

**EFFECTIVENESS OF RPAH ‘ DEALING WITH FOOD ALLERGY’
EDUCATION PACKAGE FOR SCHOOLS**

MASTERS OF NUTRITION AND DIETETICS

UNIVERSITY OF SYDNEY

by
May Shuen Lim

Supervisors:

Dr Velencia Soutter(Pediatrician)
Dr Anne Swain (Chief Dietitian)
Dr Robert Loblay (Director)
Maine Norberg (Public Health dietitian)

ALLERGY UNIT
DEPARTMENT OF CLINICAL IMMUNOLOGY
ROYAL PRINCE ALFRED HOSPITAL

October 2001

ACKNOWLEDGEMENTS

I would like to thank everyone at the RPAH Allergy Unit for all their help and support.

A big thank you to my supervisors, Dr Anne Swain, Dr Velencia Soutter and Dr Robert Loblay.

Thank you Dr Soutter for your advice and challenge during the course of the project. I enjoyed the focus group and the discussion we had before the commencement of it.

Thank you Dr Loblay for your time and expertise for this project.

My heartfelt thanks to Anne. Thank you for your constant encouragement, your joy and positive words throughout this project. I felt I have learnt a lot from you.

I would like to thank Dorothy and Jenny for your friendship and help during my time at the Allergy unit.

Thank you Tim for your help in setting up the database.

Finally, I would like to thank Carmen for her company and good conversation during the project, to my parents for their love and support and to God for seeing me through all the time.

Abstract

Introduction: Food-induced anaphylaxis is the most severe form of food allergy. It can be fatal if prompt emergency treatment is not given. Food allergies and food-induced anaphylaxis are increasing and children while at school are at particular risk.

Aims:

To investigate:

- (1) Teachers attitude and level of knowledge about food allergies.
- (2) Barriers which may impair teachers' ability to deal with food anaphylaxis.
- (3) The effectiveness of the educational package on food allergy for schools and preschools.
- (4) The most effective way to disseminate the information in the educational package.

Methods: Cross-sectional mailed survey of school teachers from normal education and intensive support school. Data was collected using a written questionnaire, which explored various aspects of teachers' knowledge and attitude towards food-induced anaphylaxis, confidence in managing emergency, legal and social issues.

Results: There was an increase of 15% for teaching staffs who felt confident in giving emergency treatment and a 10% increase in staffs who felt confident that they can recognize the symptoms of a severe allergy reaction for intervention groups(234). Simply answering the questionnaires had a significant impact on the scores of the control group. A high percentage (98%) in intervention group intended to ask the principal whether a plan and procedures about children with food allergy was available at the schools and pre-schools.

Conclusion: The educational package was successful in improving teachers' confidence and ability to manage an emergency, and in altering attitudes towards food allergy. Simply answering the questionnaires had an impact even on the scores of the control group. Scores appeared to show obvious improvements for respondents who each received a set of the educational package, which consisted of a video and a food allergy booklet.

INTRODUCTION

Food allergy, defined as an immunological hypersensitivity mediated by immunoglobulin E antibodies to certain proteins in foods¹, can manifest clinically in a number of ways. The most acute and serious manifestation of food allergy is anaphylaxis, which can be fatal if prompt emergency treatment is not given. Foods likely to trigger an anaphylactic reaction are peanuts, cow's milk, eggs and fish.^{2,3}

There has been an increase in food allergies, in particular peanut allergy.^{4,5}

In childhood, the prevalence of food allergy is 5-8%. Currently, approximately 0.5% of children in Australia experience a severe generalized allergic reaction (anaphylaxis) to food. This can be attributed by changes in eating habits and infant feeding. Other contributing factors as stated by published surveys and clinical experience indicate that most food allergic children are accidentally exposed at least once a year despite their parents' best efforts at avoidance.^{5,6} Hidden ingredients, eating outside home and food-swapping in pre-schools and kindergartens are the most common causes of fatal or near-fatal reactions.⁴

While the use of adrenaline can be lifesaving in an emergency situation, its prescription complicates the management of at risk children. Other problems include lack of knowledge about food

induced anaphylaxis and its management in the event of an emergency amongst parents, carers and teachers.

