PARENTAL KNOWLEDGE OF THE ADVERSE EFFECTS OF HOUSEHOLD TOBACCO SMOKE EXPOSURE IN ASTHMATIC CHILDREN

Supanun Poopat[1], Suchada Sritippayawan[1], Hanrutai Kamalaporn[2] and Sintra Phumethum[3]

[1]Department of Pediatrics, Faculty of Medicine, Chulalongkorn University; [2]Department of Pediatrics, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok; [3]Department of Pediatrics, Prapokklao Hospital, Chanthaburi, Thailand

Abstract. The aim of this study was to determine the prevalence of household tobacco smoke exposure in children presenting to asthma clinic at Prapokklao Hospital and to survey parental knowledge and perception to the dangers of household smoke exposure. Parents/guardians who brought their children to asthma clinic during June-September 2014 were interviewed to complete survey questionnaires. If there were smokers in the household, questionnaires with a postage paid self-addressed envelopes were given to the family to take back home for other household smokers to complete. There were 149 asthmatic children who attended the asthma clinic during the study period. Seventy-one pediatric patients (47.7%) lived with at least one household smoker. Thirty-one smokers completed the questionnaires. Only five (16.1%) accompanied the patients to asthma clinic. Almost all of the smokers had a desire to quit smoking, and 58.1% of the smokers and 63.2% of the non-smokers had received information regarding the dangers of household smoke exposure. The knowledge test scores were not different between the two groups. The prevalence of household smoke exposure in asthmatic children was high, despite most of the smokers knew about the adverse effects of household smoke exposure on their children' s health and desired to quit smoking.

Keywords: asthma, children, household smoke exposure, knowledge, parents, Thailand

INTRODUCTION

Epidemiological study of allergic airway diseases, including allergic rhinitis and asthma, shows an increasing prevalence of these diseases among the pediatric Thai population during the last decades (Bunnag *et al*, 2009). Household tobacco smoke exposure could be one of the potential factors associated with this increased prevalence. Numerous studies in Thailand and other countries have identified a significant relation between household smoke exposure and the development of asthma in both children and adults (Uthaisangsook, 2010; Mitchell *et al*,

Correspondence: Dr Suchada Sritippayawan, Department of Pediatrics, Faculty of Medicine, Chulalongkorn University, Rama IV Road, Bangkok 10330, Thailand.
Tel: +66 (0) 2256 4951; Fax: +66 (0) 2256 4911
E-mail: ssritippayawan@yahoo.com

2012; Charoenca *et al*, 2013). Moreover, tobacco smoke exposure is also causing increased symptoms, and asthma-related emergency department visits or hospitalizations in asthmatic children (Wang *et al*, 2007; Lawson *et al*, 2011; Akinbami *et al*, 2013). Conversely, avoiding smoke exposure can prevent the exacerbation of asthma (Rayens *et al*, 2008; Herman and Walsh, 2011).

As there are adverse effects of environmental tobacco smoke exposure, the parents/guardians of asthmatic children may receive more information than the parents/guardians of healthy children. However, the prevalence of household tobacco smoke exposure among asthmatic children currently is still high in many countries (Halterman *et al*, 2006, 2010; Wagener *et al*, 2010; Biksey *et al*, 2011; Borrelli *et al*, 2014). Therefore, it is very challenging for medical personnel to reduce environmental tobacco smoke exposure, especially household exposure. Before implementing a course of action, we need to know the prevalence of household smoke exposure in the population, sociodemographic backgrounds, and smoking habits of parents, as well as their knowledge and perceptions about the dangers of tobacco smoke. However, there are limited studies in Thailand about aforementioned information.

As a result, the aims of this study were to determine the prevalence of household smoke exposure among Thai asthmatic children in pediatric asthma clinic of Prapokklao Hospital, and to survey parental knowledge and perceptions of the adverse effects of household smoke exposure.This information would be helpful for developing the appropriate specific interventions to reduce household smoke exposure and improve treatment outcome in asthmatic children.

MATERIALS AND METHODS

Study design

This study was a cross sectional study. Parents/guardians who brought their children to the asthma clinic at Prapokklao Hospital Chantaburi Province, were interviewed to complete the questionnaire by the investigator (SP) during their waiting period prior to seeing their pulmonologist in a private location.

