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Childhood Asthma — What Teachers Need to Know

ANG KAI LING

1. Introduction

The incidence of asthma among Singaporean children is as high as one in five (Goh et al., 1994). Although this article is based on the author's studies in England, the findings may well be useful in throwing light on the problem in Singapore and assisting parents and teachers in the management of children with asthmatic tendencies.

Each year, in the United Kingdom, approximately 10% of young children exhibit symptoms of coughing and wheezing. By the age of ten, at least 20% will at some time have had symptoms of underlying asthma.

I am particularly concerned about the incidence of food restrictions designed to prevent or mitigate asthma attacks. To examine the extent to which parents of asthmatic children believed that foodstuff provoked asthma and the extent to which they applied dietary restrictions, a survey was conducted with 145 parents of 294 asthmatic children, aged 11 and below in UK in 1993.

19.7% of asthmatic children have been reported to react to certain foods/drinks. Milk and dairy products featured most frequently. The rest of foods reported, in order of decreasing frequency, were fizzy soft drinks, eggs, nuts, fresh fruits and fruit-juices, fish/seafood, artificial additives/colourings, chocolates and wheat.

These reactions were mainly identified by the parents' own observations (50%) and almost 70% of them adopted dietary restrictions or avoidance, out of their own judgement and advice from friends and relatives. 57% of these parents provided vitamins and minerals to their children, probably with the hope of making up the

nutrients that they may have taken out from their children's diet. Unfortunately, many of these supplements provided were not appropriate diet replacement.

Forty percent of these parents found professional help on asthma management not easily available while another 15.2% of them were uncertain. It is understandable that parents and teachers are frustrated or helpless in dealing with asthmatic attacks. Such a scenario can be avoided when some basic knowledge of common triggers are made known to them. The aim of this paper is to provide some scientific findings about childhood asthma — at home or in school.

I. What is Asthma

It is important to understand what asthma means, its causes and the sequence of events that takes place. This knowledge makes it much easier for parents and teachers to manage asthmatic children.

Asthma is a condition affecting the respiratory tracts. Bronchial tubes, airways of the lungs, gradually divide further until they reach all parts of the lungs.

At the beginning of the tubes, the bronchi are about 2 cm wide and at the extremities, inside the lungs, the width is reduced to about half a millimetre (Figure 1). The bronchial tubes are soft and kept open by muscles in the walls. Unlike the muscles in our hands or legs, if irritated, they tend to involuntarily contract, resulting in muscle spasm and narrowing of the airways. This reduces the amount of air that can move through them. The medical term for this is bronchoconstriction.

Trigger factors that cause bronchoconstriction vary from child to child, although dust and pollen are the most common. The situation is made worse with swelling of the inner lining of breathing tubes and excess amount of mucus or phlegm. However, such swelling takes a few hours to develop. Hence, it is easier to treat an asthma attack when there is only muscle contraction. Therefore, it is equally important to be able to recognize an attack so as to provide the appropriate treatment rapidly.

