

Relationship between Asthma and Obesity in Pediatric Age from Four Years to Four Teen Years in Tabuk City

Nada Awad Al Suhaimi^{1*}, Amani Abdullah Albalawi¹, Nada Saleh Al-Balawi¹, Amani Salem Al-Atawi¹, Hamad Ibrahim Albalawi², Asmaa Ghmaird³

¹Medical intern, Tabuk University, Faculty of Medicine, Tabuk City, Saudi Arabia. ²Medical Students, Tabuk University, Faculty of Medicine, Tabuk City, Saudi Arabia. ³MD, Assistant Professor of Pediatric, Pediatric Consultant, Tabuk, Saudi Arabia.

ABSTRACT

Introduction: Asthma is the most common heterogeneous chronic disorder of the airways, characterized by variable usually reversible and recurring symptoms of cough, wheezing, shortness of breath, and chest tightness related to one or more of airflow obstruction.

Methods: A cross sectional study conducted in Tabuk city to determine statistic of asthma, to identify the risk factors for asthma and to determine the relationship between BMI and asthma.

Results: A total of 171 participants included in this study, most of them aged between 4-7 years old (48.5%), 66.7% were male and 97.1% were Saudi. Most of asthmatic child weight 5-85 percentile. 33.9% of study participants exposed to passive smoking, regarding family history 24% had positive history of asthma in parent, 28.7 had family history of atopy in form of allergic rhinitis and eczema.

Conclusion: Steps such as education and explanation about

asthma and it is risk factors, passive smoking effect on asthma are required to improve public awareness.

Keywords: Asthma; Tabuk; Saudi Arabia.

*Correspondence to:

Nada Awad Al Suhaimi, Medical intern, Tabuk University, Faculty of Medicine,

Tabuk City, Saudi Arabia. Article History:

Received: 10-08-2018, Revised: 06-09-2018, Accepted: 30-09-2018

Access this article online			
Website: www.ijmrp.com	Quick Response code		
DOI: 10.21276/ijmrp.2018.4.5.048			

INTRODUCTION

Asthma is the most common heterogeneous chronic disorder of the airways, characterized by variable usually reversible and recurring symptoms of cough, wheezing, shortness of breath, and chest tightness related to one or more of airflow obstruction.¹

The prevalence of asthma indicated by WHO, world widely 235 million individuals complaining of asthma², and in US increase in the last three decades in which affect 10% of school age children³, and more than two million Saudis complaining of asthma.⁴ It affects patients, their families, and therefore the community¹, and evaluated to cost \$3.2 billion every year, represents 14 million missed school days every year and is the third reason for hospitalization among children younger than 15 years old.⁵ A Systemic review study done at 2017 for Prevalence of asthma among Middle Eastern children revealed prevalence of asthma less the developed countries but this study should include all countries of the region to estimate more accurate information.⁵

There are many factors to explain increasing asthma rates, including genetic, environmental, and socioeconomic factors⁶, and the obesity one of them. The obesity which increases asthma severity is a preventable condition which affects the physiological and psychological health and defined by WHO as (abnormal or

excessive fat accumulation that may impair health.) Its the one of a risk factor for diabetes, cardiovascular disease, hypertension, a certain type of cancers, musculoskeletal disorders, and now there is some evidence establish the association between asthma and obesity.⁶ Also, obesity is affect 18% of school aged children in US.⁷

The obesity increase the prevalence of asthma .a meta-analysis of the effect of high weight on asthma during childhood period estimated the children with high body weight at risk to have asthma in future with rate 1.5 times than children without overweight.⁸ The obesity increase airway hyper responsiveness by some inflammatory substances that increase in circulation like (leukocytes, serum concentrations of cytokines, cytokine receptors, chemokines, and acute phase proteins) and adipocyte-derived factors.⁹ the obesity has negative impact on asthma control and therapy response too.¹⁰

The obesity which start early will limit the chest wall expansion, make the diaphragm mobility more difficult, increase the breath rate with shallow pattern and will reduce the lung compliance and function all these will lead to dyspnea with more lung effect which result in asthma and other diseases.¹¹

Another study found that obesity will lead to increase the airway inflammation and reduce the steroid therapy response by increasing systemic oxidative stress which lead to poor asthma control even the patient have a good pulmonary function.¹¹ So targeting overweight children is important to reduce the asthma incidence.