Data collection methods

If there were no household smokers, only the parents/guardians accompanying the pediatric patient were interviewed. If there were smokers in the household, the parents accompanying the patient were interviewed, and additionally, a questionnaire with a postage-paid, self-addressed envelope was given to the family to take back home for other household smokers to complete.

Study population

Respondents were the parents or guardians whose children were followed up at the pediatric asthma clinic, Prapokklao Hospital during June-September 2014. The inclusion criteria included those who were fluent in reading, speaking, and writing of the Thai language.

Ethical considerations

This study had been undertaken at Prapoklao Hospital, which is affiliated to the Department of Pediatrics, Faculty of Medicine, Chulalongkorn University, for the pediatric residency-training program. The Chanthaburi Research Ethics Committees approved this study (CTIREC)(Ref Nº CTIREC 016; 2014 Jun 25). Informed consent was obtained from all respondents prior to enrollment.

Questionnaires

Data were collected using a question-

naire, which was adapted from the three following sources:

Questionnaire from the Thai Health Promotion Foundation and Health Promotion Enterprise (2006) entitled "Smoking behavior in workplace"; Questionnaire from the Tobacco Control Research and Knowledge Management Center (TRC) and Thai Health Promotion Foundation (2013) entitled "Smoking behaviors of female teenagers"; Questionnaire from a thesis entitled "Relationship between perception from danger of second hand smoke and health behavior among member in smoking family" (Klumchim, 2008).

The questionnaires consisted of the following information: Part 1: Personal information of the patients; Part 2: Personal information of the parents/guardians: 2.1 General information, 2.2 Smoking history, 2.3 Knowledge of the dangers of smoking, 2.4 Perception of the risks of household smoke exposure, 2.5 Perception of the risks of disease exacerbation due to household smoke exposure, 2.6 Perception of the costs and benefits of avoidance of household smoke exposure.

Parts 2.3-2.6 were: agree/disagree/not known questions containing 29 items with a total score of 58. The total score of these four parts were used for the assessment of parental knowledge and perceptions toward the dangers of household smoke exposure.

Prior to be used in the study, the questionnaire that was adapted from the aforementioned sources was reviewed by an expert panel including two pediatric pulmonologists and one research professor, who reviewed the contents and evaluated the appropriateness of the questionnaire in relation to the objectives of the study. A pre-test field survey on the reliability of the questionnaire was conducted with 30 parents/guardians of children attending general pediatric outpatients department of Prapokklao Hospital. Data collected from this survey was then statistically analyzed for reliability with Cronbach's alpha test, which calculated a value of 0.78.

Data analysis

Data were compared between the two groups using unpaired Student's *t*-test for the continuous variables. A two-tailed *p*-value of >0.05 was considered to be statistically significant. The statistical analysis was performed using SPSS® (version 19.0; IBM: Armonk, NY).

RESULTS

There were 149 pediatric patients (mean age 6.8±3.3 years, ranging from 0.6 to 18 years, 68.5% male) who presented at the asthma clinic of Prapokklao Hospital during June-September 2014. One hundred thirty-two patients (88.6%) were well-controlled asthma, while 119 patients (79.9%) received one or more controllers [Steps 2-to-4 treatment protocol according to the Global Initiative for Asthma (GINA) guidelines (GINA, 2014)]. Seventy-one patients (47.7%) lived with at least one household smoker. Fifty-three smokers (74.6%) were the child'fathers. Other smokers included grandparents, uncles, brothers, and others (Table 1).

Of the 149 parents/guardians who were interviewed at the clinic (mean age 37±8.8 years, range 19-to-62 years, 83.2% female), 110 (73.8%) were mothers. The remainder were fathers (21 cases; 14.1%), grandparents (16 cases; 10.8%), aunts or uncles (two cases, 1.3%). Only five were smokers; all of them were the patients' father and smoked everyday. The numbers of cigarettes smoked per day were 6-10 in

Table 1
Demographic, clinical and second-hand smoke exposure data of patients (*N*=149).

