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A Prospective Observational Study On Medication Adherence And Quality Of Life Of Asthma Patients On Single Maintenance And Reliever Therapy Using Knowledge Attitude And Practice Study In A Tertiary Care Hospital – A Pilot Study

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Abstract

Asthma is a chronic inflammatory airway disease affecting millions worldwide and is associated with significant morbidity and reduced quality of life. Single Maintenance and Reliever Therapy (SMART) has improved asthma management; however, treatment success depends largely on patient knowledge, adherence, and self-management practices.

Objective: To evaluate the impact of patient counselling on knowledge, attitude, practice (KAP), medication adherence, and quality of life among asthma patients receiving SMART therapy.

Methods: A prospective observational study was conducted among 20 asthma patients receiving SMART therapy in a tertiary care hospital. Baseline and follow-up assessments of KAP, medication adherence, and quality of life were performed before and after counselling. Data were analyzed using the Wilcoxon Signed-Rank Test, with $p < 0.05$ considered statistically significant.

Results: Significant improvements were observed following counselling. Mean knowledge scores increased from 60% to 88% (p=0.001), attitude scores from 66% to 82% (p=0.004), practice scores from

52% to 78% (p=0.001), and medication adherence scores from 54% to 79% (p=0.001). Quality-of-life scores improved significantly from 48% to82% (p=0.014).

Conclusion: Patient counselling significantly improved KAP, medication adherence, and quality of life among asthma patients receiving SMART therapy, highlighting the important role of pharmacists in asthma management.

Keywords: Asthma, SMART therapy, KAP, Medication Adherence, Quality of Life, Pharmacist Counselling.

1. Introduction

Asthma is a chronic inflammatory disease of the airways characterized by variable respiratory symptoms such as wheeze, shortness of breath, chest tightness, and cough, along with variable expiratory airflow limitation. It affects individuals of all age groups and remains one of the leading causes of chronic respiratory morbidity worldwide. Despite the availability of effective pharmacological therapies and evidence-based management guidelines, asthma continues to impose a substantial burden on patients, healthcare systems, and society through frequent exacerbations, hospitalizations, impaired quality of life, and reduced productivity[1].

According to the Global Initiative for Asthma (GINA) 2025 report, asthma affects more than 260 million people worldwide and accounts for over 450,000 deaths annually, many of which are preventable through appropriate diagnosis, optimal pharmacotherapy, and patient education[2]. In India, asthma contributes significantly to respiratory disease burden, with an estimated prevalence ranging from 2% to 6% among adults and a disproportionately high number of asthma-related deaths compared with many developed countries[3]. Poor disease control remains common because of inadequate adherence to prescribed medications, improper inhaler technique, poor awareness regarding disease management, environmental exposures, and limited patient education[4].

Recent advances in asthma management have shifted the focus from symptom relief alone to long-term disease control and prevention of exacerbations. The Global Initiative for Asthma recommends inhaled corticosteroid (ICS)-containing therapy for all adults and adolescents with asthma and discourages short-acting β_2-agonist (SABA)-only treatment because of the increased risk of severe exacerbations[2]. Single Maintenance and Reliever Therapy (SMART), also referred to as Maintenance and Reliever Therapy (MART), involves the use of a combination inhaler containing inhaled corticosteroid and formoterol for both daily maintenance treatment and symptom relief. This strategy has demonstrated superior effectiveness in reducing severe exacerbations, improving asthma control, minimizing corticosteroid exposure, and simplifying treatment regimens compared with conventional maintenance therapy with a separate reliever inhaler[2,5].

Medication adherence is a cornerstone of successful asthma management. However, adherence to inhaled medications remains suboptimal worldwide, with studies reporting adherence rates frequently below 50%. Poor adherence is associated with increased emergency department visits, recurrent exacerbations, hospital admissions, impaired lung function, and higher healthcare costs[6]. Factors influencing adherence include inadequate knowledge of asthma, misconceptions regarding inhaled corticosteroids, concerns about adverse effects, forgetfulness, treatment complexity, socioeconomic factors, and poor physician-patient communication[7].

Knowledge, Attitude, and Practice (KAP) studies provide valuable insight into patients' understanding of asthma, their beliefs regarding treatment, and their day-to-day self-management behaviors. Adequate knowledge regarding disease pathophysiology, trigger avoidance, inhaler technique, and adherence to controller medication has been shown to improve clinical outcomes. Positive attitudes toward long-term controller therapy and appropriate self-management practices contribute significantly to better asthma control and reduced exacerbation frequency[8]. Conversely, poor knowledge and inappropriate practices remain important barriers to effective asthma management in many low- and middle-income countries, including India[9].

Quality of life (QoL) has become an essential patient-reported outcome in asthma research. Persistent symptoms, activity limitations, sleep disturbances, emotional distress, and fear of exacerbations adversely affect the physical, psychological, and social well-being of patients with asthma. Validated instruments such as the Mini Asthma Quality of Life Questionnaire (Mini-AQLQ) enable comprehensive assessment of the impact of asthma and its treatment on patients' daily lives[10]. Previous studies have demonstrated that higher medication adherence and better asthma control are associated with improved quality of life, whereas poor adherence and inadequate disease knowledge are associated with poorer patient-reported outcomes[11].

Although the clinical benefits of SMART therapy have been well established, relatively few Indian studies have comprehensively evaluated medication adherence and quality of life among patients receiving SMART while simultaneously assessing patients' knowledge, attitudes, and self-management practices. Understanding these interrelated factors is important for identifying barriers to optimal asthma control and designing pharmacist-led educational interventions that promote rational inhaler use, improve adherence, and enhance quality of life.

Therefore, the present prospective observational pilot study aims to evaluate medication adherence and quality of life among asthma patients receiving Single Maintenance and Reliever Therapy (SMART) using a Knowledge, Attitude, and Practice assessment in a tertiary care hospital. The findings are expected to provide preliminary evidence regarding the feasibility of conducting a larger observational study and contribute to the development of patient-centered strategies for improving asthma outcomes through enhanced education and pharmaceutical care.

3. Study methodology

Study design: Prospective observational study.

Study site: Department of Pulmonory and critical care.

Duration: 3 months

Sample size: 20 patients

Inclusion criteria:

- Patients aged above ≥18 years.
- Patient who are diagnosed with Asthma
- Willing to provide informed consent.