FOOD ALLERGY

Food allergy is characterized by the presence of high levels of food protein specific immunoglobulin (Ige) antibodies in individuals with allergies.¹⁶ Sensitization usually occurs early in life either when weaning foods are first introduced, or more often when protein fragments absorbed from the mother's diet are transmitted to the infant via breast milk, resulting in the production of Ige antibodies.¹⁴ The allergy manifests clinically when the sensitized child is subsequently re-exposed to the relevant food or beverage. Symptoms are caused by Ige mediated mast cell activation, with release of histamine and other inflammatory mediators. Most allergic reactions to foods are not severe and will disappear as the child gets older.¹⁵ Symptoms are immediate and reproducible and include swelling at the point of contact followed by hives, redness, swelling of the face and often vomiting. Infantile eczema is also highly associated with food allergy.^{1,17}

FOOD ANAPHYLAXIS

The most serious manifestation of food allergy is anaphylaxis. An anaphylactic reaction can involve a number of symptoms consisting of generalised urticaria, angioedema, wheezing, shortness of breath, laryngeal oedema, nausea, vomiting, diarrhoea, hypotension, shock or

coma.¹⁸ While a variety of agents are known to precipitate anaphylaxis, foods are the most common cause in children.^{19,20} Foods most likely to cause an anaphylactic reaction are cow's milk, egg, nuts, fish.^{2,3}

Adrenaline is the preferred first line of treatment in the event of an anaphylactic reaction.¹⁰ However, due to the rapid onset of symptoms adrenaline should be self administered in the form of an EpiPen (a pre loaded dose of adrenaline), before reaching medical attention.

PREVALENCE OF FOOD ALLERGY AND ANAPHYLAXIS

It had been known that food allergies affect approximately 4-6% of infants, 1-2% of children and less than 1% of adults.¹⁷ Although most children eventually grow out of their food allergies, a significant number remain at risk of a serious reaction in primary school and the early years of high school.

The American Academy of Allergy and Immunology has estimated that, in USA, at least one food allergic student attends most school.¹⁷ A similar trend has been noted in Australia, and it may not be long before most schools will also have one or more food allergic children.

There is little information on the mortality and morbidity associated with severe food allergy; however it appears to be a growing problem.^{4,5,11,19,20,22}

SITES AND CIRCUMSTANCES WHERE ANAPHYLAXIS OCCURS

Yunginger and Valentine (1980,1979) did studies and had data showing that anaphylactic fatalities more often occur away from home and are associated with either not using epinephrine or a delay in the use of epinephrine treatment. In children, the majority of fatal anaphylactic reactions occur away from home, often at school.¹⁴ Because children spend a significant percentage of their waking hours in a school setting, special attention must be made to the unique features of the risk of anaphylaxis at school and the possible barriers to effective treatment.

Rudd (1993) wrote in a report on six fatal and seven near-fatal anaphylactic episodes to foods in children that highlighted the seriousness of the need for prompt recognition and treatment. Four of the six fatal reactions occurred at school, and none of these patients had epinephrine available at the time of their reactions.

In a study on food allergic reactions in schools and preschools, it was reported that of 132 children in the study, 58% reported food allergic reactions in the past two years. 18% experienced one or more reactions in schools.

The following table shows the detailed prevalence of food allergic reactions in schools and preschools. 24 of these children experienced one or more reactions in schools. A total of 41 reactions were reported in these 24 children(median, 1 reaction; range, 1-7 reactions). 12 children had 19 reactions in schools, and 12 had 22 reactions in preschools. There

were an additional 3 children with multiple food allergies who had frequent (>30) benign cutaneous reactions in school that were attributed to foods.¹¹

It is important, therefore, that teachers are:

- (a) well informed about food allergies and the associated risk.
- (b) Aware of the need for vigilance to prevent accidental exposure
- (c) Recognize the early signs of a severe reaction and
- (d) Know what to do in the event of an emergency.

NUTRITIONAL IMPLICATIONS

Long term studies of food-allergic subjects suggest that the frequency of adverse reactions resulting from the accidental ingestion of offending foods by allergic individuals is alarming, in one study, 16 of 32 peanut-sensitive individuals contacted had experienced an accidental ingestion within the previous year.⁵ A study reviewing seven cases of fatal allergic reactions to foods revealed that the ingestion of milligram to gram (5000mg equals 5g or 1 teaspoon) amounts of food allergen by very sensitized individuals may prove fatal.²⁰ As such, dietary avoidance is the main preventive management of food allergy. This may involve the exclusion of only a single food or a range of foods depending on the extent of a person's allergies. Those with allergies to staple foods, such as milk or wheat, and those with allergies to multiple foods will need to follow a more restrictive diet than those with allergies to single peripheral foods, such as peanut or soy. As dairy products are the major source of dietary calcium, it is not surprising that children with cow's milk allergy who do not receive appropriate substitutes have calcium intakes below the estimated requirement. Providing parents with advice about obtaining appropriate substitutes for foods excluded from the diet, as a result of food allergy, is therefore an important part of the management of food allergic children.

In a school setting, besides teachers, canteen vendors ought to be aware of food allergy.

In preschools and child care centers, the cook responsible for preparing meals for the children need to be appropriately trained in the area of food safety and food preparation. It is best to consult a dietitian for dietary management of a child with food allergy.

Peanut allergy for instance is serious and the number of peanut allergic individuals is on the increase. Debate has gone into the banning of peanut butter from day-care centers with peanut allergic children. However, there are opinions that peanut butter is nutritious and, therefore, should not be banned. On the other hand, looking at the guidelines for healthy eating for children and adolescents and the healthy eating pyramid, nowhere is it stated that peanut butter is categorized into the core food groups. Having said that, omitting it from the menu of a day-care center and thus lowered occurrence risk of anaphylactic reactions from peanut allergy children far outweighs peanut butter seen as a nutritious food.

