MIDLAND HEALTH BOARD

Department of Public Health & Planning, Cardiovascular Health Strategy.

Pack a Punch Eat a Healthy Lunch

February 2003

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Executive Summary

Recent evidence from the World Health Organisation suggests that nutrition habits of children are deteriorating with the level of obesity and overweight children rising dramatically. Conway et al. (2002) concluded from research conducted in the United States that more research needs to be conducted on the nutritional content of foods brought to school in pack lunches in gaining a better understanding about how to improve students' nutrition. In Ireland limited statistics are available in relation to childhood nutrition with no previous published research addressing the nutritional content of lunch boxes. In an attempt to target this the community nutrition service in the Midland Health Board set about working with schools to develop healthy school food policies through the *'Eat it Dude'* Midland Health Board Schools' project. The aim of this project was to assess the effectiveness of targeted nutrition interventions in the schools setting. The primary objective was to establish a healthy eating policy while auditing its impact within the primary schools selected. The evaluation of the project showed a drop in consumption of fizzy drinks and fruit squashes with an increased consumption of fruit juice and milk. There was an increase in yoghurt consumption, from 21%-30%; decrease in consumption of chocolates/sweets from 31%-16%; crisps from 15% -11%; with an increase in the consumption of popcorn from 4%-11%. The majority of students, both at baseline and re-audit, were getting the recommended daily intake of bread. Marginal increases were observed in those achieving the recommended daily intake of fruit/vegetables, 49%-53%. The largest increase was observed in the recommended daily intake of milk/cheese from 37%-51%. Overall the results are promising however a more comprehensive methodology would add strength to the findings.

1.1 Introduction

Cardiovascular disease (CVD), including heart disease, stroke and related diseases is the single largest cause of death in Ireland each year. The incidence of CVD has been high in Ireland for several decades and accounts for over 40% of all deaths and 37% of pre-mature deaths (under 65 years) annually. As such CVD remains an important cause of mortality and morbidity in Ireland. Compared to our EU counterparts we have the highest death rate from coronary heart disease in men and the third highest in women. When premature deaths of both sexes are compared, we also have the highest death rate from heart disease, running at almost double the EU average (37 % of deaths under 65 years).

In addressing the growing impact of cardiovascular disease the European Heart Health Initiative (EHHI, 1998) has adopted the following focus, *"Every child born in the new millennium has the right to live until the age of 65 without avoidable cardiovascular disease."* The importance of this theme is further substantiated by the fact that risk factors develop early in life and are therefore more effectively tackled at an early age.

In 1999 the national Cardiovascular Health Strategy was published, titled "Building Healthier Hearts" to combat heart disease. Central to this strategy is the recognition that CVD is a multi-faceted chronic disease with a strong need to impact on the risk factor profile of the Irish population. Major risk factors for CVD include smoking, obesity, high blood pressure, elevated cholesterol, diabetes and lack of physical activity. The more risk factors present the greater the risk of developing CVD. This strategy and indeed the National Health Promotion Strategy 2000-2005 have both highlighted the importance of projects focused on children. Furthermore the Sub-Committee on Young People of the National Consultative Committee on Health Promotion identified nutrition and exercise as priority areas for targeting young people.

Nutrition plays an important role in curbing many of the risk factors for CVD including high blood pressure, elevated cholesterol and body mass index. In the following sections nutritional trends will be addressed in relation to the Irish population. The focus will be on adult and childhood trends. The justification for looking at overall trends is based on the knowledge that many health risks e.g. obesity may track from childhood into adulthood (Power, 1997).

1.2 Nutrition and Irish Adults

In the most recent survey conducted on nutritional habits of Irish people some worrying trends were detected. Obesity has emerged as a growing health issues, since 1990 the overall prevalence levels in the island of Ireland have increased by 67%, up 1.25 fold in women (from 13%) and up 2.5 fold in men (from 8%) (IUNA, 2001). This is a worrying trend as obesity has been linked to increased incidence of a number of diseases, including cardiovascular disease, hypertension, diabetes (type 2), gall bladder disease and certain cancers while overweight is associated with increased risk of diabetes (type 2). Additionally it was reported that mean daily fat intakes for both men and women were higher and mean carbohydrate intakes were lower than current dietary recommendations. On a regional levels, results from the National Health & Lifestyle Surveys (1999) survey indicated that a significantly higher percentage of respondents in the MHB were obese compared to all other health boards (14% versus 10% national). This was predominantly contributed to by a significantly higher proportion of obesity among women in the Midlands.

