



# The Impact of Shortness of Breath on Asthmatic Language Learners' Speech

Mohammad Hamad Al-khresheh\*

Faculty of Science and Arts, Northern Border University,  
Arar, Saudi Arabia

**Abstract:** This is a quantitative descriptive research that aimed to examine the impact of shortness of breath on the speech of asthmatic language learners. To achieve this objective, over 405 asthmatic learners hailing from 54 different countries were involved using the snowball sampling method. To collect the necessary data, a questionnaire with a five-point Likert scale was carefully developed. Its validity and reliability coefficients were properly ensured as well. The findings revealed that shortness of breath had a tangible negative impact on the oral abilities of asthmatic language learners, irrespective of the seriousness of their asthma condition. The impact was found to cause several moderate speech and language with psychosocial problems, which would be aggravated significantly when their condition worsened. This research is admittedly the first of its kind that seeks to determine how shortness of breath in asthmatic language learners could affect their speech directly and psychosocial abilities indirectly. The current research establishes a precedent for upcoming studies that seek to determine the link involving breathing patterns and speech abilities of the language learners suffering from asthma and to decide whether it results in low speech achievement. Implications and recommendations for further research were presented, as well.

**Keywords:** Asthma, language learners, speech and psychosocial problems, shortness of breath

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## INTRODUCTION

Asthma ranks as one of the world's most widely widespread chronic inflammatory diseases, affecting over 334 million people worldwide. When it comes to worldwide prevalence and duration period, it is ranked at the 14th position. It is a significant non-communicable health condition whose primary characteristics include recurrent bouts of wheezing and breathlessness, which may vary in the number of occurrences and severity from one individual to another. Put simply, asthma is a major burden to have as it comes with immense financial costs and causes emotional and physical distress as well. The effects are particularly compounded in learning age patients (Abramson et al., 2001; Asher et al., 2006).

Asthma is incredibly dangerous due to the debilitating negative impact on a student's academic life. An asthma diagnosis may result in the affected student living under a constant cloud of fear. When the condition is not appropriately treated, the symptoms can cause disruptions in the classroom and affect their academic performance adversely. Additionally, a poorly managed case can result in increased behavioural, social, and emotional troubles, which affects academic progress adversely as well. As per Blackman and Gurka (2007), asthmatic students were found to be likelier to repeat an entire grade and struggle with learning difficulties and achievement issues, compared to others who did not

\*Correspondence concerning this article should be addressed to Mohammad Hamad Al-khresheh, Faculty of Science and Arts, Northern Border University, Arar, Saudi Arabia. E-mail: [mohammed.alkhresheh@nbu.edu.sa](mailto:mohammed.alkhresheh@nbu.edu.sa)

have the condition (their study had over 100,000 participants, among which 8000 were asthmatic students). Night-time and daytime asthma symptoms may lead to disruptive sleeping patterns, poor attentive spans, failure in completing homework assignments, and limited ability to participate in physical and social activities. Numerous studies have concluded that asthmatic students are absent for more school days, compared to regular students. For students with a runaway asthma condition, absenteeism due to asthma-related complications often results in unsatisfactory academic performance (Kohen, 2010; Moonie, Sterling, Figgs, & Castro, 2008; Sturdy et al., 2012).

The impact of asthma on language learning performance has not been studied in greater detail yet. Since asthma attacks are notorious for hindering and continually interrupting a person's capability to learn and achieve well in his academics, one can only imagine the havoc it can wreak on his language learning abilities. Strom and Silverberg (2016) stated that asthma could interfere with one's language learning abilities by affecting their speech, comprehension, and concentration abilities. It has also been speculated that there may be unknown genetic and environmental reasons that affect the overall development of speech disorders and asthma simultaneously.

Although asthma happens to be a medical condition that affects the body's respiratory tract, many studies have also linked it to communication disorders and speech issues. Bronchial asthma also causes many symptoms, which may lead to other communication disorders such as deficits in language acquisition, reading, and articulation difficulties (Wiechern, Liberty, Pattemore, & Lin, 2018).

Like any other teachers, language teachers should also be aware of the effect asthma has on the language learning abilities of their students and be prepared with appropriate solutions. Being unaware of the impact of asthma on the attendance, attitudes, comprehension, concentration, and oral skills of the students may stunt their ability to help students with asthma and leave them unable to act properly in the unfortunate occurrence of an attack. This study looks into the problems of asthma-related education to language learners and explores how such education can be delivered for optimal results. The present research may have a significant impact in attracting the consideration of academics, medical personnel, researchers, and language teachers and help them understand the effect of asthma on the oral abilities of their learners. It could aid them in curbing the factors and activities that could potentially trigger asthma attacks in a learning environment. This study makes a case for why more research is required to analyse the impact of asthma-related complications on language learners, who are trying to learn a second or a foreign language. Incredibly, this research seeks to determine how the shortness of breath could negatively affect the oratory skills of language learners with asthma. More importantly, it also seeks to provide a possible answer to the following question that applies to language learners with asthma.

- How detrimental is shortness of breath to the oratory skills of asthmatic language learners?

Given this research question, it is hypothesized that shortness of breath can affect the speech abilities of language learners with asthma. This results in psychological problems, which may also cause social problems like being unable to speak aloud in public. Self-confidence levels may also be affected. This hypothesis has been supported by the evidence that asthmatic complications may result in shortness of breath, which affects speech abilities (Kim & Mazza, 2011). Asthmatic people are often unable to keep their breathing conditions under control. Respiratory control refers to the process of controlling one's breathing rate. Since a person can speak only while exhaling, a pause during a speech indicates that he may have done so to inhale air. But there may be other reasons as well - the person may be planning his answer to the question posed to him. When a person speaks, the breathing patterns may differ significantly, conditional on the purpose and nature of the speech (Robb, Sinton-White, & Kaipa, 2011).