.

AIM

To investigate:

- (1) teachers attitude and level of knowledge about food allergies.
- (2) barriers which may impair teachers' ability to deal with food anaphylaxis.
- (3) the effectiveness of the educational package on food allergy for schools and preschools.
- (4) the most effective way to disseminate the information in the educational package.

Methods

This research project involved two main parts, which can be outlined as

- School Study
- Preschools Pilot Study.

ETHICAL APPROVAL

Ethical approval was obtained from the Ethics Review Committee (RPAH Zone) of the Central Sydney Area Health Service.

RECRUITMENT

Subjects

Recruitment was done during phase 1 of the school study. A list of government primary schools were obtained from the NSW Department of Education and Training's website and that for independent primary schools from the Sydney telephone directory. Schools were randomly selected. Invitation was made via a letter to the school principal and a follow-up telephone call. If a school refused to participate, another school was invited. Out of this, 26 government schools, 12 independent schools, 14 special schools in the Sydney metropolitan area, and 18 schools in rural NSW agreed to participate in this study.

Study Groups

Participating schools were assigned randomly to the following groups:

Group 1

- (1) A questionnaire, for each teacher to fill out .
- (2) A follow-up questionnaire, for each teacher to fill out ..

Group 2

- (1) A questionnaire, for each teacher to fill out.
- (2) A copy of the RPAH 'Dealing with Food Allergy' educational package (videotape & booklet) for the school.
- (3) A follow-up questionnaire, for each teacher to fill out.

Group 3

- (1) A questionnaire, for each teacher to fill out.
- (2) The RPAH 'Dealing with Food Allergy' videotape for the school and the information booklet for each teacher.
- (3) A follow-up questionnaire, for each teacher to fill out.

Group 4

- (1) A questionnaire, for each teacher to fill out.
- (2) A copy of the RPAH 'Dealing with Food Allergy' package (videotape & booklet) for each teacher.
- (3) A follow-up questionnaire, for each teacher to fill out.

PROCEDURE

Data collection

Information was collected using a questionnaire, which was developed following previous series of research focus group with parents of children with severe allergies, a literature review seeking to identify teachers' and school needs to appropriately handle children with special health needs and through consultation with immunologists and dieticians at the RPAH Allergy Unit .The questionnaire explored issues such as teachers' knowledge of emergency procedures, awareness of children at risk in each school, beliefs, attitudes, self-efficacy in coping with emergencies and legal issues .

The questionnaire

Participating schools were sent a package containing:

- (1) A letter to the principal outlining the aims and procedures of the study.(Appendix 1)
- (2) A letter to participating teachers outlining the aims and procedures of the study (Appendix 2)
- (3) A Food Allergy Questionnaire.
- (4) A copy of the RPAH 'Dealing with Food Allergy' package.
Depending on which of the four study groups the school is assigned)
- (5) A reply paid envelope for return of the questionnaire.

Following the above, a second ,similar, questionnaire was mailed to schools, for distribution to teachers who had previously responded to the first questionnaire.

As before, the questionnaire is attached with a postage-paid reply envelope.

One week after the due date, a reminder phone call was made to schools who have yet responded.

DATA ANALYSIS

The data from returned surveys were analysed using SQL Query Analyser.

A t-test: Paired Two Sample for Means was used to identify any differences between before and after responses and descriptive statistics; mean, standard deviation were obtained.

PRESCHOOL PILOT STUDY

Using information from the school study, a specific information package will be developed for preschools and day-care centers. Evaluation of effectiveness of the package will be done to determine if there is any impact on teacher's knowledge and capacity to manage food allergy and anaphylactic reactions in the event of an emergency. This will be done as per the method described in the school study using questionnaires which will be reviewed by pediatrician and dietitians in the RPAH Allergy Unit to suit this study.

It will however be beyond the scope of this study to look into the follow-up study in evaluation of effectiveness of the information package and its effect on teachers' knowledge of food allergy and anaphylaxis.

RESULTS

(A) School Study

(1)“Knowledge” questions

Table 1 and 2 show the responses of the control group and intervention groups(G234) to the knowledge questions. There was no significant difference in knowledge between the four groups and on follow-up, there was a similar improvement in knowledge.

