Research Article

The Association between obesity and Increase severity of asthma in pediatric age group in Maternity and Children Teaching Hospital in Diwaniya City

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ABSTRACT

Background: Childhood obesity has become a significant public health concern worldwide, and its impact on respiratory conditions like as thmais of particular interest.

Aim: this research aims to assess whether obesity is associated with increased severity of asthma symptoms inchildren.

Patients and methods: The questionnaire-based study investigates therelationshipbetween obesity andtheseverity ofasthma in pediatric patients at the Maternity and Children Teaching Hospital in Diwaniya City. Datawere collectedfrom patient admitted to the hospital asinpatient and all ofthem diagnosed asa case ofasthma.The questionnaire consists of 10 questions, included age, sex, weight according toage, height according to age, BMI according to age, numbers of attack per week, type of diet, family history of asthma, level of education of the parents, and socioeconomic status. Findings were analyzed to determine any correlation between body mass index (BMI)and asthma severity.

Findings: Showed higher percentage of patients were at 4 to 5 years of age, being 44.26% to the total. Slightly higher percentage of patients were male (32, 52.46%) compared to females (29, 47.54%). Investigating weight according to age showed (18, 29.5%) patients above the 95th percentile. While height according to age presented patients (43, 70.49%) with normal findings. Investigating BMI according to age showed (17, 27.87%) patients as obese. The number of attacks were the highest in those who their attacks lasted for two weeks (18, 29.51%), and (37, 55.74%) patients were on unhealthy type of food. Most of the patients were with family history, being (44, 72%). Level of education and socioeconomic status were also investigated and showed considerable variations among patients.

Conclusion: findings provided valuable insights into pediatric asthma management strategies, highlighting the importanceof addressing obesity as a potential factorinfluencing disease outcomes.

Keywords: questionnaire, pediatric, patients, health, worldwide

INTRODUCTION

Asthma is achronic inflammatory disorder of the airways characterized by anobstruction of airflow, which may be completely or partially reversed with or without specific therapy. Airway inflammation is the result of interactions between various cells, cellular elements, and cytokines. In susceptible individuals, airway inflammation may cause recurrent or persistent bronchospasm, which causes symptoms that include wheezing, breathlessness, chest tightness, and cough, particularly at night (early morning hours) or after exercise[1,2]..Airway inflammation is associated with airway hyperreactivity or bronchial hyperresponsiveness (BHR), which is defined as the inherent tendency of the airways to narrow in response to various stimuli (eg, environmental allergens and irritants).Asthma affects anestimated300 million individuals worldwide. The prevalence of asthma is increasing, especially in children. Annually, the World Health Organization (WHO) has estimated that 15 million disability-adjustedlife-years are lost, and 250,000 asthma deaths arereported worldwide[3,4].

Although the cause of childhood asthma has not been determined, a combination of environmental exposures and inherent biologic

and genetic susceptibilities has been implicated. In the susceptible host, immune responses to common airways exposures (e.g respiratory viruses, allergens, tobacco smoke, air pollutants) can stimulate prolonged, pathogenic inflammation and aberrant repair of injured airways tissues. In fact, lung dysfunction and airway remodeling develop. these pathogenic processes in the growing lungduring early life adversely affect airways growth and differentiation. leading to altered airways at mature ages. once asthma has developed, ongoing inflammatory exposures appears to worsen it, driving disease persistence and increasing the risk of severe exacerbations[5,6].

Therefore, the current retrospective study investigates the relationship between obesity and the severity of asthma in pediatric patients at the maternity and children Teaching Hospital in Diwaniya City.

PATIENT& METHODS
This study was conducted at pediatric Department in Al-Diwaniy a maternity &pediatric teaching hospital in Iraq during the period from 1st of February 2024 to 10th of April 2024.The ethical approval was obtained from hospital director and from child's mother. Inclusion criteria: All patient includedin this study were, admitted to hospital as inpatient and all of them diagnosed asa case ofAsthma.

Exclusion criteria: we excluded any child <1 month age, any child with congenital abnormality & any child who his mother is uncooperative, subnormal or refused participative in study.