There are several studies revealed that there is relation between asthma and obesity resulted with positive association.¹²⁻¹⁵

Papoutsakis C¹⁵ et al found that majority of children who have asthma are central obese. Also there is study which found the asthma increase particular in post-pubertal females than males¹⁶ vs. the study which done on adult which found the same rate between male and female for incidence of asthma.¹⁷

A large case control study which conducted in Madinah, Saudia Arabia 2013 found that there is association between asthma and children central and peripheral obesity.¹²

Luder E et al¹³ who study black and Hispanic children with single diagnosis of asthma in them study result in children with moderate to severe asthma are more obese than their peer, also, they found that the overweight is associated with more asthma severity.

The prospective, longitudinal study which conducted in western Sweden at 2015 resulted in high bodyweight at childhood increase the risk of asthma diagnosis at school age which suggest that the risk of this relation is mediated by the immune system.¹⁸ Gilliland FD1 et al¹⁴ before they did a longitudinal study at 2003 found nearly result same other studies they found that begin overweight increase the risk of newly diagnose asthma in boy and non-allergic children.

However there are few studies conducted in Saudi Arabia and no studies conducted in Tabuk. We aim in this study to investigate obesity as a risk factor for asthma.

METHODOLOGY

A cross sectional study conducted in Tabuk city to determine statistic of asthma, to identify the risk factors for asthma and to determine the relationship between BMI and asthma. Study include children diagnosed with asthma aged between 4 - 14 years old via questionnaire contain data about socio-demographics information like gender, age, passive smoke exposure, type of child feeding , Birth weight, family income, asthma of parent, family history of parent, family history of atopic diseases . Items regarding the knowledge, attitude and practice of our health problem.

Ethical Considerations: Study was explained to participant and informed consent was taken from the participant.

Statistical Analysis: The collected data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) statistical program version 19.

		Number	Percentage	
Age	4-7 Years	83	48.5%	
	8-11 Years	57	33.3%	
	12-14 Years	31	18.1%	
Gender	Male	114	66.7%	
	Female	57	33.3%	
Nationality	Saudi	166	97.1%	
	Non Saudi	5	2.9%	

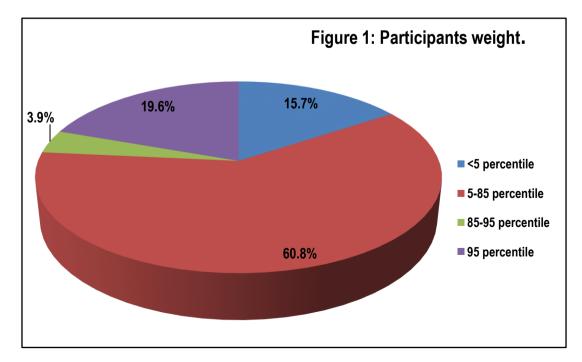


Table 1: General characteristics of study participants. (N=171)

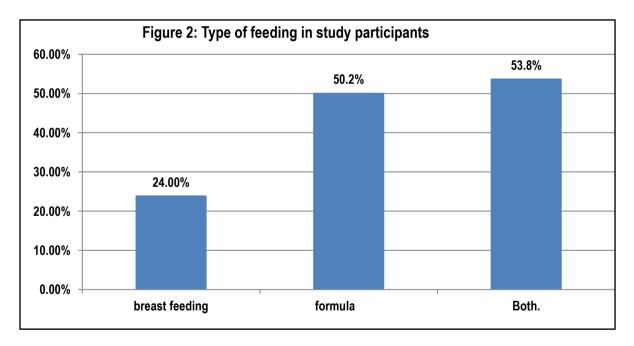
	Yes		No	
	n	%	n	%
Passive smoke exposure?	58	33.9%	113	66.1%
Passive Hubble bubble exposure?	17	9.9%	154	90.1%
History of asthma in parent?	40	24%	130	76%
Family history of asthma (sibling)?	58	33.9%	113	66.1%
Family history of atopic disease such as (allergic rhinitis, eczema)?	49	28.7%	122	71.3%
Is your child having atopic disease such as (allergic rhinitis, eczema)?	68	40.6%	101	59.4%
Was there an animal or plant at home?	42	24.6%	129	75.4%