The results of G2, G3 & G4 were combined as all show corresponding improvement except for Q21 (Table1) where only G3 showed a 10% increase in agreement that “ food allergy can be fatal if not treated promptly”

Table 1 Comparison between initial and follow-up responses to knowledge questions in intervention Groups (G234)

Question No/Type	Initial Questionnaire % Agree (N = 513)	Follow-up Questionnaire % Agree (N = 167)
Q21)Food allergy can be fatal If not treated promptly	87%	92%
Q29)Life threatening reactions Can come on within Minutes.	80%	89%
Q30)Hives and swellings around The face are a common sign Of a food allergic reactions	71%	84%
Q35) Surfaces and teaching materials with traces of peanut butter can cause a severe reaction in a peanut allergic child.	52%	76%
Q33) Peanut is the food most likely to provoke a severe food allergy reaction.	50%	71%

Table 2 Responses to knowledge questions in Control (G1)

Question No/Type	Initial Questionnaire % Agree (N = 513)	Follow-up Questionnaire % Agree (N = 167)
Q21)Food allergy can be fatal If not treated promptly	87%	95%
Q29)Life threatening reactions Can come on within Minutes.	76%	95%
Q30)Hives and swellings around The face are a common sign Of a food allergic reactions	70%	89%
Q35) Surfaces and teaching materials with traces of peanut butter can cause a severe reaction in a peanut allergic child.	70%	89%
Q33) Peanut is the food most likely to provoke a severe food allergy reaction.	47%	75%

(2) Managing an Emergency

More than half of the respondents recognized the need for further information in managing an emergency.

On follow-up, the intervention groups (1) G2(one set video and booklet for school) has 54% for initial agree and 63% for follow-up agree to Q63 in Table 3. (2) G4 (video and booklet for each participant) has 60% for initial agree and 69% for follow-up agree to Q63 in Table 3.

Table 3 Initial and follow-up responses to managing an emergency questions in intervention group (G234)

Question No/Type	Initial Questionnaire % Agree (N= 513)	Follow-up Questionnaire % Agree (N= 167)
Q63)I would ask the principal to arrange for the child's Doctor to come to the school & talk to the staff.	55%	62%

Table 4 Responses to managing an emergency questions in control (G1).

Question No/Type	Initial Questionnaire % Agree (N= 513)	Follow-up Questionnaire % Agree (N= 167)
Q63)I would ask the principal to arrange for the child's Doctor to come to the school & talk to the staff.	59%	59%

(3)Attitude towards Food Allergy

The majority of respondents were aware that parents of children with food allergy are protective and want to be involved if appropriate.

When asked the question “I would ring the nearest Public hospital for further information”, intervention group(G234) showed no change in response whereas the control group realized they needed more information.

Table 5 Responses to attitude towards food allergy questions in intervention groups(G234).

Question No/Type	Initial Questionnaire % Agree (N = 513)	Follow-up Questionnaire % Agree (N = 167)
Q25)Parents should be able to accompany their children with food allergy on school excursions, if appropriate.	78%	82%
	Initial Questionnaire % disagree (N = 513)	Follow-up Questionnaire % disagree(N = 167)
Q20)Parents of children with food allergy are over-protective.	31%	86%
Q32)A responsible & well disciplined child with a food allergy is not likely to experience an accidental Exposure.	65%	71%
Q56)I would ring the nearest Public hospital for Further information	22%	20%

Table 6 Responses to attitude towards food allergy questions in control (G1).

Question No/Type	Initial Questionnaire % Agree (N = 513)	Follow-up Questionnaire % Agree (N = 167)
Q25)Parents should be able to accompany their children with food allergy on school excursions, if appropriate.	82%	88%
	Initial Questionnaire % disagree (N = 513)	Follow-up Questionnaire % disagree(N = 167)
Q20)Parents of children with food allergy are over-protective.	77%	81%
Q32)A responsible & well disciplined child with a food allergy is not likely to experience an accidental Exposure.	66%	27%
Q56)I would ring the nearest Public hospital for Further information	41%	16%

(4)Self-efficacy

Most respondents did not feel confident about dealing with food allergy. On follow-up, all groups felt improved ability to recognize symptoms of food allergy reaction. Only G234 felt an increased confidence in what to do in an emergency.

Table 7 Responses to self-efficacy questions in intervention group (G234)

Question No/Type	Initial Questionnaire % Agree (N = 513)	Follow-up Questionnaire % Agree (N = 167)
Q40)I feel confident that I can recognize the symptoms of a severe allergic reactions	29%	39%
Q87)Feel confident to give emergency treatment yourself.	25%	40%

Table 8 Responses to self-efficacy questions in control (G1)

Question No/Type	Initial Questionnaire % Agree (N = 513)	Follow-up Questionnaire % Agree (N = 167)
Q40)I feel confident that I can recognize the symptoms of a severe allergic reactions	27%	39%
Q87)Feel confident to give emergency treatment yourself.	31%	25%

Table 9 Responses to self-efficacy questions in intervention group(G234)

Question No/Type	Initial Questionnaire % disagree (N = 513)	Follow-up Questionnaire % disagree (N = 167)
Q85)Be uncertain as to what action to take	48%	64%

Table 10 Responses to self-efficacy questions in control (G1)

Question No/Type	Initial Questionnaire % disagree (N = 513)	Follow-up Questionnaire % disagree (N = 167)
Q85)Be uncertain as to what action to take	48%	48%

(5) Prevention Strategies

Most teachers did not recognize the special role of peanut butter among food allergies and still felt it was not necessary to ban peanut butter from schools that had a child with peanut allergy.

