

RESEARCH ARTICLE

Asthma Control and Self-Management Among Adults in Southern Tunisia: Insights from a Cross-Sectional Study

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Abstract

Background: One of the most common chronic respiratory diseases in the world, asthma placed a significant burden on adult populations in low- and middle-income nations like Tunisia. Although many patients continue to have less than ideal results, effective self-management is crucial to reaching optimal asthma control and avoiding exacerbations.

Objective: This study aimed to assess the level of asthma control and explored the self-management practices of adult asthma patients in Southern Tunisia while identifying key socio-behavioral and environmental factors associated with poor disease outcomes.

Methods: A descriptive cross-sectional study was conducted among adult asthma patients attending healthcare facilities in Southern Tunisia. Data was gathered using validated tools to measure asthma control, self-management behaviors, and exposure to potential risk factors such as passive smoking, sleep disturbances, and adverse environmental conditions. Descriptive and inferential statistical analyses were used to interpret the data.

Results: The findings revealed a substantial proportion of participants who had uncontrolled asthma, which was significantly associated with insufficient self-management practices and high exposure to modifiable risk factors. Limited health literacy, lack of structured education, and inconsistent communication with healthcare providers emerged as key barriers. Conversely, patients who received tailored education and support demonstrated improved asthma control.

Conclusion: Enhancing asthma outcomes in Southern Tunisia required a patient-centered, multidisciplinary approach that integrates personalized education, structured self-management plans, and risk reduction strategies. Strengthening patient-provider communication and addressing socio-environmental determinants were critical to reducing the disease burden and improving the quality of life among adults with asthma.

Keywords: *Asthma control, self-management, chronic respiratory disease, patient education, Tunisia, risk factors, adult health*

Introduction

Non-communicable diseases (NCDs)—including cardiovascular diseases, cancer, diabetes, and chronic respiratory conditions—represent an escalating global health challenge due to their significant morbidity, mortality,

and economic impact (Enarson, 2013). Among these, asthma emerged as a major public health concern, impairing quality of life and ranking among the leading causes of outpatient visits and hospital admissions

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worldwide (Koffi et al., 2020). Characterized by reversible airflow obstruction and chronic inflammation of the airways, asthma affected individuals across all age groups who had showed symptoms ranging from mild discomfort to life-threatening exacerbations (Kombila et al., 2020).

Globally, asthma affects over 300 million individuals and ranks 16th in terms of years lived with disability (Ghozali & Urrohmah, 2023). Its prevalence and burden vary widely across regions, shaped by diverse environmental exposures, socioeconomic conditions, and healthcare system capacities. Despite the availability of international treatment guidelines and effective therapies, asthma control remains inadequate—particularly in low- and middle-income countries (LMICs), where over 80% of asthma-related deaths occur (Ghozali & Urrohmah, 2023).

One persistent challenge in asthma management is the disconnect between access to treatment and effective disease control. Contributing factors include suboptimal self-management, limited access to specialized care, poor medication adherence, and unfavorable environmental conditions (D'Amato et al., 2016; Nguyen et al., 2018). Self-management—encompassing appropriate medication use, symptom monitoring, and trigger avoidance—is a foundational element of asthma control. However, in many LMICs, including countries in North Africa and Asia, self-management practices remain poorly understood and insufficiently supported by health systems.

In Tunisia, adult asthma prevalence was estimated at 6.5% in 2017 (Mjid et al., 2017). Yet, little is known about the role of self-management in asthma control, particularly in Southern Tunisia, where healthcare access is limited and disparities may be more pronounced. These insights are also relevant to comparable LMICs, such as the Philippines, where asthma remains a prevalent condition and where culturally sensitive, context-specific strategies are essential to bridging gaps in care.

This study aimed to:

1. Assess the levels of asthma control and self-management among adult patients in Southern Tunisia;
2. Identify socio-demographic and clinical factors associated with asthma control and self-management;
3. Explore the relationship between self-management behaviors and asthma control outcomes.

