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Analytical Study On Common Risk Factors Linked To Asthma In District Abbottabad

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Abstract

Asthma is a chronic respiratory disease that poses a public health burden worldwide, including in Pakistan. The increasing frequency of asthma in districts such as Abbottabad highlights the need to identify and analyze its associated risk factors. This study aims to conduct an investigative assessment of common environmental and lifestyle-related risk factors linked to asthma among residents of District Abbottabad. A cross-sectional analytical study design is proposed, including patients diagnosed with asthma from healthcare facilities in Abbottabad. Data was collected using structured questionnaires focusing on demographic characteristics, environmental exposures (such as tobacco smoke, indoor pollution, and allergens), and lifestyle factors. Previous studies in similar settings have identified key contributors such as tobacco smoke, allergens (dust, pets, carpets), and indoor pollutants like wood or coal smoke as major determinants of asthma. Analysis was done to determine the strength of association between these risk factors and asthma prevalence. The findings are expected to provide evidence-based insights into the most significant contributors to asthma in the local population. This study will contribute to the development of prevention strategies, awareness programs, and improved management policies aimed at reducing asthma in District Abbottabad.

Introduction

Asthma is a chronic respiratory disorder characterized by airway irritation, bronchial problem, and irregular airflow obstruction. It affects individuals of all ages and arises from a complex interaction of environmental and lifestyle factors. The worldwide frequency of asthma continues to increase, particularly among children (Asher & Pearce, 2014). Understanding the common risk factors associated with asthma is essential for early prevention, improved disease management and reduction of illness and death (Global Initiative for Asthma, 2024). Genetic tendency is one of the most

important non-modifiable risk factors of asthma or other allergic disease such as allergic rhinitis being at higher risk (Ober & Yao, 2011). Environmental exposures also play a critical role, particularly during early life. Common indoor allergens include dust mites, mold, pet dander, and cockroach allergens, while outdoor triggers such as pollen and air pollution significantly contribute to disease development (Centers for Disease Control and Prevention, 2023). In addition, exposure to tobacco smoke, both before and after birth, has been strongly linked to increased asthma risk and severity (Centers for Disease Control and Prevention, 2023). Job-related exposure to irritants such as chemicals, smokes, and dust further increases the possibility of asthma, especially in adults (Global Initiative for Asthma, 2024). Lifestyle and socioeconomic factors are also closely associated with asthma risk. Urbanization and reduced physical activity have been linked to increasing asthma prevalence, while nutritional patterns may also influence immune responses and inflammation (Asher & Pearce, 2014). Moreover, socioeconomic status affects access to healthcare, quality of housing, and levels of exposure to environmental pollutants (Centers for Disease Control and Prevention, 2023). A wide-ranging understanding of these unified risk factors is crucial for developing effective prevention strategies and reducing the overall risk of asthma. Abbottabad has experienced growing environmental concerns in past many years, particularly due to dust issues and smoke-related air pollution. Factors like unpaved roads, deforestation, and poor urban planning further deteriorate the situation in Abbottabad (Pakistan Environmental Protection Agency, 2018). These conditions also negatively impact the quality of life for residents. In adding to dust, smoke pollution from vehicular releases, burning of solid waste, and low-quality fuels has become a serious issue in Abbottabad. Traffic congestion and poorly maintained vehicles release harmful pollutants like carbon monoxide and sulfur dioxide into the atmosphere (Ali & Athar, 2010). Consequently, the city often experiences smog-like conditions that pose significant health risks, especially for children, the elderly, and those with respiratory illnesses (World Health Organization, 2021). Prolonged exposure to polluted air can lead to respiratory and cardiovascular diseases, while also harming local biodiversity (Pakistan Environmental Protection Agency, 2018). Addressing these challenges needs active policies, better waste management and improved urban planning.

Research Objective:

To analyze the common risk factors associated with asthma among the population of District Abbottabad.