The questionnaire consistof10 questions included age, sex, weight according to age, height according to age, BMI according to age, numbers of attack per week, type of diet (were garded healthy if the child receiving all his daily need of carbohydrates, proteins, fat, vitamins and minerals and if bad if he is not), family history of asthma, level of education of the parents (we regarded good education level if the parents complete secondary school and poor education level if not complete secondary school) and socioeconomic status (were garded poor status if both parents don't have a job, good status if the one of them have a job and excellent if both haveajob).

RESULTS
In this study, there were 61children from Al-diwaniya hospital. The average age of the participants was 4- 5years. Patients' demographic characteristics are listed in table 1.

Table 1: Summarizes patients characteristics

Character of Patients	No	%
Age		
1-3 year	11	18%
4-5 year	27	44.26%
>5 year	23	37.7%
Sex		
Male	32	52.46%
Female	29	47.54%
Weight according to age		
Under 5th P.	6	9.84%
Normal weight	37	60.66%
Over 95th P.	18	29.5%
Height according to age		
Below 5th P.	7	11.48%
Normal	43	70.49%
Above 95th P.	11	18%
BMI according to age		
Under 5th P.	6	9.84%
Normal	21	34.43%
Overweight above 85th P.	16	26.23%
Obese above 95th P.	17	27.87%
N. of attacks per week		

1 A/W	29	47.54%
2 A/W	18	29.51%
>2 A/W	14	22.95%
Type of food		
Healthy	24	39.34%
Not healthy	37	55.74%
Family history	44	72%
Level of education		
Poor	15	24.59%
Good	46	75.41%
Socioeconomicstatus		
Poor	6	9.84%
Good	48	78.7%
Excellent	7	11.47%

Showed higher percentage of patients were at 4 to 5 years of age, being 44.26% of the total. Slightly higher percentage of patients were male (32, 52.46%) compared to females (29, 47.54%). Investigating weight according to age showed (18, 29.5%) patients above the 95th percentile. While height according to age presented patients (43, 70.49%) with normal findings. Investigating BMI according to age showed (17, 27.87%) patients as obese. The number of attacks were the highest in those who their attacks lasted for two weeks (18, 29.51%), and (37, 55.74%) patients were on unhealthy type of food. Most of the patients were with family history, being (44, 72%). Level of education and socio economic status were also investigated and showed considerable variations among patients.

The investigation into the association between obesity and asthma severity among pediatric patients at the Pediatric Technical Hospital in Al-Diwaniyah City reveals nuanced insights intothe multifactorialnatureofpediatric asthma.

The majority of participants in this study, aged predominantly between 4to5 years, were male and exhibited normal height, increase weight, and body mass index (BMI) for their respective age groups, a notable proportion of patients experienced asthma exacerbations, with the predominant frequency being one attack per week. Concurrently, dietary practices among the majority were characterized as non-ideal, while a positive family history of asthma was prevalent. Encouragingly, participants generally demonstrated a satisfactory level of educational attainment and socio economic status.
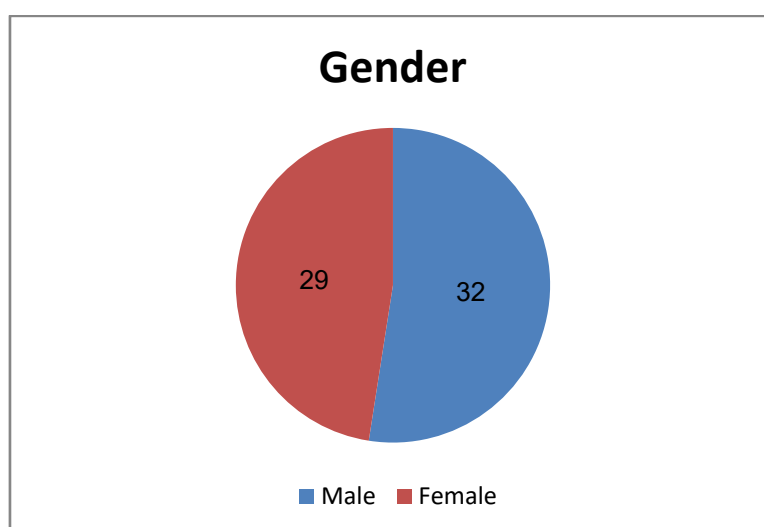

