ORIGINAL ARTICLE

Questionnaire study of self reported asthma triggers:

A Case Series of East – Mediterranean Syrian Patients

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Abstract

Setting: Initial evaluation of asthmatic males and females, fourteen years and older at the Tishreen University Department of Internal Medicine outpatient clinic.

Objectives: Asthma triggers are defined as factors reported by the patient to cause attacks or exacerbation. We speculated that it would be useful to track a pattern for triggers in our country. We anticipated the pattern would enable us to improve our care of asthmatics, enrich our asthma education program and enhance the curriculum of medical students.

Methods: A questionnaire was administered prospectively by the same chest physician. Spontaneous and subsequent directed answers were recorded. The percentage of patients affected by each trigger was calculated.

Results: Environmental tobacco smoke and household dust were common reported triggers. Narguileh side-stream smoke and seasonal sandstorm dusts were specific regional triggers.

Key words:

Asthma triggers, environmental tobacco smoke, narguileh, common triggers, particular triggers.

Background

Asthma triggers are factors reported by the patient to cause exacerbation [1-2] by inducing cough, by provoking inflammation or acute broncho-constriction or both. Triggers vary from person to person and from time to time. They include exposure to environmental factors, such as allergens or occupational agents, which have previously sensitised the airways of the asthmatic person. Triggers also include exposure to exercise, cold air, irritant gases, weather change and emotions; these triggers cannot cause asthma to develop initially but can exacerbate asthma once it is present. [1]

In spite of the subjectivity of a patient report, a clinical questionnaire is frequently used to elicit specific asthma triggers [3-5]. Several questionnaires have been validated primarily in Western patients. An example is the International Study in Asthma and Allergy in childhood (ISAAC), questionnaire for which repeatability has been studied in South-Wales, UK [4]. Another example is the questionnaire by the International Union Against Tuberculosis and Lung Diseases (IUATLD) questionnaire which was validated in four European countries [5]. Objective testing is impractical for some suspected asthma triggers and a clinical history may be the only evidence for triggers such as emotions, thunderstorms, household chemicals, pregnancy or freezing weather. [1-2].The Asthma Management and Prevention Workshop Report (1995) by the National Heart, Lung, and Blood Institute (NHLBI) and The World Health Organization (WHO) issued global recommendations for research on Asthma risk factors. An important recommendation was identifying

allergens and irritants for each geographic area. [1] Identification of asthma triggers would be the first step in research on risk factors in diverse geographic areas [2-3].

Years of experience with Asthma management in Syria suggested the need for tracking our pattern of asthma triggers, which will enrich our asthma education programs, and the curricula of medical students. In this paper we report common, occupational and then particular asthma triggers in this Eastern Mediterranean country.

Material and Methods:

Population

The target population was every new asthma patient visiting the Tishreen University Department of Internal Medicine outpatient Clinic and recruited from summer 1998 to summer 2000. The patients were diagnosed as asthmatics during their initial presentation by the same chest physician. Diagnosis was based on the clinical history, reversibility and/or variability of peak flow rate according to Guidelines from the Global Initiative for Asthma [1]. Eligible patients were older than fourteen years and presented either with acute asthma or seeking long-term management. Patients were excluded from the study if asthma was associated with any debilitating condition (e.g.: end stage renal or cardiac or hepatic failure, or imbalanced insulin dependant diabetes, or stroke).

Questionnaire:

The questionnaire was adapted from IUALTD's patient card [3] and ISAAC questionnaires [4], modified according to our local situation. All answers were recorded by the same chest physician. Initial questions were open ended: What has been making asthma worse in the previous 12 months? What has made wheezing worse? Spontaneous answers were recorded. Next, answers were directed. The patient was asked to describe circumstances, exposures or smells that made asthma worse or made wheezing worse during the last previous months.

Next, the patient was asked specific questions concerning a standardised list of triggers, and queried for additional unlisted particular triggers. The standardised list of questions in our study was the following usual common triggers: Environmental tobacco smoke, household dust, infection, pollen, weather change, humidity, pets, fumes and heating, effort, emotion, wool and traffic fumes, plus aspirin and occupation. Answers in response to these triggers were mandatory. Particular triggers, self reported but initially non-included in the standard list, were determined after review of reported questionnaires at the end of data collection. Then were divided into six sub-categories: household indoor particular triggers, outdoor triggers, agriculture triggers, drugs, foods and drinks, laugh. (See appendix).

