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ASTHMA: DISTRIBUTION, FAMILIAL ASSOCIATION, EVALUATION A CROSS SECTIONAL STUDY IN NORTH INDIA.

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Abstract
All over the world asthma is a major cause of morbidity. To understand it we have to find out its associations, either if it is due to environmental factors or due to genetic inheritance or both are interacting in its etiology. In this study we found that some age groups (41 to 50 years) are at higher risk of asthma incidence than others and also the female sex was more prone to have asthma attacks during these years of life. We also found that other lung conditions like tuberculosis was also associated with asthma poor control or sometimes also precipitates acute attacks. As we also evaluated our patients with X-ray and spirometry, so we found that instead of good evidence of superiority of spirometry over X-ray in diagnosis and evaluation of asthma, even then patients were not interested in that investigation. In our evaluation of four cardinal symptoms of asthma we concluded that chest tightness was the first symptom that patient experience and also the last symptom to be relieved by treatment followed by breathlessness. We also found that most of patients approaching physician were follow-up patients and only 15% had familial history of asthma.

Keywords – Asthma, Demography, genetic inheritance, symptoms and evaluation

1. Introduction

In India, as a developing nation[1]we all know there is scarcity of resources[2]. So to use the available resources rationally the physician must follow the guidelines for diagnosing and prescribing the patients. As asthma prevalence is so high in community, it might pose high load to economic heath budgets of a country[3]. We must keep in mind the difficulties arise in evaluation and treatment of asthma patients. In north India there is very few people who are having health insurances, so the maximum load of treatment and related expenses directly goes for patient's earnings.[4]There are some evidences we found during study that the prevalence may be increasing in asthma due to various factors[5]. Patients who are already diagnosed are suffering from this non curable disease impose to

increase burden on health care and increasing prevalencefurther increase the load on economic health planning.

2. Literature Review

In India the prevalence of asthma ranging from 2%-11.9%[6]Asthma is responsible for high morbidity than mortality as it is the 25th leading cause for disability adjusted life years (DALYs)[7]

A study conducted by Pandey et al. indicated that there was highest prevalence in age group 41-50 years.[8]In a study conducted by Dharmage SC et al. the incidence and prevalence of asthma is bimodal, first peak was found in childhood and the other peak was in age group around 5th decade of life.[9]

It was also demonstrated that female had more prevalence than male in this disease article.[10,11,12]This was also confirmed by a study conducted in 2019, that pre-puberty boys had higher incidence than girls but around age of 40 to 60 yearsincidence was predominated by female population.[9]Trivedi et al. evaluated patients association of hypertension, diabetes and tuberculosis with asthma. They demonstrate that patients have high prevalence of asthma having such conditions 11.5%, 7.2% and 4.3% respectively.[13]

The GINA guidelines demonstrate that patients need spirometry for diagnosis and assessment of severity of asthma. Some patients also need X-ray to rule out other causes of these symptoms or for acute asthma attacks.[14,15,16]A study conducted by Quirt J et al. in 2018, they stated that spirometry is the preferable method to diagnose asthma in non-acute conditions both children and adult. They also stated that bronchodilator test was also a good tool for diagnosis and severity assessment of asthma adjunct to spirometry.[17]A similar study was conducted by Kaplan AG et al. in 2009 also indicated that to confirm diagnosis of asthma spirometry was recommended. They also stated that before starting patient'slifelong therapy of asthma there must be confirmation with spirometry.[18]A study conducted in England tertiary care center indicates that there must be dual test for confirmation of asthma-spirometry and nitric oxide inhalation test. The same was included in most followed guidelines for asthma in British areas.[19]

According to GINA guidelines there are four cardinal symptoms of asthma- cough, shortness of breath, chest tightness and wheeze.[16,20,21]A study conducted by Globe G. et al. to access the asthma symptom frequency in adults found that the most common symptom was chest tightness (97.1%), wheezing (91.2%), coughing (88.2%), and shortness of breath (73.5%);but in adolescents wheezing (87.5%) was most common followed by coughing (81.3%), and chest tightness (68.8%).[22]There was a study conduted by He Z. et al. showed varied results that Nasal congestion was most common followed by sleep disturbance, and chest tightness.[23]

We also recorded old history of asthma of patients. Similarly as study was conducted in 2006, by Reed CE. The results of study showed that infant asthma if severe will have more chances to persist through put of life rather than mild asthma which disappear during school years.[24]

We also recorded the family history of asthma in our record forms. Familial history of asthma dates back to 1960 by a study counted by Wiener AS et al. for genetic basis of this disease.[25]. A study conducted by Thomsen SF[26] in 2014 showed that there was genetic inheritance pattern in asthma as monozygotic twins had up to 70% of susceptibility of asthma among them. In an old study conducted in 1980s was also indicting the strong genetic inheritance of asthma.[27]There was a report published by Bijanzadeh M et al. in 2011[28]. Showed that prevalence of asthma was 13% in first degree relatives but only 4% in controls, this study indicated the strong genetic component of asthma. Thomsen SF et al,conducted a study in 2015[29] even showed that with one parent suffering from asthma or both parents suffering from asthma transmit disease to younger ones in ration or 1:2. Second, offspring of asthmatic parents are at increased risk of asthma.