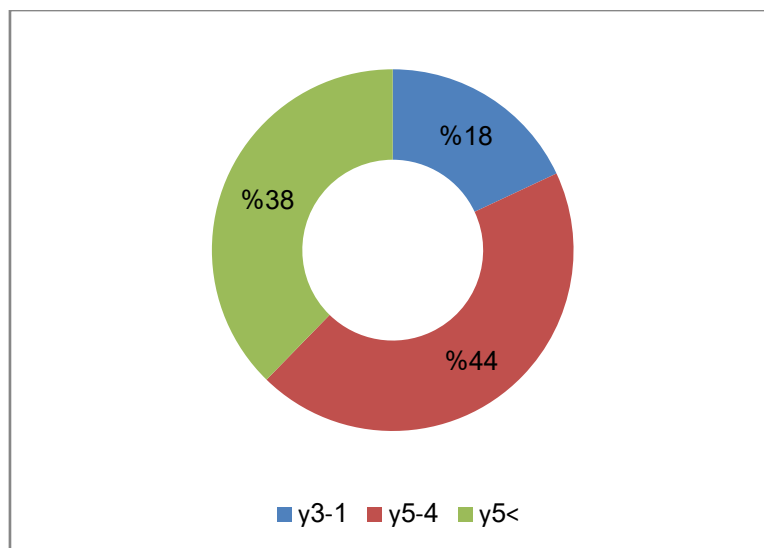**Figure 1: showed the distribution of gender in the total sample**

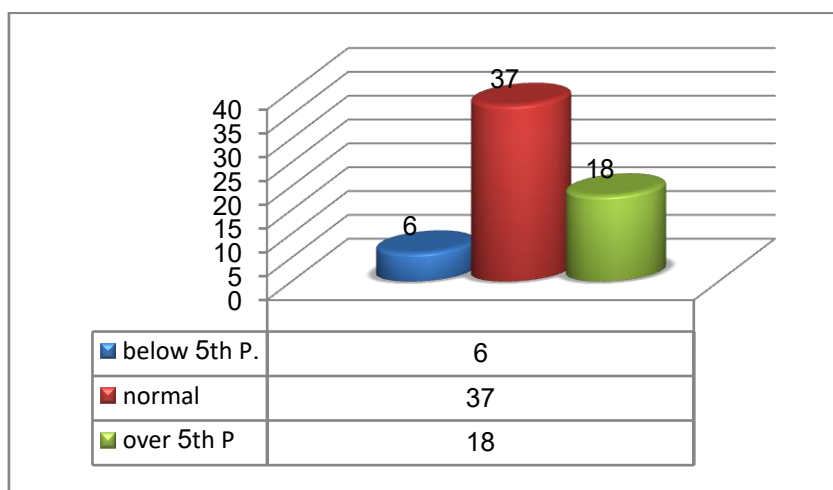**Figure 2: showed the distribution of Age in the total sample**

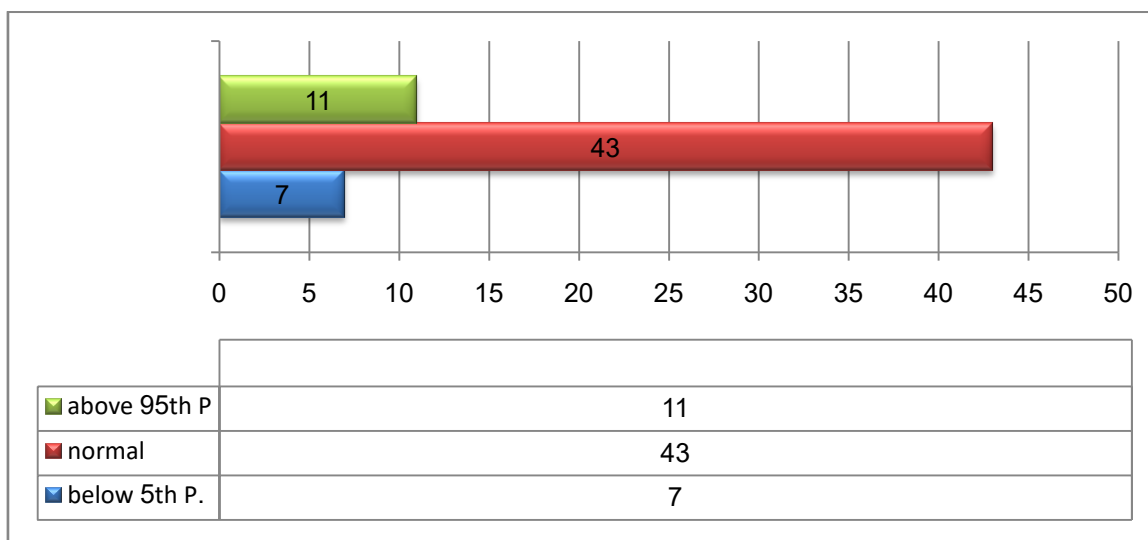**Figure 3: showed the distribution of Weight according to age in the total sample**