Research Methodology:

This study adopted a cross-sectional analytical design to investigate the common risk factors associated with asthma in District Abbottabad. The data was collected during the period from August 2025 to March 2026. The study population included individuals diagnosed with asthma, selected from Ayub Medical Complex, Abbottabad. Questionnaire has also been distributed among local people of district Abbottabad for collection of data. Inclusion criteria consisted of patients of all age groups with a confirmed diagnosis of asthma, while individuals with other chronic respiratory diseases excluded. Data was collected using a structured and pre-tested questionnaire designed to capture information on socio-demographic characteristics, environmental exposures and lifestyle factors. Variables of interest was included exposure to tobacco smoke, indoor air pollution (such as biomass fuel use), presence of allergens (dust, pets, carpets), housing conditions and history of allergic diseases. In addition to self-reported data, relevant clinical information was obtained from medical records where available. Prior to data collection, informed consent was obtained from all participants and ethical approval was secured from the appropriate institution to ensure compliance with research ethics. The results presented in the

form of tables and graphs to facilitate interpretation, and findings were used to draw conclusions and propose evidence-based recommendations for asthma prevention and control in District Abbottabad. The detail about common risk factors linked to asthm**a is** discussed below**.**

Impact of seasonal variation on Asthma symptoms

The research study on asthma in District Abbottabad examined the seasonal variation in symptom severity among patients. The findings reveal that asthma symptoms were most severe during the winter season, with the highest number of affected patients 14 males and 19 females. In contrast, moderate symptoms were reported during spring 6 males and 10 females and summer 4 males and 6 females, while autumn showed the lowest frequency of cases 1 male and 2 females. A small group of patients 8 individuals reported no specific seasonal pattern in their symptoms (Fig. 1). Generally, the results indicate that winter is the most critical season for asthma severity, affecting both genders. Seasonal variation also plays a significant role in influencing breathing difficulties among patients. The majority of participants 21 females and 15 males reported that seasonal changes consistently affected their breathing, with females slightly more affected than males. Additionally, 8 females and 5 males' patients reported that seasonal changes sometimes affected their breathing, while 5 males and 4 females patients indicated that they often experienced symptoms during seasonal variation. A smaller number of patients reported being less affected, with 5 males and 4 females stating they were rarely affected and 2 males and 1 female patient reporting no impact at all (Fig. 2). The findings suggest that seasonal variation has a substantial impact on breathing issues in most asthma patients.

