ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 11, Issue, 06, pp.4417-4422, June, 2019

DOI: https://doi.org/10.24941/ijcr.35292.06.2019

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

ASSOCIATION BETWEEN WHEEZING AND HOUSEHOLD RELATED FACTORS AMONG PRESCHOOL CHILDREN IN JEDDAH, SAUDI ARABIA

***, [1]Bayan Hashim Al Sharif, [2]Iman Mohmad Wahby Salem and [3]Sulafa Tarek Alqutub**

[1]Department of Community Medicine, Ministry of Health, Jeddah, Saudi Arabia
[2]Department of Community Medicine, Al azhar University, Egypt, King Abdulaziz University, Saudi Arabia
[3]Planning Department, Saudi Commission for Health Specialties, Jeddah, Saudi Arabia

ARTICLE INFO

Article History:
Received 16th March, 2019
Received in revised form
24th April, 2019
Accepted 19th May, 2019
Published online 30th June, 2019

Key Words:

Wheezing, risk factors, respiratory diseases, children, Jeddah, Saudi Arabia.

ABSTRACT

Background: Wheezing is considered as an important sign for bronchial hyper-responsiveness in children and adults, and it is considered one of the most common causes for visiting the emergency room. Objective: to describe the prevalence of wheezing and its associated factors in four to six-year-old children living in Jeddah city. **Methods:** A cross sectional study was conducted in Jeddah city among four to six-year-old children who attend preschool between November to December 2018. We used an adapted and modified questionnaire filled by the parents; It was tested in a pilot study. **Results:** Out of 400 questionnaires sent to the parent n = 300 (75%) were retained to the researcher. Meanwhile, a highly significant result was observed ($p < 0.05$) between wheezing and smoking in the family, home incense and coal use and low socioeconomic class. **Conclusion:** There is a significant association between presence of smoker at home, lower Family income and using of incense fragrant and coal inside the house and the appearance of wheezing in children born to atopic parents.

***Citation: Bayan Hashim Al Sharif, Iman Mohmad Wahby Salem and Sulafa Tarek Alqutub,* 2019.** "Association between wheezing and household related factors among preschool children in jeddah, Saudi arabia", *International Journal of Current Research*, 11, (06), 4417-4422.

INTRODUCTION

Children are considered the most vulnerable group in the community (Moya *et al*., 2004; Valent *et al*., 2004). Due to the later development of their respiratory system. In addition, they are more physically active which leads to more environmental exposure and deposition of pollution in the respiratory tract (Sigmund *et al*., 2007). The global morbidity and mortality related to respiratory diseases in children is a major issue in health care systems in both developing and developed countries (Mulholland, 2003). In 2007 the international study of asthma and allergies in childhood (ISAAC) has documented an increase in asthma prevalence across the world especially in low-income and middle-income countries (Pearce *et al*., 2007). Wheezing in most epidemiological studies is considered an important sign for bronchial hyper-responsiveness in children and adults (Dherani *et al*., 2008) and in many countries it is considered as one of the most common causes for visiting the emergency room (Bisgaard and Szefler, 2007). Wheezing has a negative impact on the health care system as well as on the quality of life patients and their families (Hafkamp-de Groen *et al*., 2013; de Jong *et al*., 2007). Many factors have been attributed to wheezing, some of them are considered non-modifiable such a genetic predisposition of being a male, family history of atopy and asthma (Bozaykut *et al.,* 2013; Bozaykut, 2013). One of the modifiable factors in home environment is to use gas as a cocking fuel which has a great influence on the respiratory system since it may lead to Indoor Air Pollution (IAP) In Hong Kong, IAP associated with higher prevalence of asthma in children compared with children from other cities of China (Wong *et al*., 2013). Furthermore, difficult living conditions such as low socioeconomic status, crowding, allergen exposure and second hand smoking are also associated to asthma (Bozaykut, 2013). Few studies have been conducted to assess home environment in Saudi Arabia, so this study aims to describe the prevalence of wheezing and its associated factors in four to six-year-old children living in Jeddah city.