Table 11 Responses to prevention strategies questions in intervention groups (G234)

Question No/Type	Initial Questionnaire % agree(N = 513)	Follow-up Questionnaire % agree(N = 167)
Q37)Peanut butter should be banned from schools where there is a peanut allergic child	10%	18%

Table 12 Responses prevention strategies questions in control (G1)

Question No/Type	Initial Questionnaire % agree(N = 513)	Follow-up Questionnaire % agree(N = 167)
Q37)Peanut butter should be banned from schools where there is a peanut allergic child	14%	20%

(6) Social Issues

Most respondents felt that classmates should know if a child had a food allergy and support them at school.

Table 13 Responses to social issues questions in intervention groups (G234).

Question No/Type	Initial Questionnaire % disagree (N=513)	Follow-up Questionnaire % disagree (N= 167)
Q39)Classmates should not be told of the child's food allergy, since they may victimize or bully the child.	90%	88%
Q38)Classmates should not be reprimanded for teasing children with food allergies because it may help them develop a healthier attitude to their problem	87%	89%

Table 14 Responses to social issues questions in control (G1)

Question No/Type	Initial Questionnaire % disagree (N=513)	Follow-up Questionnaire % disagree (N= 167)
Q39)Classmates should not be told of the child's food allergy, since they may victimize or bully the child.	87%	87%
Q38)Classmates should not be reprimanded for teasing children with food allergies because it may help them develop a healthier attitude to their problem	91%	97%

(7)Legal Issues

Most respondents did not know about their legal situation in an emergency and what might result legally if they were to administer first-aid. However, in all groups, on follow-up, there was an increase in those willing to administer the adrenaline.

Table 15 Responses to legal issues questions for intervention groups (G234)

Question No/Type	Initial Questionnaire % disagree (N = 513)	Follow-up Questionnaire % disagree (N = 167)
Q49)I believe that teachers are legally vulnerable if they administer first-aid.	31%	33%
Q89)Await the arrival of the ambulance officers or doctor, who can take legal responsibility for administration of adrenaline.	35%	43%

Table 16 Responses to legal issues questions for control (G1)

Question No/Type	Initial Questionnaire % disagree (N = 513)	Follow-up Questionnaire % disagree (N = 167)
Q49)I believe that teachers are legally vulnerable if they administer first-aid.	27%	32%
Q89)Await the arrival of the ambulance officers or doctor, who can take legal responsibility for administration of adrenaline.	30%	47%

(8)Procedures

More than half of the respondents(67%) answered that it was “ not a teacher’s” job to administer medical treatment involving injection (Table 19). However, on follow-up, respondents were more likely to view the administration of injection like adrenaline as part of their job.

Table 17 Responses to procedures questions in intervention groups(G234)

Question No/Type	Initial Questionnaire % agree (N = 513)	Follow-up Questionnaire % agree (N = 167)
Q95)Administer adrenaline/ Epipen yourself immediately.	20%	35%
Q96)Inject adrenaline/ Epipen through clothing if necessary.	18%	35%

Table 18 Responses to questions related to procedures in control (G1)

Question No/Type	Initial Questionnaire % agree (N = 513)	Follow-up Questionnaire % agree (N = 167)
Q95)Administer adrenaline/ Epipen yourself immediately.	11%	23%
Q96)Inject adrenaline/ Epipen through clothing if necessary.	10%	16%

Table 19 Responses procedures questions in intervention groups (G234)

Question No/Type	Initial Questionnaire % Disagree (N = 513)	Follow-up Questionnaire % Disagree (N = 167)
Q48)It is not a teacher's job to administer emergency medical treatment involving injections.	23%	40%
Q93)Not give any treatment Without first checking With the parents.	36%	48%

Table 20 Responses to procedures questions in control (G1).

Question No/Type	Initial Questionnaire % Disagree (N = 513)	Follow-up Questionnaire % Disagree (N = 167)
Q48)It is not a teacher’s job to administer emergency medical treatment involving injections.	19%	21%
Q93)Not give any treatment Without first checking With the parents.	30%	40%

(9)Priorities when Handling Emergencies

Most respondents, in the event of an emergency, recognized the need to call the parents and the ambulance. On follow-up, there was an increase in awareness for the need for immediate treatment and that the child should not be made to wait for a doctor or parent to arrive before adrenaline was administered.

Table 21 Responses to priorities when handling emergencies in intervention groups(G234).

Question No/Type	Initial Questionnaire % high priority (N = 513)	Final Questionnaire % high priority (N = 167)
Q77)Call the parents	95%	96%
Q78)Call an ambulance	76%	74%
Q80)Administer an emergency adrenaline injection.	17%	31%

Table 22 Responses to priorities when handling emergencies in control (G1).