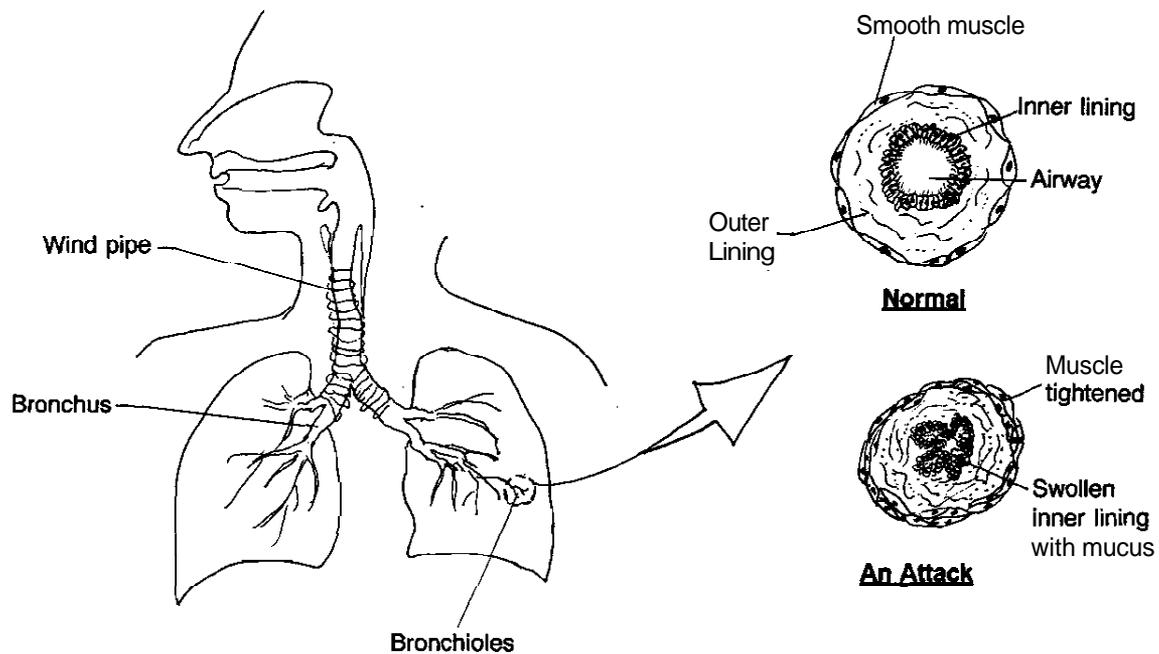


Figure 1: The Lungs and the Bronchial Tree

II. How to Recognize an Asthma Attack

Asthma can be in two forms; a chronic shortness of breath or a quick onset of severe breathlessness. There is more difficulty breathing out than breathing in, because during the inhalation, the pulling in of air tends to widen the airways, while exhalation is the opposite, the airways become relatively narrower. Hence, in the attempt of forcing air out, there is the characteristic whistling sound known as wheeze.

At such a stage, it is not easy to reassure the child. Management now is aimed solely at relieving the breathing difficulty. An aerosol inhaler will do the trick rapidly. Hence, perhaps, schools should consider placing inhalers in their first-aid kit and regularly monitor the expiry dates for all items in the kit.

2. Methodology

The sample of the study was made up of parents of asthmatic children from various Asthma-Self-Help groups of the Greater London area, patients of general practitioners and Hospital Asthma Clinics (Royal Brompton Hospital, Hammersmith Hospital and Hospital For The Sick Children) and two preschools.

As this was apparently the first study of its kind conducted in UK, a structured 'Diet and Childhood Asthma' questionnaire, based on the different aspects of diet and asthma, was developed and piloted with a small number of parents who had asthmatic children. The response to the pilot-test was very encouraging, with most of the questions answered without difficulty. Together with their comments, the questionnaire was further refined.

A total of 302 questionnaires were given to these parents and 145 were returned. The Statistical Package for Social Science (SPSS) was used to analyse the returned questionnaires.

The questionnaire consisted of 3 sections. Section A which is pertinent to this paper, established the following :

1. the total number of asthmatic children,
2. environmental factors as well as foods/drinks which trigger their attacks,
3. existence of dietary restrictions,
4. whether the need for dietary restrictions had been confirmed by professionals or initiated by themselves,
5. their source of dietary management information.

Limitations of this kind of questionnaire are acknowledged. Time constraints did not allow for focus group interviews and formal validation was not feasible. Its reliability is thus correspondingly limited. Nonetheless, the results produced some interesting indicators.

3. Results and Discussions

1 Common Triggers of Asthma

Analysis of the questionnaires received showed the common triggers of asthma to be;

- Allergy - inhaled, consumed
- Emotionally disturbed/stress
- Pollution - dust, smoke, etc.
- Infection - common cold etc.
- Physical exertion

Similar findings were also discovered in a recent study conducted in Singapore. (Results will be published in the near future). Some children have underlying general irritability of their breathing tubes due to one or a combination of these triggers. This is undoubtedly an inherited trait which is also found in my studies in London. Figure 2 shows the percentage of asthmatics in relation to the family history of asthma being traced to either the father or the mother.

Exposure to only a single stimulant may not be sufficient to create problems but when another is added on, then the attack may start. For example, a brief football game during school recess may not immediately trigger an asthma attack, but the presence of another trigger, such as exposure to cold when the asthmatic child stands under the fan to cool himself before a lesson, can start the asthma attack. Perhaps, teachers, who should know all asthmatic children in his/her class, can help to watch out for this common scenario and warn the child beforehand. Alternatively, the school can conduct talks for asthmatic children together with their teachers and parents on this and other relevant topics.