1.3 Nutrition and Irish Children

Limited statistics are available regarding the nutritional habits of Irish children one study that does provide some comparative data is the Health Behaviour in School Children (HBSC)(WHO, 2000). The results of this study found the nutritional habits of Irish children to be unsatisfactory with on average of 61% of boys and 49% girls consuming high fat and high sugar foods frequently. This equates to the most recent evidence which indicate that the prevalence of childhood obesity is increasing throughout the world (WHO, 1997). Results from the UK and France illustrate some worrying statistics with a 100% increase in the level of obesity since 1984 (Chinn, 2001;Gibault 2001). However at the other end of the spectrum it is important to note that children may also be undernourished, resulting in difficulty resisting infection. Thus they are more likely to become sick, to miss school and fall behind in class. They are irritable and have difficulty concentrating, which can interfere with learning, and they have low energy, which can limit their physical activity (Miles & Eid, 1997).

There is therefore a need for more concentrated efforts to improve the dietary habits of many children. As outlined in the HBSC (WHO, 1999), childhood is an important time for

establishing healthy eating patterns and maintaining healthy eating patterns remains important as children grow into adolescents. Based on the fact that many nutritional disorders track from childhood into adulthood prevention strategies are best targeted at children (Frubeck, 2000; Garrow, 1991).

There are many nutritional issues that must be highlighted when looking at the area of healthy food for children; these include adequate protein and energy for growth, in addition to adequate iron, vitamin C, and calcium intake. To ensure that children grow to their full potential it is important that a good varied diet is provided to allow for a wide variety of nutrients essential for growth. In terms of the school lunch it should provide at least one-third of the child's recommended daily allowance (RDA) of nutrients (Food & Nutrition Guidelines for Primary school, 2002).

When promoting a healthy varied diet for children the Food Pyramid is the best educational tool available, and is used across Ireland to promote the healthy eating message. Based on the Food Pyramid a child should be getting the following in their lunch box:

- 2 or more servings from the 'bread, cereals & potatoes' shelf'
- 1 or more serving from the 'fruit & vegetable' shelf
- 1 serving from the 'milk, cheese & yoghurt' shelf
- 1 serving from the 'meat, fish and alternatives' shelf
- Very small amounts from the 'Top' shelf.

There is little research available on the intakes of primary school age children, and any that has been carried out has been on a relatively small scale, and focusing on lower socio-economic backgrounds. Conway et al. (2002) concluded from research conducted in the United States that more research needs to be conducted on the nutritional content of foods brought to school in pack lunches in gaining a better understanding about how to improve students' nutrition. However it is difficult to compare the intake of food by Irish children to that of their counterparts in the UK, USA or Europe as children in other countries are often provided with school dinners whereas in Ireland this is not the case.

Requests from primary school teachers and parents for nutrition resources and information, together with reports of inadequate lunches, break time snacks and lack of breakfasts, prompted a decision to approach schools in the Midland Health Board to discover whether

there would be interest in the area of school food policy development. In this project, it was proposed to work with schools in a participatory manner; the ultimate aim being to enable and facilitate parents, pupils, and teachers in each school to create an individually tailored working policy for healthy school food in their own school, whilst ensuring the active inclusion of these members of the community in a participatory manner (Springett, cited in Peberdy 2000).

2.0 Methodology

2.1 Aims and Objectives

Aim: To assess the effectiveness of targeted interventions on nutrition in the schools health promotion setting.

Objectives:

- To establish a healthy eating policy within the primary schools selected
- To compare the intake of squash and fizzy drink in contrast to juice, milk and water
- To assess the number of children with sandwiches with and without a protein filler
- To identify the number of children who take fruit to school
- To evaluate the quantity and nature of snack food that children bring to school e.g. chocolate, crisps
- To assess if the intervention had an impact on lunch box content.
- To assess the effect of schools enforcing bans on certain foods in relation to the content of children's lunches.

2.2 Development of School Policy

Planning stage:

1. A preparatory meeting took place between the Dietitian, Health Education Officer and Health Promotion Officer for schools, to determine an initial plan of action regarding school contact, workload and funding available for project.
2. An in-house consultative meeting was set up to
    - Determine the current role of Health Board staff in the school setting

- To establish whether staff would be willing to become involved in a multidisciplinary way in this project (Dietitians, Health Promotion Staff, Dental Officers, Public Health Nurses, and Area Medical Officers).