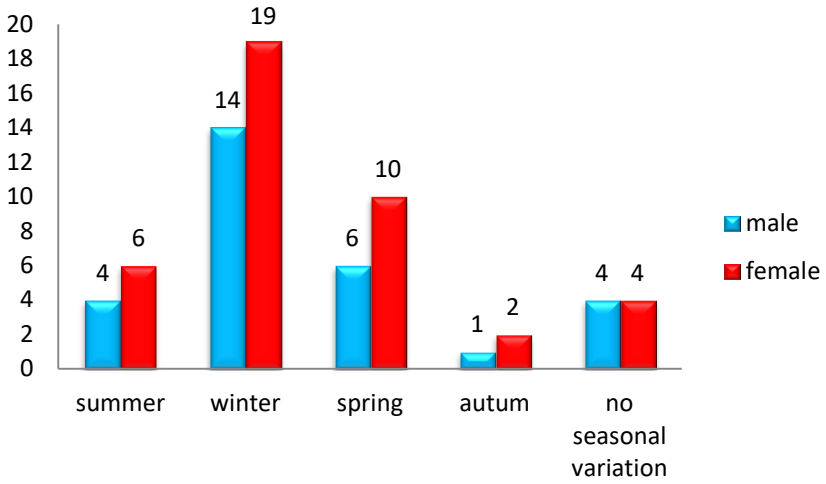

Fig. 1: Graph showing impact of seasonal variation on asthma symptoms

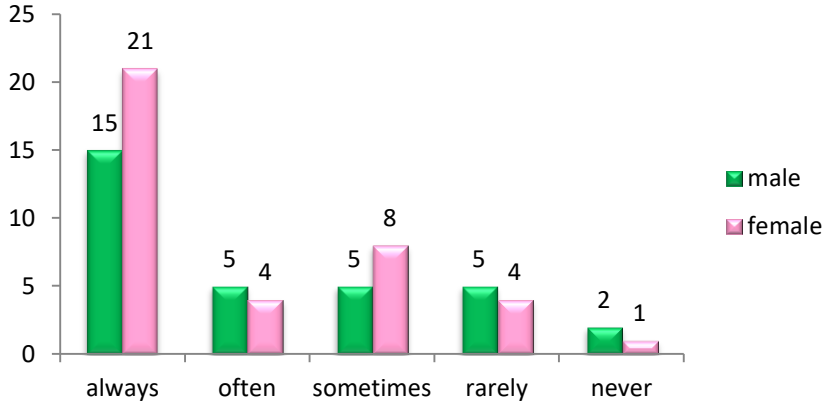

Fig.2: Graph showing breathing issue due to seasonal changes among asthma patients

Impact of smoking on Asthma patients

The research on asthma patients on District Abbottabad shows that majority of reported patients including 13 males and 36 females never smoked. Among smokers, 6 patients smoked daily and 9 smoked occasionally. A small number such as 2 males and 4 females reported exposure to second-hand smoke. Most female patients (36) were non-smokers, and none reported smoking daily or occasionally. In contrast, smoking was more common among males. Overall, the results indicate that smoking prevalence is higher among males, while the majority of females are non-smokers (Fig 3).