Methods: A cross sectional study was conducted in Jeddah city among four to six-year-old children who attend preschool between November to December 2018, the estimated sample size was 400 students. We conducted a multistage sampling technique; stratification was applied in the first stage according to the geographical location while preschool level was applied in the second stage according to preschool level. Lastly in the third stage, we conducted a systematic randomized sampling between the student using an updating list with an adapted and modified questionnaire (Mundackal *et al*., 2013) in which it was tested in a pilot study using 10% of the total sample size. Questionnaire were handed to the children to be filled by the parent with an attached consent, also an approval from both the Saudi Board of Community Medicine Research Committee

***Corresponding author:* Bayan Hashim Al Sharif**
Department of Community Medicine, Ministry of Health, Jeddah, Saudi Arabia.

and the Ministry of Health in Jeddah was obtained. The data was coded and entered using Statistical Package for Social Sciences (SPSS) SPSS software version 24. Demographic and clinical data was analyzed using descriptive statistics (frequency, mean, and standard deviations). To test for significance of the statistical association between variables of categorical and nominal Chi-square test was used. Multivariate analysis was used to adjust for confounder.

RESULTS

We conducted the study among four preschools located in south, west, east and center area in Jeddah city. We included 400 children out of which only 75% ((n=300) were included whom their parents responded to the questionnaire while 54.3% of those were female children and 45.7% were males (Table 1). During the study period, n= 171 (57%) of the students were absent because of sickness two weeks prior with n= 161 (53.6%) out of those absence children missed school for 1-9 days. Allergy prevalence was n=63 (21%) while number of children diagnosed with asthma by a physician was n=49 (16.3%) and 16% reported wheezing in their children (Table 2). The study demonstrated a highly significant result ($p < 0.05$) between wheezing and the presence of more than one smoker in the family, using incense fragrance and home coal every day at the house and a low socio-economic class. Meanwhile, other variable showed no significant association (Table 3). On the other hand, the daily use of home coal and incense fragrance showed the highest rate of presence of wheezing (28.9%) with statistical significance (p value = 0.001) (table 4). Meanwhile, those who have wheezing, 42.2% reported having allergy, 44.4% reported history of bronchial asthma, 48.9% reported a diagnosis of bronchitis while80% of children were absent for two weeks with the occurrence of wheezing with high statistically significant of ($p < 0.05$) accordingly (Table 5).

Table 1. Children Sociodemographic characteristics n=300

Variable	No. (%) 300 (100)
Children characteristics	
Gender	
Male	137(45.7)
Female	163(54.3)
Family characteristics	
Father education level	
Non, Primary or preparatory	31(10.3)
Secondary and above	269(89.7)
Mother education level	
Non, Primary or preparatory	27(9)
Secondary and above	273(91)
Family income	
<10000 Real/month	152(50.7)
from 10000 to 20000 Real/month	138(46)
> 20000 Real/month	10(3.3)
Home characteristics	
Smokers at home	
No smoker	153(51)
One smoker in the family	120(40)
More than one smokersin the family	27(9)
Cooking fuel	
Gas	235(78.3)
Electricity	57(19)
Gas and electricity	8(2.7)

Table 2. Reported children health status n=300

Variable	Studied Children	
	No.300	100%
Absenteeism		
Not absent	129	43
1 – 9 days	161	53.6
≥ 10 days	10	3.4
Allergy in the child		
Yes	63	21.0
No	232	77.7
Bronchitis		
Yes	92	30.7
No	208	69.3
Pneumonia		
Yes	8	2.7
No	292	97.3
Earache		
Yes	36	12.0
No	264	88.0
Hay Fever		
Yes	8	2.7
No	292	97.3
Sinus problem		
Yes	76	25.3
No	224	74.7
Asthma		
Yes	49	16.3
No	250	83.3

Table 3. Family factors associated with wheezing among the study group n=300

Variable	Wheeze		sig
	Yes No.% 45(100)	No No.% 255(100)	
Mother education			
Non, Primary or preparatory	6(13.3)	21(8.2)	.27
Secondary and above	39(86.7)	234(91.8)	
Mother occupation			
Yes	8(17.8)	80(31.4)	.06
No	37(82.2)	175(68.6)	
Father education			
Non, Primary or preparatory	7(15.6)	24(9.4)	.21
Secondary and above	38(84.4)	231(90.6)	
Father occupation			
Yes	40(89.9)	238(93.3)	.29
No	5(11.1)	17(6.7)	
Smokers at home:			
No smoker	22(48.9)	131(51)	.00*
One person	13(28.9)	107(40)	
More than one	10(22.2)	17(9)	
Social class			
Low	32 (71.1)	120 (47.1)	.01*
Moderate	13(28.9)	125(49)	
High	0	10(3.9)	