Question No/Type	Initial Questionnaire % high priority (N = 513)	Final Questionnaire % high priority (N = 167)
Q77)Call the parents	95%	93%
Q78)Call an ambulance	75%	72%
Q80)Administer an emergency adrenaline injection.	10%	19%

(B) Focus Group Results

1. What do people understand about food allergy?

Overall, the participants in the focus group realise the importance of food allergy and most had a fairly good understanding. Some reported :

“ Food allergy can be fatal .” (S, FG1)

“ Symptoms such as swelling on lips, face.” (M, FG1)

“ Some need to be dealt with in severe ways such as adrenaline shot.” (N,FG1)

2. If faced with a problem, what motivates you to change? What factors relating in particular to child care setting?

The majority of participants are motivated to change based on their best interest of the children. There were some who change upon parents’ request. There were yet comments such as:

“ Some will change only when something happens.” (J, FG1)

“ We need to keep abreast of changes, training for staff and policy.” (K, FG1)

3. One in 20 children has peanut allergy. How will this affect or change the way you react?

“ Take all nuts off the menu; Our center had a number of children allergic to peanut, it is safer to take out. Children with peanut allergy was noted in the enrolment forms.”(L, FG1)

“ Should look into policy removing nuts from premises.” (S, FG1)

4. There is a need for a high level of awareness. There are thousands of childcare centers in Sydney. What strategies should be implemented?

Many of the participants in the focus group agreed that inservice would certainly be a good way to start. Then, there was the media, health policies, including modules such as nutrition course, OH&S, catering, accidents of children in tertiary institutions and TAFE. Also, having risk assessment and routine checks by DOCS.

5. What do you think is the main obstacle to administering adrenaline/Epipen?

“ Afraid that we may cause injuries to the child.” (L, FG1)

“ We have no experience and are not medically trained.” (S, FG1)

“ There are the legalities involved if we have got it wrong.” (M, FG1)

“ How to restrain the child legally, we’re not sure.” (L, FG1)

6. Comments about the questionnaires.

Participants in the focus group all liked the scenario given in the questionnaire and found it good and helpful. Also, there was a common consensus that the questionnaire was easy to fill in and not time consuming.

DISCUSSION

The School Study intervention had been successful in improving some of the participants' confidence in dealing with food anaphylactic reactions. There were some marked improvements in knowledge among staff of intervention groups relative to controls, and over time. However, the majority of the results showed that there was no significant difference between control and intervention groups. It appeared that simply doing the questionnaires helped in raising awareness to food anaphylaxis and its management. However, some common attitudes and legal concerns did not change in either the control or the intervention group. Some of the reasons for the changes observed and not observed will be explored in the discussion in relation to the pilot study for pre-schools whereby a focus group was conducted.

Response To The Questionnaire

Of the 12 independent schools that were given post-surveys, 7(58%) did not return the post-questionnaires. Of the 25 metropolitan schools, 12(48%) did not return the post-questionnaires. Of the 18 rural schools, 13(72%) did not return the post questionnaires and of the 14 Special schools, 5(36%) did not return the post questionnaires.

From the total of 1481 pre-surveys, 35% (n = 513) were returned, and from the total of 513 post-surveys, 32%(n = 167) were returned.

In total, 167 (out of 513) questionnaires were returned between 3 August 2001 and 30 September 2001.

Limitations Of The Study

Due to the confidentiality of participants, the school principal was given the task of assigning participants with code numbers. However, there were several instances where the teacher's code number list was misplaced. In addition, there was a period of approximately 48 weeks between first and second mail-out of questionnaire. This raise a question about how much can teachers might remember between the first and second questionnaire. On the other hand, attitudes are difficult to change. Within the time between the intervention and the post survey, there may not have had the time required to make the desired change.

“Knowledge” Questions

Knowledge of several issues in food allergy improved in both intervention and control groups. Sending questionnaires to schools has shown an impact in terms of improvements of scores for knowledge questions. The key is perhaps to engage the thinking process through the doing of the questionnaire. As seen from the findings from control groups, though there was no direct information disseminated, yet an improvement in score was observed presumably because doing the questionnaires had got teachers talking amongst themselves. Overall, the majority of the respondents agree that food allergy can be fatal if not treated promptly. Out of this, 74% are female and 43% aged in the category of 41-55 years and >55 and 41% in the category of 25-40 years and <25.. Also, they were more likely to realise that hives and swellings around the face are a common sign of a food allergic reaction and that life threatening reactions can come on within minutes. Respondents from both intervention and control groups were also more likely to agree that peanut is the food most likely to provoke a severe allergy reaction and that surfaces

and teaching materials contaminated with traces of peanut butter can cause a severe reaction in a peanut allergic child. Respondents with higher knowledge were more likely to feel confident of recognizing symptoms ($p < 0.0001$) and about what to do in an emergency ($p < 0.0001$).