By identifying key determinants of asthma control and evaluating self-management behaviors in real-world clinical settings, this study provided evidence to inform patient education initiatives, clinical guidelines, and public health strategies—not only in Tunisia but also in similarly situated LMICs. Such insights are crucial for designing culturally appropriate and sustainable interventions that enhance asthma outcomes and reduce health system burdens.

Methodology

1.1. Study Design

This study employed a descriptive, analytical, single-center, cross-sectional design conducted at the Pneumo-Allergology Department of a university hospital in Sfax, Tunisia. Data collection was carried out over a two-and-a-half-month period, from January 15 to March 31, 2024. As a tertiary referral center serving a diverse population in Southern Tunisia, this hospital provided an appropriate setting for exploring asthma control and self-management behaviors in the regional context.

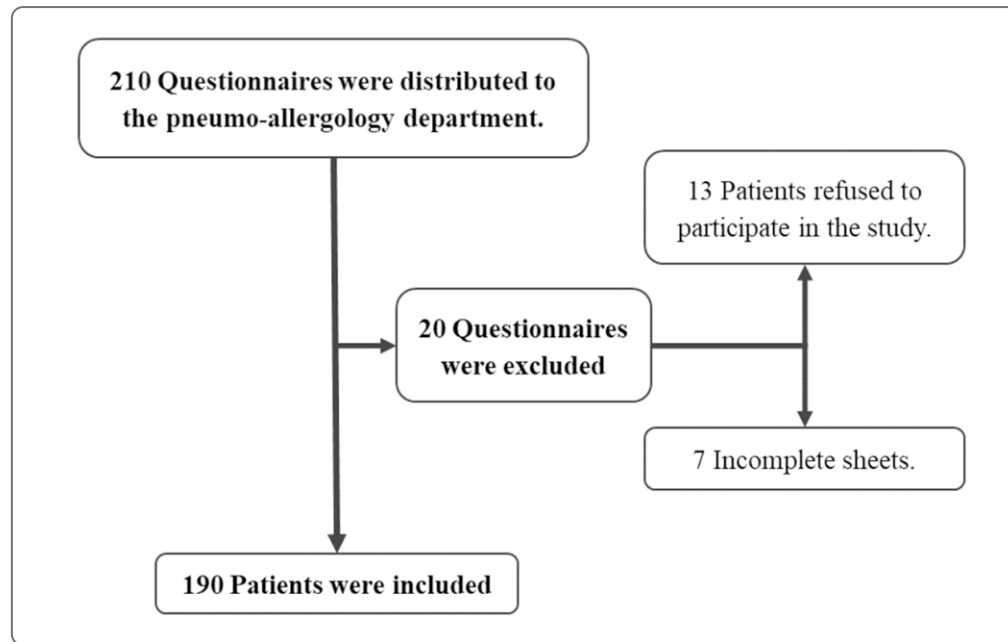
1.2. Study Population

The study population included all asthmatic patients who sought consultation at the Pneumo-Allergology Department during the study period. Eligible participants were adults aged 18 years and above with a physician-confirmed asthma diagnosis for at least 12 months and were under active follow-up during the data collection period. Inclusion criteria also required the ability to provide informed consent and complete the structured questionnaire. Exclusion criteria included refusal to participate, the presence of cognitive or psychiatric disorders, clinically unstable conditions, or incomplete medical records.

1.3. Sample Size

The minimum sample size was determined based on an estimated 12% prevalence of good asthma self-management knowledge, as reported in a 2019 study conducted in Iraq. Using a 5% margin of error and a 95% confidence level, the calculated minimum sample size was 162 participants. To account for potential non-response and data attrition, additional participants were recruited. A total of 190 completed questionnaires were included in the final analysis, yielding a

Figure 1. Flowchart of the study population



response rate of approximately 90% (see Figure 1 for the study flowchart).