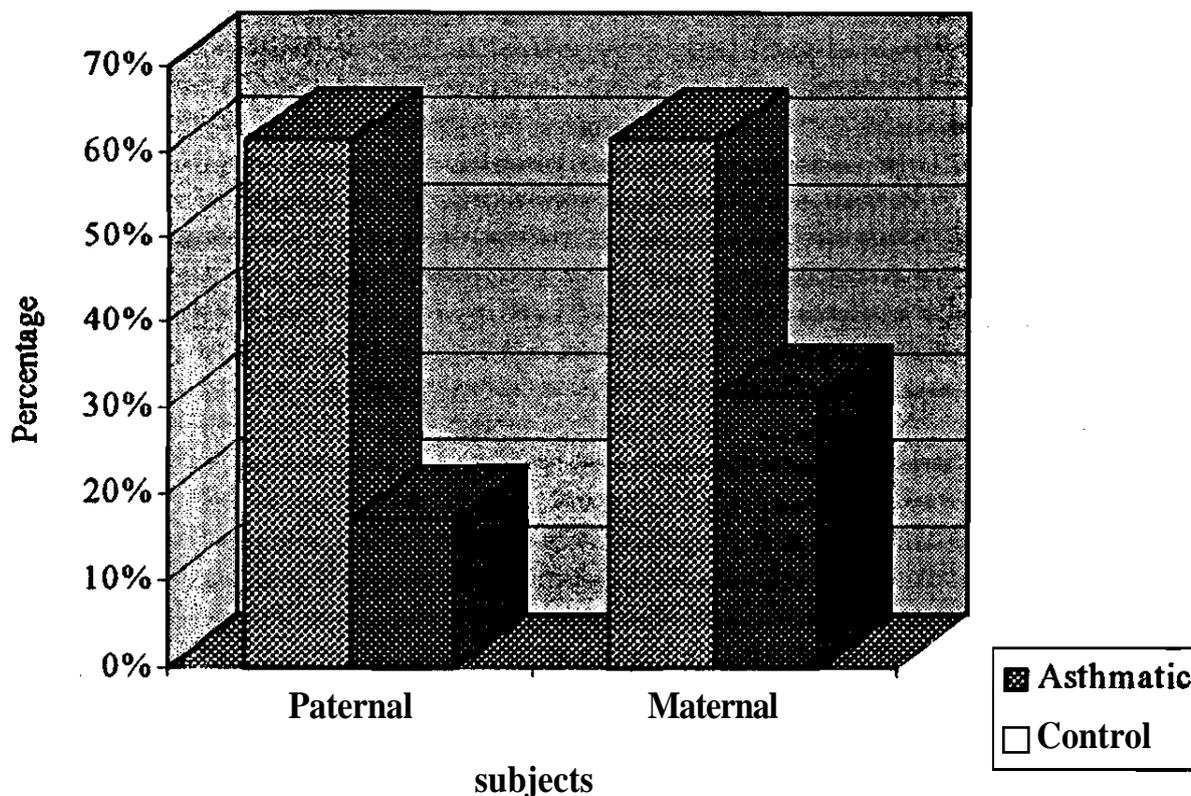


Figure 2: Family History of Asthma/Related Diseases

In another study, Wilson et al. (1985) found Coca Cola and other fizzy drinks to cause an increased sensitivity of the airways; additional stimuli, such as cold air or exercise is more likely to produce asthma symptoms, rather than the cold drink itself. Steinman et al, who conducted a study on the effect of soft-drink preservatives on asthmatic children, had shown that it was not the beverage that cause the asthmatic symptoms, but rather the addition of other stimuli, such as cold air or exercise, as the airways and lungs become more sensitive with these beverages. We can illustrate this as in the "asthma barrel" (Figure 3). Soft drinks is a common item, parents complain for the cause of their children's asthma attacks. Here again, we see the 'barrel effect'; perhaps, it is the physical exertion from games that children have after the drink that triggers the attack, rather than the drink itself.

