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Association of Childhood Asthma Control with Parental Socioeconomic status

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ABSTRACT

Objective: To evaluate association of childhood asthma control with parental socioeconomic status.

Patients and Methods: This cross sectional study was conducted in four hospitals of Rawalpindi and Islamabad from 1st February, 2017 to 31st January, 2018. Total 151 patients, aged 6 months to 15 years were enrolled in study through non-randomized, simple consecutive sampling. After informed consent doctor filled the structured proforma by taking short interview of parents about their socioeconomic status, drug compliance and level of asthma control of their child. Data was entered and analyzed on SPSS version 21.0. Chi-square test was applied for association among categorical variables. P-value less than 0.05 was considered significant.

Results: Among total of 151 children, 37 (24.5%) children had well controlled asthma while 69 (45.7%) had partially controlled and 45 (29.8) had uncontrolled asthma. Children from low socioeconomic families had poor asthma control than children from high socioeconomic families.

Conclusion: There is statistically significant association of poor asthma control with low parental education and income status. Therefore, more asthma education, frequent follow-ups and provision of free of cost medicines are needed in order to achieve good asthma control in such children.

Key words: Asthma control, Childhood, Socioeconomic status

Author`s Contribution
[1,2] Conception, synthesis, planning of research and manuscript writing Interpretation and discussion
[3,4] Data analysis, interpretation and manuscript writing, Active participation in data collection.

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Introduction

Asthma is a chronic inflammatory condition of the lung airways resulting in episodic airflow obstruction. The exact cause of asthma has not been determined; a combination of environmental exposures (viruses and home allergens) and genetic susceptibilities has been implicated.[1] Asthma is the most common chronic disease among children and is associated with morbidity, school absenteeism, substantial healthcare resource use and parental absence from work.[2,3] A study of childhood asthma prevalence in 233 centers in 97 countries (International Study of Asthma and Allergies in Childhood, Phase 3) found a wide range in the prevalence of asthma in 6-7 years (2.4-37.6%) and 13-14 years old children (0.8-32.6%) with mean prevalence of 11.6% and 13.7% respectively worldwide.[1,3,4] In India, the mean asthma prevalence is 7.1% in children 6-7 years of age and 6.5% in children 13-14 years of age. In Bangladesh mean prevalence is 9.1% among 6-7 years old children and in Pakistan mean prevalence is 10.1% among 13-14 years old children.[5] In individual cities of Pakistan, asthma prevalence is 6% in Multan, 10.2% in Karachi and 31.5% in Islamabad.6-8 Asthma prevalence is increasing in

Indian subcontinent at the rate of 0.06% per year in 6-7 year old children and 0.02% per year in 13-14 year old children.[3]There are various studies done in European and American countries regarding association of socioeconomic status with incidence and control of asthma in adults and children. Most of the studies reported that asthma prevalence is higher in children and youth belonging to low socioeconomic status especially first year of life [9,10] and children from lower socioeconomic status have poor asthma control.[11-14]

While other studies showed that asthma prevalence is higher in children from higher socioeconomic groups especially after 1st year of life.[9,14,15] Another study showed that socioeconomic status had no significant effect on prevalence of childhood asthma.[16] Studies done in Pakistan showed asthma risk is higher in adult population belonging to middle socioeconomic status and children from low socioeconomic status.[17,18] Very few such studies are conducted in Pakistan. Thus this study was conducted in various hospital of Rawalpindi and Islamabad to know exact relationship of parental income status and maternal education with control of childhood asthma.

Patients and Methods

This cross sectional study was conducted in Pediatric Department, Dr. Akbar Niazi Teaching Hospital, Islamabad, and three other private hospitals of Rawalpindi and Islamabad from 1st February, 2017 till 31st January, 2018. Ethical permission was taken from Institutional Ethical review board. Patients, aged 6 months to 15 years, coming to OPD clinics, admitted in emergency or pediatric wards with physician-diagnosed asthma on basis of history were included in this study. Children who had any other chronic disease (cardiovascular, GIT or seizures, endocrine, delayed milestones) along with asthma were excluded from study. Total 151 patients were inducted. Sample size was calculated by using WHO sample size calculator with following values of calculations; confidence level = 95%, anticipated population proportion =11%, absolute precision required= 5%.[11] Patients coming from Islamabad and various cities of Punjab and Khyber Pakhtunkhwa were recruited through a non-randomized,

simple consecutive sampling. Parents were verbally briefed about the study and written consent was taken. Doctors filled the structured proforma by taking short interview of parents about their socioeconomic status, drug compliance and level of asthma control of their child. Level of asthma control was categorized into controlled, partially controlled and uncontrolled depending on asthma symptoms in last 4 weeks according to latest Gina guidelines 2015 (Figure 1).[19]