1.4. Data Collection

Data was collected through face-to-face interviews using a structured, interviewer-administered questionnaire consisting of five sections:

- **Section 1: Sociodemographic Characteristics** – Included variables such as age, sex, residence, marital status, education level, socioeconomic status, employment, and financial constraints.
- **Section 2: Lifestyle and Environmental Exposures** – Covered smoking status, physical activity, substance use, indoor pollution (e.g., humidity, pets), allergen exposure, and sleep quality.
- **Section 3: Clinical Characteristics** – Captured medical and family history, psychiatric history, comorbidities, asthma-specific information (e.g., duration, severity, hospitalizations, exacerbations, treatment type, and follow-up frequency).
- **Section 4: Asthma Self-Management Questionnaire (ASMQ)** – A validated 16-item tool with binary responses (0 or 1). Total scores (0–16) were converted to a 0–100 scale, with categories defined as poor (<50), adequate (50–75), or good (>75) knowledge. The ASMQ has shown

acceptable internal consistency in prior studies (Cronbach's $\alpha = 0.70$ – 0.80).

- **Section 5: Asthma Control Test (ACT)** – A 5-item scale evaluating symptom frequency and impact on daily functioning. Total scores ranged from 5 to 25, interpreted as follows: ≥ 20 (well-controlled), 15–19 (partially controlled), and <15 (uncontrolled). The ACT is a World Health Organization (WHO) recommended tool with high reliability (Cronbach's $\alpha > 0.80$) and has been validated across multiple populations, including Arabic-speaking groups.

Apriori-test of the full questionnaire was conducted with 30 patients to assess clarity, cultural appropriateness, and internal consistency. Minor adjustments were made based on feedback. Final reliability testing yielded Cronbach's alpha values of 0.915 for the ACT (excellent) and 0.712 for the ASMQ (acceptable), confirming the tools' internal consistency in the study context.

1.5. Statistical Analysis

Statistical analysis was performed using **SPSS version 25**. The **Kolmogorov-Smirnov test** was also used to assess the normality of quantitative variables. Normally distributed variables were expressed as **means and standard deviations (SD)**, while non-normally distributed variables were reported as **medians and interquartile ranges (IQRs)**. Categorical variables were presented as **frequencies (n) and percentages (%)**.

For univariate analysis, group comparisons were conducted using the **Chi-square test** or **Fisher's exact test**, as appropriate. **Odds ratios (ORs)** with **95% confidence intervals (CIs)** and **p-values** were reported for significant associations. The relationship between asthma self-management and control scores was assessed using either **Pearson** or **Spearman correlation coefficients**, depending on the data distribution.

1.6. Ethical Considerations

Prior to data collection, ethical clearance was obtained from the **Scientific Research Committee** of the institution under protocol number **D18-2024**. All participants provided informed consent both orally and in writing. The principles of confidentiality and anonymity were strictly upheld, and participants were informed of their right to withdraw from the study at any point without any impact on their medical care or treatment.

Results

1.1. Descriptive statistics

The median age of participants was 56 years (interquartile range: 43–65). Females constituted 51.1% ($n = 97$) of the sample, with a sex ratio of 0.95. The majority resided in urban areas (64.7%) and were married (71.1%). Most participants were from low-to-medium socioeconomic backgrounds. In terms of education, 18.4% were illiterate, while only 12.1% had attained a university-level education.

Regarding occupational status, 38.4% were actively employed, 36.8% were unemployed, 22.1% were retired, and 2.7% were students. In terms of tobacco use, 53.2% were non-smokers, 24.2% were ex-smokers, 12.6% were active smokers, and 10% reported passive smoking. Environmental exposures included allergens (65.3%), animals (36.3%), and humidity (30%). Notably, 80% reported sleep disturbances. Allergic rhinitis was diagnosed in 29.5% of participants.

Nearly half (49.5%) had asthma for more than 10 years, while 19% experienced three or more hospitalizations annually. Based on GINA classification, 34.2% had intermittent asthma, while 12.1% had severe persistent asthma. All participants were on inhaled corticosteroid therapy (ICT). A third were prescribed combination therapy with long-acting beta-agonists (LABA) (32.6%) or long-acting muscarinic antagonists (LAMA) (32.6%), and 31.6% received antihistamines (Table 1).

The distribution of respondents according to their asthma self-management techniques and associated asthma control levels is shown in Table 2. According to the data, the majority of patients

(68.4%) had poor asthma self-management, followed by adequate self-management (27.0%) and good self-management (3.7%). These results point to a serious weakness in the patients' capacity to control their illness, pointing to a lack of the information, abilities, or support networks required for the best possible self-care for asthma.