## **LITERATURE REVIEW**

There are several obstacles to language learning, including psycholinguistic, linguistic, or social factors. There are numerous studies that have studied them in great detail and offered solutions for such issues. However, the latest literature on the subject indicates a major glut in the number of studies that thoroughly examine the effect of specific illnesses and their symptoms on one's language learning abilities. This problem is magnified in asthma and other related complications, such as shortness of breath, which has been shown to have a touchable impact on one's oral speaking abilities. The current research classifies asthma under the category of a common illness. It provides a comprehensive overview of the link between speech impairments and language learning, culminating in a detailed review of the latest research studies about this topic.

## **Asthma**

Asthma may be defined to be a chronic inflammatory illness affecting the airways. Chronic inflammation has been linked to hyperresponsiveness in the airways (which is an exaggerated narrowing response of the airways to certain triggers like exercise and allergens), leading to persistent symptoms like wheezing, coughing, chest tightness, and dyspnea (shortness of breath). The primary symptoms can be linked to variable obstructions to the airflow inside the lungs, which can be reversed with appropriate treatment (Kim & Mazza, 2011). Asthma control refers to the degree of efficiency to which one has met the objectives of their asthma therapy (e.g., maintaining normal lung activity levels and functions, preventing further exacerbations/symptoms). Asthma control can be classified under three different levels - poorly controlled (bad), somewhat controlled (moderate), and well-controlled (good). Remarkably, the severity of one's chronic asthma condition is usually assessed by evaluating the history and frequency of their symptoms, along with their interference with one's lifestyle, sleep, and exercise. Severity levels of one's chronic asthma condition may be classified as severe, moderate, and mild (Wiechern et al., 2018).

Al Ghobain, Algazlan, and Oreibi (2018) stated that asthma could result in shallow breathing and shortness of breath (from one's shoulder or chest muscles instead of the diaphragm). Dogan, Eryuksel, Kocak, Celikel, and Sehitoglu (2007) also revealed that lack of adequate breath support could limit one's ability to talk aloud or even somehow normally since loudness happens to be dependent on the volume of air that escapes the lungs. A weak voice (strident/strained, roughness, or hoarseness) may also be a product of badly or inadequately controlled airflow issues. Speech prosody (intonation and rhythm) depends on exhalation as well. Asthma allergy-related nasal congestion could give rise to hyponasality - a resonance issue that also affects one's voice during a cold. Since certain English sounds (-ng, m, and n) require directing the airflow through one's nose, people with nasal congestion may also face problems articulating themselves clearly (Bailey & Hoit, 2002).

## **Speech Impairments**

Speech refers to the production of specific sounds, which convey a certain meaning to listeners. It helps people communicate all their ideas, feelings, and thoughts with one another (Bishop & Leonard, 2000). Speaking requires humans to coordinate different body parts precisely, including the abdomen, chest, neck, and head. Speech impairment includes conditions that affect an individual's ability to make sounds and create words. Language and speech impairments can be formally defined as communication disorders that limit a person's ability to write, read, understand, and talk properly. There are two subcategories: language impairments and speech impairments (Goodyer, 2000).

Weismer (2013) defined speech impairments as conditions that affect people's ability to produce sounds necessary for proper communication with others. They are separate from language disorders in that they completely prevent individuals from producing the right speech sounds whereas language disorders limit their ability to understand speech or learn new words. However, both language and speech impairments can severely affect one's ability to express their feelings and thoughts with others. Speech disorders are prevalent among individuals of all age groups. Some widely-prevalent speech disorders include dysarthria, apraxia, and stuttering (Bishop & Leonard, 2000; Howell, 2002). For instance, stuttering is a form of speech impairment, which disrupts one's flow while speaking and it might also occur due to shortness of breath. People with stuttering issues undergo the following forms of disruption: prolongations occur when an individual draws out or stretches certain words or sounds. Blocks occur when people are unable to make the requisite speech sounds despite being aware of what they want to say (Jiang, Lu, Peng, Zhu, & Howell, 2012). Repetitions take place when people start involuntarily repeating words, vowels, or sounds. Frustration, excitement, or stress may worsen stuttering issues further. Some people may be unable to pronounce certain sounds or words due to their tendency to aggravate their stutter. Stuttering is known to have physical and behavioural symptoms, including sudden movements of the head, clenched fists, lip tremors, rapid blinking, and tension in the shoulders and face (Damico, Muller, & Ball, 2010).

Boone (2018) defined three basic speech impairment issues: articulation disorders, voice disorders, and fluency disorders. Voice disorders refer to issues with the usage or feature of one's voice that occurs due to larynx-related disorders. Their characteristics comprise abnormal construction or/and nonappearance of adequate verbal quality, period, resonance, loudness, and pitch. Howell (2002) defined fluency disorders as conditions that affect speech timing and rhythm. It is primarily characterised by prolongations, hesitations, or repetitions of phrases, words, syllables, or sounds. The most widely prevalent speech fluency disorders are - Cluttering, which involves jerky and excessively fast speech, and stuttering, which involves verbal blocks, interjections, hesitations, prolongations, and rapid repetitions of

vowel or consonant sounds. Voice disorders usually occur due to larynx-related problems and are characterised by an abnormal production or/and absence of resonance, loudness, pitch, vocal quality, and adequate duration (Boone, 2018; Damico et al., 2010; Neumann et al., 2003).

Language and speech impairments cause communication difficulties and are often caused by physical factors like oral motor functions. Impairments and delays could range from being incredibly subtle to an absolute inability to form speech sounds or make use of a language. Luckily, the number of children stuck on the extreme end is meagre. However, as communication and language skills are incredibly important for proper all-round development in children, even a moderate or mild disturbance or disorders could have profound consequences on their life. In extreme cases, it may even result in self-isolation from their educational institutions and peers (Brown, Ingham, Ingham, Laird, & Fox, 2005; Howell, Bailey, & Kothari, 2010).