Exclusion criteria:

- Patient below 18 years of age
- Pregnancy and breastfeeding women
- Use of systemic corticosteroid as maintenance therapy
- Treatment with biologics(monoclonal antibodies)
- Concomitant diagnosis of COPD
- Respiratory Tract Infections (RTI)

Study tools:

- Structured KAP questionnaire
- Quality of life questionnaire
- Medication adherence questionnaire

4. Data collection procedure

The study was conducted in the pulmonary and critical care department in a tertiary care hospital after approval from the institutional ethics committee. Eligible patients diagnosed with asthma and receiving single maintenance and reliever therapy (SMART) were identified through the review of medical records and Physicians reference. Patient who met the inclusion criteria were approached and informed about the purpose of the study. Written informed consent was obtained prior to enrolment. Baseline demographic details were collected using a structured data collection form. At baseline participants were assessed using validated questionnaire to evaluate the knowledge attitude and practise, medication adherence and quality of life. Following the baseline assessment a counselling session was provided. Patients were subsequently followed up after counselling intervention. During follow up the same assessment tools were administered to evaluate changes in KAP, medication adherence and quality of life. All collected data were recorded in a pre designed proforma form and entered into a database for statistical analysis.

5 Statistical Analysis

Statistical Package for Social Sciences [SPSS] for Windows Version 22.0 is used to perform statistical analyses.

5.1 Descriptive Statistics

Descriptive analysis of all the explanatory and outcome parameters will be done using mean and standard deviation for quantitative variables, Number and proportions for categorical variables. The data were presented in the form of tables, graphs and diagrams which ever may be applicable.

5.2 Inferential Statistics

Based on the data distribution Wilcoxon Signed Rank Test (non-parametric) is used to compare the variables before and after counselling. The level of significance [P-Value] will be set at $P<0.05$.

6. RESULTS

Table 1: Distribution of age

	No of patients	Minimum	Maximum	Mean	Std. Deviation
Age	20	20	70	45	14

Out of 20 individuals, the mean age is 45years with a standard deviation of 14 years and a minimum age is 20 years and maximum age is 70 years.

Table 2 : Distribution of age category

AGE IN YEARS	Number of patients	Percentage
< 30	2	10.0
30-39	6	30.0
40-49	4	20.0
50-59	4	20.0
>= 60	4	20.0
Total	20	100.0

Out of 20 individuals, 2(10%) are from the age group less than 30 years, 6(30%) are from the age group 30-39 years, 4(20%) are from the age group 40-49 years, 4(20%) are from the age group 50-59 years and 4(20%) are from the age group greater than or equal to 60 years.

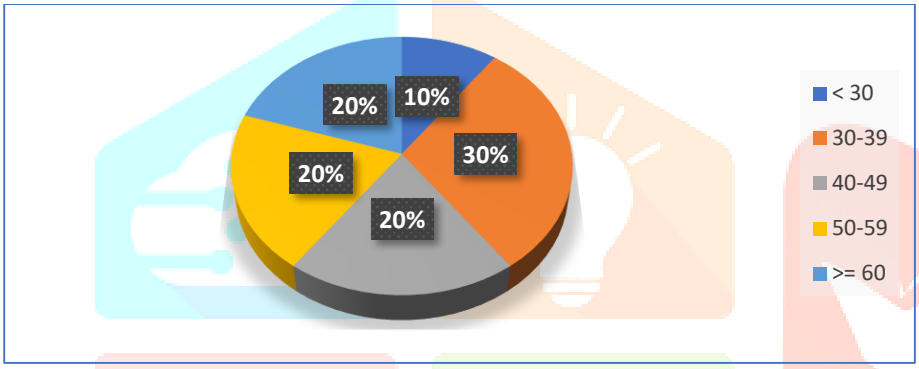

Figure 1 : Pie diagram showing the distribution of age

Table 3 : Distribution of sex

Gender	Number of patients	Percentage
FEMALE	11	55.0
MALE	9	45.0
Total	20	100.0

Out of 20 individuals, 11(55%) are females and 9(45%) are males

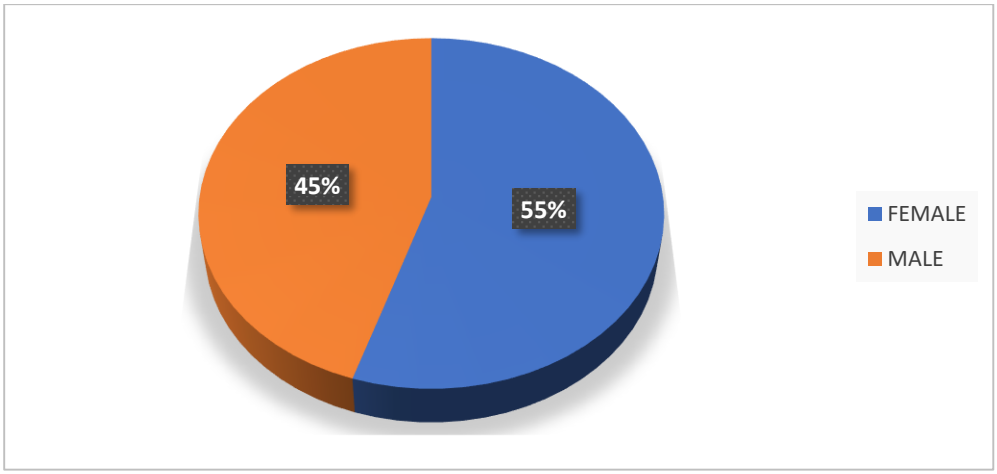

Figure 2 : Pie diagram showing the distribution of sex

Table 4 : Distribution of type of inhaler dose

TYPE OF INHALER DOSE	Number of patients	Percentage
AEROCORT	1	5.0
BUDAMATE 200	2	10.0
DUOLIN	4	20.0
FORACORT 200	8	40.0
NIVEOLI	1	5.0
SEROFLO	3	15.0
SYMBICORT	1	5.0
Total	20	100.0

Out of 20 individuals, the type of inhaler dose is 8(40%) have Foracort 200, 4(20%) have Duolin, 3(15%) have Seroflo, 2(10%) have Budamate 200 and others are evenly distributed.