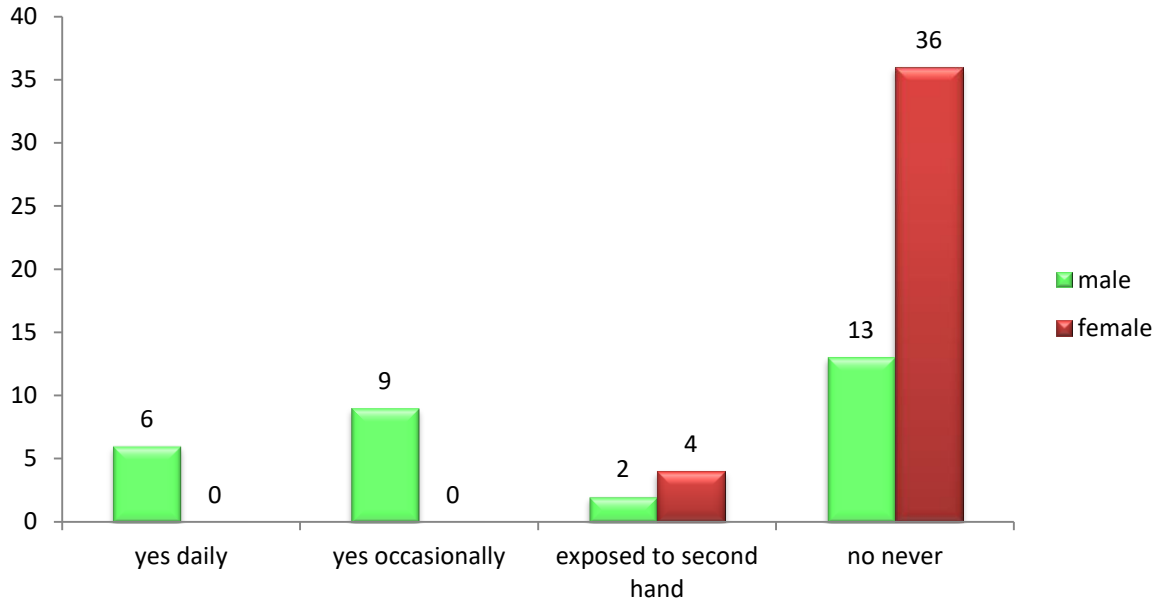

Fig. 3: Graph showing smoking status among asthma patient

Frequency of Asthma patient's exposure to dust

The study assessed the frequency of dust exposure among patients in different environments, including the workplace, home and outdoors. The findings indicate that the majority of patients 19 males and 22 females were exposed to dust on a daily basis. Weekly exposure was reported by 7 males and 3 females. Rare exposure was observed in 4 males and 13 females' patient, showing a higher proportion of females in this category. Only 1 male and 1 female patient was reported never being exposed to dust (Fig. 4). Overall, daily dust exposure was the most common pattern, suggesting a high level of regular environmental exposure among patients. In terms of location, most respondents identified the home as the primary source of dust exposure, with 30 females and 6 males' patients reporting frequent exposure in this setting. Outdoor environments were the second most common source, reported by 13 males and 6 females, indicating that outdoor activities also contribute significantly to dust exposure. Exposure at the workplace or school was reported by 12 males and 3 females, reflecting comparatively lower exposure in these settings (Fig. 5). No participants selected the "other" category. In summary, the findings suggest that the home environment is the most common source of dust exposure, followed by outdoor settings and to a lesser extent workplaces or schools.

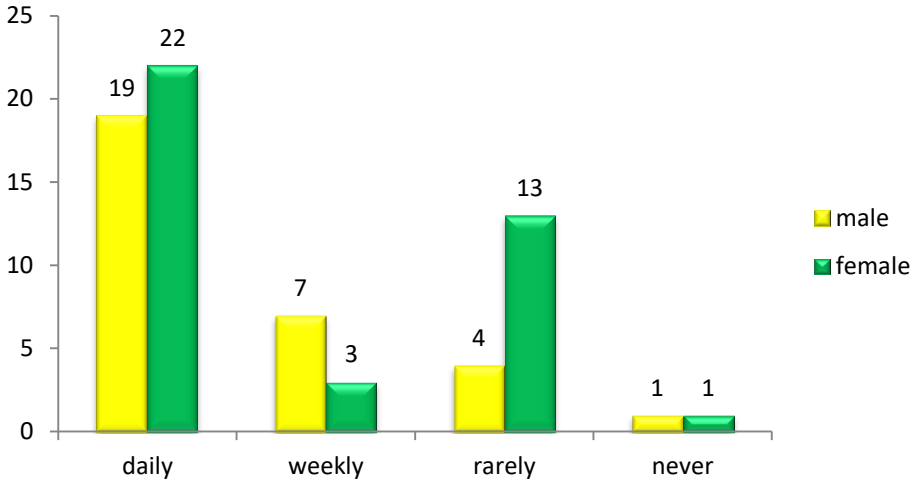

Fig. 4: Graph showing frequency of dust exposure to asthma patients.

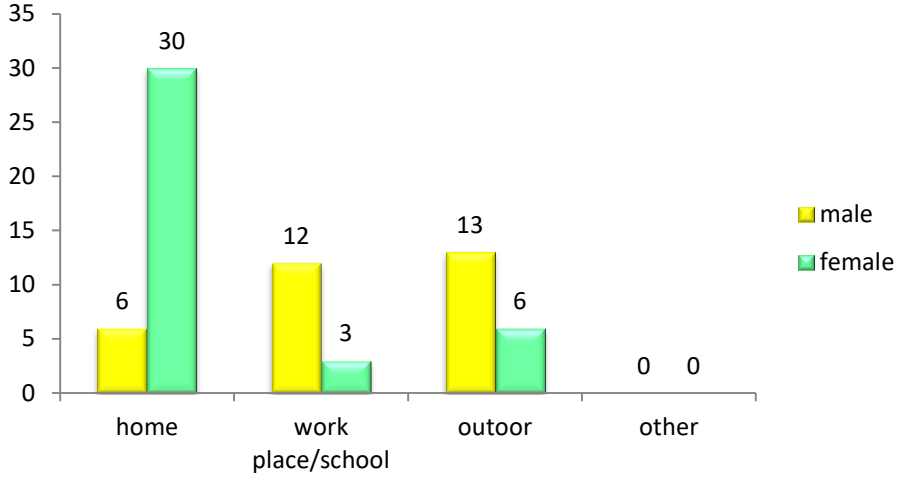

Fig. 5: Graph showing higher dust exposure to asthma patients.