Table 2: Participants ri	isk factor and family	y history of asthma.
--------------------------	-----------------------	----------------------

Table 3: Participant symptoms of asthma.	
--	--

	Yes	
	n	%
Primary health care should be the first place to visit rots any health problem.	123	27.1%
If you have any health problem you will visit Primary health care first?	156	36.3%
Did you visit primary health care only to ask for referral?	178	39.2%

	Yes		No	
	n	%	n	%
Does your child have wheezing?	111	64.9%	60	35.1 %
The Common symptom of your child at night?	114	66.7%	57	33.3 %
Did the child complain from other symptoms?	17	9.9%	154	90.1 %



RESULTS

A total of 171 participants included in this study, most of them aged between 4-7 years old (48.5%), 66.7% were male and 97.1% were Saudi. (Table 1) As shown in figure 1, most of asthmatic child weight 5-85 percentile (60.8%), 19.6% weight more than 95 percentile, 15.7 weight less than 5 percentile. 33.9% of study participants exposed to passive smoking, regarding family history 24% had positive history of asthma in parent, 28.7 had family history of atopy in form of allergic rhinitis and eczema. (Table 2) In regard asthma symptoms, 64.9% has wheezy chest, 66.7% report that symptoms increase at night. (Table 3)

DISCUSSION

Asthma the most common chronic disorder of the respiratory system characterized by variable usually reversible and recurring symptoms of cough, wheezing, shortness of breath.¹

Asthma related to many risk factors including; genetic, environmental, socioeconomic and most serious is obesity.⁶ Obesity increase the risk of asthma as a A large case control study which conducted in Medina Saudi Arabia 2013 found that there is association between asthma and children central and peripheral obesity.¹² Same as increase the severity of asthma and it increase the respiratory symptoms.^{11,13} Obesity increase the risk of asthma by increasing many inflammatory cells in the circulation which lead to increase the airway hyper responsiveness.⁹

Many studies conducted to define the association between asthma and obesity in children.

A multivariate analysis for a large prospective , longitudinal study which conducted in western Sweden at 2015 estimate that high bodyweight at childhood increase the risk of asthma diagnosis at school age which suggest that the risk of this relation is mediated by the immune system.¹⁸

Masako To et al¹¹ estimate that the systemic oxidative stress will be increase in asthmatic obese patient which lead to more airway inflammation and reduce steroid therapy response, which further more increase the asthma severity even the patient have a good pulmonary function and this mechanism only noted in obese asthmatic patient.

CONCLUSION

Steps such as education and explanation about asthma and it is risk factors, passive smoking effects on asthma are required to improve public awareness.

ACKNOWLEDGMENT

Appreciate our collages Nouf Mohammad Aloglaa, Bashair Muslim Albalawi, Alanuad Ibrahim Albazei and Alhanouf Abdullah Alatawi for their effort in data collection.

REFERENCES

1. Al-Moamary M, Alhaider S, Idrees M, Al Ghobain M, Zeitouni M, Al-Harbi A, et al. The Saudi Initiative for Asthma - 2016 update: Guidelines for the diagnosis and management of asthma in adults and children. Ann Thorac Med. 2016;11(1):3.

2. WHO | Obesity and overweight. WHO. 2017; Available at: www.who.int/news-room/fact-sheets/detail/obesity-and-overweight 3. Akinbami LJ, Moorman JE, Garbe PL, Sondik EJ. Status of childhood asthma in the United States, 1980-2007. Pediatrics. 2009;123 Suppl(March):S131-45.