Self-efficacy

The results showed a marked improvement in the responses to self-efficacy questions in the intervention group. There was an increase of 15% for teaching staffs feeling confident in giving emergency treatment and a 10% increase in feeling confident that they can recognise the symptoms of a severe allergic reactions (Table 7). Control group showed a 6% drop in staff feeling confident about giving an emergency treatment but a 12% increase for feelings of confidence in recognising symptoms of a severe allergic reaction (Table 8). Also, table 11 showed that 64% disagreed after intervention compared to 48% before intervention to the question that they would be uncertain as to what action to take in a situation where they are called to the playground to see a boy with peanut allergy whose face has suddenly become red and swollen.

There was no change in self-efficacy observed in the control group. The education package consists of information that explained how anaphylaxis can be recognised and what the emergency treatment is. This could be one of the vital reasons for the increase in confidence observed in intervention group. Controls on the other hand, showed some improvement in terms of recognising symptoms but no improvement in feeling confident enough to give emergency treatment.

The completion of the questionnaire has been successful in acting as a facilitator and opened doors for discussion amongst staff and exchange of information as reflected by

the findings of this project. However, though staff in control group were feeling more confident in recognising symptoms, they were still not confident enough to give emergency treatment, unlike the intervention group. With regards to findings in the pre-intervention project, increased knowledge about food allergies, their symptoms, the emergency treatment to give and knowing what to do was found to increase teachers' confidence and therefore less likely to wait for someone else to provide treatment. Therefore, it is clear that the education package has led to an improvement in knowledge and hence an increase in confidence of teaching staff. This is crucial to prevent unnecessary delays in administering the appropriate treatment to a child suffering anaphylaxis, and thus to decrease the risk of a fatal outcome.

Attitudes towards Food Allergy

Attitudes towards food allergy did not change according to responses to the question about staff taking the initiative to call the nearest public hospital for further information. Intervention groups (G2:one set video and booklet for school and G3: video for school only and booklet for each participant) did not show any improvement in terms of the percentage initial disagree and percentage subsequent disagree. For G2, there was a 3% drop in the percentage who disagree and for G3, there was a 4% drop. However, for G4 (video and booklet for each participant), there was an increase from 20% initial disagree to 24% subsequent disagree. Bearing in mind that attitude being a difficult area of change, perhaps greater intervention measures could help in making it more amenable to change. According to the observation here, intervention group where participant was each given an education package consisting of video and booklet seemed to be better reached in terms of elucidating a change in their attitude towards food allergy. However, this

observation also suggest that perhaps this mode of dissemination information, that is, giving participants each an education package with video and booklet is better compared to the other methods as studied in this project.

Prevention Strategies

There was an overall improvement seen in both intervention and control group as reflected by an increase in percentage agreeing that peanut butter should be banned from schools where there is a peanut allergic child. However, the majority still do not see the need to ban peanut butter from schools generally.

Managing an Emergency

Confidence in managing an emergency improved in the intervention group. For example, the intervention group was significantly more likely in the post-survey than in the pre-survey to indicate that they would arrange for the child's doctor to come speak to school and staff. (Table 3) Also, a high percentage (98%) in intervention group intended to ask the principal whether a plan and procedures about children with food allergy was available at the school or pre-school..

Social Issues

This study has explored some of the social issues of severe food allergy on children and their peer, teachers and parents. The prevention and management of accidental exposure to food allergens may cause anxiety in parents, and food allergen avoidance requires constant vigilance. However, findings show that this does not stop teaching staff from disagreeing that a child with food allergy should not enjoy activities such as going on school excursions. They also agree that a food allergic child should not be singled out at school. The majority of the participants in the intervention and control groups realised the

need to tell classmates of the child's food allergy and were not concerned that they may victimise or bully the child with food allergy (Tables 13 and 14).

Legal Issues

Although 53% from intervention group agree that teachers are legally vulnerable if they administer first aid, there was an increase in the percentage of teachers in the intervention group who disagreed that teachers are legally vulnerable if they administer first-aid. Similarly, there was improvement seen in control group where there was a 5% decrease in the belief that teachers are legally vulnerable if they administer first aid. In addition, there was improvement in both control and intervention groups where fewer would await the arrival of the ambulance officers or a doctor to take legal responsibility for administration of adrenaline. These findings show that doing the questionnaires has generated reassurance amongst participants who felt legally vulnerable in giving emergency treatment to a child experiencing an anaphylactic reaction.

Procedures And Priorities when Handling Emergencies

The intervention group was more likely than the control group to consider administering adrenaline/Epipen immediately and to inject adrenaline/ Epipen through clothing if necessary (Table 17 & 18)

Also, there appeared to be a higher percentage in intervention group compared to control who regarded administering an emergency adrenaline injection as a high priority. Previous studies have found that fatal reactions are more likely to occur outside the home, and in the absence of available adrenaline. In one study examining thirteen cases of anaphylaxis, of the six patients who died only two received adrenaline within the first

hour. This was compared to the patients who survived, where all but one received adrenaline within thirty minutes after the onset of the reaction.