The same Chest Physician administered the questionnaire during the visit along the two years recruitment period to six hundred patients during their first presentation to the clinic. Patients who were unable to give consistent responses during the first evaluation because of their very severe attack or inconvenience gave responses during a second invited evaluation visit.

Results:

1. General characteristics

Six hundred patients were recruited along the two years. A total of one hundred patients were excluded due to inconsistency in responses or were lost to follow up. So the study population included 500 asthmatics, (329) women (65%) and 171men. The mean age of our patients was 36 ranges (14-80). Among men there were 22% of smokers, 18 % of ex-smokers; 60% had never smoked. Among women there were 14 % of smokers, 6 % of ex-smokers; 80% had never smoked.

Only 41% of patients were rural. In 65% of patients, asthma was classified as persistent, 61% of them were mild, 29% were moderate and 10% were severs according to the Global Initiative for Asthma (GINA). Inhaled corticosteroids have been prescribed before to only 15% of persistent asthmatics. And 33% of our patients have some education about the most common triggers, while 77% were completely ignorant about triggers before this visit. Only twenty-three patients were unable to identify any trigger. All others either identified common listed triggers or reported any other particular triggers.

2. Common and occupational triggers/ Mandatory:

The proportion of patients triggered is reported according to gender in table 1. Regardless of gender, the main environmental triggers are: Environmental Tobacco Smoke/ETS (70.4%) household dust (67%), weather change, traffic fumes (33%) and pollens (33%). Infection in (45%) and effort in (22%). The gender distribution showed a trend for men to be more triggered by occupation (18%vs 8%), and for women to be more triggered by ETS (73% vs. 64%) and psychological (9%vs2.3%).

3. Particular triggers/ free communications:

The other self reported triggers are classified in six categories :(table 2.):

Among indoor triggers frying smells and perfumes triggered the highest proportion of patients (31% and 15%). Two other triggers were less frequent but of particular regional interest: passive smoking of narguileh. (21 patients), chopping hot red pepper (5 patients).

Among agricultural triggers the role of barnyard animals is not negligible: triggering contact with cow, poultry and sheep was reported by 34 patients (9%). Some patients also reported specific agricultural or environmental triggers: Orange flowers smells and harvest of dusty crops (olives and eggs plants) respectively 9 and 8 patients.

Discussion:

We found that in our study ETS was the highest ranked common trigger (70%), followed by household dust (67%), and infection in (45%) while particular triggers like frying smells, narguileh side-steam smoke, orange flowers smell, and seasonal sandstorm were notable local triggers.

In Syria primary care for asthma at the time of the study was not scheduled, and a referral system between different health sectors (Public, private, academic.) did not exist at the time. Asthmatics refer themselves, during attacks, exacerbations or seeking long-term management, either in outpatients' clinics or in emergency departments. Study patients can therefore be regarded as a representative sample of asthmatics in the Mediterranean part of Syria. The catchments population of our centre is one million.

Although smokers were less frequent among our patients compared to the general population in Syria (forty-eight percent of men and twenty percent of women) [6], ETS was the most alerting common trigger self-reported by our patients. In a postal based community survey in Australia [7], follow up questionnaires were sent to respondents on a screening questionnaire, indicating a history of doctor diagnosed asthma or non-specific respiratory symptoms. The follow up questionnaire dealt with a list of trigger factors reported as provoking wheeze. In diagnosed asthma, unlike us, infection was the highest ranked (80%), followed by dust (70%), ETS being accused only in 69% of diagnosed asthma. Among patients with non-specific respiratory symptoms the triggers ranking was different: infection (68% of cases), cigarette smoke (44%) and household dust (31%).

In a multicenters study in the United States, the authors compared triggers for sudden and slow onset attack in the emergency department, among patients 18-54 years old, [8]. These patients were asked to list all usual asthma triggers using a standardized list of potential triggers: respiratory infection, environment allergens (dust, pets, and pollens), tobacco smoke, other environmental factors (perfumes, paints, pollution, weather change, and cold air), exercise, ingested substances (aspirin, sulphate, and food), reproductive factors, psychological stress and others. They were then asked to identify a single trigger of their current asthma exacerbation. Infection was the highest usual trigger as well for sudden (77%) as for slower onset attacks (86%) while ETS triggered (67%) of sudden and (58%) of slower onset. For a single trigger of their current attack, the trigger of sudden asthma exacerbation was less often-upper respiratory infection and more often respiratory allergens, tobacco smoke, exercise, psychological stress and ingested substances. Nevertheless the design of this study

was different from ours because eligible subjects were only patients with severe attacks.