*Chi-square test

Table 4. Indoorenvironmental health behaviors n=300

Variable	Wheeze		Sig.
	Yes No.% 45(100)	No No.% 45(100)	
Fuels used at home:			
Electricity	6(13.3)	51(20)	.55
Gas	38(84.4)	197(77.3)	
Both	1(2.2)	7(2.7)	
Using coal and incense in home:			
Every day	13(28.9)	37(14.5)	
3_4 times a week	4(8.9)	63(24.7)	.01*
One time a week	3(6.7)	37(14.5)	
In special occasions	11(24.4)	59(23.1)	
Never	14(31.1)	59(23.1)	
Changing air condition filter at home:			
Every 6 months			
Every year	22(48.9)	131(51.4)	.97
Never changed	13(28.9)	72(28.2)	
	10(22.2)	52(20.4)	
Open windows for ventilation:			
Daily			
3-4 times a week	26(57.8)	140(54.9)	.54
Weekly	11(24.4)	65(25.5)	
Rare	3(6.7)	13(5.1)	
Never	3(6.7)	33(12.9)	
	2(4.4)	4(1.6)	

In addition, wheezing was highly significant with a p value<0.05 when there was a family history of allergy (Table 6). The following factors were found to be associated with more wheezing in our study: having a history of asthma and bronchitis (OR, 5.29; 95% CI, 1.680-16.704, OR1.69; 95% CI, .774-3.721) respectively, a family history of allergy (OR,2.21; 95%CI,1.030-4.759)and low family income (OR,3.02; 95%CI:1.458-6.258) (Table 7).

DISCUSSION

The prevalence of wheeze in our study found to be 15%this approximate prevalence was reported in a systematic review conducted in 2018 in Saudi Arabia, which was 16.5% (Mohamed Hussain *et al*., 2018), while a slightly lower prevalence rate was reported in 2017 in Jazan (11.4%). Moreover, a study in China in 2012 showed a lower prevalence (10.6%) compared to our finding study group. On the other hand, a cross sectional studies conducted in 2012 in Sri Lanka demonstrated a prevalence rate of (20.8%) (Nandasena *et al*., 2012) while another study in Brazil (67.2%) showed a higher prevalence of wheeze. This variation may be explained by the difference in age of participants as they included older children. However, there was also a difference in the method of questionnaire administration and instrument used to assess wheezing. In 2014, a study conducted in Korea showed a significant association between wheezing and male gender (Chae *et al*., 2014) which suggests that males have greater influence of hereditary mechanisms (Bjerg *et al*., 2007; Eder *et al*., 2006). Even though our study showed that males were affected more than females, the result was not significant which might be due to the difference in ethnicity but this is

Variable	wheeze		sig
	Yes No.% 45(100)	No No.% 255(100)	
Absent of child in the last two weeks:			
Yes	36(80)	135(52.9)	
No	9(20)	120(47.1)	.00*
History of allergy:	19(42.2)	49(19.2)	
Yes	26(57.8)	206(80.8)	.00*
No			
History of bronchial asthma:			
Yes	20(44.4)	29(11.4)	
No	25(55.6)	226(88.6)	.00*
Bronchitis	22(48.9)	70(27.5)	
Yes	23(51.1)	185(72.5)	.00*
No			
Pneumonia:	1(2.2)	7(2.7)	
Yes	44(97.8)	248(97.3)	.65#
No			
Earache:			
Yes	8(17.8)	28(11)	.21
No	37(82.2)	227(89)	
Hay fever			
Yes	1(2.2)	7(2.7)	1
No	44(97.8)	248(97.3)	
Sinus problem			
Yes	15(33.3)	61(23.9)	.19
No	30(66.7)	194(76.1)	

*Chi-square test

Table 6. Association between family history and wheezing (n=300)

Variable	wheeze		sig
	Yes No.% 45(100)	No No.% 255(100)	
Allergy:			
Yes	26(57.8)	84(32.9)	.00*
No	19(42.2)	171(67.1)	
Bronchial Asthma:			
Yes	18(40)	70(27.5)	.10
No	27(60)	185(72.5)	
Using the medications during the common cold:			
Yes	15(33.3)	66(25.9)	.36
No	30(66.7)	189(74.1)	