Apart from being physically taxing on people suffering from asthma, it also has a social and emotional impact on their abilities. Breathing difficulties can lead to panicked reactions, especially during asthma attacks. People also become terrified of having further episodes in the future. A dangerous disease like asthma could also aggravate psychosocial problems like lack of self-confidence, anxiety, shyness, and depression, triggering panic attack episodes in some cases. Additionally, people with anxiety and depression tend to be emotionally and physically exhausted, limiting their capacity for self-management of their condition. Psychosocial problems prevent the proper management of the condition and result in adverse behavioural, educational, and development disorders, perpetuating further damaging cycles. Adverse psychosocial disorders may even trigger asthma attacks, as noted by several studies, though the eventual outcomes are somewhat inconsistent (Giardino, Friedman, & Dager, 2007; Nunes, Pereira, & Morais-Almeida, 2017; Tunde-Ayinmode, 2015).

### **Previous Studies**

Not many research studies have looked into asthma-related complications and their impact on language learning. Asthma was among the world's most prevalent chronic diseases that were increasing in number at a steady pace. Asthma was also reported to have significant consequences on people hailing from different age groups (Asher et al., 2006). In the same vein, Al Ghobain et al. (2018) held a detailed analysis of the prevalence of asthma and measured its symptoms on a group of people. Asthma was discovered to affect millions around the globe. The number of people affected by asthma varies from country to country and is usually around 1% - 20% in adults and children, which can be traced to environmental factors.

In education, Isik and Isik (2017) dealt with students who had asthma and studied its impact on their general academic performance. They concluded that uncontrolled asthma could impact social skills and self-confidence levels adversely. The study reviewed the social, emotional, and physical burden of asthma-related complications on parents and school-going children and the efficacy of asthma programs in schools.

Certain studies have concluded that a poor history of achievements could have its roots in asthma-related complications. McNelis, Dunn, Johnson, Austin, and Perkins (2007) conducted a study involving 29 asthmatic children with a mean age of 9.06 years who demonstrated a gradual decline in scores in their achievement tests administered by their school over one year. They found that these differences could not be pinned down on just their absences from school. (Moonie et al., 2008) demonstrated that asthmatic learners with a severe persistent condition were likelier to underperform below the proficiency level expected for their grade and age, when compared against students with a milder condition. (Kohen, 2010) conducted a cross-sectional research study involving 8914 children between 7 - 15 years. He stated that after adjusting for chronic conditions, socio-demographics, and school absence, children suffering from severe or moderate asthma were likelier to have poor achievement test scores on their standardised reading and math tests than to those without any chronic conditions. The children who had extremely rigorous asthma wound up with the poorest scores.

Similarly, Coelho, Cardoso, Souza-Machado, and Souza-Machado (2016) study was another remarkable research that sought to understand the impact of educational asthma intervention programs in schools regarding the morbidity and knowledge of this disease among adolescents and children. The effects of such interventions on certain morbidity indicators were found to be adequate among diagnosed students. Al Aloo, Naik-Panvelkar, Nissen, and Saini (2014) carried out an in-depth review of the existing literature for evidence that supported asthma interventions that were held in primary schools. They found that limited studies had explored the effects of interventions on the academic performances of the students.

[Strom and Silverberg \(2016\)](#) examined speech disorders and concluded that people with asthma had significantly greater chances of suffering from severe, moderate, and mild speech disorders in a bivariate model. The link between moderate and mild speech disorders was tangibly strong in the multivariate model, though the same could not be said for severe speech disorders. Food allergy and hay fever were linked with severe, moderate, and mild speech disorders in multivariate and bivariate models. The study also discovered that a one-year history of conditions like hay fever, food allergy, and asthma could be linked with a greater risk of suffering from a speech disorder.

In another linguistic study that dealt with language learning and academic performance, [Wang, Green, Nip, Kent, and Kent \(2010\)](#) analysed the reading and spontaneous speech abilities of 16 otherwise healthy adults as they went through six breathing cycles. The duration of the pauses, while they read, was measured to be 650ms with a standard deviation of 240. For spontaneous speaking, it was measured at 690ms with a standard deviation of 280, which wasn't significantly different. But when adults were asked to respond to a question posed to them during the speaking test, they made several pauses at grammatically inappropriate points, more than what they did during the reading test. [Wiechern et al. \(2018\)](#) also investigated the breathing cycles of kids aged between 5 - 9 years who suffered from asthma. They were made to read stories of gradually increasing difficulty aloud. Eleven children suffering from asthma participated in this test with 11 children of similar sex and age being employed as the control group. Non-contact respiratory monitoring techniques were deployed for yielding acoustic recordings as they read aloud and performed baseline tasks. The reading material's difficulty levels were increased gradually during the test. The results revealed that asthmatic children breathed slowly while reading grammatically difficult books and took long pauses compared to kids without asthma. Severely asthmatic children were the most affected category in the group.

The studies of [Wang et al. \(2010\)](#) and [Wiechern et al. \(2018\)](#) set a precedent for future research studies that sought to analyse the relationship between language skills and breathing cycles in asthmatic children, and how they affected the child's reading achievements. However, the study was restricted to only an analysis of the students abilities to read aloud. Unlikely, the current research seeks to evaluate other aspects of the condition on the language learning process. A cursory glance at the literature mentioned above shows that most of these studies were strictly medical and did not analyse the effects of asthma on their academic lives. An asthma diagnosis can have on a person's language learning performance has never been studied in detail before. Looking at the data, it is clear that there is an urgent need for such studies that look at how asthma limits the oral abilities of aspiring language learners. Therefore, this research aimed to answer how detrimental is shortness of breath to the oratory skills of asthmatic language learners?

## RESEARCH METHODOLOGY

A quantitative descriptive cross-sectional research design has been utilized to answer the study's research question, which deals with the impact of shortness of breath to the oratory skills of asthmatic language learners. Participation in this research was anonymous and voluntary.

### *Participants*

The sample size plays an important role in descriptive research as its primary aim to enable the making of certain inferences regarding a population based on the given sample [DeMarrais and Lapan \(2004\)](#); over 405 asthmatic participants were involved in this study, out of which 193 were female and 212 were male language learners hailing from 54 different countries.