According to the results of the ACT, 65.3% of patients had uncontrolled asthma, 18.4% had partially controlled asthma, and only 16.3% had well-controlled asthma. This distribution highlights a possible link between inadequate asthma control and poor self-management, as it parallels trends in self-management practices.

The prevalence of uncontrolled asthma and inadequate self-management suggested systemic issues with asthma education, health resource access, and regular treatment compliance. The disproportionately low number of patients with well-controlled asthma and good self-management highlighted the need for focused interventions that emphasized the significance of medication compliance, trigger avoidance, and self-monitoring. Examples of these interventions included regular follow-up, structured asthma education programs, and patient-centered care plans.

Overall, these results demonstrated how important it is for nurses and other medical professionals to improve asthma self-management skills by using patient education techniques that are accessible, culturally sensitive, and literacy-appropriate. People with asthma may experience better health outcomes and a higher quality of life if these initiatives are incorporated into standard clinical care.

1.1. Inferential Analysis of Factors Associated with Asthma Self-Management and Control

The inferential analysis identified several socio-demographic and clinical factors significantly associated with poor asthma self-management (Table 3). Notably, **being retired** was associated with the highest risk, showing an **eightfold increase** in the odds of poor self-management ($OR = 8.143$; 95% CI: 2.404–27.584; $p = 0.001$). Similarly, patients with **only primary education** were more likely to have poor self-management ($OR = 2.774$; 95% CI: 1.436–5.360; $p = 0.002$), whereas those with a **university-level education** demonstrated significantly lower odds ($OR = 0.122$; 95% CI: 0.045–0.330; $p < 0.001$).

Gender and marital status were also significant. **Females** were less likely to exhibit poor self-management ($OR = 0.533$; 95% CI: 0.285–0.995; $p = 0.040$), and **single individuals** showed substantially lower odds compared to their married counterparts

Table 1. Sociodemographic, Lifestyle, Clinical and Asthma Characteristics

Variables		Frequency	Percentage (%)
Gender	Female	97	51.1
	Male	93	48.9
Age	< 40 years	39	20.5
	40 – 59 years	77	40.5
	≥ 60 years	74	38.9
Residency	Urban	123	64.7
	Rural	67	35.3
Marital status	Married	135	71.1
	Single	27	14.2
	Widow	17	8.9
	Divorced	11	5.8
Education level	Illiterate	35	18.4
	Primary	85	44.7
	Secondary	47	24.7
	Academic	23	12.1
Income	Low	72	37.9
	Medium	118	62.1
Profession	Active	73	38.4
	unemployed	70	36.8
	Retired	42	22.1
	Students	5	2.7
Tabaco use	Non smoker	101	53.2
	Ex-smoker	46	24.2
	Active Smoker	24	12.6
	Passive smoker	19	10
Domestic Exposure	Animals	69	36.3
	Humidity	57	30
	Allergens	124	65.3
Sleep disorders	Yes	152	80
	No	38	20
Medical history	Yes	118	62.1
	Allergic rhinitis	56	29.5
Duration of asthma	< 5 years	29	15.3
	5 – 10 years	67	35.2
	> 10 years	94	49.5
Severity of asthma	Intermittent	65	34.2
	Mild Persistent	43	22.6
	Moderate Persistent	59	31.1
	Severe Persistent	23	12.1
Number of hospitalizations (times/year)	0	69	36.3
	1 – 2	85	44.7
	≥ 3	36	19
Number of asthma attacks in the last month	0	27	14.2
	1 – 2	72	37.9
	≥ 3	91	47.8
Treatment	ICT	190	100
	ICT with LABA	62	32.6
	LAMA	62	32.6
	Antihistamine	60	31.6

ICT : Inhaled corticosteroid therapy ; LABA : Long-Acting Beta-2 Agonists ; LAMA : Long-Acting Muscarinic Antagonists ; % : percent.