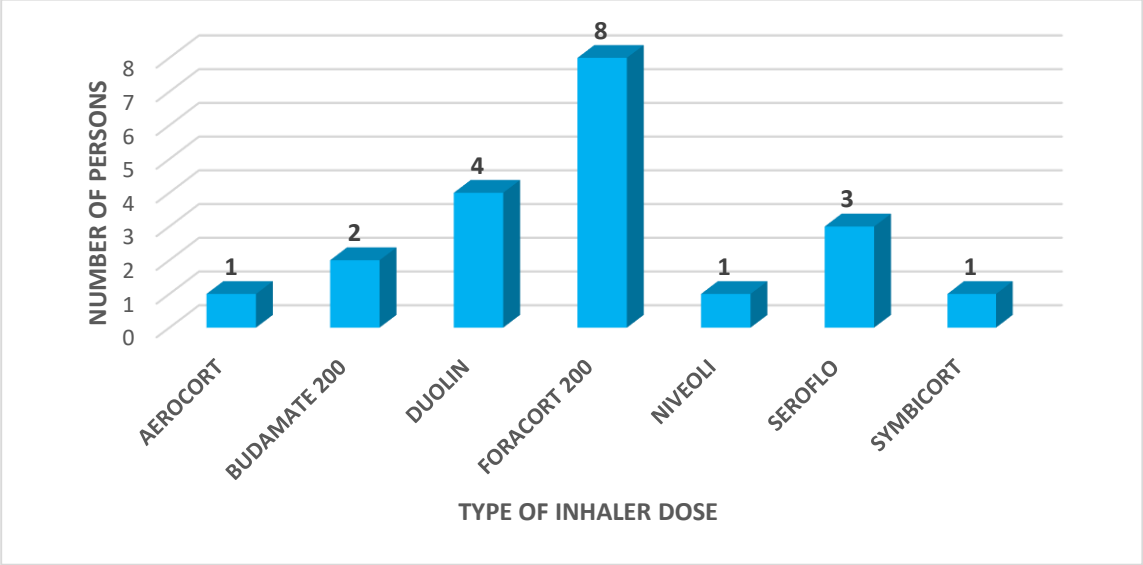

Figure 3 : Bar Diagram showing the distribution of type of inhaler dose

Table 5 : Duration of Asthma

DURATION OF ASTHMA IN YEARS	Number of patients	Percentage
< 5	1	5.0
5 - 9	5	25.0
10 - 14	2	10.0
15 - 19	4	20.0
20 - 24	3	15.0
>= 25	5	25.0
Total	20	100.0

Out of 20 individuals, 1(5%) are duration of asthma less than 5 years, 5(25%) are 5-9 years, 2(10%) are 10-14 years, 4(20%) are 15-19 years, 3(15%0 are 20-24 years and 5(25%) are greater than or equal to 25 years.

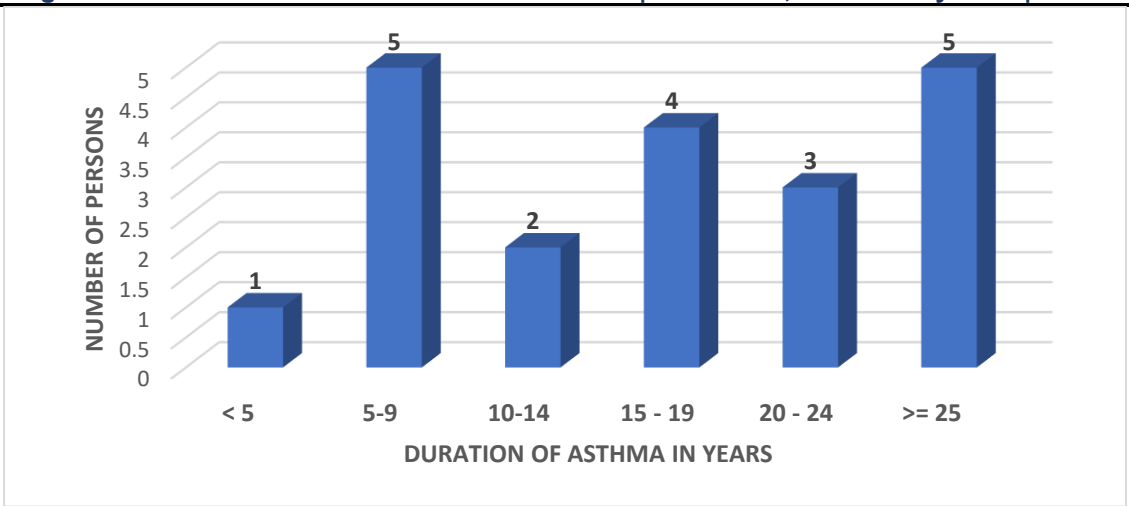

Figure 4 : Bar diagram showing the distribution of duration of asthma in years

Table 6 : Distribution of Comorbidities

CORMORBIDITIES	Number of patients	Percentage
DM	2	10.0
HYPERTENSION	7	35.0
NIL	11	55.0
Total	20	100.0

Out of 20 individuals 2(10%) have diabetes mellites, 7(35%) have hypertension and 11(55%) have no comorbidities.

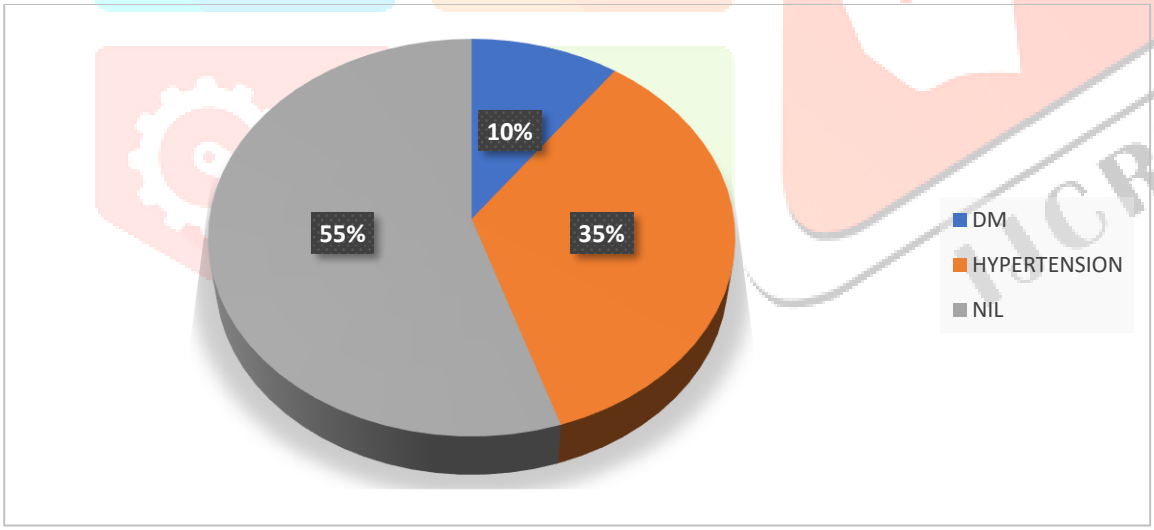

Figure 5 : Pie diagram showing the distribution of comorbidities

Table 7 : Distribution of allergies

ALLERGIES	Number of patients	Percentage
COLD	1	5.0
COLD, DUST	5	25.0
COLD, PERFUME	1	5.0
COLD, RICE HUSK	1	5.0
DUST	4	20.0
DUST, EXCERSICE	1	5.0
PERFUME, POLLUTION	1	5.0
PETS	1	5.0
PETS, SMOKE	1	5.0
POLLEN	1	5.0
RICE HUSK	1	5.0
SMOKE	1	5.0
STRESS	1	5.0
Total	20	100.0