3. Materials and Methods

This study was conducted on 300 patients of chest and TB hospital which is integral part of Government Rajindera hospital, Patiala (Punjab). Study included the patients attending OPD and also the patients admitted in wards. The patients were asked to sign (thumb impression for illiterate person) the well informed consent and then the data was collected on the self-designed form for this study

specially. The statistical analysis was done to further compile the results. This study was approved by institution ethical committee and registered with CTRI number REF/2018/03/018449. The inclusion and exclusion criteria was kept, the patients who fulfilling these criteria's were included in the studyonly.

4. Results

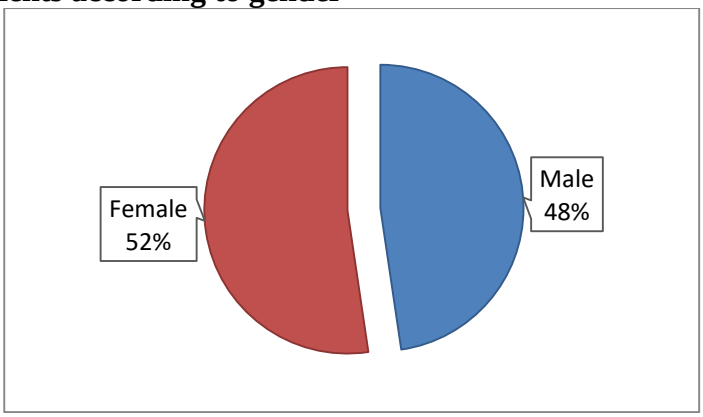
The data was collected on self-designed forms are processed and recordings were made in form of excel sheet.

1. Distribution of asthma -- age wise

The patients included in study were from age 18 to 70 years. Out of 300 patients highest percentage (25.3%) was in age group 41 to 50 years of age and if we compare the patients with male to female ratio we found younger patients have male predominance and as the age progress there was female predominance.

Patient age (years)	No. of patients	Percentage	Male/Female ratio
< 20	23	7.7	1.09
21-30	60	20	1.31
31-40	55	18.3	0.5
41-50	76	25.3	0.77
51-60	40	13.4	0.81
>60	46	15.3	1.4
Total	300	100	--

2. Distribution of patients according to gender



From the above figure we can see that there was female predominance of asthma overall. Maximum numbers of patients enrolled were from OPD (250).

3. Distribution of patients according to co morbid conditions

Co-morbid condition	No. of patients	Percentage
Hypertension	62	20.6
Diabetes	76	25.3
Tuberculosis	87	29
Hypertension with diabetes	28	9.3
Diabetes with tuberculosis	31	10.3
Tuberculosis with hypertension	27	9
Tuberculosis with hypertension with diabetes	15	5

So patients visited for treatment of asthma found to have TB as most common co-morbid condition followed by diabetes

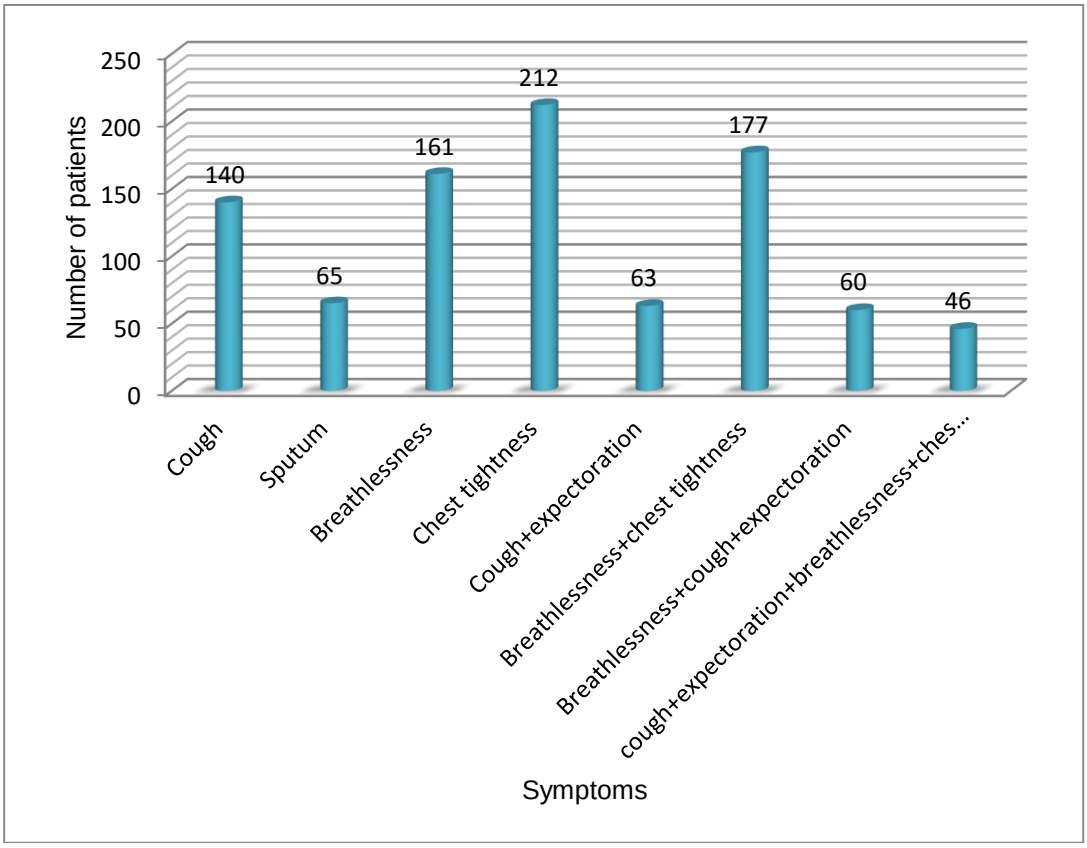
4. Distribution of patients according to investigations prescribedof investigations