In socioeconomic status, education of mother and household income were considered. Education of mother was categorized according to "National Qualification Framework of Pakistan" approved by Higher Education Commission of Pakistan on 11th January, 2016. These Education categories are (1) Primary (1-5 years), (2) Middle (6-8 years), (3) Matriculation (9-10 years), (4) Intermediate (11-12 years) and (5) Higher education levels (13-21 years).[20] For purpose of data analysis, we divided them into three groups: Low education group (uneducated, primary and middle), medium education group (matriculation and intermediate) and higher education group (graduation and above). Household income was grouped according to national income tax slab year 2016. These groups were as follows; Low income group (annual income up to 4 lac Rupees), medium income group (annual income from 4 lac to 7.5 lac Rupees) and higher income group (annual income above 7.5 lac Rupees).[21]

Data were entered and analyzed in SPSS version 21.0. Mean and standard deviation was calculated for age of children in years. Frequencies and percentages were calculated for patient's gender, income status of parents, maternal education and asthma control. Chi-square test/Fischer exact test were applied for association among categorical variables. P-value less than 0.05 was considered statistically significant

Results

Total 151 cases were included in the study. Mean age (years) was 3.77+2.94 SD. Males were more in number (71.5%) as compared to females. A large number of children belonged to families having higher income (41.1%) and higher education levels (57.6%). Children having partial control of asthma were more in number (45.7%) as shown in Table 1. Association of socio-economic status in terms of low income group and higher income group was observed significantly with uncontrolled

Table 1: Descriptive statistics of asthma patients (n=151)	
Characteristics of patients	**Mean+SD**
Age (years)	3.77+2.94
Characteristics of patients	**n (%)**
Gender	
Male	108 (71.5)
Female	43 (28.5)
Income Level	
Low	30(19.9)
Medium	59 (39.1)
Higher	62 (41.1)
Education Level	
Low	19 (12.6)
Medium	45 (29.8)
Higher	87 (57.6)
Asthma Control	
Well Control	37 (24.5)
Partially control	69 (45.7)
Uncontrolled	45 (29.8)

and well controlled asthma; 16 (35.6%) & 18 (48.6%) respectively.

Low education was associated significantly with uncontrolled asthma level 11 (24.4%) whereas association of well controlled asthma 26 (70.3%) was observed with higher education of mother as shown in Table 2.

There was no statistically significant association of drug compliance with socio economic status. Good drug compliance was observed in medium and higher income group 53 (43.1%) and 49 (39.8%) respectively. Similarly, there were more mothers having medium and higher education, [40(32.5%) and 71 (57.7%) respectively], who followed good drug compliance (Table 3).

Discussion

Nowadays infectious diseases are decreasing due to prevention by vaccination and allergic diseases are constantly on rise and are becoming major health problems affecting all age groups. Poorly controlled asthmatic children cannot carry out their usual activities during play and education. It also results in parental loss of work and productivity due to frequent emergency visits and admissions resulting in more expensive treatment. In our study, 20.5% children belong to low income families, 38.4% to medium and 41.1% to high-income families. This is in contrast to study done in Karachi which showed 60% patients belong to poor income levels.[18] In our study children belonging to low, medium and higher education families are 12.6%, 29.8% and 57.6% respectively which is also in contrast to the study done in Karachi, in which 86.7% children belong to low education families.[18] In our