Variables	*n* (%)
Male	102 (68.5)
Age (years)	
≤5	57 (38.3)
>5-10	69 (46.3)
>10-15	20 (13.4)
>15-18	3 (2)
Severity of asthma[a]	
Step 1	30 (20.1)
Step 2	52 (34.9)
Step 3	45 (30.2)
Step 4	22 (14.8)
Control of symptoms	
Controlled	132 (88.6)
Partly controlled	14 (9.4)
Uncontrolled	3 (2)
Comorbidity	
Yes	111 (74.5)
Allergic rhinitis	102 (91.8)
Atopic dermatitis	0
Allergic conjunctivitis	2 (1.8)
Others	36 (42.4)
Exposure to second-hand smoke	
None	61 (41)
In-house only	62 (41.6)
Outside only	17 (11.4)
Both in-house and outside	9 (6)
Number of in-house smokers	
None	78 (52.3)
One person	55 (36.9)
Two persons	15 (10.1)
Three persons	1 (0.7)
Relationship between in-house smokers (*n*=71) and patients	
Father	53 (74.6)
Grandparent	17 (23.9)
Uncle	13 (18.3)
Brother	1 (1.4)
Other	1 (1.4)

[a]Severity of asthma referred to treatment Steps (Global Initiative for Asthma, 2014).

four cases and greater than ten in one case. Three cases were in-house smokers, while two cases smoked only at the workplace. All of the five said that they had a desire to quit smoking (Table 2).

After finishing the visit at asthma clinic, all parents/guardians were asked whether there were other household

Table 2
Smoking data and resources of information.

Variables	Smokers who accompanied the patients to asthma clinic (*n*=5) *n* (%)	Smokers who were mail correspondents (*n*=26) *n* (%)
Frequency of smoking		
Everyday	5 (100)	16 (61.6)
Almost everyday	0	5 (19.2)
Occasionally	0	5 (19.2)
Number of cigarettes/day		
1-5	0	9 (34.6)
6-10	4 (80)	9 (34.6)
11-15	1 (20)	2 (7.7)
16-20	0	3 (11.5)
Missing data	0	3 (11.5)
Location of smoking		
At home	0	8 (30.8)
At workplace	2 (40)	5 (19.2)
Both	3 (60)	11 (42.3)
Missing data	0	2 (7.7)
Desire to quit smoking		
No	0	1 (4)
Yes	5 (100)	25 (96.1)
Resources of information about the dangers of household smoke exposure		
Formal teaching by medical personnel/volunteers	0	5 (19.2)
Social media	3 (60)	15 (57.6)[a]

[a]Five of 15 cases also received general information about the dangers of household smoke exposure via formal teaching.

smokers who did not accompany the patients but who would be able to complete aquestionnaire at home. Finally, there were 80 questionnaires that parents/guardians took back home for other household smokers to complete. However, only 26 questionnaires (32.5%) were returned (mail correspondence).

The mean age of the mail correspondents was 37.6±13.4 years (range 21-to-70 years). All of them were male. Among these, 19 (73.1%) were fathers; the remainder were grandfathers (four respondents; 15.4%) and uncles (three respondents; 11.5%).The number of cigarettes smoked per day was greater than ten in five respondents (19.2%). Nineteen respondents were in-house smokers, while five respondents smoked only at the workplace. Twenty-five respondents (96.1%) said that they wished to quit smoking (Table 2).

One hundred seventy-five parents/guardians (including 149 parents/guardians who accompanied the patients to asthma clinic and 26 mail correspondents (31 smokers and 144 non-smokers) com-

pleted the questionnaires. Among these, 109 cases (62.3%) had opportunities to receive information about the dangers of household smoke exposure (18 smokers, 91 non-smokers). Of 175 parents/guardians, 34 (19.4%) received information via attending the formal teaching classes conducted by medical personnel or medical volunteers, while 75 (42.9%) had never received formal teaching but received the general information about the dangers of household smoke exposure via social media (such as television and posters).

Of 31 household smokers, 18 (58.1%) had received the information about the dangers of household smoke exposure. Five household smokers (16.1%) received information via formal teaching, while 13 (41.9%) had never received formal teaching but did so via social media (Table 2).