Investigation		No. of patients	Percentage
Chest X-ray	Normal	161	53.6
	Abnormal	71	23.6
	Findings same as old X-rays	25	8
Spirometry (FEV_1/FCV)	Normal (>0.80)	42	14
	Abnormal (<0.80)	39	13
	Borderline (0.8 ± 0.02)	23	7
Others (not related to asthma)		27	9

Out of 300 patients 251 were prescribed the investigations. 232 patients followed the physician order of chest X-ray PA view and 131 patients undergo the spirometry

5. Distribution of patients according to symptoms and signs

Patients were examined in details and history was also noted in most of cases. On examination of 4 cardinal symptoms of asthma we found that chest tightness (212) was the most common symptom of the patients.



6. Distribution of patients according to old history and family history

Patients were also asked about old history of asthma and about the family history. We found that 232 patients who were attending OPD and IPD were already treated but only 47 patients had family history of asthma.

5. Discussion

In this cross sectional study we included the factors which have impact on asthma, its causation, distribution, main symptoms and genetic impact of asthma.We found that maximumnumber of patients suffering from asthma were in age group 41 to 50 years of age, the results were nearly similar to a study conducted by Pandey et al.[8],in other words we can say that asthma has bimodal peak of distribution either in young children or on age group above mentioned[7]

The results of our study of asthma distribution according to sex is very similar to study conducted by Aggarwal ANet al[11], Jindal SK et al[12]. our study had female predominance which is similar to the above studies. Clinically we can say that various autoimmune and atopic diseases have female predominance. CDC[30] data published in 2017 also have same results as of our study. It showed that 9.8% of asthma attacks were in women 18 years and above and 60 years below but male only have 5.5% of attack rate in the same age group.

In our study we tried to find out the co relation between asthma and any co-morbid condition, to find out as these conditions aggravate asthma or any condition specifically associated with asthma or not. Our data showed that some conditions like TB (29%) either precipitate asthma exacerbation or may shift patient from adequate control to inadequate control category. So we can conclude that respiratory tract infections like TB can make patient more prone to acute attacks of asthma. TB also affect asthma drug intake as there is common drug interaction between two categories. Sometime we can also say that patient suffering from TB may have increase chances of being asthmatic in future.[31]

The investigations were done in 251 patients out of 300. According to GINA[16] guidelines the chest X-ray was only needed when patient treatment category move towards severity, to rule out other lung pathologies[32]. But our study showed that almost 77.3% of patients were prescribed X-rays of chest. We have concluded from above data that as Indian population lacks awareness, patients attending OPD pressurizes the physician for X-ray evaluation.

Spirometry was done in 131 patients to rule out its severity. We found that 32% of patients undergone investigates have normal values rest of patients have spirometry changes. So, we can conclude that spirometry change can diagnose or also can assess the severity of asthma[29]. One more important future of spirometry is even the change in values of FEV1/FCV before change in the clinical picture of patient can predict the further coming events of exacerbations. In GINA guidelines[16]spirometry was prescribed as preferred method for diagnosis and evaluation of asthma but as the patients have little phobia of process so most of patients did not take physicians advice about this evaluation.

GINA guidelines[16], mentioned four cardinal symptoms of asthma as cough, breathlessness, chest tightness and wheezing. As we also analyzed the fact mentioned in GINA, we find that 70.6% cases were suffering from chest tightness, followed by breathlessness (56.6%), cough was noted in 46.6% of cases while wheezing was present in 46% of cases.

As we analyze the data the new cases were only 68 out of 300 rests were follow-up cases of asthma. We also tried to find out the genetic predisposition of asthma. We found that 15.7% of patients enrolled had history of familial asthma may indicate that asthma is related to geneticinheritance.[33]

6. Conclusion

So from above study we conclude that, asthma has peak in 4th to 5th decade of life, has a genetic inheritance pattern but incidence is also affected by environmental factors, having female sex predominance and have four cardinal symptoms (chest tightness, wheez, cough and shortness of breath) and is affected by co-morbid conditions.

7. Conflicts of interest, Financial support and sponsorship- None

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