The snowball sampling method was used for selecting participants due to its cost-efficient and simple nature. It also requires less planning and fewer staff members, unlike other sampling methods. It would help the authors discover population characteristics that were not as common and aid them in selecting participants who were accurately representative of the general population. This sampling method is highly recommended for such kind of research. The participants were all asthmatic language learners who had a history of asthma ranging between one to more than ten years. Their ages were between 15 to 45+ years of age, and were all learning different languages during the study. The participation of those identified as non-asthmatic language learners was not taken into consideration.

There were two primary reasons behind choosing participants from different nations: 1) A small sample size prevents accurate generalisations from being made; and 2) Bigger samples tend to be more representative of the general population ([Cohen, Manion, & Morrison, 2017](#)). By encouraging more language learners from different nations to participate, the study was able to accomplish its main objective.

### ***Instruments and Procedures***

The researcher developed a questionnaire to accomplish the main objective of this research. The statements of this questionnaire were rated on a five-point Likert scale anchored by 1 (always) and 5 (never). The questionnaire had two main parts. The first part included general important information related to gender, age, nationality, asthma control rate, the most problematic language skill, other important questions such as whether the participant suffers from asthma and s/he is meanwhile learning a language, and finally the period of language learning. The second part concerned the main questionnaire items, which were divided into three main domains.

The validity and reliability coefficients of this questionnaire were ensured, as shown in Table 1. The validity coefficient and reliability coefficient or Cronbach's alpha was found to be 0.947\*\* and 0.897\*\*, respectively (\*\* $p < 0.01$ ). Additionally, content validity checks were also conducted using the judges method. The judges were requested to rate (on a four-point rating scale) the appropriateness of the questionnaire's statements. The index of content validity was 90.5%. This percentage is considered a satisfactory value for new instruments. Over 29 statements were made, and 22 items were picked that were most relevant to the literature. Around six statements were eliminated by the judges, who were three experienced professors in the field of applied linguistics, when they were requested to comment on the suitability of the questionnaire's statements and to select the most relevant ones. After taking their recommendations, feedback, and comments into consideration, only six statements were removed and the remaining statements were classified under three interconnected domains. These domains have been identified based on a review of the literature on speech impairment problems. The first 13 items dealt with pure speech issues, the second six items (14 - 19) dealt with psychological issues, and the last three items (20 - 22) dealt with social issues. The main justification of the classification of these three domains is due to the fact that pure speech problems give rise to psychological problems, which in turn, give rise to social problems.

Table 1 *Validity and Reliability of the Questionnaire*

Dimensions	No. of Items	Validity Coefficient	Reliability Coefficient Cronbach's Alpha ( $\alpha$ )	$p$
Speech problems	13	0.929**	.863**	0.00
psychological problems	6	0.894**	.799**	0.00
Social problems	3	0.631	.398	—
Overall	22	0.947**	.897**	0.00

### **DATA COLLECTION AND ANALYSIS**

For collecting the necessary data, a Google Form was utilised to upload and share the questionnaire to different asthma-related groups on some social media platform. These platforms are mainly created to those people with asthma problems. Only the people who were determined to have something relevant to contribute to the study were allowed to fill in and submit the questionnaire. Due to a large number of people in asthmatic online social media groups, data collection was not a big challenge. Participants were provided adequate information regarding the study and its overall scope. Collection of the responses took around one and a half months. Follow up requests related to the questionnaire were sent repeatedly during the collection process. It was difficult to reach such a large number of asthmatic language learners from one place; therefore, there was a need to collect data from different countries using social media platforms in order to be able to achieve the main objective of this study.

The data obtained from the study's participants were analysed using the Statistical Package for Social Science (SPSS), version 20. Many descriptive statistical methods like means (M), standard deviations (Std.), percentages (p), numbers (N), one-way ANOVA analysis test, and statistically significant differences were utilised. Tabulation was used for data presentation purposes.

## RESEARCH RESULTS

Using the tabulation method of data presentation, Table 2 sorts out participants based on asthma control rates and gender. The table shows that over 50% of all participants had a moderate degree of control over their asthma with a Std. of 13.17 and a mean of 70.47. Over 130 participants exercised a poor degree of control over their asthma, with only 57 individuals reporting good/decent control levels.

Table 2 Descriptive Statistics According to Gender and Asthma Control Rate

Gender	Asthma Control Rate								
	Bad			Moderate			Good		
	<i>N</i>	<i>M</i>	Std.	<i>N</i>	<i>M</i>	Std.	<i>N</i>	<i>M</i>	Std.
Male	61	78.0	13.0	110	73.4	14.1	41	60.0	18.1
Female	69	77.6	10.6	108	75.5	12.5	16	64.1	14.2
Total	130	77.8	11.8	218	74.5	13.4	57	61.2	17.1

Table 3 indicates that speaking is widely considered as the most difficult language skill to master by over 262 learners with asthma. Out of them, over 151 participants exercised a moderate degree of control over asthma. Writing was deemed to be the least distressing aspect, as only 34 participants reported it as their most distressing skill to master. Additionally, a two-way ANOVA test had to be deployed to figure out whether there were any major variations between language skills and asthma control rates. Since  $p < 0.001$ , statistically significant differences were found between language skills and their asthma control rate.

Table 3 Descriptive Statistics According to Language Skills and Asthma Control Rate

No.	Language skills	A C R	<i>N</i>	<i>M</i>	Std.	F	df 1	df 2	<i>p</i>
1.	Listening	Bad	18	74.2	11.3	2.378**	11	393	.007
		Moderate	32	71.2	12.8				
		Good	4	67.7	6.2				
2.	Speaking	Bad	77	79.9	11.8				
		Moderate	151	76.8	13.1				
		Good	34	59.0	18.7				
3.	Reading	Bad	21	74.0	10.7				
		Moderate	19	67.0	11.3				
		Good	15	67.0	13.0				
4.	Writing	Bad	14	76.7	12.1				
		Moderate	16	67.8	13.9				
		Good	4	51.0	18.7				

Note: (\*\*)  $p < 0.001$

Table 4 offers a statistical description of the experience range of language learners who have asthma. This table shows that most participants had over 1 - 5 years of experience in language learning. The smallest number of participants had over ten years of experience in language learning.