Frequency of Asthma patients living in dusty environment

The majority of respondents reported in always category including 20 females and 14 males, showing that constant exposure to dust is common in the study population. The second most selected response was often 11 females and 9 males, indicating frequent exposure. A smaller proportion chose sometimes 8 respondents, while only 2 participants reported rarely living in a dusty environment. Additionally, 3 males and 3 females selected never (Fig 6). Overall, the graph suggests that most participants are regularly exposed to dusty conditions, which could be an important environmental risk factor for respiratory problem.

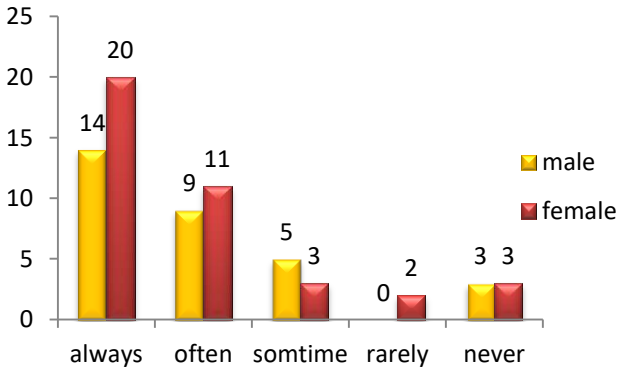

Fig. 6: Graph showing frequency of asthma patients living in a dusty environment.

Frequency of Asthma patient exposure to indoor air pollution

The research study shows the frequency of exposure to indoor air pollution from kitchen smoke among males and females. Daily exposure is most common, especially among females, with 28 females and 6 males affected. Weekly exposure is relatively low, reported by 2 females and 4 males. Rare exposure is higher among males, with 13 males and 5 females. The "never exposed" category includes 4 females and 8 males. Generally, the data indicate that daily exposure is more prevalent among females, while males are more represented in the rarely exposed group (Fig.7).

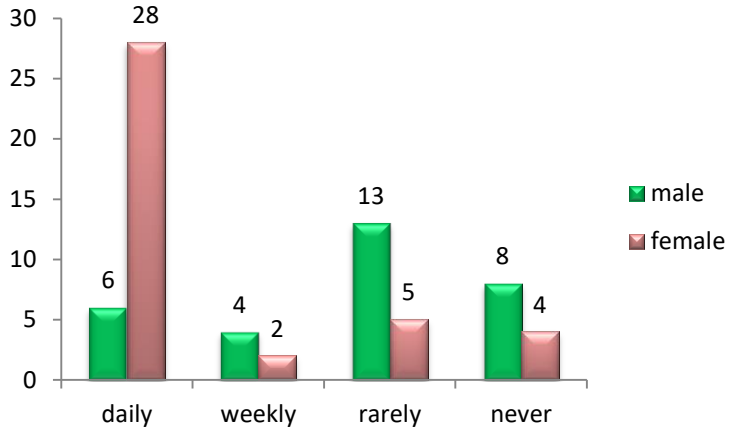

Fig. 7: Graph showing frequency of asthma patient's exposure to indoor air pollution

Main sources of indoor air pollution affect Asthma patients

The research findings highlight the key sources of indoor air pollution among both females and males. Cooking smoke appears as the most momentous contributor, affecting 38 females and 17 males, indicating a higher exposure among women. Tobacco smoke is another notable source, impacting 2 females and 10 males, with a moderately greater effect on males. Additionally, poor ventilation is reported by 2 males, while other minor sources account for 1 male respondent. Generally, the results clearly reveal that cooking smoke is the dominant source of indoor air pollution, particularly among females, likely due to their greater involvement in household cooking activities (Fig.8).