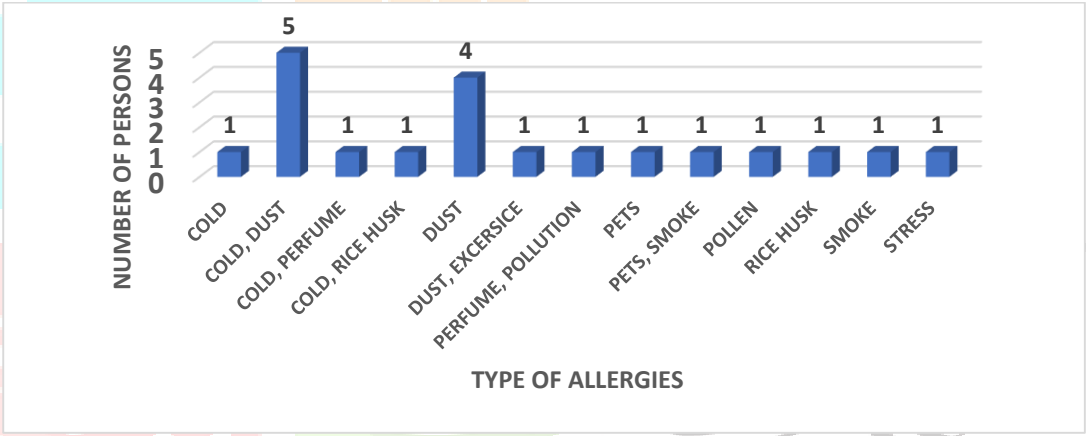

Figure 6 : Bar diagram showing the distribution of type of allergiesTable 8 : Distribution of other medications

OTHER MEDICATION	Number of patients	Percentage
AMLODIPINE	2	10.0
DOXOVENT	1	5.0
LOSARTAN	1	5.0
METFORMIN	1	5.0
NIL	10	50.0
PRAZOSIN	1	5.0
SITAGLIPTIN	1	5.0
TELMISARTAN	3	15.0
Total	20	100.0

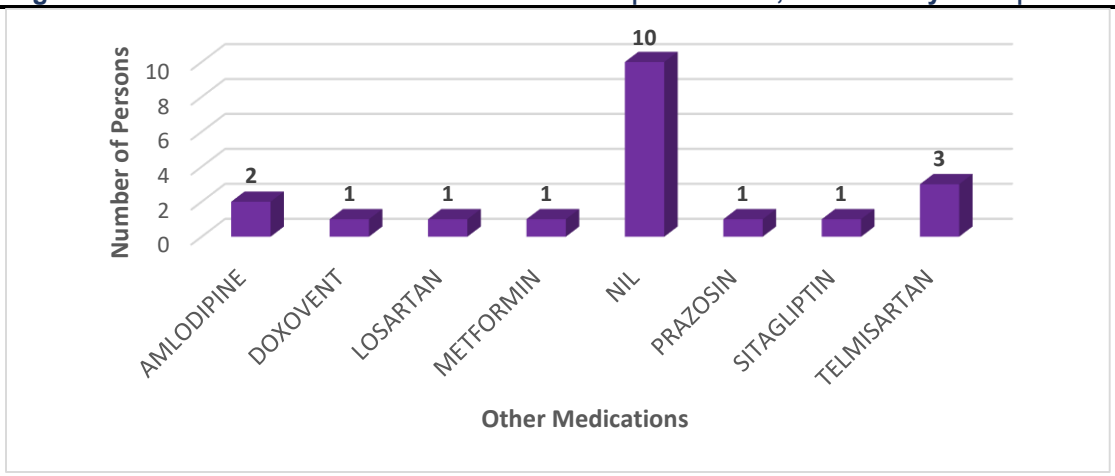

Figure 7: Bar diagram showing the distribution of other medications

7. COMPARISON OF KAP SCORE AT BASELINE AND AFTER COUNSELLING OF ASTHMA PATIENTS.

a. Comparison of Knowledge score

Table 9 : Descriptive statistics of percentage knowledge score

	Number of patients	Minimum	Maximum	Mean	SD
KNOWLEDGE BASELINE %	20	20	100	60.00	25.13
KNOWLEDGE FOLLOW UP %	20	80	100	88.00	10.05

The mean knowledge score at the baseline is 60 with a standard deviation of 25.13 and after counselling the mean knowledge score becomes 88 with a standard deviation of 10.05. There is an observed improvement in the knowledge score after counselling.

Table 10: comparison of percentage knowledge score before and after counselling

		Number of patients	Mean Rank	Sum of Ranks
KNOWLEDGE FOLLOW UP % - KNOWLEDGE BASELINE %	Negative Ranks	0[a]	.00	.00
	Positive Ranks	15[b]	8.00	120.00
	Ties	5[c]		
	Total	20		
a. KNOWLEDGE FOLLOW UP % < KNOWLEDGE BASELINE %				
b. KNOWLEDGE FOLLOW UP % > KNOWLEDGE BASELINE %				
c. KNOWLEDGE FOLLOW UP % = KNOWLEDGE BASELINE %				
Test statistics				
Z value -3.464		P value 0.001		

In the percentage knowledge score out of 20 individuals, 15 individuals have knowledge score after counselling is greater than before counselling, no individuals have knowledge score after counselling is less than before counselling and 5 individuals have unchanged or tie in knowledge score.