Table 4 *Descriptive Statistics According to Years of Language Learning and Asthma Control Rate*

No.	Years of Learning	Bad			Moderate			Good		
		N	M	Std.	N	M	Std.	N	M	Std.
1.	Less than a year	27	77.3	11.2	29	74.5	14.0	7	51.0	16.2
2.	1-5	49	78.4	12.1	113	76.7	12.9	29	59.6	18.1
3.	6-10	47	77.2	12.1	65	72.1	11.8	15	66.6	13.7
4.	Above 10	7	80.1	11.4	11	65.0	19.5	6	67.5	17.3

In order to estimate the difficulty level of each item on the questionnaire, a comprehensive scoring system was developed as follows: very low (with a mean ranging between 1 - 1.8) was rated 1, low (with a mean ranging between 1.9 - 2.7) was rated 2, moderate (with a mean ranging between 2.8 - 3.6) was rated at moderate, high (with a mean between 3.7 - 4.5) was rated at 4, and very high (with a mean above 4.6+) was rated 5. Table 5 presents different speech issues and their relationship with the degree of control one has over their asthmatic condition. Item 1, "Shortness of breath causes me to speak hardly and deliver incomplete sentences" actually had the greatest mean value as assigned by participants with good, moderate, and bad levels of control over their asthma. It was given a high difficulty rating by participants with moderate and bad control over their asthma and a moderate difficulty rating by people with a good degree of control over their asthma. Other items were rated as being of moderate difficulty by everybody, regardless of their actual degree of control over their condition.

Table 5 *Descriptive Statistics According to Psychological Problems and Asthma Control Rate*

Asthma Control Rate		Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Item9	Item10
Bad	M	4.2	3.57	3.53	3.63	3.66	3.53	3.40	3.64	3.43	3.60
	Std.	1.04	1.01	1.07	1.03	1.06	1.05	1.17	1.07	1.01	1.11
	Sum	34.5	34.6	34.7	34.6	34.8	34.0	33.2	34.6	33.5	35.1
	Range	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Moderate	Mean	4.03	3.34	3.24	3.38	3.36	3.39	3.45	3.40	3.36	3.23
	Std.	1.08	1.11	1.11	1.13	1.03	1.13	1.11	1.12	1.21	1.20
	Sum	54.3	54.4	53.4	54.1	53.5	54.7	56.6	54.2	55.1	52.8
	Range	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Good	M	3.19	2.59	2.75	2.70	2.80	2.68	2.38	2.70	2.64	2.84
	Std.	1.41	1.27	1.19	1.25	1.15	1.53	1.17	1.22	1.20	1.33
	Sum	11.2	11.0	11.9	11.3	11.7	11.3	10.2	11.2	11.3	12.1
	Range	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

Table 6 includes items that cover psychological issues. The mean values for all these items tended to be in the moderate level (2.8 - 3.6), indicating that they only posed moderate difficulties. Item 14, "I feel stressed and anxious when I speak" was given the greatest mean value by participants with poor control over their condition whereas Item 16 "I feel shy to speak in front of others" was awarded the lowest mean by people with poor control. Interestingly, people with a good degree of control over their asthma gave this the greatest mean value. Item 18 "I feel afraid of making mistakes in pronunciation because of some of the problems mentioned in items 5,6,7,8,9,10,11,12, and 13" was given the greatest mean value by participants with a moderate level of control over their condition.



Table 6 Descriptive Statistics According to Psychological Problems and Asthma Control Rate

Asthma Control Rate		Item11	Item12	Item13	Item14	Item15	Item16	Item17	Item18	Item19
Bad	M	3.59	3.53	3.57	3.55	3.45	3.31	3.46	3.51	3.54
	Std	1.06	1.14	.94	1.08	1.13	1.20	1.00	1.07	1.07
	Sum	35.0	34.4	34.0	34.6	33.5	32.2	33.8	33.7	34.4
	Range	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Moderate	Mean	3.24	3.33	3.38	3.26	3.35	3.38	3.34	3.42	3.34
	Std.	1.14	1.11	1.15	1.16	1.23	1.06	1.17	1.15	1.19
	Sum	52.9	54.3	53.9	53.3	54.5	55.3	54.9	55.0	54.4
	Range	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Good	M	2.84	2.66	2.89	2.82	2.84	2.92	2.63	2.68	2.63
	Std.	1.27	1.15	1.16	1.32	1.25	1.22	1.18	1.15	1.26
	Sum	12.1	11.4	12.1	12.1	12.1	12.5	11.3	11.3	11.2
	Range	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

Table 7 reveals that social troubles were given a moderate difficulty rating by every participant, irrespective of the degree of control they had over their asthma. The participants also stated that they found participating in oral discussions to be a challenging and difficult affair, which was awarded the highest difficulty by learners with poor asthma control. Item 20 was found to have the greatest mean values. Those with good control over their asthma gave the lowest mean values to Item 21, which dealt with whether people could understand their speech. People with poor or moderate control over their asthma had the lowest mean values for another item, which dealt with public speaking.

Table 7 Descriptive Statistics According to Social Problems and Asthma Control Rate

Asthma Control Rate		Item20	Item21	Item22
Bad	M	3.59	3.45	2.94
	Std.	.99	1.11	1.27
	Sum	32.9	34.0	29.8
	Range	4.00	4.00	4.00
Moderate	M	3.51	3.37	3.29
	Std.	1.08	1.10	1.25
	Sum	53.9	55.6	55.8
	Range	4.00	4.00	4.00
Good	M	3.28	2.42	3.26
	Std.	1.39	1.23	1.35
	Sum	13.2	10.4	14.5
	Range	4.00	4.00	4.00

Table 8 displays a 95% confidence interval for the impact that shortness of breath has on the problems categorised below. A one-way ANOVA test had to be deployed to check for significant variations between the 3 questionnaire groups who had different degree of control over their asthma. The table affirms the view that there are many statistically significant variations among the groups ((\*\*\*),  $p < 0.001$ ; (\*\*),  $p < 0.01$ ).