Traffic Fumes trigger (33%) in our survey, which is lower than the Australian percentage (64%). Although the number of vehicles is lower in Syria, it is not negligible especially when we know that particles in diesel exhaust have been proven to enhance the allergy to pollen ,and that asthmatics that live near the highway experience more exacerbations [9].Pollen was accused in only 31.5% of our patients, many patients responded: I don't know if I am triggered by pollen. Another approach for pollen needs to be codified [10]. Pets triggered only (2.6%) of our patients, while (45%) in Australia. May be the percentage was lowered because we don't have this social hobby in our region, but it is worthwhile to say that 10 out of 11 patients owing birds in our study report being triggered by them. Aspirin is (2.4%) for us, 2% of adult asthmatics have problems with aspirin in the medical literature; [2]

For the agriculture triggers: Barnyard animals were accused as triggers by 34 patients. A study in Finland and another in Sweden proved cow dander to be causal factor for asthma onset with high positive for Skin Prick Test and RAST [11]. A possible bias in our study is that in some cases hay was stored in the same place and the responsibility of storage-mite could not be excluded [12]. And poultry farmers are listed as occupational [1]. Orange flowers smell triggered patients who live in orange orchards. Other studies reported the same [13]. Chopping hot red pepper has never been reported as trigger for asthma in the medical literature, but one study reported acute rhinitis provoked by ingestion of red hot pepper, which was attributed to the stimulation of muscarinic receptors [14].

For drugs: 8 patients out of eleven using angiotensine conversion enzyme inhibitor (ACEI) reported being triggered by this drug, although it has been reported to provoke dry cough in 5%, or transitory worsening of asthma [1-3].

A study of New Jersey College, was designed not only to track and rank triggers, but extend beyond our study and the other above studies in examining the relationship among respiratory infections, triggers of attacks, and asthma severity; mothers were asked to complete a questionnaire for their asthmatics children [15], the frequency of infections during the past year was correlated with the impacts of air pollution, cigarette smoke, nighttime hours and respiratory infection as trigger for asthma.

Although Environmental Tobacco Smoke: Is being the most prevalent in our survey, and is also alerting in all the above-mentioned surveys. For this reason we will expand upon it, especially when we know that the increase of asthma prevalence the last decades was attributed to the indoor environment (indoor allergens and women smoking)[16]. In the medical literature, Environmental tobacco smoke is evidenced as risk factor for asthma onset in infant and children [9,16]]. Our survey concerned adults, In adults the role of environmental tobacco smoke as risk factor for asthma onset is controversial [17], but it's confirmed that it plays a role of adjuvant making allergens more sensitising and a role of trigger of attack [16-17]. And that Asthmatics exposed to environmental tobacco smoke have more severe asthma and emergency department visits and are more expensive [18]. In a general review about environmental tobacco smoke exposure and asthma in adults[17], Weiss and all from Harvard and John Hopkins Universities, addressed with scrutiny the methodological barriers that limited the available data, and conclude that in spite of potential problems of recall bias and selection bias in these observational studies tracking triggers, there is some evidence that exposure to ETS contribute to both development

and exacerbation of asthma. And that in spite of lacks in the design of controlled clinical studies, in volunteers spontaneously reporting there asthma symptoms to be provoked by ETS, exposure to ETS generated by smoking machines, provoked asthma symptoms and only in some smoke-sensitive subjects a decrease of FEV1 and increase in airway reactivity. But further studies are needed for definitive conclusions. Evidence is biologically plausible, In a general review of the pathogenesis events attributed to tobacco smoke in asthma, Fleorani and al [19] mentioned a cascade of inflammatory events, cytokines release, and a shift for lymphocyte T helper to helper 2 secretion profile enhancing the production of specific IgE, but concluded that the intimate micro molecular mechanisms of such changes are still elusive. Recently, genetic studies define certain genotype susceptible to develop severe symptoms when exposed to ETS [20]

Regarding the questionnaires used by all the above observational studies, we will see that there are not standard questions: triggers that were described by the medical literature, as common triggers are not always the same. The International Study in Asthma and Allergy address some example of them in Childhood‘s Questionnaire Module2-1 [4]: “ In the last 12 month what has made your child's wheezing worse? Weather, Pollen, Emotion, Fumes, Dust, Pets, wool clothing, Cold or flue, cigarette smoke, foods or drinks, soaps sprays or detergents, others”. Other example for adults is the listed triggers of the International Union Against Tuberculosis and Lung disease’s patient card in its Guide for Asthma Management in Low Income Countries: Humidity, and exercise were added to the above list, and questions about aspirine and occupation were also mandatory [3]. A third Survey done by the college of New Jersey considered laugh and nighttime jobs as common triggers [15]. In the questionnaire of the first survey, there is a question about emotion but in the third,