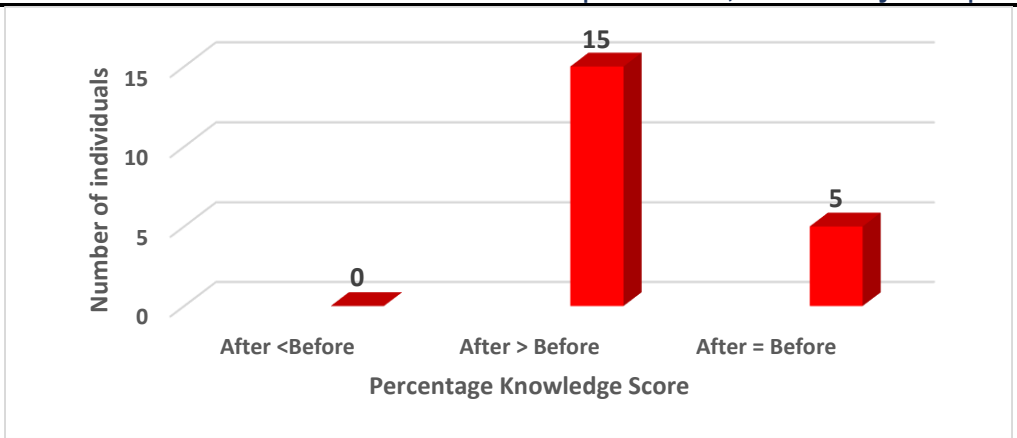

Figure 8 : Bar diagram showing the before and after comparison of percentage knowledge Score

This observed improvement in the knowledge score after counselling is statistically significant on a Wilcoxon Signed Rank test (Z=-3.464, P=0.001). Since the P-value was less than the specified significance level of 0.05, the test results were statistically significant and have strong evidence against the null hypothesis. Hence, reject the null hypothesis and conclude that there is significant improvement in the knowledge score after counselling as compared to before counselling. Counselling significantly improves the knowledge.

b. Comparison of attitude score

Table 11 : Descriptive statistics of percentage attitude score

Descriptive Statistics					
	N	Minimum	Maximum	Mean	SD
ATTITUDE BASELINE %	20	40	100	66.00	21.62
ATTITUDE FOLLOW UP %	20	60	100	82.00	14.36

The mean attitude score before counselling is 66 with a standard deviation of 21.62 and after counselling the mean attitude score becomes 82 with a standard deviation of 14.36. There is an observed improvement in the attitude score after counselling.

Table 12 : comparison of percentage attitude score before and after counselling

Ranks				
		N	Mean Rank	Sum of Ranks
ATTITUDE FOLLOW UP % - ATTITUDE BASELINE %	Negative Ranks	2[a]	6.00	12.00
	Positive Ranks	13[b]	8.31	108.00
	Ties	5[c]		
	Total	20		
a. ATTITUDE FOLLOW UP % < ATTITUDE BASELINE %				
b. ATTITUDE FOLLOW UP % > ATTITUDE BASELINE %				
c. ATTITUDE FOLLOW UP % = ATTITUDE BASELINE %				
Test statistics				
Z value -2.858		P value 0.004		

In the percentage attitude score out of 20 individuals, 2 individuals have attitude score after counselling is less than before counselling, 13 individuals have attitude score after counselling greater than before counselling and 5 individuals have unchanged or tie in the attitude score.

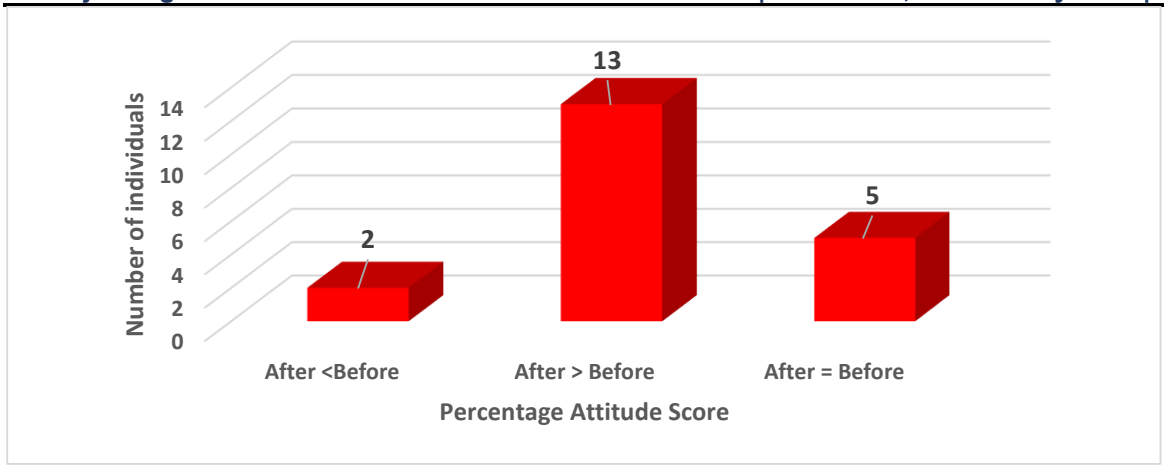

Figure 9 : Bar diagram showing the before and after comparison of percentage attitude Score

This observed improvement in the attitude score after counselling is statistically significant on a Wilcoxon Signed Rank test (Z=-2.858, P=0.004). Since the P-value was less than the specified significance level of 0.05, the test results were statistically significant and have strong evidence against the null hypothesis. Hence, reject the null hypothesis and conclude that there is significant improvement in the attitude Score after counselling as compared to before counselling. Counselling significantly improves the attitude of the asthma patients.

b. Comparison of practice score

Table 13 : Descriptive statistics of percentage practice score

Descriptive Statistics					
	N	Minimum	Maximum	Mean	SD
PRACTICE BASELINE %	20	20	100	52.00	22.85
PRACTICE FOLLOW UP %	20	40	100	78.00	15.76

The mean practice score before counselling is 52 with a standard deviation of 22.85 and after counselling the mean practice score becomes 78 with a standard deviation of 15.76. There is an observed improvement in the practice score after counselling.

Table 14 : comparison of percentage practice score before and after counselling

Ranks				
		N	Mean Rank	Sum of Ranks
PRACTICE FOLLOW UP % - PRACTICE BASELINE %	Negative Ranks	0[a]	.00	.00
	Positive Ranks	16[b]	8.50	136.00
	Ties	4[c]		
	Total	20		
a. PRACTICE FOLLOW UP % < PRACTICE BASELINE %				
b. PRACTICE FOLLOW UP % > PRACTICE BASELINE %				
c. PRACTICE FOLLOW UP % = PRACTICE BASELINE %				
Test statistics				
Z value -3.598		P value 0.001		

In the percentage practice score out of 20 individuals, no individuals have practice score after counselling is less than before counselling, 16 individuals have practice score after counselling greater than before counselling and 4 individuals have unchanged or tie in the practice score.