Table 8 *One-Way ANOVA Descriptive Statistics*

Questionnaire Groups		N	M	Std.	95% Confidence Interval		F	p
					Lower Bound	Upper Bound		
Speech problems	Bad	130	47.03	7.36	45.75	48.30	34.558***	.000
	Moderate	218	44.19	8.30	43.08	45.30		
	Good	57	35.71	11.75	32.60	38.83		
	Total	405	43.91	9.28	43.00	44.82		
Psychological Feelings problems	Bad	130	20.84	4.45	20.07	21.61	16.674***	.000
	Moderate	218	20.12	4.69	19.50	20.75		
	Good	57	16.54	5.86	14.98	18.10		
	Total	405	19.85	4.98	19.36	20.34		
Social problems	Bad	130	9.99	2.13	9.62	10.36	5.938**	.003
	Moderate	218	10.17	2.36	9.86	10.49		
	Good	57	8.96	2.86	8.20	9.72		
	Total	405	9.94	2.40	9.71	10.18		

As per the findings of the one-way ANOVA analysis test, difficulty levels were determined as per the mean value distribution statistics, which differed from one group to another. When it came to speech problems, a mean of 57+ was deemed very high at 5; a mean of 46-56 was deemed high at 4; a mean of 35-45 was deemed moderate at 3; a mean of 24-34 was deemed to be low at 2; and a mean of 13-23 was deemed to be very low at one. When it came to social problems, a mean of 15+ was deemed very high at 5; a mean of 12-14 was deemed high at 4; a mean of 9-11 was deemed moderate at 3; a mean of 6-8 was deemed to be low at 2; and a mean of 3-5 was deemed to be very low at 1. Table 9 reveals that all problems arising as a result of shortness of breath were considered to be of moderate difficulty.

Table 9 *One-Way ANOVA Descriptive Statistics According to Level of Difficulty*

Questionnaire Group	N	Range	Sum	M	Std.	Variance	Level of Difficulty
Speech problems	405	50.0	17785.00	43.91	9.28	86.18	Moderate
Psychological problems	405	24.0	8041.00	19.85	4.98	24.84	Moderate
Social problems	405	12.0	4029.00	9.94	2.40	5.77	Moderate
Valid N (listwise)				405			

## DISCUSSION

This study sought to examine the impact that shortness of breath could have on the speech and psychosocial abilities of asthmatic language learners. As of now, there are not any studies that investigate the link between breathing troubles and the oral performance of language learners. It is quite evident based on the analysis conducted in this study that shortness of breath, which is one of asthma's most debilitating symptoms, has a tremendous negative effect on the speaking abilities of language learners with asthma, irrespective of whether their condition was under good, moderate, or bad control. Over 50% of the study's participants were able to exercise moderate control over their condition whereas over 130 participants had bad control over their condition. Only around 57 participants had good control over their asthma. All participants reported having been affected by shortness of breath, which is the primary factor under study here.

An analysis of this study's findings reveals that speaking is arguably the most challenging language skill to master for all participants, irrespective of the level of control they exercise over their condition. The existence of several statistically significant variations has also been confirmed beyond doubt. Additionally, the one-way ANOVA analysis also affirmed that there were major variances between the results of participants with good, moderate, and bad levels of

control over their condition in terms of their speech, psychological, and social abilities. The significant differences observed from the data confirm the study's hypothesis that language learners with asthma suffer from severe speaking skill limitations due to their condition. Since proper breathing is essential for speaking smoothly, shortness of breath in asthmatic language learners affects their ability to communicate effectively.

The study discovered that shortness of breath leads to speech problems, which triggered a cascade of psychological and social problems for language learners with asthma, irrespective of the language, and level of control over their condition. Their responses to this study's questionnaire revealed that shortness of breath leads to tangible breathing issues that affected their language learning and speaking abilities significantly. People with poor or moderate control over their condition had it worse since they found it difficult to move their tongue or mouth with ease, thus causing fluency, voice, articulation, and speech troubles. They were also unable to pronounce certain nasal sounds properly as well. These troubles forced them to draw or stretch out particular words or sounds and made them repeat words or stutter involuntarily while speaking. Some were outright incapable of making appropriate speech sounds despite being fully aware of what they had to do. A possible explanation for these problems is that there is a strong link between the respiratory system and speech abilities. Any damage to the respiratory system may result in speech issues. Compared to people without asthma, asthmatic patients face many troubles that affect their speaking abilities. [Strom and Silverberg \(2016\)](#) affirmed the popular notion that asthma raised the chances of a speech disorder. Though most speech-related problems only posed moderate handicaps, fluency related issues were dime a dozen in asthmatic patients, who found it difficult to speak in a natural, fluid manner. Some of them tend to repeat words or stammer multiple times in the same sentence or create awkward pauses as they speak. Although there is no concrete, scientific proof regarding the factors causing disfluency [Neumann et al. \(2003\)](#), the current study seeks to attract the attention of speech therapy experts, specialists, and the medical community in general to initiate an informed, detailed discussion of the impact shortness of breath can have on asthmatic language learners and their ability to speak fluently.

Speech problems like the ones mentioned above may result in adverse psychological complications for asthmatic language learners who may find themselves frustrated, shy, anxious, or stressed while talking to others aloud or in public. Poorly controlled asthma may further aggravate these feelings. The analysis revealed that psychological issues had the greatest mean values submitted by language learners with asthma who did not have an adequate level of control over their condition. People generally get frustrated, anxious, stressed, nervous, and shy when they find themselves incapable of behaving normally. The same is applicable for asthmatic learners as well. [Giardino et al. \(2007\)](#) and [Ten Thoren and Petermann \(2000\)](#) affirm these findings as they concluded that asthmatic patients are at a greater risk of facing psychological issues like stress and anxiety, probably due to the link between respiratory rates and anxiety levels. It can be reasonably concluded that psychological issues cause asthmatic learners to suffer from poor performance scores.