Table 2: Comparison of parental socioeconomic status with asthma control (n=151)						
Parental socioeconomic status		**Level of Asthma Control**			**Total n (%)**	**p-value***
		Well Controlled n (%)	**Partly Controlled n (%)**	**Uncontrolled n (%)**		
Income of parents	Low	01 (2.7)	13 (18.8)	16 (35.6)	30 (19.9)	0.001
	Medium	18 (48.6)	32 (46.4)	09 (20.0)	59 (39.1)	
	Higher	18 (48.6)	24 (34.8)	20 (44.4)	62 (41.1)	
Education of mother	Low	02 (5.4)	06 (8.7)	11 (24.4)	19 (12.6)	0.013
	Medium	09 (24.3)	27 (39.1)	09 (30.0)	45 (29.8)	
	Higher	26 (70.3)	36 (52.2)	25 (55.6)	87 (57.6)	

Table 3: Comparison of Parental socioeconomic status with drug compliance (n=151)					
Parental socioeconomic status		**Drug Compliance**		**Total n (%)**	**p-value***
		Good n (%)	**Poor n (%)**		
Income of parents	Low	21 (17.1)	09 (32.1)	30 (19.9)	0.061
	Medium	53 (43.1)	06 (21.4)	59 (39.1)	
	Higher	49 (39.8)	13 (46.4)	62 (41.1)	
Education of mother	Low	12 (9.8)	07 (25.0)	19 (12.6)	0.053
	Medium	40 (32.5)	05 (17.9)	45 (29.8)	
	Higher	71 (57.7)	16 (57.1)	87 (57.6)	

study, 24.5% children have well controlled asthma while 45.7% had partly controlled and 29.8% have uncontrolled asthma. These results are comparable to those of study conducted in Canada and San Francisco which showed two thirds of children did not achieve good asthma control.[11,13] Our study showed that children belonging to low income and low education groups had poor control of asthma as compared to children from higher income and higher education groups. These results are similar to study done in adult population (18-44years) in Denmark.[12] Study done in San Francisco in 2014, in African American youths (8-21years) also showed association of poorly controlled asthma with low maternal education and low parental income status.[13] Study done in South Africa in 13-14 year old school children also showed similar results in which asthma control was poor in children from poor societies who rely less on controller treatment and more on episodic care of asthma exacerbations.[14]

Study done in Boston and San Francisco showed that factors through which socioeconomic status influence asthma prevalence and severity include indoor and outdoor air quality, smoke exposure, access to health care facility, psychological and cultural factors.[22,23] Indoor allergens like cockroach, dust mites and moulds, cooking fuels, proximity to pets, overcrowding and infections are higher in low income areas as compared to higher income areas. Smoking, violence, stress and depression are more prevalent in poor families.[24] All these factors contribute to poor asthma control. Mostly low-income families live in areas with more outdoor pollutants, which trigger asthma exacerbations. Lack of insurance and low income results in negative impact to access health care, diagnosis and management of asthma. Gong and Mielick found less use of controller medications as a cause of poor asthma control in families with lower education.[10,25]

Our study also supports above finding as drug compliance is poor in low socioeconomic families as compared to higher socioeconomic families although it is not statistically significant. This can be because controller medicines are costly, moreover mothers with low education do not know the importance of continuing medicines even when children are apparently well. As a result, they stop controller medicines of their children and asthma control worsens resulting in frequent exacerbations. Previous studies in Pakistani population showed that there are myths in society regarding use of inhalers. People think that inhalers are used only in advanced stages of asthma and their regular use may result in inhaler addiction.[17, 26] Same attitude of parents towards inhalers was observed in our study when they tried to avoid use of inhalers and requested health care providers to prescribe oral medicines despite proper education and counseling. With oral medicines only, asthma control is rarely achieved as they have low efficacy and more side effects than inhalers. This misconception is another cause of less use of controller medications resulting in poor control of asthma in our study. Due to poor knowledge about asthma, most people in Pakistani society have false belief that milk, egg and rice trigger asthma attack which result in avoidance of these diets leading to malnutrition in asthmatic children.[26]

Conclusion

Low Socioeconomic status is associated with poor asthma control. It should be kept in mind while managing asthmatic patients and more time should be spent in educating such families regarding asthma allergens, triggers and importance of controller medications especially inhalers and their proper use. False beliefs regarding inhalers and diet should be properly addressed. Maximum efforts should be done to provide free of cost medicines to such families through medical insurance or other means to increase drug compliance. Frequent follow-ups should be advised in such children to check compliance and assess asthma control. By taking these measures, percentage of children with good asthma control can be increased which is our goal in asthma management.

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