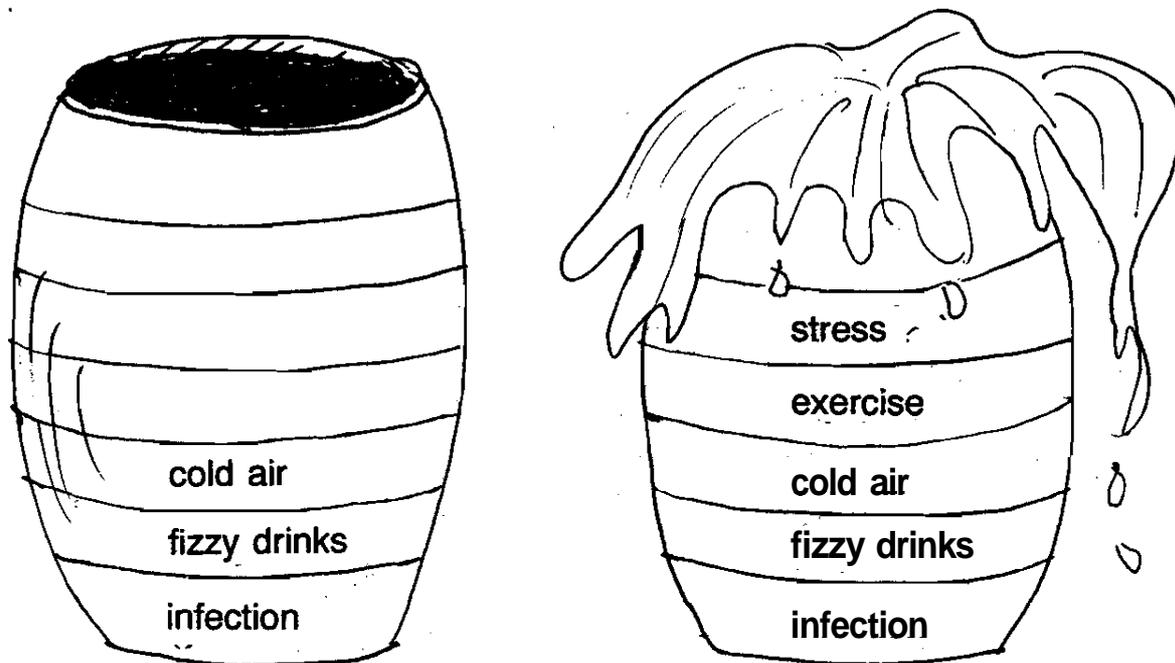


Figure 3: "The Barrel Effect"

The results of this study show that about 18.6% of parents with asthmatic children reported that their children reacted to foods/drinks with asthma attacks. Milk and dairy products occurred most frequently as foods/drinks that provoked asthma. The rest of foods reported, in order of decreasing frequency, were fizzy soft drinks, eggs, nuts, fresh fruits and fruit-juices, fish/seafood, artificial additives/colouring, chocolates and wheat (Figure 4).