It is also likely that these moderate psychosociological problems drive asthmatic language learners into self-isolation by making them unable to participate in oral discussions. They are also often worried that people may find their speech incomprehensible and lack adequate confidence to make public speeches without worry. It should be noted that asthmatic language learners who stated that they avoided oral discussions completely were mostly the ones with poor control over their condition.

The analysis also reveals that every problem mentioned above was not found to be too low or too high - its effects were moderate at best. A moderate difficulty level indicates that having shortness of breath due to asthmatic complications only creates a moderate impediment and psychosocial troubles for language learners trying to improve their speech skills, irrespective of their age, language, and level of control over their asthma. However, people with poorly controlled cases of asthma were at a significant disadvantage from all angles.

The study's findings are in line with the findings of [Wiechern et al. \(2018\)](#), who reported that asthmatic complications could affect the language learning process negatively, resulting in an abysmally poor performance in tests. The findings of [Strom and Silverberg \(2016\)](#) have also been validated, who stated that people with asthma had greater chances of suffering from severe, moderate, and mild cases of speech disorders in a bivariate model compared to people without asthma.

## IMPLICATIONS

Given the results, findings, and the discussion presented in this study, there are certain important points, which need to be placed under the focus of language teachers. Firstly, they must identify students with asthma and pay more

attention to the reasons mentioned earlier in this research study. Second, they should offer more encouragement to their students and instil in them, the ability and confidence to participate and speak fluently, at par with other students. It would be ideal if teachers could make use of forecasts for environmental issues and air quality while planning outdoor or indoor activities. Clear, well-defined procedures must also be established for handling students who fail to turn in their work due to asthmatic complications. Teachers must be aware of the symptoms of asthma: a feeling of drowsiness, tiredness, embarrassment, anxiety, isolation, and the inability to partake in activities that result in patients becoming withdrawn and uncertain. Teachers can make them feel comfortable by providing due recognition to their feelings since asthmatic complications tend to aggravate cases of emotional distress.

## CONCLUSION AND IMPLICATIONS

The present study sets a precedent in language learning as it is one of the first studies that analyse the effects of shortness of breath on language learners with asthma from 54 countries around the world along with associated psychosocial complications. The results unanimously prove that shortness of breath has a tangible negative impact on the oral achievements of language learners with asthma, irrespective of their actual age, language, asthma control, and gender. Its negative impact has been studied from three different angles. Speech problems refer to issues that have to do with fluency, voice, pronunciation difficulties, and involuntary repetition of words while speaking. Psychologically, issues like frustration, shyness, anxiety, tiredness, and stress while making public speeches or while speaking aloud were moderately reported. Social issues refer to the inability to participate properly in oral discussions, feelings of worry over whether others will comprehend their speech, and an utter lack of confidence while speaking in public. There were several tangible differences between the variables under study in this study. It ought to be mentioned that these difficulties worsen further when asthma is not controlled properly. It is clear that there is a need to balance linguistic and metabolic needs in order to counter the asthmatic complications on breathing systems and speaking abilities. Although the findings of this study are the first of their kind, it only makes a case for the necessity of more research studies into the effects of asthmatic complications on language learners.

## REFERENCES

- Abramson, M. J., Bailey, M. J., Couper, F. J., Driver, J. S., Drummer, O. H., Forbes, A. B., ... Haydn Walters, E. a. (2001). Are asthma medications and management related to deaths from asthma? *American Journal of Respiratory and Critical Care Medicine*, 163(1), 12-18. doi:<https://doi.org/10.1164/ajrccm.163.1.9910042>
- Al Aloom, N. A., Naik-Panvelkar, P., Nissen, L., & Saini, B. (2014). Asthma interventions in primary schools - A review. *Journal of Asthma*, 51(8), 779-798. doi:<https://doi.org/10.3109/02770903.2014.914534>
- Al Ghobain, M. O., Algazlan, S. S., & Oreibi, T. M. (2018). Asthma prevalence among adults in Saudi Arabia. *Saudi Medical Journal*, 39(2), 179-184. doi:<https://doi.org/10.15537/smj.2018.2.20974>
- Asher, M. I., Montefort, S., Björkstén, B., Lai, C. K., Strachan, D. P., Weiland, S. K., & Williams, H. (2006). Worldwide time trends in the prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and eczema in childhood: ISAAC phases one and three repeat multicountry cross-sectional surveys. *The Lancet*, 368(9537), 733-743. doi:[https://doi.org/10.1016/s0140-6736\(06\)69283-0](https://doi.org/10.1016/s0140-6736(06)69283-0)
- Bailey, E. F., & Hoit, J. D. (2002). Speaking and breathing in high respiratory drive. *Journal of Speech, Language, and Hearing Research*, 45(1), 89-99. doi:[https://doi.org/10.1044/1092-4388\(2002/007\)](https://doi.org/10.1044/1092-4388(2002/007))
- Bishop, D. V. M., & Leonard, L. B. (2000). *Speech and language impairments in children: Causes, characteristics, intervention and outcome*. Sussex, UK: Psychology Press.
- Blackman, J. A., & Gurka, M. J. (2007). Developmental and behavioral comorbidities of asthma in children. *Journal of Developmental & Behavioral Pediatrics*, 28(2), 92-99. doi:<https://doi.org/10.1097/01.DBP.0000267557.80834.e5>
- Boone, R. D. (2018). *Trouble talking: The realities of communication, language, and speech disorders*. Maryland, UK: Rowman & Littlefield.
- Brown, S., Ingham, R. J., Ingham, J. C., Laird, A. R., & Fox, P. T. (2005). Stuttered and fluent speech production: An ALE meta-analysis of functional neuroimaging studies. *Human Brain Mapping*, 25(1), 105-117. doi:<https://doi.org/10.1002/hbm.20140>
- Coelho, A. C. C., Cardoso, L. S. B., Souza-Machado, C., & Souza-Machado, A. (2016). The impacts of educational asthma interventions in schools: A systematic review of the literature. *Canadian Respiratory Journal*, 2016,