4. Al Frayh AR, Shakoor Z, Gad El Rab MO, Hasnain SM. Increased prevalence of asthma in Saudi Arabia. Ann Allergy Asthma Immunol. 2001 Mar;86(3):292–6.

5. Mirzaei M, Karimi M, Beheshti S, Mohammadi M. Prevalence of asthma among Middle Eastern children: A systematic review. Med J Islam Repub Iran [Internet]. 2017;31:9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28638816%5Cnhttp://www.p ubmedcentral.nih.gov/articlerender.fcgi?artid=PMC5473014

6. Vangeepuram N, Teitelbaum SL, Galvez MP, Brenner B, Doucette J, Wolff MS. Measures of obesity associated with asthma diagnosis in ethnic minority children. J Obes. 2011; 2011: 517417.

7. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. JAMA. 2012 Feb;307(5):483–90.

8. Flaherman V, Rutherford GW. A meta-analysis of the effect of high weight on asthma. Arch Dis Child. 2006 Jan;91(4):334–9.

9. Shore S, Fredberg J. Obesity, smooth muscle, and airway hyperresponsiveness. J Allergy Clin Immunol. 2005 May; 115 (5):925–7.

10. Juel CT-B, Ulrik CS. Obesity and Asthma: Impact on Severity, Asthma Control, and Response to Therapy. Respir Care. 2013 May;58(5):867-73. doi: 10.4187/respcare.02202.

11. Fitzgerald DA. The weighty issue of obesity in paediatric respiratory medicine. Paediatr Respir Rev. 2017 Sep;24:4-7. doi: 10.1016/j.prrv.2017.06.008.

12. Nahhas M, Bhopal R, Anandan C, Elton R, Sheikh A. Investigating the association between obesity and asthma in 6- to 8-year-old Saudi children: a matched case-control study. NPJ Prim care Respir Med. 2014 Jun;24:14004.

13. Luder E, Melnik TA, DiMaio M. Association of being overweight with greater asthma symptoms in inner city black and Hispanic children. J Pediatr. 1998;132(4):699–703.

14. Gilliland FD, Berhane K, Islam T, McConnell R, Gauderman WJ et al. Obesity and the risk of newly diagnosed asthma in school-age children. Am J Epidemiol. 2003;158(5):406–15.

15. Beuther DA, Sutherland ER. Overweight, obesity, and incident asthma: A meta-analysis of prospective epidemiologic studies. Am J Respir Crit Care Med. 2007;175(7):661–6.

16. Matricardi PM, Gruber C, Wahn U, Lau S. The asthma-obesity link in childhood: open questions, complex evidence, a few answers only. Clin Exp Allergy. 2007 Apr;37(4):476–84.

17. Beuther DA, Sutherland ER. Overweight, obesity, and incident asthma: a meta-analysis of prospective epidemiologic studies. Am J Respir Crit Care Med. 2007 Apr;175(7):661–6.

18. Loid P, Goksör E et al. A persistently high body mass index increases the risk of atopic asthma at school age. Acta Paediatr [Internet]. 2015;104(7):707–12. Available from:

http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=465424 7&tool=pmcentrez&rendertype=abstract

Source of Support: Nil. Conflict of Interest: None Declared.

Copyright: © the author(s) and publisher. IJMRP is an official publication of Ibn Sina Academy of Medieval Medicine & Sciences, registered in 2001 under Indian Trusts Act, 1882.

This is an open access article distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Cite this article as: Nada Awad Al Suhaimi, Amani Abdullah Albalawi, Nada Saleh Al-Balawi, Amani Salem Al-Atawi, Hamad Ibrahim Albalawi, Asmaa Ghmaird. Relationship between Asthma and Obesity in Pediatric Age from Four Years to Four Teen Years in Tabuk City. Int J Med Res Prof. 2018 Sept; 4(5):211-14. DOI:10.21276/ijmrp.2018.4.5.048