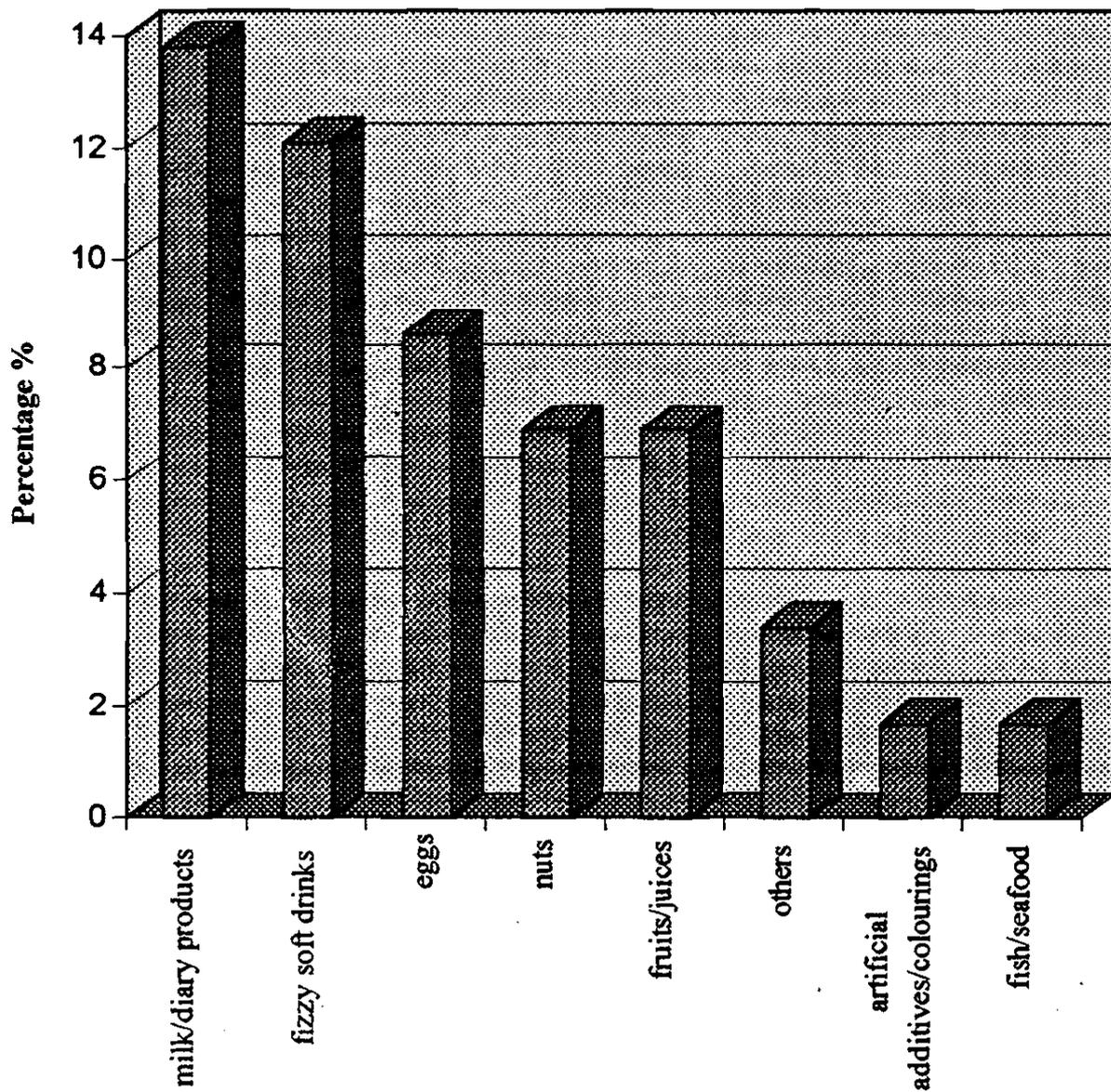


Figure 4: Foods and Drinks Reported to Provoke Asthma

II *Diagnosis and Management*

The data obtained in the study were identified mainly by parents' own observations and this makes up 50% (Figure 5). The strong belief by parents that certain foods are somehow instrumental in initiating an asthma attack has resulted in 37% of these parents refusing to allow their children to consume these foods, while 40% of the parents allowed these foods only on special occasions.

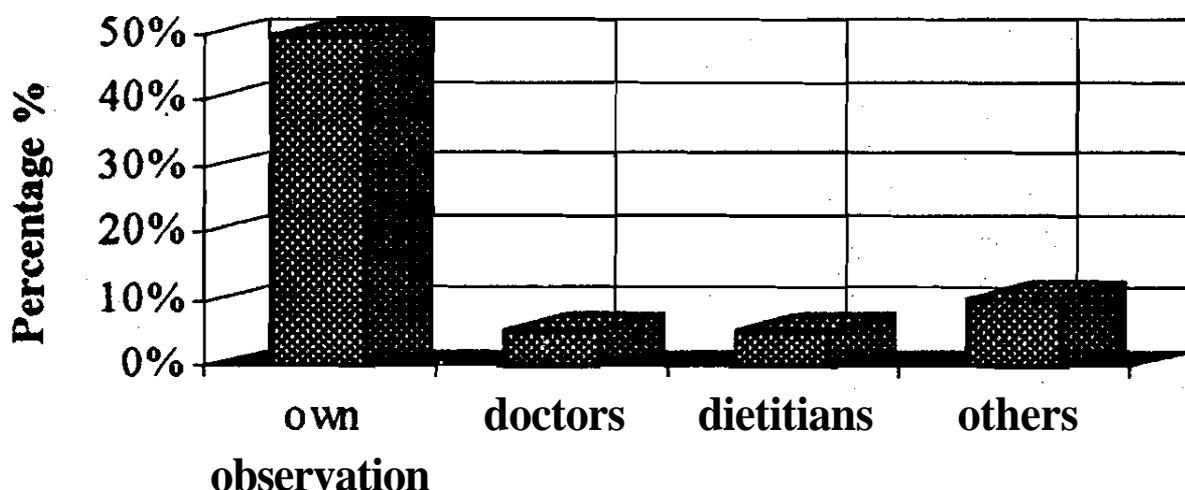


Figure 5: Diagnosis of Foods/Drinks Reported to Provoke Asthma

It is understandable that parents, in such a situation, can be anxious and may be frustrated by the sole reliance of drugs in managing their asthmatic children. Parents may therefore resort to whatever source of information that come to their attention. It is therefore not surprising to find 40% of these parents practising dietary restriction or avoidance on their own initiative and advice from friends/relatives (Figure 6).