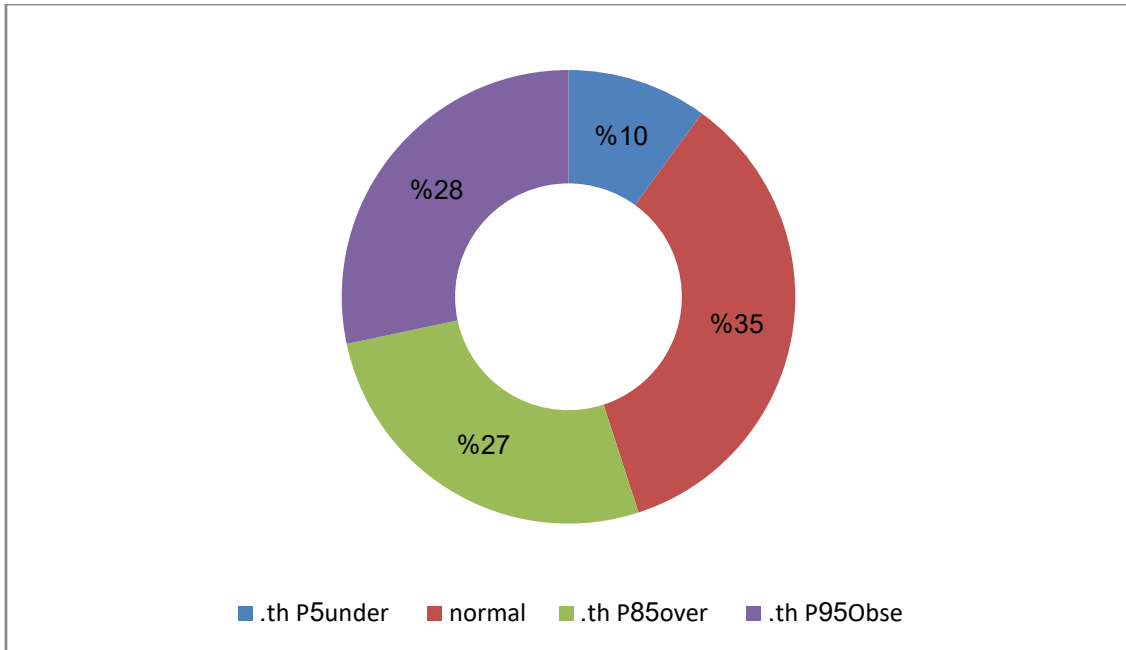|	
▣ below 5th P.	6
▣ normal	37
▣ over 5th P	18