Table 2. Asthma Self-Management and Control Levels

Variable	Frequency (n)	Percentage (%)
Self-management level		
Good	7	3.7
Adequate	53	27.9
Poor	130	68.4
Asthma control level		
Well-controlled	31	16.3
Partially controlled	35	18.4
Uncontrolled	124	65.3

(OR = 0.254; 95% CI: 0.110–0.520; $p = 0.001$). Similarly, being **employed** was protective against poor self-management (OR = 0.328; 95% CI: 0.174–0.618; $p < 0.001$).

Environmental and behavioral factors also played a role. **Passive smoking** (OR = 9.482; 95% CI: 1.235–72.793; $p = 0.009$), **former smoking** (OR = 2.685; $p = 0.017$), and **exposure to humidity** (OR = 2.439; $p = 0.017$) were significantly associated with poor self-management. Patients with **sleep disturbances** had a more than **threefold increase** in risk (OR = 3.579; $p < 0.001$).

In terms of clinical characteristics, **asthma severity** emerged as a strong predictor. Those with **severe persistent asthma** had a sixfold increased likelihood of poor self-management (OR = 6.078; $p = 0.041$), followed by those with moderate and mild persistent asthma. Duration of illness also mattered; patients with asthma for more than six years had significantly higher odds of poor self-management, particularly those with over 20 years of illness (OR = 2.909; $p = 0.025$). Conversely, patients with **intermittent asthma** had significantly lower odds of poor self-management (OR = 0.331; $p = 0.001$).

Patterns observed in asthma control mirrored those of self-management. **Illiteracy** was associated with a **nearly fourfold increase** in the likelihood of **uncontrolled asthma** (OR = 3.894; 95% CI: 1.432–10.585; $p = 0.005$), and **unemployment** (OR = 3.033; $p = 0.002$), **low socioeconomic status**, and **low educational attainment** were also significant risk factors. In contrast, individuals with **secondary or higher education**, who were **single** or **employed**, were less likely to have uncontrolled asthma.

Environmental triggers again featured prominently. **Passive smoking** was strongly associated with uncontrolled asthma (OR = 5.084; $p = 0.019$), as were **exposure to humidity** (OR = 2.242; $p = 0.024$) and **sleep disturbances** (OR = 3.887; $p < 0.001$). The highest risk was observed among patients with **severe persistent asthma** (OR = 8.276; $p = 0.002$), followed by those with moderate

and mild persistent forms. Patients with **intermittent asthma** had significantly lower odds of uncontrolled disease (OR = 0.254; $p < 0.001$).

Furthermore, a bivariate correlation analysis revealed a strong, positive, and statistically significant relationship between asthma self-management and asthma control (Spearman's $\rho = 0.704$; $p < 0.001$), indicating that improved self-management is closely associated with better asthma control outcomes in this population (Table 4).

Discussion

1.1. Self-Management of Asthma

The low levels of asthma self-management observed in this study highlighted a persistent challenge in chronic disease management. Most participants demonstrated difficulty in effectively managing their asthma, suggesting significant gaps in health education, limited patient engagement, and potentially inadequate follow-up by healthcare providers. Without the necessary knowledge, skills, and support, patients are less likely to recognize symptoms early, adhere to prescribed treatment plans, or take preventive measures. This is particularly critical in asthma, where day-to-day decisions and symptom monitoring play a central role in disease control and quality of life.

Similar findings have been reported across diverse settings, especially in low- and middle-income countries (Abbas & Amen, 2019; Behr et al., 2015; Ghazali & Urrohman, 2023). While prevalence rates and healthcare structures vary, the consistently low levels of optimal self-management suggested a common problem: many individuals are not sufficiently supported in understanding or controlling their condition. Disparities in outcomes may be attributed to differences in healthcare infrastructure, cultural perceptions of chronic illness, and the presence or absence of structured asthma education programs.