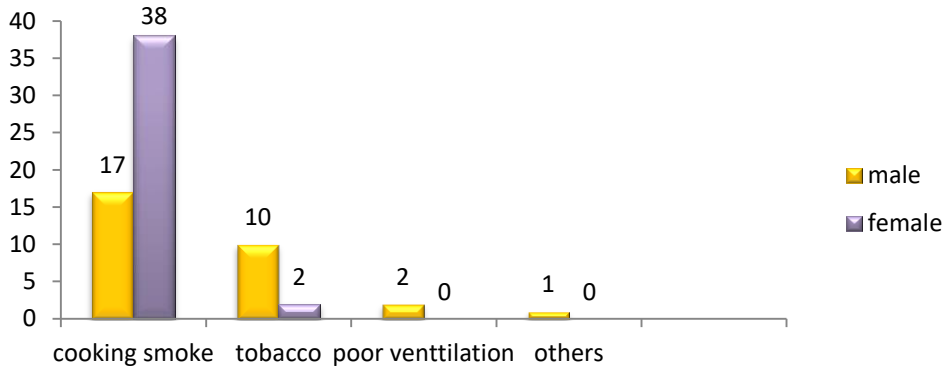

Fig. 8: Graph showing main sources of indoor air pollution for asthma patients

Effect of Home and life style triggers on asthma patients

The research study also shows the prevalence of different home-related triggers among females and males. Pet triggers affect 26 females and 17 males, while carpets and rugs trigger asthma in 37 females and 28 males. Strong smells are reported by 33 females and 27 males. Generally, carpets/rugs and strong smells are more common

triggers than pets, and females are slightly more affected by all three triggers compared to males (Fig.9).

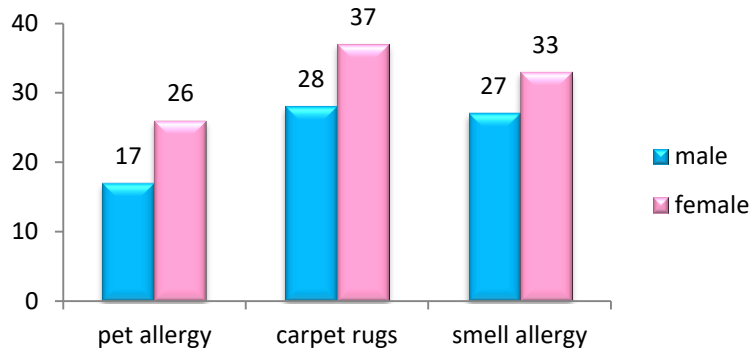

Fig. 9: Graph showing effect of home and life style on asthma patients

Different types of allergies in Asthma patients

The study was conducted to examine the different types of allergies reported among participants. The findings indicate that pollen allergy was the most common, affecting 18 patients. This was followed by dust allergy and combined dust-related allergies, reported in 14 patients. Food allergy was observed in 12 individuals, some participants reported experiencing symptoms after consuming oily foods, while few identified rice as a trigger as well as foods mentioned by patients included mango, cold drinks, dry fruits, sour foods and yogurt, whereas smoke allergy was the least common affecting only 6 patients. Additionally, 17 participants reported multiple types of allergies, highlighting a strong association between allergic conditions and asthma(Fig. 10). These findings based on patient responses, suggest that specific dietary factors may contribute to the worsening of asthma symptoms in certain individuals

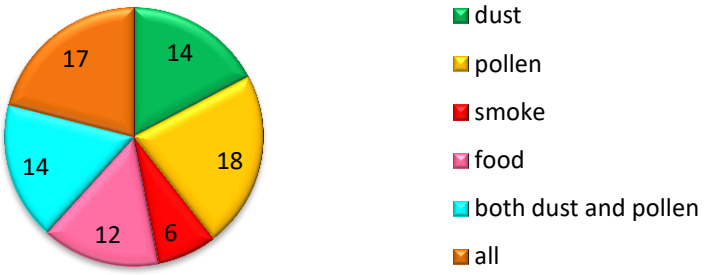

Fig. 10: Graph showing the different types of allergies among asthma patient

RESULT AND DISCUSSION:

The present study identified numerous environmental and lifestyle-related risk factors associated with asthma in District Abbottabad. A prominent finding of this investigation was the presence of seasonal variation with asthma symptoms reportedly deteriorating during the winter months. These findings are consistent with Raza et al. (2021), who observed the highest prevalence of both asthma and COPD in winter than in summer or autumn. Analysis of environmental exposure revealed that the majority of participants were regularly exposed to dust, with daily exposure being the most commonly reported pattern. The home environment was identified as the primary location of such exposure. Dust is a well-established environmental trigger for asthma, as it often contains allergens. These results align with the findings of Dai et al. (2025), who reported a significant association between occupational dust inhalation and increased asthma prevalence. Gender-based differences were also observed, with females more frequently reporting daily dust exposure, while males were more commonly represented in the rarely exposed group. This disparity may be attributed

to differences in household roles and patterns of indoor environmental exposure. Indoor air pollution emerged as another significant determinant of asthma in this study. Cooking smoke was identified as the predominant source, particularly among female participants. These findings are supported by Dutt et al. (1996), who reported that the highest levels of air pollutant exposure in developing countries occur within homes where biofuels are used for cooking. Participants frequently reported allergic conditions, with pollen allergy being the most prevalent, followed by dust allergy and combined pollen and dust allergies. This observation is consistent with Kitinoj et al. (2020), who found that increased pollen exposure is associated with an average 2% rise in the risk of allergic or asthmatic symptoms. Additionally, strong smells were identified as a common trigger, affecting a substantial proportion of asthma patients (33 females and 27 males). This finding is in agreement with Shah et al. (2022), who identified the use of perfumes as significant contributing factors. Other triggers identified in the study included pets (reported by 26 females and 17 males) and carpets or rugs (reported by 37 females and 28 males). Similar findings were reported by Khan et al. (2019), who highlighted the impact of indoor environmental conditions such as carpeted living spaces and pet exposure on asthma severity. Tobacco smoke exposure was reported among 2 females and 10 males in this study. Smoking and secondhand tobacco exposure have been widely recognized as major contributors to asthma development, particularly among children (Khan et al., 2019). Moreover, cooking smoke remained the most prevalent exposure inclusive, affecting 38 females and 17 males. These findings are consistent with Shah et al. (2022), who highlighted that exposure to wood and coal smoke especially in households for cooking is a major risk factor for asthma. Overall, the findings of this study highlight that asthma in District Abbottabad is a multifactorial disease influenced by environmental exposures. Among these, indoor air pollution plays a particularly critical role in disease progression. The extensive use of biomass fuels such as wood and coal contribute to poor indoor air quality and increased respiratory disease. Therefore, prevention and control strategies focusing on reducing these exposures could significantly lower the burden of asthma in the District Abbottabad.

Note: **The scholar declares no conflict of interest.**

RECOMMENDATIONS

Based on the findings of the study on the topic analytical study on common risk factors linked to asthma in district Abbottabad the following simple and practical recommendations are suggested to reduce asthma in District Abbottabad:

Increase Community Awareness

People of the area should be educated about asthma, its causes, and how to prevent it. Awareness programs should be introduced in this regard. This can help in better prevention of asthma.

Improve Indoor Air Quality

Many families use wood for cooking, which produces damaging smoke. People should be encouraged to use clean fuels like gas or electricity. Homes should have proper ventilation system.

Reduce Smoking

Smoking should be avoided inside homes. There should be public campaigns for discouraging smoking.

Keep Homes Clean

Living homes should be clean in all respect. There should not any type of dust because dust and allergens can trigger asthma. People should avoid heavy carpets and curtains. Pets should be kept away from sleeping areas.

Train Healthcare staff

Doctors and healthcare staff should be trained to properly manage asthma. They should guide patients about correct medicine use and how to avoid.

Future Research

More research studies and projects should be done to better understand asthma and its causes. This will benefit in improving prevention and treatment in the future.

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