3. In an effort to determine the number of schools in the region that had either a written and/or verbal nutrition policy a telephone survey was conducted on a sub sample of schools (20%). Results indicated (table1) that between 50-82% of schools surveyed had a policy on health eating with the highest level reported in Offaly. Written policies on healthy eating were less widespread with on average 28% possessing one. Longford had the lowest number of schools with a healthy eating policy, be it written or oral.
4. From the list of schools interested in nutrition policy, six schools were recruited at random. It was ensured that there was an urban / rural divide, and that there was at least one school from each county, Longford, Westmeath, Laois and Offaly. Each school principal was contacted in each case and the proposed project was explained. They were then asked whether they would be still interested in the project and this informal enquiry was followed up with a letter.

Table1: Profile of School Health Eating Policy in the Midland Health Board.

County	**% With Policy on Healthy Eating**	**% With Written Policy on Healthy Eating**
Laois	75%	36%
Offaly	82%	30%
Longford	50%	14%
Westmeath	75%	33%
Total	71%	28%

Process

1. Once schools were confirmed as being interested, a meeting was set up with each principal and their staff, in order to explain proposed project to them, ask their opinions on the project and the resources that may be used; and take note of all suggestions for the project
2. The project commenced in September with a parents'-evening to discuss nutrition in general and the project specifically. This forum was used to identify interest in the project and also to recruit parent representatives for the working group. Other members of the

working group included the principal, at least 2 sixth class students, member of board of management and Health Board representatives, i.e. Dietitian, dental officer etc, (if so wished by the school)

3. The role of the working group was to guide the creation of policy looking at current situation in school and needs of pupils, parents and teachers. They also guided the implementation of policy, through consultation with teachers, parents and pupils.
4. Health Board staff acted as a resource for schools if the need was expressed.
5. Sixth class pupils acted as health promoters in the school.
6. A lunch audit was carried out on a sample of lunches in each school before the project commenced and in June of the following year.
7. Resource material specific to Health Board was created in consultation with schools and health board staff.

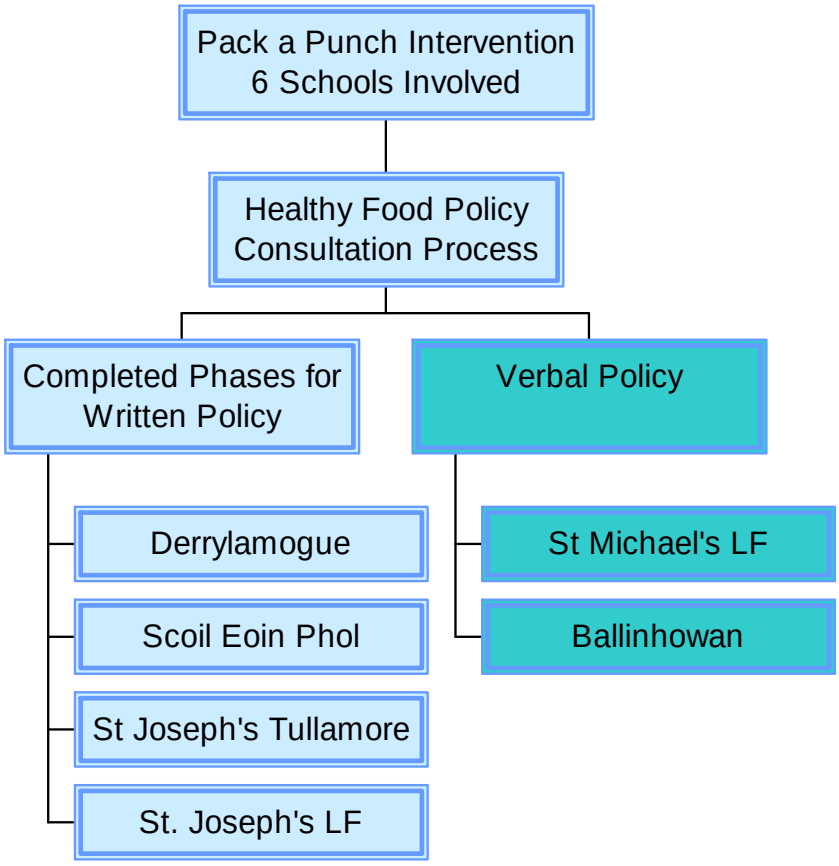


Fig 1: Overview of Involvement in the Developmental Stages

2.3 Study design (Lunch Box Audit)

This was based on an audit re-audit framework with standards outlined and data compared at the two assessments points to those references.