▣ above 95th P	11
▣ normal	43
▣ below 5th P.	7

Figure4: showed the distribution of Height according to age in the total sample

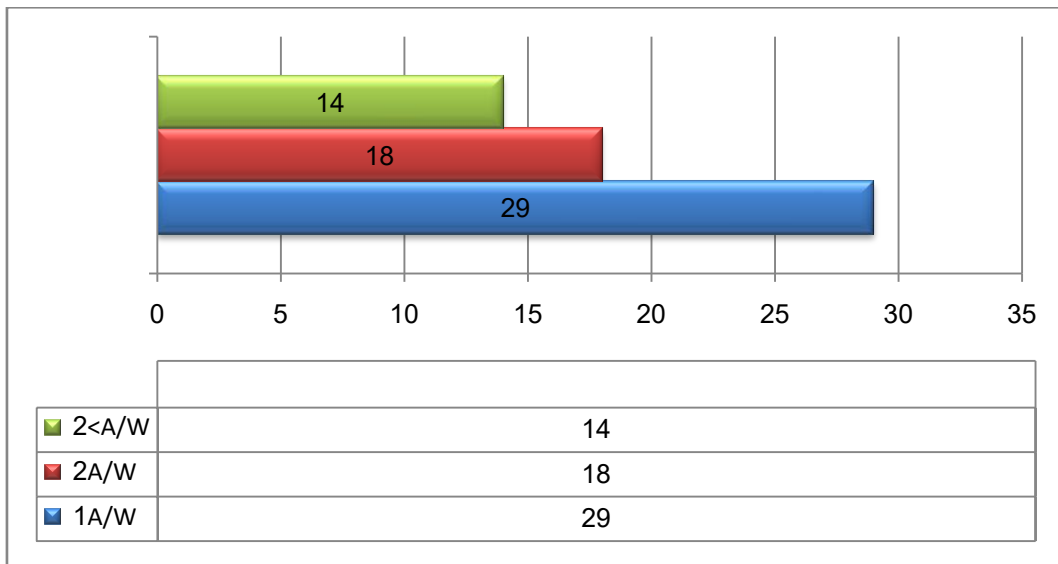**Figure 5: showed the distribution of BMI according to age in the total sample**

2<A/W	14
2A/W	18
1A/W	29

Figure 6: showed the distribution of N. of attacks per week in the total sample

Healthy	27
Not Healthy	37
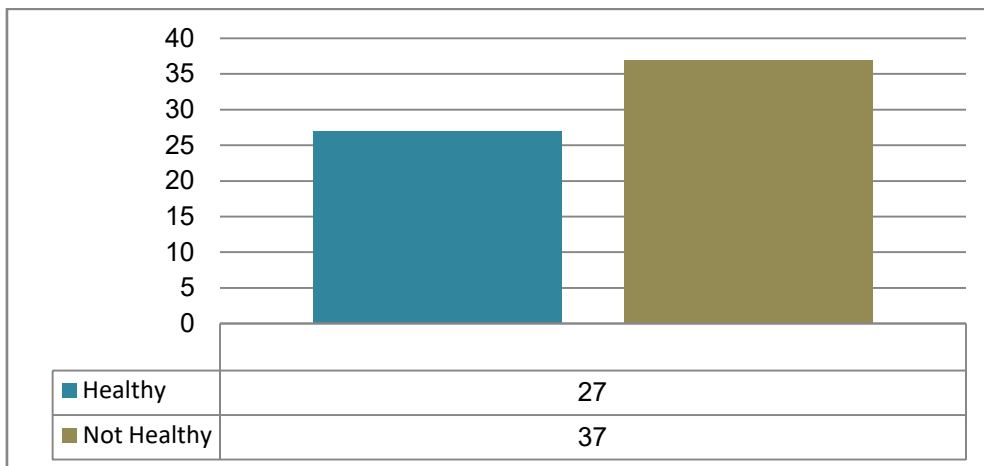
Figure 7: showed the distribution of type of Diet in the total sample