In trying to make up for the foods and drinks avoided or restricted, 57% of parents provided vitamins and minerals to their children. However, such a 'shot gun' method of giving multivitamins may not be the best solution to asthma management for all asthmatic children. Growing children need protein other than vitamins or minerals; milk and dairy products removed from the diet cannot be replaced by multivitamins.

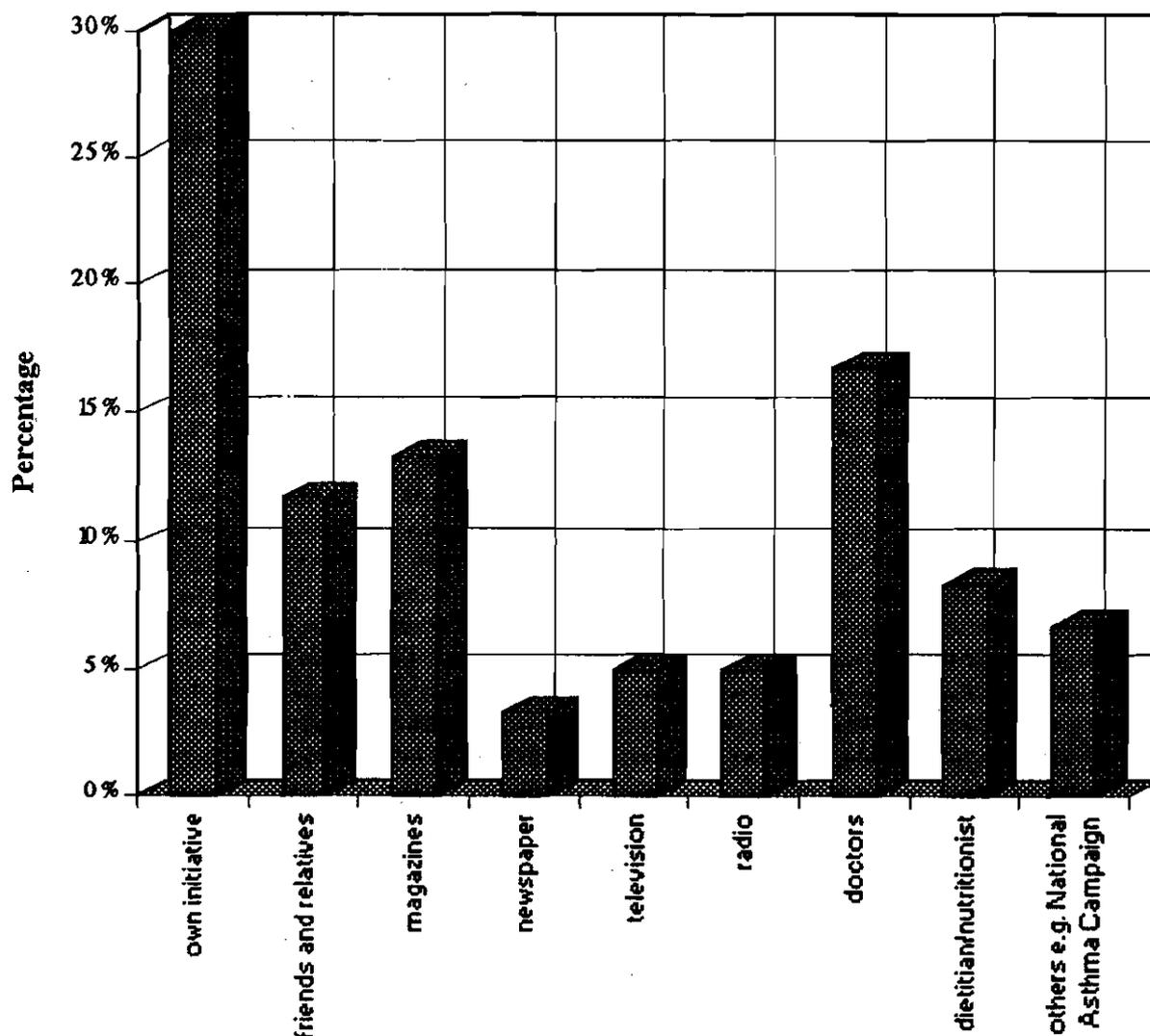


Figure.6: Sources of Information on Dietary Restrictions/Avoidance

The next common food removed is fruits. Vitamin C has been found in many studies to build-up resistance against transient respiratory diseases, which is one of the cause leading to asthma wheezing, yet only about 9.7% of the parents with asthmatic children in this study supplemented with vitarnin C while 18.9% of parents of control children gave vitamin C. Bucca et al. (1992) found that vitamin C may be effective when the increase in bronchial responsiveness induced by allergen exposure is mild and of recent onset.

Removal of fruit from the diet may result in reduction in dietary fibre intake, unless this is replaced with a lot of vegetables. This ignorance is reflected in only about 6.1% of the parents of asthmatic

children believing that they should provide a lot of greens. It is a well-known fact that most children do not like vegetables and consume very little of them or avoid them when mum is not watching!

III Exercise

It has been known since the mid 1960s that prolonged stressful exercise produces a bronchoconstriction 6-10 minutes after the onset of exercise (Jones et al., 1962). In other words, the shortness of breath actually increases after exercise has stopped. This is more likely if the child has a cold or has had recent exposure to an allergen to which he is sensitive, for example dust mites. This could be frustrating to many active children, and it is therefore important to take a very positive approach to ensure that it does not prevent them from taking part in play and game activities. Teachers, especially PE teachers should be advised on this topic. One practical approach is to encourage the children to take two to three puffs from their inhalers, minutes before commencing games and to have few minutes rest interval for brief runs of 10-15 minutes. This is demonstrated in Schnall et al's study (1980), where they found a protective effect of repeated short sprints in exercise-induced asthma. This will often allow the child to take part in prolonged stress with fewer, if any, asthma symptoms. Blecker (1984) also found a diminished exercise-induced asthma developed when exercise is repeated at time intervals of less than 2 hours. In fact, respiratory physicians would recommend incorporating exercise rehabilitation into complete asthma management to strengthen the patients' peripheral muscle and improve general fitness. PE teachers can introduce exercises that strengthen chest muscles for asthmatic children.