Table 3. Associated Factors to asthma self-management and Control

Associated factors	Low levels of asthma self-management			Uncontrolled asthma		
	N (%)	OR (CI 95%)	P-value	N (%)	OR (CI 95%)	P-value
Age						
< 40 years	13 (33.3)	0.145 (0.067-0.313)	< 0.001*	11 (28.2)	0.132 (0.060-0.291)	< 0.001*
40 – 59 years	56 (72.7)	5.333 (2.317-12.247)	< 0.001*	54 (70.1)	5.976 (2.551-13.999)	< 0.001*
≥ 60 years	61 (82.4)	9.385 (3.833-22.976)	< 0.001*	59 (79.7)	10.012 (4.076-24.593)	< 0.001*
Female	60 (61.9)	0.533 (0.285-0.995)	0.040*	--	--	--
Single	11 (40.7)	0.254 (0.110-0.520)	0.001*	11 (40.7)	0.304 (0.132-0.702)	0.004*
Low income	--	--	--	55 (76.4)	2.298 (1.193-4.426)	0.012*
Exposure to humidity	46 (80.7)	2.439 (1.157-5.145)	0.017*	44 (77.2)	2.242 (1.103-4.558)	0.024*
Sleep disorder	113 (74.3)	3.579 (1.715-7.470)	< 0.001*	109 (71.7)	3.887 (1.854-8.147)	< 0.001*
Education level						
Illiterate	--	--	--	30 (85.7)	3.894 (1.432-10.585)	0.005*
Primary	68 (80)	2.774 (1.436-5.360)	0.002*	64 (75.3)	2.286 (1.222-4.276)	0.009*
Secondary	--	--	--	25 (53.2)	0.505 (0.257-0.991)	0.045*
Academic	6 (26.1)	0.122 (0.045-0.330)	< 0.001*	5 (21.7)	0.112 (0.039-0.319)	< 0.001*
Profession						
Active	39 (53.4)	0.328 (0.174-0.618)	< 0.001*	37 (50.7)	0.354 (0.191-0.658)	0.001*
Retired	39 (92.9)	8,143 (2,404-27,584)	0.001*	33 (78.6)	3.568 (1.497-8.500)	0.004*
Unemployed	--	--	--	53 (75.7)	3.033 (1.486-6.191)	0.002*
Tabaco use						
Non-smoker	55 (54.5)	0.223 (0.112-0.446)	< 0.001*	58 (57.4)	0,470 (0,254-0871)	0,016*
Ex-smoker	38 (82.6)	2.685 (1.165-6.187)	0.017*	--	--	--
Passive smoker	18 (94.7)	9.482 (1.235-72.793)	0.009*	17 (89.5)	5,084 (1,137-22,729)	0.019*
Seniority of asthma						
0 – 5 years	16 (45.7)	0,303 (0,142-0,644)	0,001*	16 (45.7)	0,366 (0,173-0,774)	0,007*
6 – 10 years	42 (72.4)	2.625 (1.113-6.190)	0.027*	35 (60.3)	1.522 (0.667-3.474)	0.319*
11 – 20 years	37 (72.5)	2.643 (1.091-6.401)	0.031*	37 (72.5)	2.643 (1.091-6.401)	0.031*
> 20 years	32 (74.4)	2.909 (1.142-7.408)	0.025*	33 (76.7)	3.300 (1.275-8.544)	0.014*
Severity of asthma						
Intermittent	34 (52.3)	0.331 (0.175-0.628)	0.001*	29 (44.6)	0.254 (0.134-0.482)	< 0.001*
Mild Persistent	32 (74.4)	2.652 (1.145-6.146)	0.023*	30 (69.8)	2.865 (1.269-6.466)	0.011*
Moderate Persistent	44 (74.6)	2.675 (1.249-5.729)	0.011*	45 (76.3)	2,116 (1,056-4,237)	0,032*
Severe Persistent	20 (87)	6.078 (1.001-12.117)	0.041*	20 (87)	8.276 (2.237-30.621)	0.002*

N : Frequency ; % : percent ; OR : Odds ratio ; CI : Confidence interval ; * : Pearson Chi squared test.

Table 4. Correlation between self-management and asthma control level

	Asthma Control	
	Rho	P-value
Self-management of Asthma	0.704	< 0.001**
Rho : Spearman correlation coefficient.		