2.4 Data collection

The target year was set for the school year commencing in September 2001 to June 2002. Schools were selected based on commitment to developing a nutritional policy be it oral or written for the school. Community Dietitians documented the content of the lunch boxes of children from various classes within the school. No personal details i.e. name or sex were recorded on the contents sheets.

2.5 Source of data

Information was gathered on assessment sheets, which included tick boxes relating to the various food categories.

2.6 Ethical issues

There are important considerations that need to be addressed when conducting research on children thus approval was given from the principal of each school prior to commencement of the research project. In addition there was parent representatives on the working group.

2.7 Data analysis

Data was coded and entered into SPSS (version 11.0), descriptive statistics were calculated.

3.0 Results

3.1 Sample

At the baseline there were a total of 176 students across the 6 schools. This was marginally lower at the re-audit stage (N=160). The sample comprised of children from the following schools: Ballinahowan, Co. Westmeath; St Michael's, Co. Longford; St Joseph's, Co. Longford; St. Joseph's, Co.Offaly; Scoil Eoin Phol II, Co. Offaly; and Derrylamogue, Co.Laois. The largest grouping was from St. Joseph's Co.Offaly (23%) (see fig 2). The mean age of the children involved was 6.95 years (±SD 1.89), 41% were male and 59% were

female. There was a board spectrum of children selected from the junior and senior cycles as illustrated in fig 3.

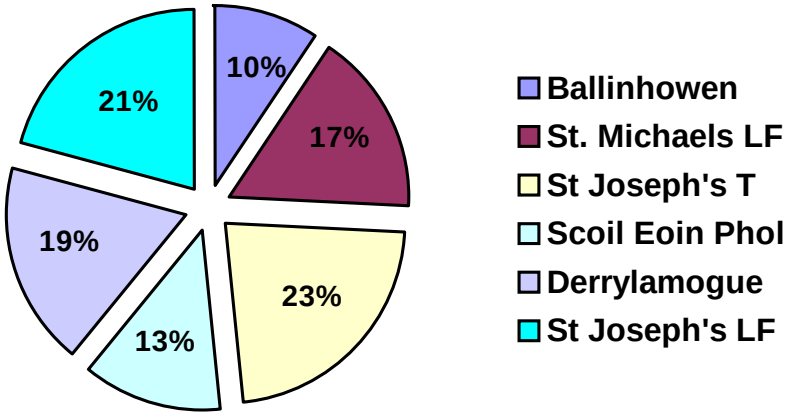


Fig 2: Breakdown of sample by school

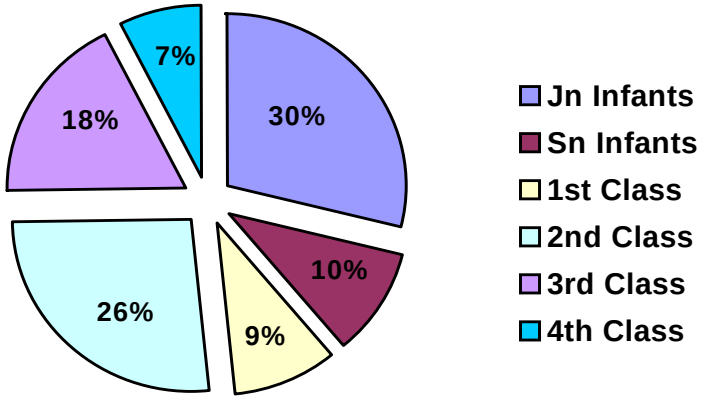


Fig 3: Profile of the overall sample by class grouping.

3.2 Lunch Box Items

3.2.1 Drinks

The majority of children had at least one drink at both time points although there was a marginal increase post intervention. Results indicated post intervention there was a decrease from 64% to 46% in fruit squash consumption with an increase reported in the levels of fruit juice and milk consumed. No changes were observed in the number of children consuming fizzy drinks (see fig 4).

