provide convenient and relatively inexpensive access to treatment.^[9,10] However, inappropriate self-medication may result in adverse effects, drug interactions, incorrect treatment and aggravation of an existing disease.^[9,11,12] In India and other developing countries, easy access to medicines through pharmacies and the availability of some prescription-only medicines without formal medical consultation may further facilitate self-medication.^[8]

Drug interactions are particularly relevant in patients with asthma because medicines taken without medical supervision may alter the efficacy or safety of prescribed therapy. A drug interaction refers to a pharmacological or clinical response to a combination of drugs that differs from that anticipated from their individual effects.^[13] Multiple

diseases and concomitant use of several medicines increase the potential for drug interactions.^[13] Certain commonly used medicines are of particular concern in asthma. Aspirin may precipitate bronchoconstriction in susceptible individuals, while β -adrenergic antagonists may induce or worsen bronchospasm and interfere with the effects of β 2-agonists.^[2,13] Thus, self-medication may have important implications for the safety and effectiveness of pharmacological treatment in patients with asthma.

Although medication adherence and self-medication are important components of asthma management, limited evidence from India has evaluated these issues together, particularly in relation to the potential for clinically significant interactions between self-medicated and prescribed medicines. Therefore, the present study was undertaken to assess medication adherence among adult patients with bronchial asthma, determine the magnitude and pattern of self-medication, and assess the potential for clinically significant drug interactions between self-medicated and prescribed medicines.

MATERIALS AND METHODS

Study design and setting: This was a quantitative, single-centre observational study conducted in the respiratory outpatient department of a tertiary-care government teaching hospital in Pune.

Study participants and sampling: A total of 100 ambulatory adult patients aged ≥ 20 years with bronchial asthma were randomly selected from the respiratory outpatient department using computer-generated random numbers. Written informed consent was obtained from each participant before enrolment. Participation was voluntary, and participants were assured of anonymity and confidentiality of the information collected.

Data collection: Data were collected through a semi-structured interview using a study-specific questionnaire and review of participants' medical records. The questionnaire recorded demographic characteristics, socioeconomic and educational status, details of bronchial asthma, prescribed anti-asthmatic medications, medication adherence and reasons for non-adherence. Participants were also asked about self-medication, including the type of medicine used, indication, duration, dose, adverse effects, reason for not consulting a doctor and how they came to know about the medicine. Details of other comorbid conditions and their prescribed medications were also recorded.

Assessment of medication adherence: Medication adherence was assessed according to the extent to which participants followed their prescribed treatment instructions.^[3] Failure to follow the prescribed treatment regimen was considered non-adherence.^[4] The reasons for non-adherence were documented, including difficulties related to the use of prescribed medicines and inhaler devices.

Assessment of self-medication: Self-medication was defined as medication taken on the patient's own initiative or on the advice of a pharmacist or layperson.^[7,8] It included obtaining medicines without a prescription, reusing previous prescriptions, sharing medicines with relatives or friends and using leftover medicines.^[9] Herbal medicines, food supplements and alternative medicines taken by participants were also considered self-medication.

Assessment of potential drug interactions: All prescribed medicines, including anti-asthmatic and medicines used for comorbid conditions, as well as self-medicated drugs, were documented. The medication histories were reviewed to assess the potential for clinically significant interactions between self-medicated and prescribed medicines. Adverse effects potentially associated with self-medication and any aggravation of asthma symptoms or hospitalization were also recorded.

Outcome measures: The study outcomes were: (1) proportion of patients adherent and non-adherent to prescribed therapy and reasons for non-adherence; (2) prevalence and pattern of self-medication according to age, sex, socioeconomic status and educational status; (3) proportion of patients

reporting adverse drug reactions potentially related to self-medication; and (4) potential clinically significant drug interactions between self-medicated and prescribed medicines.

Statistical analysis: Categorical variables were summarized using frequencies and percentages. Adherence and self-medication patterns were described according to relevant demographic and socioeconomic characteristics.

Ethical considerations: The study was conducted after Institutional Ethics Committee approval. Written informed consent was obtained from all participants before enrolment. Participation was voluntary, and confidentiality and anonymity of participant information were maintained throughout the study.

RESULTS

A total of 100 ambulatory adult patients aged ≥ 20 years with bronchial asthma were included in the study. Of these, 62 (62.0%) were males and 38 (38.0%) were females. The age- and sex-wise distribution of participants is presented in Table 1.