These results underscored more than a knowledge gap—they point to a broader need for system-level interventions that enhance patient empowerment and engagement. Countries with established national asthma strategies, patient education initiatives, and continuity of care mechanisms often report improved self-management outcomes. In contrast, fragmented care models and limited access to tailored educational support remain significant barriers in many regions.

1.2. Asthma Control

Our findings revealed that a substantial majority of patients failed to achieve adequate asthma control, with only a minority exhibiting well-controlled asthma. This imbalance mirrors patterns seen globally, particularly in resource-constrained settings, and highlights the persistent burden of uncontrolled asthma despite medical advancements.

Comparable trends have been documented in studies conducted in Iraq and Turkey, affirming that poor asthma control remains a widespread concern across diverse health systems (Abbas & Amen, 2019; Yalçinkaya & Kılıç, 2022). In contrast, studies from Thailand and Tunisia have reported better control, which may reflect enhanced access to healthcare, targeted education programs, or more systematic follow-up (Mjid et al., 2017; Sangngam et al., 2023). These contrasts emphasized the influence of structural elements—such as trained personnel, availability of asthma management protocols, and healthcare accessibility—on patient outcomes.

1.3. Associated Factors

This study highlighted the complex interplay between individual, environmental, and systemic determinants influencing both asthma self-management and disease control. Socio-demographic vulnerabilities—such as low educational attainment, unemployment, retirement, and illiteracy—were consistently linked to poor asthma outcomes. These factors often co-occur with low health literacy, limited access to accurate information, and inadequate resources, which collectively impair patients' capacity to follow treatment plans, identify symptoms, and effectively navigate the healthcare system.

Environmental exposures also play a critical role. Humidity, common in tropical and coastal regions, and passive smoking were found to aggravate symptoms and reduce treatment efficacy. As many of these exposures are beyond individual control, their impact stressed upon the importance of public health interventions targeting environmental risk reduction, including improved air quality and smoking cessation programs.

Sleep disturbances emerged as an indicator of uncontrolled asthma, reinforcing the cyclical relationship between poor disease control and diminished quality of life. Furthermore, patients with longstanding or severe asthma were more likely to demonstrate poor self-management, possibly due to treatment fatigue, frustration, or resignation over time (Turktas et al., 2010). Chronic illness can sometimes lead to disengagement from care plans, inconsistent medication adherence, and reduced motivation, particularly in the absence of perceived improvement.

Conversely, higher education levels, employment, single marital status, and engagement in physical activity were positively associated with better asthma outcomes. These factors likely reflect greater autonomy, higher health literacy, and increased access to resources. Importantly, education—formal and informal—plays a critical role not just in understanding medical instructions but in enabling patients to communicate effectively with healthcare providers and apply health knowledge in daily life.

These findings aligned with prior research demonstrating that patient education, health literacy, and continuity of care are central to improved asthma outcomes (Ghozali & Urrohmah, 2023; Ahmed et al., 2014). Comorbidities, mental health, and adherence also critically shaped disease trajectories, thereby reinforcing the view that asthma is not solely a biomedical issue but a complex psychosocial and behavioral challenge.

Cultural and systemic contexts further modulate self-management behaviors. Family dynamics, traditional beliefs, religious practices, and stigma surrounding chronic illness can significantly influence patients' perceptions and responses to asthma. Effective interventions must therefore be culturally tailored and contextually grounded.

1.4. Association between Asthma Self-Management and Asthma Control

This study revealed a significant positive correlation between asthma self-management and asthma control. This association is grounded in the logic that effective self-management reflects greater disease awareness, better identification of triggers, adherence to treatment, and timely use of rescue medications. Patients who actively monitored their symptoms are more capable of detecting early warning signs and adjusting their management accordingly—key actions that helped maintain control and prevent exacerbations.

This finding is supported by previous research. Ghozali and Urrohmah (2023) found a statistically significant association

between self-management knowledge and asthma control ($p = 0.001$), while Abbas and Amen (2019) reported similar results in the Iraqi context ($p < 0.001$). These studies, alongside this study's findings, provided compelling evidence that improving self-management is a viable pathway to achieving better asthma control.