Anger, Sorrow and excitement are considered as separate triggers, while in our study emotion covers all these situations with deep psychological influence. The question about weather in the third survey is divided into two questions one on cold and the other on hot air while in our combined questionnaire we chose tow other items: humidity and weather change. In the New Jersey study laugh is common trigger while we considered it as specific in our study, which means the question about laugh was not mandatory in our survey. In our questionnaire, we put car exhaust (traffic fumes) instead of Pollution, because there is rarely other pollution in our region, nor a regular report of pollution level [2]. And in the multicenter survey of the emergency department perfumes and paints are considered as usual environmental triggers [8].

So even for the "usual common triggers", a standardised International Scientific Questionnaire has not yet been achieved. Another point is that, beside these usual triggers there are particular triggers self reported by the patient, depending on geographic area or other social or economic factors, For these triggers each region has to find out and track its own listing. .

It is the first time a questionnaire about triggers adapted to our local situation has been used to track triggers in our region; the same chest physician interviewed all patients for more consistency. Asthma was diagnosed according to GINA guidelines. And questions about triggers were open-ended and then directed, plus an invited evaluation visit to complete the questionnaire when inconvenience.

. For all theses questionnaire based observational studies, there is potentially a recall bias, patient report is subjective, as it is mentioned by Weiss and al [17]. However it is widely validated that questioning about self reported asthma triggers should be a complement to the clinical history , and are reliable tool to guide avoidance

intervention strategy [1-3, 10] Ritz validated an asthma triggers inventory in 2005, and find that self reported triggers reflect the actual reactivity to specific trigger factors; and he concluded that self reported triggers are reliable for the most of triggers like emotion, diesel exhaust, animals, dust and irritants . But he confirms our impression that for pollen we can not rely on self reported triggers, we should perform skin prick test [10]. While triggers like mould could not be perceived [10] Contrary to the fact that respiratory infection is the highest ranked trigger in the medical literature [1,7,8,15], Our study is surprising by the relatively low report of infection as trigger, is it an information bias due to the fact that respiratory infection make the airways more reactive to those triggers which have the most direct and immediate impact, such as cigarette smoke, traffic fumes and allergens[2,15], and so while the first precipitating factor was respiratory infection, our patient recall being triggered by ETS, or allergens? Or is it an epidemiological bias, as we do not have epidemiological data about the incidence of infection in adults in our region, which could be lower than in adults in the western countries? We can also expect that there is epidemiological bias in why exposure to ETS is the highest ranked in our study; the reason might be that adults are more exposed in Syria than in Western countries due to tobacco control policy and ban of smoking in the workplace?

The originality of our study is the categorization of particular regional triggers in six subdivisions. Although the avoidance of the most common triggers, like house dust and pollens has been widely investigated, and preventive measures are known, we have to think about tracking guidelines or avoidance strategies for particular triggers related to our social habits e.g. free chlorine and perfumed detergents and bleaches, and inquiry into the microclimate and work conditions in green houses. Alternative for Gaseous insecticides used against mosquitoes (Kerosene vapors).

Beside that tracking our regional triggers could help as we saw above preventing asthma attacks, but also could help to reduce the growing asthma prevalence, because we know that asthma is a multifactorial genito-environmental disease [20]. And that tracking particular triggers is first step for further research in risk factors for asthma onset .last point ,occupational asthma in rural works like poultry farmers and green houses is not recognized in Syria, it is just considered as part of the daily life of farmers, highlighting that could be useful for better prevention and patients compensations.

Conclusion: Triggers are factors reported by the patient to provoke asthma symptoms; Therefore while taking the clinical history, questions about asthma triggers are crucial for avoidance strategy which is part of asthma management guidelines. each patient should be considered in his own environment at home and work. We tracked triggers of 500 adult asthma patients in the Coastal Syria, ; we found that ETS is the most reported and that regional particular triggers like frying , using of Chlorine as detergent, and narguileh side stream smoke are frequently accused, while pets are less accused than in developed countries, which reflect the scarcity of this social habit.

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Acknowledgements: We are grateful to Pr.Safwan Badr head of the department of pulmonary and critical care in the Wayne State University School of Medicine for the preparation of this manuscript in his department. And to Dr.Jean-François Tessier, INSERM 330, Bordeaux for his advice.