*Chi-square test

Table 7. Logistic Regression Analysis describing variables relationship

	Sig.	OR	95% CI	
			Lower	Upper
Family and Home characteristic				
Family social class	.00	3.020	1.458	to 6.258
Using coal andincense in house	.11	.237	.039	to 1.426
Smoker in the family	.41	.808	.487	to 1.342
Child Health:				
Allergy	.41	.375	.035	to 4.014
Bronchitis	.18	1.698	.774	to 3.721
Asthma	.00	7.654	2.803	to 20.899
Family history of allergy	.042	2.214	1.030	to 4.759

beyond the scope of our study. In 2012, a study in China correlated higher education level of parents with the presence of wheezing in their children. This was explained due to the assumption that manual labor and low education level workers had less access to hospitals than high education parents (Liu *et al*., 2013). However, our finding suggests that education level of parents does not signify the results. This may be due to the fact that hospital and health system is accessible to every level in Saudi Arabia. Several studies have found that children exposed to smoking were more likely to present with wheezing (Liu *et al*., 2013; Seneviratne and Gunawardena, 2018). Our study showed the similar finding; however, the result was not statistically significant for those who reported smoking inside the house this bias could be attributed to underreporting of caregiver. Mean while, a difference in relation to cooking resources in Sri Lanka in which they were using kerosene as primary fuel as it is cheaper (Nandasena *et al*., 2012) but the results was not statistically significant with wheeze. A positive association was found between using incense fragrances and coal at home and wheezing ($p < 0.05$). Similarly, a study conducted in China in which they found that the presence of fragrance burning devices increased respiratory symptoms

among children (Liu *et al*., 2013) while a different study found no association which might be due to the difference in age groups as small children has less developed respiratory system. Regarding limitations of this study, firstly, as the parents were the one who filled the questionnaire this study was subjected to recall bias. Secondly, the prevalence of wheezing and associated respiratory disease was determined by the review of the questionnaire responses which may have led to overestimation or underestimation. However, we tried to avoid this by the use of validated symptom-based written questionnaires and estimation of the overall prevalence of wheezing illnesses using a randomized, stratified, three-stage cluster sampling design.

Conclusion

There is a significant association between living with a smoker, low social class and using of incense fragrance and home coal inside the house and the presence of wheezing in children born to atopic parents. More studies should be carried out using a bigger sample by visiting the houses to avoid bias.

Conflict of Interest: The authors declare no conflict of interest

REFERENCES

Bisgaard, H. and Szefler, S. 2007. Prevalence of asthma-like symptoms in young children. Pediatr Pulmonol (Internet). 2007 Aug 1 (cited 2019 Apr 7);42(8):723–8. Available from: http://doi.wiley.com/10.1002/ppul.20644.

Bjerg, A., Hedman, L., Perzanowski, MS., Platts-Mills, T., Lundback, B. and Ronmark, E. 2007. Family History of Asthma and Atopy: In-depth Analyses of the Impact on Asthma and Wheeze in 7- to 8-Year-Old Children. Pediatrics (Internet). 2007 Oct 1 (cited 2019 Apr 7);120(4):741–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/17908760.

Bozaykut, 2013. Evaluation of Risk Factors for Recurrent Wheezing Episodes. J Clin Med Res (Internet). 2013 (cited 2019 Apr 7); Available from: http://www.jocmr.org/index.php/JOCMR/article/view/1543.

Bozaykut, A., Paketci, A., Sezer, RG. and Paketci, C. 2013. Evaluation of risk factors for recurrent wheezing episodes. J Clin Med Res (Internet). 2013 Oct (cited 2019 Apr 7);5(5):395–400. Available from: http://www.ncbi.nlm.nih.gov/pubmed/23976913.

Chae, Y., Hahm, M. Il., Ahn, K., Kim, J., Kim, WK., Lee, SY., *et al*., 2014. Indoor environmental factors associated with wheezing illness and asthma in South Korean children: Phase III of the International Study of Asthma and Allergies in Childhood. *J Asthma.,* 51(9):943–9.

de Jong, BM., van der Ent, CK., van Putte Katier, N., van der , MM., Verheij, TJM., Kimpen, JLL., *et al*., 2007. Determinants of Health Care Utilization for Respiratory Symptoms in the First Year of Life. Med Care (Internet). 2007 Aug (cited 2019 Apr 7);45(8):746–52. Available from: http://www.ncbi.nlm.nih.gov/pubmed/17667308

Dherani, M., Pope, D., Mascarenhas, M., Smith, KR., Weber, M. and Bruce, N. 2008. Indoor air pollution from unprocessed solid fuel use and pneumonia risk in children aged under five years: a systematic review and meta-analysis. Bull World Health Organ (Internet). 2008 May (cited 2019 Apr 7);86(5):390–398C. Available from: http://www.ncbi.nlm.nih.gov/pubmed/18545742.

Eder, W., Ege, MJ. and von Mutius, E. 2006. The Asthma Epidemic. N Engl J Med (Internet). 2006 Nov 23 (cited 2019 Apr 7);355(21):2226–35. Available from: http://www.ncbi.nlm.nih.gov/pubmed/17124020.