Table 1: Age- and sex-wise distribution of study participants (n=100)

Age group (years)	Male, n (%)	Female, n (%)	Total, n (%)
20–29	4 (6.5)	0 (0.0)	4 (4.0)
30–39	12 (19.4)	8 (21.1)	20 (20.0)
40–49	12 (19.4)	9 (23.7)	21 (21.0)
50–59	7 (11.3)	2 (5.3)	9 (9.0)
60–69	18 (29.0)	11 (28.9)	29 (29.0)
70–80	9 (14.5)	8 (21.1)	17 (17.0)
Total	62 (100.0)	38 (100.0)	100 (100.0)

Percentages in the sex-specific columns are calculated within each sex; total percentages are calculated from the overall sample.

The anti-asthmatic medications prescribed to participants are shown in Table 2. Montelukast was the most frequently prescribed medication, followed by salbutamol and deriphylline. Both inhaled corticosteroids and long-acting β_2 -agonists were also prescribed.

Table 2: Distribution of prescribed anti-asthmatic medications (n=100)

Anti-asthmatic medication	n (%)
Montelukast	73 (73.0)
Salbutamol	29 (29.0)
Deriphylline	28 (28.0)
Budesonide	21 (21.0)
Fluticasone	21 (21.0)
Salmeterol	16 (16.0)
Formoterol	12 (12.0)
Methylprednisolone	2 (2.0)

Multiple medications could be prescribed to the same participant; therefore, percentages do not total 100%.

Overall, 89 (89.0%) participants were adherent and 11 (11.0%) were non-adherent to prescribed therapy. Among males, 55 (88.7%) were adherent and 7 (11.3%) were non-adherent, compared with 34 (89.5%) and 4 (10.5%), respectively, among females.

Table 3: Medication adherence according to sex and age

A. Sex-wise distribution

Sex	Adherent, n (%)	Non-adherent, n (%)	Total
Male	55 (88.7)	7 (11.3)	62
Female	34 (89.5)	4 (10.5)	38
Total	89 (89.0)	11 (11.0)	100

B. Age-wise distribution

Age group (years)	Adherent, n	Non-adherent, n	Total
20–29	4	0	4
30–39	20	0	20
40–49	20	1	21
50–59	7	2	9
60–69	26	3	29
70–80	12	5	17
Total	89	11	100

Non-adherence was more frequently observed among participants in the older age groups, particularly those aged 70–80 years. Difficulty in understanding or appropriately using inhaled medication was reported as a reason for non-adherence. Availability and cost of medication were not reported as major barriers

because medicines were provided free of cost by the hospital.

Self-medication was reported by 16 (16.0%) participants. The reported pattern of self-medication according to demographic and socioeconomic characteristics is presented descriptively. No adverse event was specifically attributed to self-medication.

Table 4: Pattern of self-medication among study participants

Self-medicated drug	n	% among self-medication users (n=16)	% of total participants (n=100)
Omeprazole	8	50.0	8.0
Pantoprazole	5	31.3	5.0
Ranitidine	2	12.5	2.0
Diclofenac	1	6.3	1.0
Total	16	100.0	16.0

Fifteen participants had comorbid conditions, including hypertension, diabetes mellitus and rheumatoid arthritis. Various concomitant medicines were reported, including levocetirizine; levofloxacin, amikacin and amoxicillin-clavulanic acid; insulin

and metformin; amlodipine, verapamil, losartan and indapamide; and other medicines such as calcium, vitamin C, domperidone, sildenafil, methotrexate, hydroxychloroquine and alprazolam.

Table 5: Comorbidities, concomitant medications and medication-related outcomes

Variable	Finding
Participants with comorbidities, n	15
Reported comorbidities	Hypertension, diabetes mellitus, rheumatoid arthritis
Antihistamine	Levocetirizine
Antimicrobials	Levofloxacin, amikacin, amoxicillin + clavulanic acid
Antidiabetic medications	Insulin, metformin
Cardiovascular medications	Amlodipine, verapamil, losartan, indapamide
Other concomitant medications	Sildenafil, calcium, vitamin C, domperidone, methotrexate, hydroxychloroquine, alprazolam
Potential clinically significant drug interaction among documented medication combinations	None identified
Adverse effects attributable to self-medication	None reported
Aggravation of asthma symptoms related to self-medication	None reported
Medication-related hospitalization	None reported
Other adverse effect reported in the study	Mild gastritis; no significant adverse effects reported