1-14. doi:<http://dx.doi.org/10.1155/2016/8476206>

- Cohen, L., Manion, L., & Morrison, K. (2017). *Research methods in education*. Abingdon, UK: Routledge.
- Damico, J. S., Muller, N., & Ball, M. J. (2010). *The handbook of language and speech disorders*. Hoboken, NJ: John Wiley & Sons.
- DeMarrais, K. B., & Lapan, S. D. (2004). *Foundations for research: Methods of inquiry in education and the social sciences*. Mahwah, NJ: Erlbaum Associates.
- Dogan, M., Eryuksel, E., Kocak, I., Celikel, T., & Sehitoglu, M. A. (2007). Subjective and objective evaluation of voice quality in patients with asthma. *Journal of Voice*, 21(2), 224-230. doi:<https://doi.org/10.1016/j.jvoice.2005.11.003>
- Giardino, N. D., Friedman, S. D., & Dager, S. R. (2007). Anxiety, respiration, and cerebral blood flow: Implications for functional brain imaging. *Comprehensive Psychiatry*, 48(2), 103-112. doi:<https://doi.org/10.1016/j.comppsy.2006.11.001>
- Goodyer, I. M. (2000). Language difficulties and psychopathology. In D. V. M. Bishop & L. B. Leonard (Eds.), *Speech and language impairments in children: Causes, characteristics, interventions, and outcomes*. Sussex, UK: Psychology Press.
- Howell, P. (2002). The EXPLAN theory of fluency control applied to the treatment of stuttering by altered feedback and operant procedures. In E. Fava (Ed.), *Current issues in linguistic theory series: Pathology and therapy of speech disorders*. Amsterdam, UK: John Benjamins.
- Howell, P., Bailey, E., & Kothari, N. (2010). Changes in the pattern of stuttering over development for children who recover or persist. *Clinical Linguistics & Phonetics*, 24(7), 556-575. doi:<https://doi.org/10.3109/02699200903581034>
- Isik, E., & Isik, I. S. (2017). Students with asthma and its impacts. *National Association of School Nurse*, 32(4), 212-216. doi:<https://doi.org/10.1177/1942602X17710499>
- Jiang, J., Lu, C., Peng, D., Zhu, C., & Howell, P. (2012). Classification of types of stuttering symptoms based on brain activity. *PLoS One*, 7(6), 39-47. doi:<https://doi.org/10.1371/journal.pone.0039747>
- Kim, H., & Mazza, J. (2011). Asthma. *Allergy Asthma and Clinical Immunology*, 7(1), 1-9. doi:<https://doi.org/10.1186/1710-1492-7-S1-S2>
- Kohen, D. E. (2010). Asthma and school functioning. *Health Reports*, 21(4), 35-40.
- McNelis, A. M., Dunn, D. W., Johnson, C. S., Austin, J. K., & Perkins, S. M. (2007). Academic performance in children with new-onset seizures and asthma: A prospective study. *Epilepsy & Behavior*, 10(2), 311-318. doi:<https://doi.org/10.1016/j.yebeh.2006.12.012>
- Moonie, S., Sterling, D. A., Figgs, L. W., & Castro, M. (2008). The relationship between school absence, academic performance, and asthma status. *Journal of School Health*, 78(3), 140-148. doi:<https://doi.org/10.1111/j.1746-1561.2007.00276.x>
- Neumann, K., Euler, H. A., von Gudenberg, A. W., Giraud, A.-L., Lanfermann, H., Gall, V., & Preibisch, C. (2003). The nature and treatment of stuttering as revealed by fMRI: A within-and between-group comparison. *Journal of Fluency Disorders*, 28(4), 381-410. doi:<https://doi.org/10.1016/j.jfludis.2003.07.003>
- Nunes, C., Pereira, A., M., & Morais-Almeida, M. (2017). Asthma costs and social impact. *Asthma Research and Practice*, 3(1), 2-11. doi:<https://doi.org/10.1186/s40733-016-0029-3>
- Robb, M. P., Sinton-White, H., & Kaipa, R. (2011). Acoustic estimates of respiration in the pain cries of newborns. *International Journal of Pediatric Otorhinolaryngology*, 75(10), 1265-1270. doi:<https://doi.org/10.1016/j.ijporl.2011.07.006>
- Strom, M. A., & Silverberg, J. I. (2016). Asthma, hay fever, and food allergy are associated with caregiver-reported speech disorders in US children. *Pediatric Allergy and Immunology*, 27(6), 604-611. doi:<https://doi.org/10.1111/pai.12580>
- Sturdy, P., Bremner, S., Harper, G., Mayhew, L., Eldridge, S., Eversley, J., ... Feder, G. (2012). Impact of asthma on educational attainment in a socioeconomically deprived population: A study linking health, education and social care datasets. *PLoS One*, 7(11), 43-47.
- Ten Thoren, C., & Petermann, F. (2000). Reviewing asthma and anxiety. *Respiratory Medicine*, 94(5), 409-415. doi:<https://doi.org/10.1053/rmed.1999.0757>

- Tunde-Ayinmode, M. F. (2015). Children with bronchial asthma assessed for psychosocial problems in a teaching hospital in Nigeria. *African Health Sciences*, 15(2), 690-700. doi:<https://doi.org/10.4314/ahs.v15i2.49>
- Wang, Y.-T., Green, J. R., Nip, I. S., Kent, R. D., & Kent, J. F. (2010). Breath group analysis for reading and spontaneous speech in healthy adults. *Folia Phoniatica et Logopaedica*, 62(6), 297-302. doi:<https://doi.org/10.1159/000316976>
- Weismer, S. E. (2013). Developmental language disorders: Challenges and implications of cross-group comparisons. *Folia Phoniatica et Logopaedica*, 65(2), 68-77. doi:<https://doi.org/10.1159/000353896>
- Wiechern, B., Liberty, K. A., Pattemore, P., & Lin, E. (2018). Effects of asthma on breathing during reading aloud. *Speech, Language and Hearing*, 21(1), 30–40. doi:<https://doi.org/10.1080/2050571X.2017.1322740>