Hafkamp-de Groen, E., Mohangoo, AD., Landgraf, JM., de Jongste, JC., Duijts, L., Moll, HA., *et al*., 2013. The impact of preschool wheezing patterns on health-related quality of life at age 4 years. Eur Respir J (Internet). 2013 Apr (cited 2019 Apr 7);41(4):952–9. Available from: http://erj.ersjournals.com/lookup/doi/10.1183/09031936.00015712.

Khawaji, A., Basudan, A., Moafa, A., Faqihi, M., Alhazmi, M., Mahnashi, T., *et al*., 2019. Epidemiology of bronchial asthma among children in Jazan Region, Saudi Arabia. Indian J Allergy, Asthma Immunol (Internet). 2017 (cited 2019 Apr 7);31(2):69. Available from: http://www.ijaai.in/text.asp?2017/31/2/69/215833.

Liu, M-M., Wang, D., Zhao, Y., Liu, Y-Q., Huang, M-M., Liu, Y., *et al*., 2013. Effects of Outdoor and Indoor Air Pollution on Respiratory Health of Chinese Children from 50 Kindergartens. *J Epidemiol.,* 23(4):280–7.

Mohamed Hussain, S., Ayesha Farhana, S. and Mohammed Alnasser, S. 2018. Time Trends and Regional Variation in Prevalence of Asthma and Associated Factors in Saudi Arabia: A Systematic Review and Meta-Analysis. Biomed Res Int (Internet). 2018 May 23 (cited 2019 Apr 14);2018:1–9. Available from: https://www.hindawi.com/journals/bmri/2018/8102527/.

Moya, J., Bearer, CF. and Etzel, RA. 2004. Children's behavior and physiology and how it affects exposure to environmental contaminants. Pediatrics (Internet). 2004 Apr (cited 2019 Apr 9);113(4 Suppl):996–1006. Available from: http://www.ncbi.nlm.nih.gov/pubmed/15060192.

Mulholland, K. 2003. Global burden of acute respiratory infections in children: Implications for interventions. Pediatr Pulmonol (Internet). 2003 Dec (cited 2018 Mar 7);36(6):469–74. Available from: http://www.ncbi.nlm.nih.gov/pubmed/14618637.

Mundackal, AJ., In, S., Of, F., Degree, The., In, M. and Health C. A. 2013. Survey of the respiratory health status of 10-year-old children in the vaal triangle priority area in 1990 and in 2010 a cross-sectional inter-comparative study.

Nandasena, S., Wickremasinghe, AR. and Sathiakumar, N. 2012. Respiratory health status of children from two different air pollution exposure settings of Sri Lanka: a cross-sectional study. *Am J Ind Med* (Internet). 2012 Dec (cited 2019 Apr 6);55(12):1137–45. Available from: http://www.ncbi.nlm.nih.gov/pubmed/22298308.

Pearce, N., Aït-Khaled, N., Beasley, R., Mallol, J., Keil, U., Mitchell, E., *et al*., 2007. Worldwide trends in the prevalence of asthma symptoms: phase III of the International Study of Asthma and Allergies in Childhood (ISAAC). Thorax (Internet). 2007 Sep (cited 2019 Apr 7);62(9):758–66. Available from: http://www.ncbi.nlm.nih.gov/pubmed/17504817.

Seneviratne, R. and Gunawardena, NS. 2018. Prevalence and associated factors of wheezing illnesses of children aged three to five years living in under-served settlements of the Colombo Municipal Council in Sri Lanka: a cross-sectional study. BMC Public Health (Internet). 2018 (cited 2019 Apr 6);18(1):127. Available from: http://www.ncbi.nlm.nih.gov/pubmed/29325544.

Sigmund, E., De Ste Croix, M., Miklankova, L. and Fromel, K. 2007. Physical activity patterns of kindergarten children in comparison to teenagers and young adults. Eur J Public Health (Internet). 2007 Dec 1 (cited 2019 Apr

9);17(6):646–51. Available from: http://www.ncbi.nlm.nih.gov/pubmed/17434876.

Valent, F., Little, D., Bertollini, R., Nemer, LE., Barbone, F. and Tamburlini, G. 2004. Burden of disease attributable to selected environmental factors and injury among children and adolescents in Europe. Lancet (Internet). 2004 Jun 19 (cited 2019 Apr 9);363(9426):2032–9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/15207953.

Wong, GWK., Leung, TF. and Ko, FWS. 2013. Changing prevalence of allergic diseases in the Asia-pacific region. Allergy Asthma Immunol Res (Internet). 2013 Sep (cited 2019 Apr 7);5(5):251–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24003381.

****