■ Positive	44
■ Negative	17
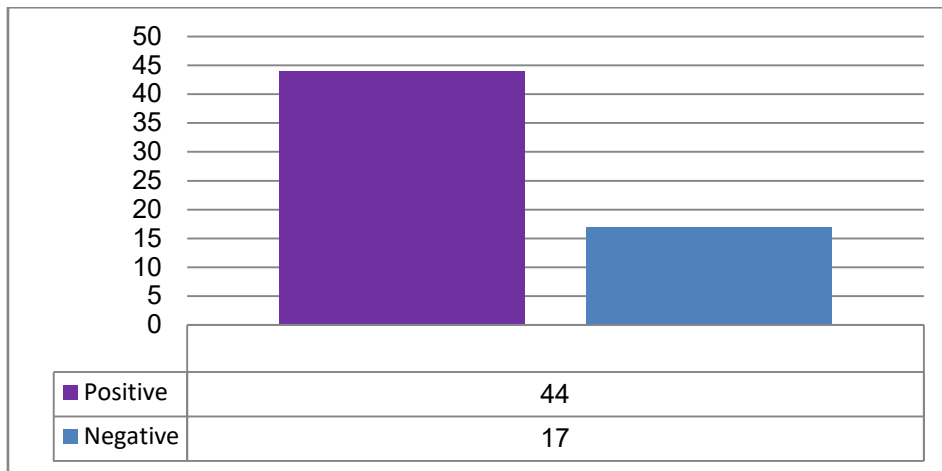
Figure 8: showed the distribution of Family Hx. Of asthmain thetotal sample

■ Poor	15
■ Good	46
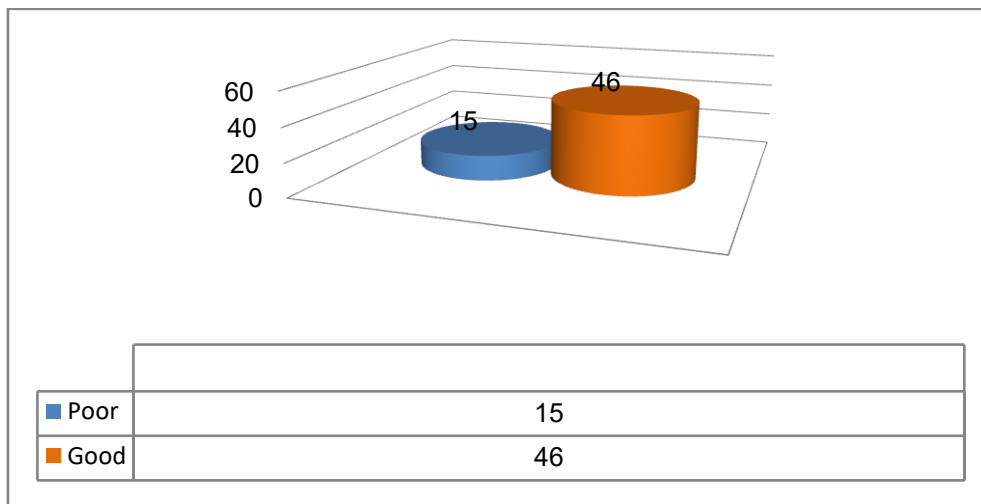
Figure 9: showed the distribution of Level of education of the parents in the total sample
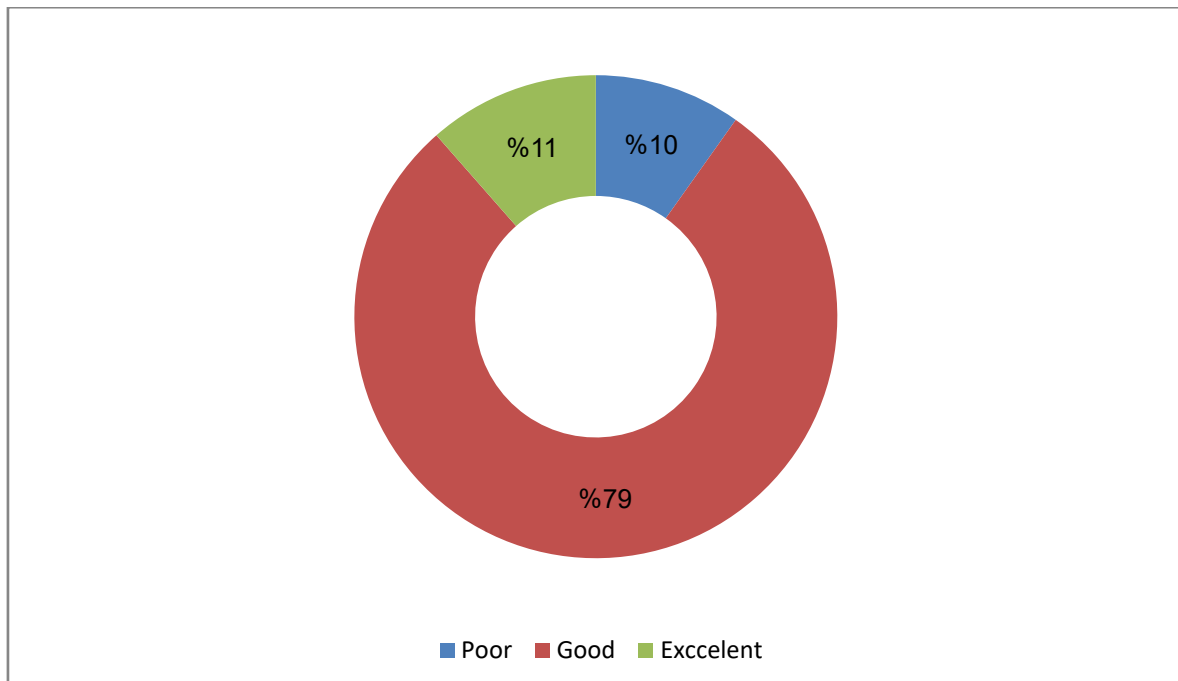