TABLE 1; PROPORTION OF PATIENTS REPORTING EACH USUAL COMMON TRIGGER or OCCUPATIONAL TRIGGER. Mandatory questions			
Triggers	Men N=171 (100%)	Women N=329 (100%)	All patients N= 500 (100%)
ETS	110 (64%)	242 (73.5%)	352 (70.4%)
Household dust	116 (68%)	218 (66.2%)	334 (67%)
Fumes, heating	11 (6.4%)	16 (4.8%)	27 (5.4%)
Pets	5 (2.9%)	8 (2.4%)	13 (2.6%)
Weather change	77 (45%)	139 (42%)	216 (43.2%)
Trafic fumes	62 (36%)	104 (32%)	166 (33%)
Pollens	57 (33%)	101 (31%)	158 (31.6%)
Humidity	50 (29%)	88 (26.5%)	138 (27.6%)
Infection	75 (44%)	150 (46%)	225 (45%)
Exersion	49 (29%)	74 (22.5%)	123 (24.6%)
Psychology	4 (2.3%)	30 (9%)	34 (6.8 %)
Aspirine	4 (2.3%)	8 (2.4%)	12 (2.4%)
Wool	6 (3.5%)	13 (7%)	19 (3.8%)
Occupation	*31 (18%)*	*29 (8%)*	*60 (12%)*

TABLE 2 : PROPORTION OF PATIENTS REPORTING EACH OTHER PARTICULAR TRIGGER /500 patient Free communications		
Particular triggers	Total responses (N=374).	% OF TRIGGERED (74.8%)
1.INDOORS		
Frying smells	153	31%
Perfumes	74	15%
Perfumed Detergent	36	7%
Detergent (NaOCl)	27	5.5%
Narguile - passive	21	4.2%
Chopping Red hot Pepper	5	1%
Household Spray	3	0.6%
2.OUTDOORS		
Paints	11	2.2%
Seasonal sandstorm	10	2%
Gaseuse insecticide	2	0.4%
3.AGRICULTURE		
Hay	19	3.8%
Cow	18	3.6%
Poultry	11	2.2%
Working in Green House	10	2%
Smell of Orange Flower	9	1.8%
Harvest of Dusty Crops: olives,and eggplants	8	1.6%
sheep	5	1%
Pesticides	5	1%
Fertilizers	2	0.4%
4.DRUGS		
ACEinhibitor	8	1.6%
Antibiotic	2	0.4%
Others (Parlodel, Tenormin, Diestradiol)	5	1%

5.FOODS AND DRINKS	*17*	*3%*
6.LAUGH	*9*	*2%*

Form- The questionnaire:APPENDIX

1-Age:

2-Sex: 1= male; 2= female.

3 Smoking: 1= nonsmoker; 2= EX; 3= smoker.

4- Have you been educated about triggers?

Usual Common triggers plus aspirin and occupation-The interviewer must put 1 in the excel cell if the patient is triggered by any of the following triggers:

5-Household Dust: .We put (1) for positive history.

6-Environmental tobacco smoke. We put (1) for positive history.

7-Humidity. We put (1) for Positive history.

8-Weather change. We put (1) for positive history.

9-Physical effort. or exercise: We put (1) for positive history.

10-Cold or flue. We put (1) for positive history.

11-Pets: Dog= 1; cat= 2; birds= 3;

12-: Diesel car exhaust. We put (1) if positive history.

13- Fumes, and heating –Smoke, WE put (1) for positive response.

14-Pollens.Put (1) if positive history.

15 -Emotions. Put (1) if positive

16-Aspirin.put (1) if positive.

17-Work . Put (1) if positive.

Other triggers (Particular triggers)(18-23):

18-HouseholdIndoors: Detergent with NaOCl= 1; perfumed detergent= 2; household sprays= 3.

Perfumes= 4; cooking smells= 5; Narguileh smoke= 6.Womens chopping red pepper for conservation. (7)-

19-Outdoors: Gaseous insecticide= 1; seasonal sand storms= 2; paints= 3

20-Agriculture: Pesticide= 1; hay= 2; working in green houses= 3; harvest of dusty crops (eggplants, olives.)= 4; smell of orange flowers= 5; Sheep= (6), Cow (7).

21-Drugs: ACE inhibitor= 1; antibiotics= 2; other= 3.

22- Foods and drinks. Put (1) if response positive.

23- Laugh. We put (1) for positive response.

24-Patient unable to identify triggers