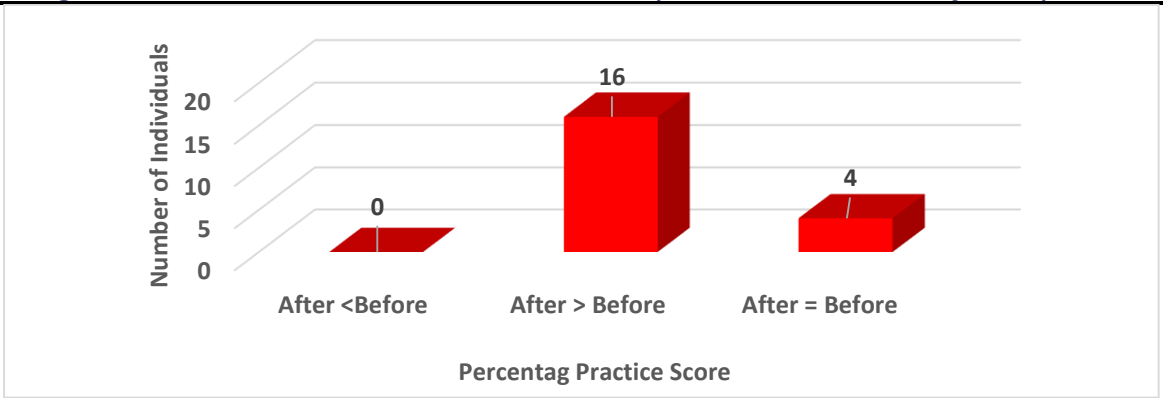

Figure 10 : Bar diagram showing the before and after comparison of percentage attitude Score

This observed improvement in the practice score after counselling is statistically significant on a Wilcoxon Signed Rank test (Z=-3.598, P=0.001). Since the P-value was less than the specified significance level of 0.05, the test results were statistically significant and have strong evidence against the null hypothesis. Hence, reject the null hypothesis and conclude that there is significant improvement in the practice Score after counselling as compared to before counselling. Counselling significantly improves the practice of asthma patients.

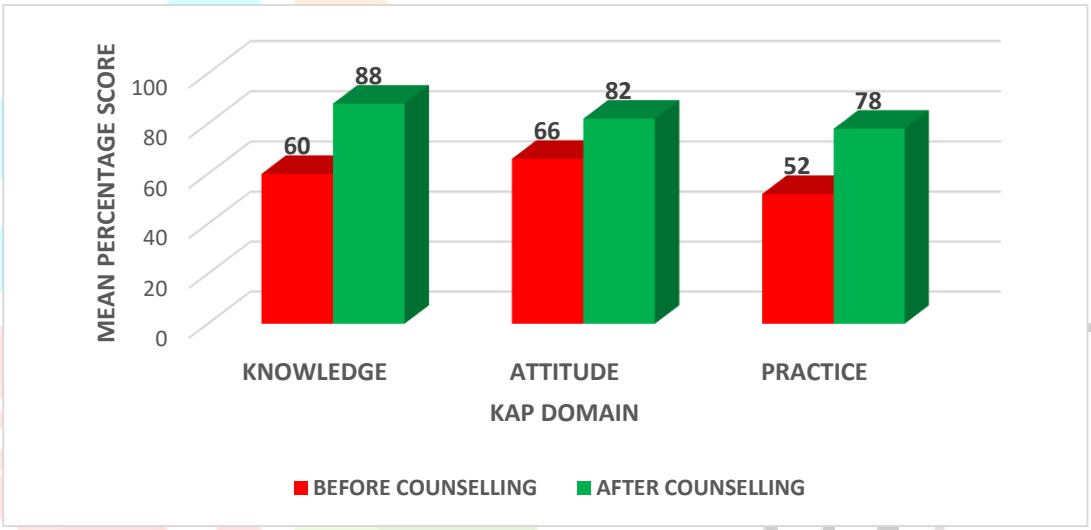

Figure 11 : Bar diagram showing the mean KAP percentage score before and after counselling.

The overall result of the KAP score is statistically significant on a Wilcoxon signed rank test (Z=-4.749, P=.001), This indicates that the patients counselling has significantly improved the overall knowledge, attitude and practice score.

8. COMPARISON OF QUALITY OF LIFE ASSESSMENT SCORE BEFORE AND AFTER COUNSELLING OF ASTHMA PATIENTS.

Comparing the quality of life assessment score before and after counselling of asthma patients, a statistical test is to be used. To choose an appropriate statistical test, check the assumption of the normality of the variables to be tested and decide whether a parametric or non-parametric test is suitable for the comparison. The null hypothesis for this assumption is that data follows normal distribution. This normality assumption is assessed by a statistical test called Shapiro Wilks test. The QOL score before and after counselling not follows normal distribution because the Shapiro Wilks test is significant(P<.05). Hence, for the comparison quality of life score before and after counselling a non-parametric test called Wilcoxon Signed Rank test which is equivalent to a parametric test called paired t-test is applied.

Table 15 : Descriptive statistics of the QOL score

Descriptive Statistics					
	Number of patients	Minimum	Maximum	Mean	SD
QOL BASELINE SCORE	20	5	20	12.10	4.42
QOL FOLLOW UP	20	5	14	8.55	2.74

The mean quality of life score before counselling is 12.10 with a standard deviation of 4.42 and after counselling the mean quality of life score becomes 8.55 with a standard deviation of 2.74. There is an observed reduction in the QOL score after counselling.

Table 16 : Comparison of QOL score before and after counselling

		N	Mean Rank	Sum of Ranks
QOL FOLLOW UP - QOL BASELINE SCORE	Negative Ranks	13[a]	9.88	128.50
	Positive Ranks	4[b]	6.13	24.50
	Ties	3[c]		
	Total	20		
a. QOL FOLLOW UP < QOL BASELINE SCORE				
b. QOL FOLLOW UP > QOL BASELINE SCORE				
c. QOL FOLLOW UP = QOL BASELINE SCORE				
Test statistics				
Z value	-2.466	P value	0.014	

In the quality of life score out of 20 individuals, 13 individuals have QOL score after counselling is less than before counselling, 4 individuals have QOL score after counselling greater than before counselling and 3 individuals have unchanged or tie in the QOL score.