Conclusion

These results seem to indicate that parents of asthmatic children need more information and professional advice on managing their children's asthma and diet. This can be important if unnecessary nutrient deficiencies is to be avoided, when self-administered dietary restrictions are commonly adopted. It is equally important for teachers and parents to understand the 'barrel-effect' of triggers and watch

out for them before allowing the asthma attacks to take place. Also, this can help to remove any unnecessary anxieties. Knowing the importance of exercise that help strengthen the fitness level of the children will help both teachers and parents from taking the children out from games and PE lessons unnecessary. It is important not to isolate the children as this may affect their confidence about themselves.

In order to prevent nutritional deficiencies, social isolation and possible emotional harm that results from inappropriate, long term and extreme dietary measures or unnecessary restriction from games and play activities, objective verification should therefore be carried out.

Childhood asthma tends to improve with time, those wheezing without obvious allergic triggers in the first few years of life may well be asymptomatic by the age of six or seven years. However, in the process of 'growing out' of asthma, the extent of dietary restriction and the types of restriction may have a great effect on the children's growth, especially a delayed onset of puberty (Balfour-Lynn, 1986). Besides drugs and dietary management, nonpharmacological means of preventing asthma could be simple and effective. Cessation of smoking in the home is one of the most important actions recommended (Price, 1990). There is a highly significant increase in wheezing, coughing and respiratory infections in children with smoking mothers. Avoiding allergens at home, such as dust mites, can be achieved by constantly vacuuming the beds, rooms. Others recommend the use of ionizers, its effectiveness is yet to be proven.

Although information given in the survey depended on memory in some cases and retrospective interpretation of asthma/food allergy by the person who answered the questionnaire, nevertheless, the results indicated a great majority of parents were uncertain about their children's diet and childhood asthma. Although, these findings were obtained from surveys done in U.K. but the lessons could well be applicable to the Singapore context.

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