DISCUSSION

Medication adherence is an important determinant of effective long-term management of bronchial asthma. In the present study, 89% of participants were adherent to their prescribed therapy, whereas 11% were non-adherent. Although adherence was relatively high, a clinically relevant proportion of patients continued to experience difficulties with their treatment regimen. Poor adherence is recognized as an important barrier to effective management of chronic diseases, including asthma, and previous literature has reported substantial variation in asthma non-adherence, ranging from approximately 28% to 70%.^[4-6]

In the present study, non-adherence was more frequently observed among older participants, while difficulty in understanding or appropriately using inhaled medication was reported as a reason for non-adherence. The greater non-adherence observed among older participants may reflect difficulties commonly encountered with vision, motor coordination, cognition and management of multiple medications.^[14] Difficulty with inhaler devices has also been identified as an important barrier to adherence in asthma.^[5,6] These findings emphasize the importance of repeated patient education and demonstration of correct inhaler technique. In the present study, availability and cost of medication

were not reported as major barriers because medicines were provided free of cost by the hospital. Self-medication was reported by 16% of participants. The most frequently used self-medicated medicines were omeprazole and pantoprazole, followed by ranitidine and diclofenac. Self-medication is common and may be facilitated by easy access to medicines, convenience and the perception that certain symptoms do not require medical consultation.^[7-10] Although self-medication can provide convenient access to treatment, inappropriate use may result in incorrect treatment, adverse effects, delayed medical consultation and potential drug interactions.^[9,11,12] Therefore, routinely enquiring about OTC and other medicines taken without prescription is particularly relevant during asthma consultations.

Drug interactions are an important consideration in patients receiving treatment for asthma. Aspirin may precipitate bronchoconstriction in susceptible individuals, while β -adrenergic antagonists may worsen bronchospasm and interfere with the effects of β_2 -agonists.^[2,13] The potential for interactions may increase in patients with multiple diseases and concomitant medication use.^[13] In the present study, 15 participants had comorbid conditions, including hypertension, diabetes mellitus and rheumatoid arthritis, and were receiving additional medications. However, review of the documented medication histories did not identify any combination considered to have clinically significant potential for interaction. No adverse effect attributable to self-medication, aggravation of asthma symptoms or medication-related hospitalization was reported. Mild gastritis was reported among the adverse effects recorded in the study; however, no adverse effect was specifically attributed to self-medication. Therefore, the absence of clinically significant adverse outcomes should be interpreted cautiously rather than as evidence that self-medication is completely safe. The study has several limitations. It was conducted at a single tertiary-care centre and included only 100 participants, limiting the generalizability of the findings. Medication adherence and self-medication were assessed through participant interviews and were therefore susceptible to recall and reporting bias. Finally, assessment of potential drug interactions was based on the medications documented or reported during the study and should not be interpreted as evidence that interaction risk is absent among patients with asthma.

CONCLUSION

Medication adherence was relatively high among adults with bronchial asthma, with 89% of participants adhering to their prescribed therapy. Nevertheless, 11% remained non-adherent, with non-adherence more frequently observed among older participants and difficulty in appropriately using inhaled medication reported as a reason for non-

adherence. Self-medication was reported by 16% of participants, predominantly involving acid-suppressive medicines. Although no clinically significant potential drug interactions were identified among the documented medication combinations, and no adverse effects attributable to self-medication were reported, the possibility of under-reporting of medication use cannot be excluded. The findings emphasize the importance of routinely assessing medication adherence, providing repeated education and demonstration of correct inhaler technique, and actively enquiring about OTC and other self-medicated medicines during asthma consultations. Such measures may help improve the safe and effective long-term management of bronchial asthma.

DECLARATIONS

Ethics approval: The study was conducted after Institutional Ethics Committee approval.

Consent to participate: Written informed consent was obtained from all participants.

Conflict of interest: The authors declare no conflict of interest.

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Data availability: Data are available from the corresponding author on reasonable request, subject to applicable ethical and institutional restrictions.

Author contributions: All authors contributed to the study and manuscript preparation and approved the final manuscript.

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