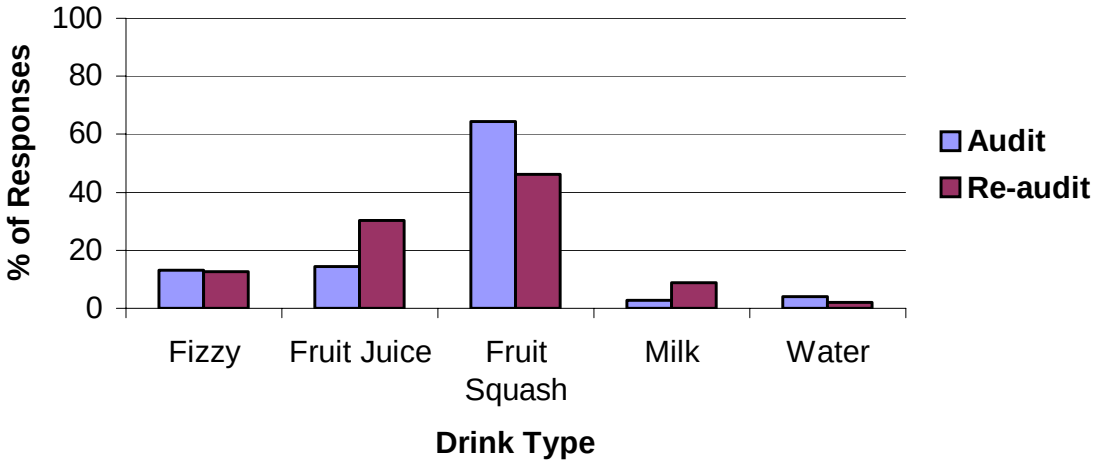


Fig 4: Profile of Drinks for total group

3.2.2 Sandwich Filling

The majority of children at baseline and re-audit had sandwiches/rolls as part of their lunches (86% V's 81%). White bread use totalled 95% at both time points with meat and cheese being the most common filling. Considering meat, cheese, egg and peanut butter as protein sources 75% had protein filler in their sandwich at baseline compared to 68% at re-audit.

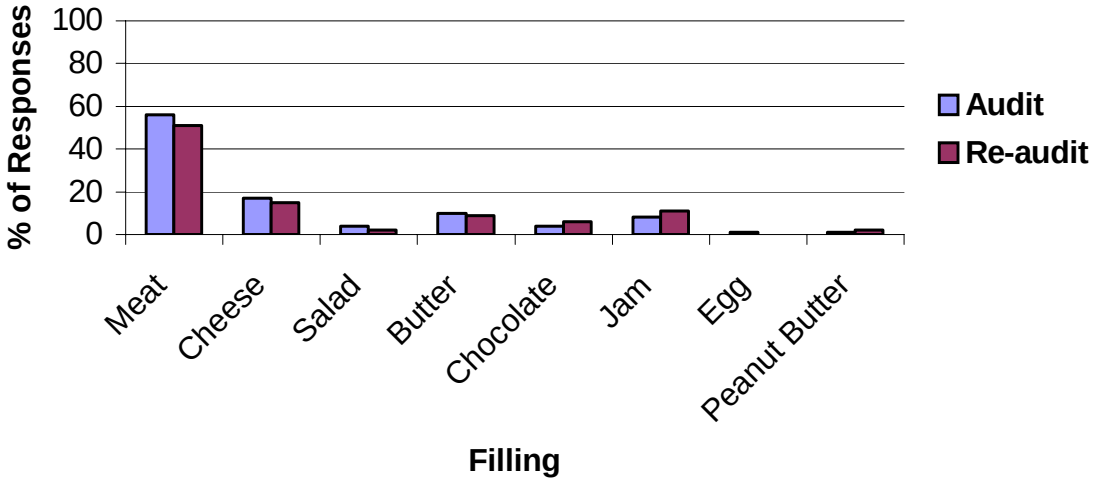


Fig 5: Sandwich Filling Profile for the Total Group

3.2.3 Fruit Consumption

There was a marginal reduction in the level of fruit consumption from 39% to 38% between the two assessments. However the number of children with more than one item of fruit

increased from 20-23%. Apples were the most common fruit and seasonal variations were evident.