1.5. Contextual Considerations: Relevance to Filipino and Asian Populations

The relevance of these findings extends to broader Asian contexts, including the Philippines. Sociocultural and systemic barriers significantly impact asthma self-management in the region. In Malaysia, for example, only 7% of patients had written asthma action plans, and over 60% had low health literacy—both of which were associated with poor control (Salim et al., 2021). Knowledge alone, however, is insufficient. Effective management also requires empowerment and sound judgment, including the ability to make informed decisions during symptom changes (Camerini et al., 2015; Londoño & Schulz, 2015).

Cultural beliefs uniquely shape disease perceptions. Legaspi et al. (2023) highlighted how Filipino folk beliefs such as *sumpong*—which conceptualize asthma as a temporary or emotional state—can undermine treatment adherence and delay care-seeking. While familial support can enhance asthma self-management through reminders and environmental control, it may also perpetuate informal or ineffective practices in the absence of sound health education (Koh et al., 2021).

Tan et al. (2021) noted that the structure of healthcare delivery in Southeast Asia—dominated by generalized outpatient services—lacks the systemic support needed for asthma education, including follow-up mechanisms, inhaler technique training, or written action plans. Fragmented care and weak referral systems further limit continuity and patient engagement.

These insights emphasized the need for culturally sensitive and structurally appropriate interventions. Solutions might include community-based education programs in local languages, mobile health apps for low-literacy users, and improved primary care infrastructure. Equally important is the involvement of culturally competent healthcare providers—such as trained community health workers—who can bridge the gap between biomedical recommendations and local beliefs and practices.

1.6. Strengths and Limitations of the Study

This study is the first to investigate asthma self-management, disease control, and associated factors in the context of a

pneumology service in a public hospital in Sfax, Tunisia. By focusing on a specific setting within the country's healthcare system, it addressed a notable gap in the literature.

A strength of this study lies in its comprehensive sample, including all asthmatic patients consulting at the pneumo-allergology department, which enhanced the statistical power and representativeness of the findings. The use of two validated French-language instruments—the ASMQ and the ACT—added methodological rigor. The ASMQ evaluated day-to-day management behaviors, while the ACT assessed overall disease control, together providing a multidimensional view of patient well-being. This integrative approach captured not only management gaps but also resilience and psychological adaptation, offering valuable insights into intervention opportunities.

However, some limitations warrant consideration. The cross-sectional design restricted the ability to infer causality between variables. It remained unclear whether the identified factors are causes or consequences of poor self-management and control. Future longitudinal or interventional studies could better establish temporal relationships. In addition, the reliance on self-administered questionnaires introduced the possibility of reporting bias and subjective interpretation, which may influence the accuracy of the responses.

Conclusion

Asthma remains one of the most prevalent chronic respiratory diseases affecting adults worldwide, posing substantial burdens on individual health, quality of life, and healthcare systems. It remains a major contributor to morbidity and, in certain situations, death. Reducing exacerbations, avoiding complications, and enhancing long-term results all depend on achieving optimal disease control and effective self-management.

The urgent need for a thorough, patient-centered strategy to manage asthma that incorporates behavioral, environmental, and socioeconomic factors is highlighted by this study. The results point to significant gaps in asthma control and self-management practices, highlighting the value of ongoing, individualized patient education, as well as, regular and honest communication between patients and healthcare professionals.

To address these challenges, the researchers recommend the implementation of targeted, culturally appropriate educational interventions and self-management support programs that are tailored to patients' individual needs and contexts. These initiatives should include structured asthma action plans,

strategies to reduce exposure to risk factors such as passive smoking and environmental allergens, and interventions to address co-existing issues such as sleep disturbances and health literacy limitations.

Ultimately, improving asthma outcomes requires a proactive, collaborative effort involving healthcare professionals, patients, families, and community stakeholders. Empowering patients with knowledge, skills, and support to manage their condition effectively can significantly reduce the burden of asthma and enhance overall quality of life.

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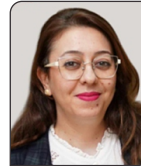
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— Adapted from Patricia Benner