It was also observed that from case studies, that the survival rate in the event of an anaphylactic reaction was directly related to the time at which adrenaline was administered. In conjunction with the above, respondents with higher knowledge score were more likely to be willing to administer epinephrine($p < 0.0001$) and inject through clothing if necessary ($p = 0.030$)

(B) Focus Group for Pre-school Study

One in 20 child has a peanut allergy. Knowing this, pre-school staffs were asked in a focus group session what they would do. Comments ranged from removing peanuts only from the premises to taking all nuts off the menu. This would require a concerted effort from the kitchen staffs, parents and carers. There appeared to be a high level of awareness and enthusiasm among those who attended the focus group. However, but there are thousands of child-care centers in Sydney. Strategies to reach them suggested by participants in the focus group include: in-service training, use of the media (Sydney Child, Current Affair, New Idea), the accreditation system, health policies, education system to incorporate modules eg planning nutrition, OH&S into tertiary institutions, TAFE etc. addition, there could be more routine risk assessment and checks by DOCS.

Conclusion

This project has shown that the education package was successful in improving teachers' confidence and ability to manage emergency, and in altering attitudes towards food allergy. Simply answering the questionnaires had a significant impact on the scores of the control group. This was presumably because of the opportunity where people engaged in

talking, discussing and more importantly it got them thinking about food allergy and how severe it could. The findings of this study have laid the groundwork and provided the baseline information for a more extensive pre-school study. This will help in the development of a specific package for pre-schools and the evaluation of the knowledge and attitude of pre-school staffs.

References

Anaphylaxis in Schools and Other Childcare Settings. *Journal of Allergy and Clinical Immunology*. (1998) 102: 173-176.

American Academy of Allergy, Asthma and Immunology, 1998. Back to School With Food Allergies.,
(<http://www.kidsource/content4/b2s.food.allergies.html>)

Anaphylaxis in Children: Clinical and Allergologic Features. *Pediatrics* Vol.101 No. 4 (1998)

Anaphylaxis in children and adolescents (apropos of 44 patients aged 2 months to 15 years) *Archives of Pediatrics & Adolescents Medicine*. (1999) 6 Suppl 1:72S-78S.

Bock SA, Atkins FM. The natural history of peanut allergy. *J Allergy Clin Immunol*. 1989;83:900-4.

Bock SA. Prospective appraisal of complaints of adverse reactions to foods in children during the first 3 years of life. *Pediatrics*. 1987;79:683-688.

Bindslev-Jensen C. ABC of allergies. *Food Allergy*. *BMJ* 1998;316:1299-1302.

Children with known risk of Anaphylaxis.
(<http://www.mbteach.org/Publications/URIS/Anaphylaxis.html>)

Fatalities due to Anaphylactic Reactions to Foods. *Journal of Allergy & Clinical Immunology*. 107(1):191-3,2001 Jan.

Food –Allergic Reactions in Schools and Preschools. *Archives of Pediatrics & Adolescents Medicine*.(2001) 155(7): 790-795.

Mechanism and Control of Food Allergy. *Lebensm-Wiss. U.-Technol* (1999) 32(1):11

Rudd Wynn S, Frazier CA, Munoz-Furlong A, et al. Anaphylaxis at school: etiologic factors, prevalence, and treatment. *Pediatrics* 1993;91:516.

Sampson HA, Mendelson L, Rosen JP- Fatal and near-fatal anaphylaxis reactions in children and adolescents. N England J Med 1992;327:380-4.

Sicherer Sh, Furlong TJ, Desimore J, Sampson HA. The US Peanut and Tree Nut Allergy Registry: Characteristics of reactions in schools and day care. J Pediatr.2001;38:560-565.

The treatment in school of children who have food allergies: committee report from the Adverse Reactions to Food Committee of the American Academy of Allergy and Immunology. J Allergy Clin Immunol. 1991;87:749-751.

Yunginger JW, Sweeney KG, Sturner WQ, et al. Fatal Food-Induced Anaphylaxis. JAMA. 1988;260:1450-1452.

Clarke L, McQueen J, Samild A, Swain A. The dietary management of food allergy and food intolerance in children and adults. Australian Journal of Nutrition and Dietetics. 1996; 53(3):89-98

Yunginger JW. Anaphylaxis. Annals of Allergy. 1992;69:87-96

Fries JH. Peanuts: Allergic & other untoward reaction. Annals of Allergy. 1982;48:220-6

Moneret- Vautrin DA, Rance F, Kanny G, Olsewski A, Gaeant JL, Dutau G and Guerin L. Food allergy to peanuts in France- evaluation of 142 observations. Clinical and Experiment Allergy. 1998; 28:1113-9