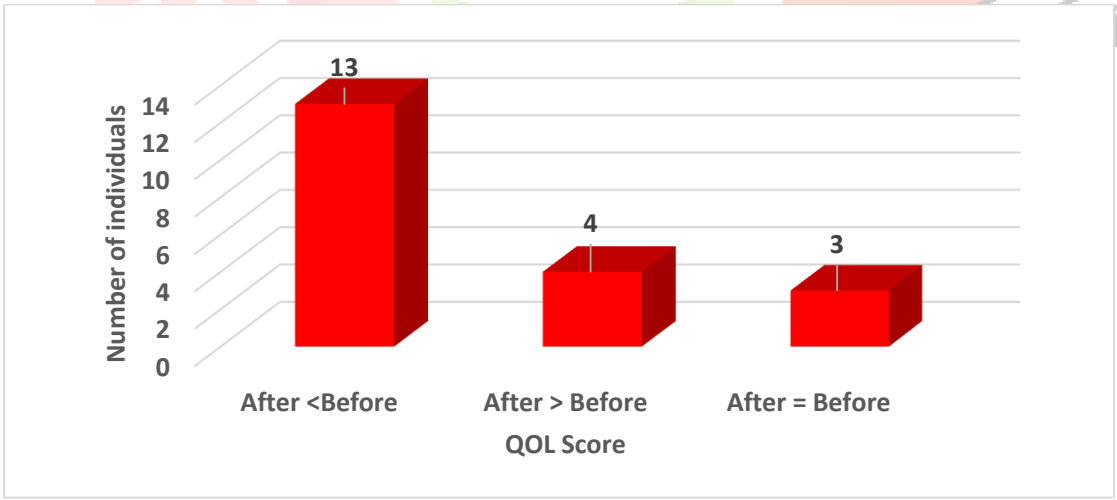

Figure 12 : Bar diagram showing the before and after comparison of QOL Score

This observed reduction in the QOL score after counselling is statistically significant on a Wilcoxon Signed Rank test (Z=-2.466, P=.014). Since the P-value was less than the specified significance level of 0.05, the test results were statistically significant and have strong evidence against the null hypothesis. Hence, reject the null hypothesis and conclude that there is significant reduction in the QOL Score after counselling as compared to before counselling. Counselling significantly improves the quality of life of asthma patients.

9. COMPARISON OF MEDICATION ADHERENCE PERCENTAGE SCORE BEFORE AND AFTER COUNSELLING OF ASTHMA PATIENTS.

Comparing the medication adherence score before and after counselling of asthma patients, a statistical test is to be used. To choose an appropriate statistical test, check the assumption of the normality of the variables to be tested and decide whether a parametric or non-parametric test is suitable for the comparison. The null hypothesis for this assumption is that data follows normal distribution. This normality assumption is assessed by a statistical test called Shapiro Wilks test. The medication adherence score before and after counselling not follows normal distribution because the Shapiro Wilks test is significant(P<.05). Hence, for the comparison medication adherence percentage score before and after counselling a non-parametric test called Wilcoxon Signed Rank test which is equivalent to a parametric test called paired t-test is applied.

Table 17 : Descriptive statistics of the medication adherence percentage score

Descriptive Statistics					
	N	Minimum	Maximum	Mean	SD
MEDICATION ADHERENCE BASELINE %	20	20	80	54.00	19.57
MEDICATION ADHERENCE FOLLOW UP %	20	60	100	79.00	13.73

The mean medication adherence percentage score before counselling is 54 with a standard deviation of 19.57 and after counselling the mean medication adherence percentage score becomes 79 with a standard deviation of 13.73. There is an observed improvement in the medication adherence percentage score after counselling. The higher medication adherence percentage score indicates better adherence. The findings suggest that the counselling had a positive impact on medication adherence.

Table 18 : Comparison of medical adherence score before and after counselling

Wilcoxon Signed Ranks				
		N	Mean Rank	Sum of Ranks
MEDICATION ADHERENCE FOLLOW UP % - MEDICATION ADHERENCE BASELINE %	Negative Ranks	0[a]	.00	.00
	Positive Ranks	17[b]	9.00	153.00
	Ties	3[c]		
	Total	20		
a. MEDICATION ADHERENCE FOLLOW UP % < MEDICATION ADHERENCE BASELINE %				
b. MEDICATION ADHERENCE FOLLOW UP % > MEDICATION ADHERENCE BASELINE %				
c. MEDICATION ADHERENCE FOLLOW UP % = MEDICATION ADHERENCE BASELINE %				
Test statistics				
Z value -3.745		P value 0.001		

In the medical adherence percentage score out of 20 individuals, no individuals have medical adherence percentage score after counselling is less than before counselling, 17 individuals have medical adherence percentage score after counselling greater than before counselling and 3 individuals have unchanged or tie in the medical adherence percentage score.

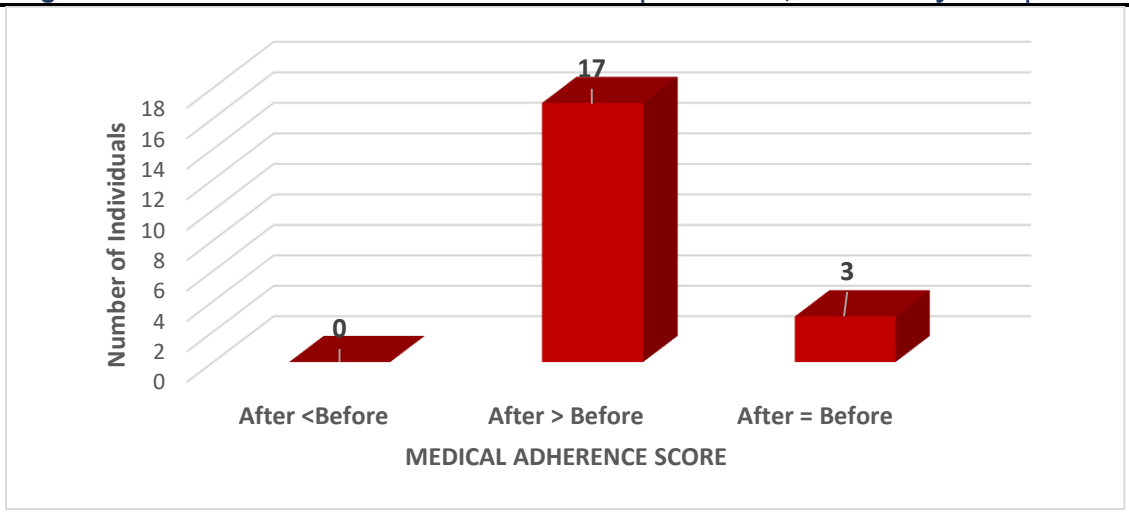

Figure 13 : Bar diagram showing the before and after comparison of medical adherence percentage Score

0This observed improvement in the medical adherence percentage score after counselling is statistically significant on a Wilcoxon Signed Rank test (Z=-3.745, P=.001). Since the P-value was less than the specified significance level of 0.05, the test results were statistically significant and have strong evidence against the null hypothesis. Hence, reject the null hypothesis and conclude that there is significant improvement in the medical adherence percentage score after counselling as compared to before counselling. Counselling significantly improves the medical adherence percentage score of asthma patients.