■ Poor ■ Good ■ Exccelent

Figure 10: showed the distribution of Socioeconomic status in the total sample

DISCUSSION

Demographic characteristics Among 61 children, 32 (52.46%) cases were males and 29 (47.54%) were females. So the frequency of asthma was more in male (52.46%) than females (47.54%), Figure (3.1)[11].The patients were divided into 3 groups according to their ages:1-3years old, those between 4 and 5 years and those above 5 years old. The majority of cases 27(44.26%) were between 4 and 5 years old. Figure (3.2)[9,10,11]. Regarding the weight according to the age the patients were divided into 3 groups: under 5th percentile (6 patients;9.84%), normal weight (37 patients;60.66%%) and over 95th percentile (18 patients; 29.5%) our study disagree with a study done by Francesco Sans one on PMC2020 which found that childhood obesity may lead to asthma development and another study done byJason E. Lang (2023)[10]..

Regarding the Height according to the age the patients were divided into 3 groups: below (6 patients; 11.48%),normal (43 patients;70.49%) and tall (11 patients; 18%), Figure(3.4)[7,8]..

Regarding the BMI according to the age the patients were divided into 4 groups: Under 5th percentile (6patients; 9.84%), normal (21patients;34.43%)and above 85th percentile (16patients; 26.23%) and Obese above 95th percentile (17patients; 27.87%).

Our result agrees with Two meta-analyses, published in 2013 and 2019 which found a 20% increase in asthma incidence in overweight children and a two fold increased risk in obese children and a study in Saudia Arabia doneby Mahmoud Nahhas, Raj Bhopal, Chantelle Anandan, Rob Elton &Aziz Sheikh, figure (3.5).

The frequency distribution showed that the majority of patients had 1a/w(29) (47.54%) while (18) (29.5%) patients have 2a/wandonly14) (22.95%) patients had >2 a/w, Figure (3.6). The frequency distribution showed that most patients had non- healthy diet (37) (55.74%).And only (24) (39%) patients are under healthy diet, figure (3.7)[11].. 44 (72%)of cases had a family Hx of asthma, figure (3.8). The frequency distribution showed that the majority of parents (especially the mothers)of asthmatic children had good education level 46 (75.4%)and only (15) (24.59)had poor education level Figure (3.9).

The frequency distribution showed that the majority of parents of asthmatic children had Good socio economic status 48 (78.7%) and only (6) (9.8%)had poor education level and(7)(11.4%)had an excellent status. Figure (3.10)[12].

CONCLUSION

Obesity rates have increased dramatically among children in many parts of the world. Children with obesity are at increased risk for developing asthma. The cause underlying obesity's impact on asthma risk is still unknown. The current findings collectively highlight the complex interplay of demographic, behavioral, and familial factors influencing pediatric asthma outcomes. The identification of such factors underscores the need for tailored intervention strategies aimed at optimizing disease management and prevention.

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