Regarding knowledge and perceptions of the parents/guardians towards the dangers of household smoke exposure, the mean knowledge testing scores were 49.9±5.6 (range 37-58) and 51.7±4.9 (range 37-58) in 39 smokers and 144 non-smokers, respectively. There was no statistical difference in the mean testing scores between the two groups (95% CI: -0.16-3.78, p=0.07).

DISCUSSION

The prevalence of household smoke exposure in children presenting at the asthma clinic, Prapokklao Hospital,was47.7%. This prevalence was comparable to a study from Chicago, Illinois where half of the parents of asthmatic children reported that at least one household member smoked (McCarville *et al*, 2013).In our study, 88.6% of the patients were well-controlled asthmatics. However, nearly 80% still needed at least one controller. This high controller requirement was probably related to the high prevalence of household smoke exposure.

In our study, we found a disparity between parental knowledge and smoking behaviors; 58.1% of household smokers had received information on the dangers of household smoke exposure. In addition, their knowledge testing scores were comparable to the non-smokers. The discrepancy between knowledge and smoking behaviors has also been reported in other countries. A case-control study of 371 caregivers of urban children with and without asthma attending school in Rochester, New York found that 78% of parents felt that cigarette smoking was very dangerous, and 97% agreed that smokes harmed the health of children (Halterman *et al*, 2010). However, 39% of children were still living with one or more smokers. A study in Iran surveyed 647 families of preschool children visiting health centers in Tehran and found that 35.7% of families had at least one smoker, while 96% of parents were aware that passive smoking was dangerous for their children (Shiva and Padyab, 2008).There was no significant difference between smokers and non-smokers.

With regards to the causes of the disparity between parental knowledge and their smoking behaviors, the Rochester study found that stress, nicotine addiction, and the use of ineffective strategies to reduce in-house smoke exposure were the barriers to reducing household smoke exposure in asthmatic children (Halterman *et al*, 2007).

In this study, although almost all of the household smokers had a desire to quit smoking, they still smoked. Other factors found in a previous research (Halterman *et al*, 2007) could also contribute to their

continuity of smoking behavior. However, factors associated with stop-smoking failure may be varied and need to be explored in specific socio-economic and cultural backgrounds. This information would be helpful for developing an appropriate specific plan to eliminate household smoke exposure in asthmatic children.

There are several methods that have been used for providing the information to the general population in regard to the adverse effects of tobacco smoke exposure on children's health. In our study, we found that 42.9% of the parents/guardians received this information via social media, while 19.4% received the information through formal teaching class conducted by medical personnel or medical volunteers.

Our study was limited by the low response rate of mail correspondence.Therefore, some data from household smokers in regards to their smoking history, their knowledge and perceptions of the dangers of household smoke exposure, as well as the sources of this knowledge could be missed. Another limitation is that very few household smokers accompanied their children to asthma clinic. This could possibly deny the opportunity to have a two-way communication with medical personnel concerning the adverse effects of household smoke exposure, and how to stop smoking and overcome their limitations to quit smoking. Medical personnel may need to take a more active and multidisciplinary approach to reach this particular population in order to provide the essential knowledge and help them to quit smoking.

In conclusion, we found a high prevalence of household tobacco smoke exposure (47.7%) among asthmatic children who attended asthma clinic at Prapokklao Hospital. The household smokers rarely accompanied their children to the clinic. Despite being aware of the adverse effects of household smoke exposure on their children's health and desiring to quit smoking, they still smoked. Medical personnel should take a more active and multidisciplinary approach to reach this particular population in order to provide them the essential knowledge and help them to quit smoking. Other potential barriers to reducing household smoke exposure need to be explored. This information would be helpful for developing the appropriate specific interventions to eliminate household smoke exposure and improve treatment outcomes for asthmatic children.

ACKNOWLEDGEMENTS

This study was undertaken as a partial fulfillment of the King Chulalongkorn Memorial Hospital pediatrics residency training program of Dr Supanun Poopat. We would like to thank Professor Yossapon Leungsommana, the research professor from Prapokklao Nursing College, who reviewed the contents and evaluated the appropriateness of the questionnaire in relation to the objectives of the study.

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