10. DISCUSSION

The pilot study demonstrated significant improvements in knowledge, attitude, practice (KAP), medication adherence, and quality of life among asthma patients following patient counselling. On average, patients had baseline knowledge, attitude, and practice scores of 60%, 66%, and 52%, respectively. The relatively lower baseline scores may be attributed to inadequate awareness regarding asthma, poor understanding of SMART therapy, lack of regular counselling, and insufficient reinforcement of inhaler-use instructions by healthcare professionals. Following counselling, significant improvements were observed in all KAP domains, indicating that patient education plays a crucial role in improving disease understanding and self-management.

Regarding knowledge, the mean score increased from 60% to 88% after counselling. This improvement may be due to individualized education on asthma, trigger avoidance, inhaler use, and the importance of adherence. Similar findings were reported by Gajera et al., who observed that educational interventions significantly improved patients' knowledge and awareness regarding inhaler use. Improved knowledge is essential because inadequate understanding of asthma is often associated with poor disease control and increased risk of exacerbations.

With regard to practice, the baseline score of 52% suggests that many patients may not have been following appropriate self-management practices before counselling. Improper inhaler technique, inconsistent medication use, and inadequate understanding of treatment instructions could have contributed to this finding. After counselling, the practice score increased significantly to 78%. This improvement may be attributed to practical demonstrations and reinforcement of correct inhaler techniques during counselling sessions. Similar studies have emphasized that repeated assessment and demonstration of inhaler techniques are necessary to ensure accurate drug delivery and achieve optimal therapeutic outcomes.

Medication adherence is a key factor influencing asthma control. In the present study, the baseline adherence score was 54%, indicating suboptimal adherence among a considerable proportion of patients. Poor adherence may result from lack of disease awareness, misconceptions regarding inhaled medications, forgetfulness, and inadequate counselling. Following pharmacist-led counselling, adherence improved significantly to 79%. These findings are consistent with the study by Zhang et al., which reported that patient education and healthcare professional support are important determinants of medication adherence in asthma patients.

The quality-of-life assessment also demonstrated significant improvement after counselling. The improvement may be attributed to better symptom control, enhanced self-management practices, and increased adherence to prescribed therapy. Asthma symptoms can negatively affect physical activities, sleep quality, social interactions, and emotional well-being. Therefore, interventions that improve disease understanding and treatment compliance are likely to result in better quality-of-life outcomes.

This study highlights the importance of regular patient counselling, practical inhaler technique demonstrations, and periodic follow-up assessments. Healthcare professionals, particularly clinical pharmacists, should actively participate in patient education programmes to ensure proper inhaler use, improve adherence, and enhance overall treatment outcomes among asthma patients receiving SMART therapy.

11. CONCLUSION

The present study shows significant improvement in the KAP score indicates that patients' counselling improved the Knowledge, attitude and practice scores of asthma patients. This implies that the counselling had a positive impact on knowledge, attitude and practice of asthma patients. The significant reduction in the quality of life score indicates that the post counselling had a positive impact on the patient's quality of life. This implies that the counselling had a positive significant impact of quality of life of asthma patients. The significant improvement in the medication adherence score indicates better adherence. This improvement demonstrates a significant improvement in patients' adherence to medication refills and medication taking behaviour after the counselling. This implies that the counselling had a positive impact on medication adherence.

REFERENCE

1. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention. Fontana (WI): GINA; 2025.
2. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention. Updated 2025. Available from: https://ginasthma.org
3. Salvi S, Agrawal A. India needs a national asthma control programme. Lung India. 2012;29(1):5–6.
4. Indian Chest Society, National College of Chest Physicians (India). Guidelines for diagnosis and management of bronchial asthma. Lung India. 2015;32(Suppl 1):S3–S42.
5. Beasley R, Holliday M, Reddel HK, et al. Controlled trial of budesonide–formoterol as needed for mild asthma. N Engl J Med. 2019;380(21):2020–30.
6. Engelkes M, Janssens HM, de Jongste JC, et al. Medication adherence and the risk of severe asthma exacerbations: A systematic review. Eur Respir J. 2015;45(2):396–407.
7. World Health Organization. Adherence to Long-Term Therapies: Evidence for Action. Geneva: WHO; 2003.
8. Bosnic-Anticevich SZ, Kritikos V, Carter V, et al. Lack of asthma and medication knowledge among patients with asthma. J Asthma. 2017;54(4):378–85.
9. George M, Bender B. New insights to improve treatment adherence in asthma and COPD. Patient Prefer Adherence. 2019;13:1325–34.
10. Juniper EF, Buist AS, Cox FM, Ferrie PJ, King DR. Validation of a standardized version of the Asthma Quality of Life Questionnaire. Chest. 1999;115(5):1265–70.
11. Pinnock H, Parke HL, Panagioti M, et al. Systematic meta-review of supported self-management for asthma. BMC Med. 2017;15:64
12. National Heart, Lung, and Blood Institute. Asthma - causes and triggers. National Institutes of Health. Available from: https://www.nhlbi.nih.gov/health/asthma/causes. Accessed 2026 May 7.
13. Toskala E, Kennedy DW. Asthma risk factors. Int Forum Allergy Rhinol. 2015;5 Suppl 1. DOI:10.1002/alr.21557.
14. Agarwal R, Khan A, Aggarwal AN, Gupta D. Is the SMART approach better than other treatment approaches for prevention of asthma exacerbations? A meta-analysis. Monaldi Arch Chest Dis. 2009;71:161169. DOI:10.4081/monaldi.2009.348.
15. Jansen EM, van de Hei SJ, Dierick BJH, Kerstjens HAM, Kocks JWH, van Boven JFM. Global burden of medication non-adherence in chronic obstructive pulmonary disease (COPD) and asthma: a narrative review of the clinical and economic case for smart inhalers. J Thorac Dis, 2021 Jun; 13(6): 3846-3864. doi: 10.21037/jtd-20-2360. PMID: 34277075; PMCID: PMC8264677.
16. Aby AS, Sivakumar AI, Kandasamy KR, Rajagopal SH, Ramanathan SA. Assessment of knowledge, attitude, practice and medication adherence among asthmatics at pre and post counselling. International Journal of Pharmaceutical Research, 2020 Jul 1; 12(3).
17. Janežič A, Locatelli I, Kos M. Criterion validity of 8-item Morisky Medication Adherence Scale in patients with asthma. PloS one, 2017 Nov 30; 12(11): e0187835.
18. Clark NM, Gong M, Schork MA, et al. Impact of educational interventions on asthma outcomes. Pediatrics. 1998;101(5):831-836.

19. Gagne M, Cote J, Boulet LP. Effectiveness of educational programs in asthma management. Patient Educ Couns. 2017;100(3):448-455.

20. Bender BG, Rand C. Medication non-adherence and asthma treatment outcomes. J Allergy Clin Immunol. 2004;113(3):489-493.