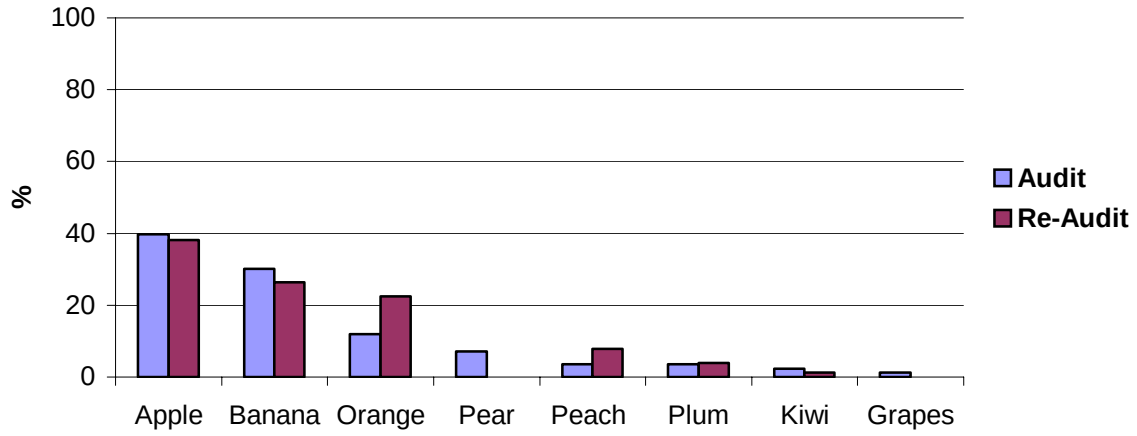


Fig 6: Fruit Profile Across Assessments

3.2.4 Snacks Profile

Snacks were classified as any item that did not fall into the previous categories. The profile illustrated in table 2 indicates that the majority of children at both time points had at least one snack in their lunch box. Although the percentage of children who did not have any snack did not change across time there was a drop from 40% to 31% in the number that had more than one snack.

Table 2: Overview of Snacks

No of Snacks	Audit		Re-audit	
	Frequency	%	Frequency	%
0	47	27	44	28
1	57	32	65	41
2	49	27	29	18
3	13	7	12	7
4	10	6	10	6
Total	**176**	**100**	**160**	**100**

At baseline the most common snack was chocolate (31%) followed by yoghurt (21%) and then crisps (15%). Although the same snacks remained popular at the re-audit stage there was

a large increase in the level of yoghurts consumed while chocolate and crisps both reduced by 15% and 4% respectively. There was a very low level of sweets reported at both time points.

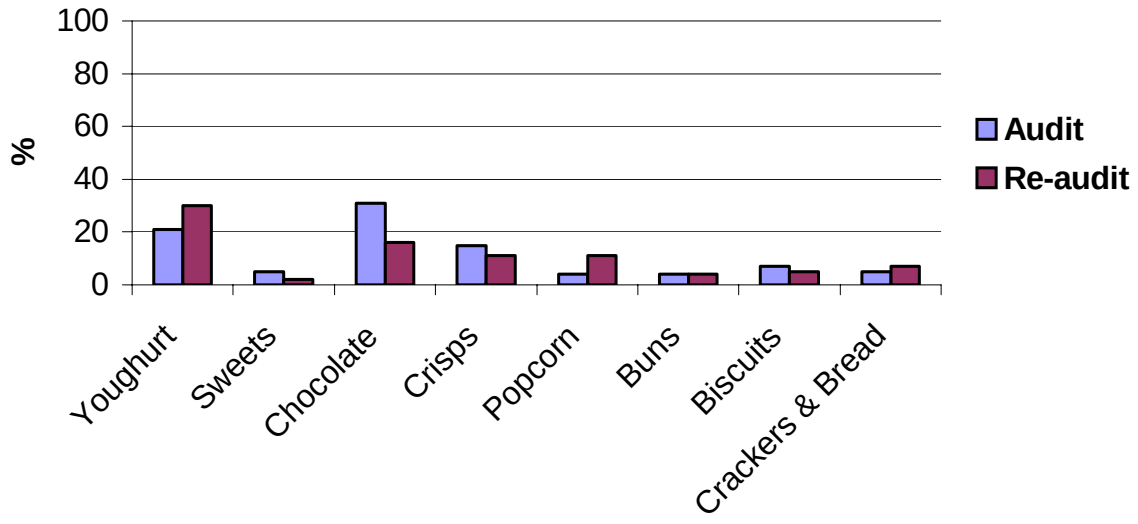
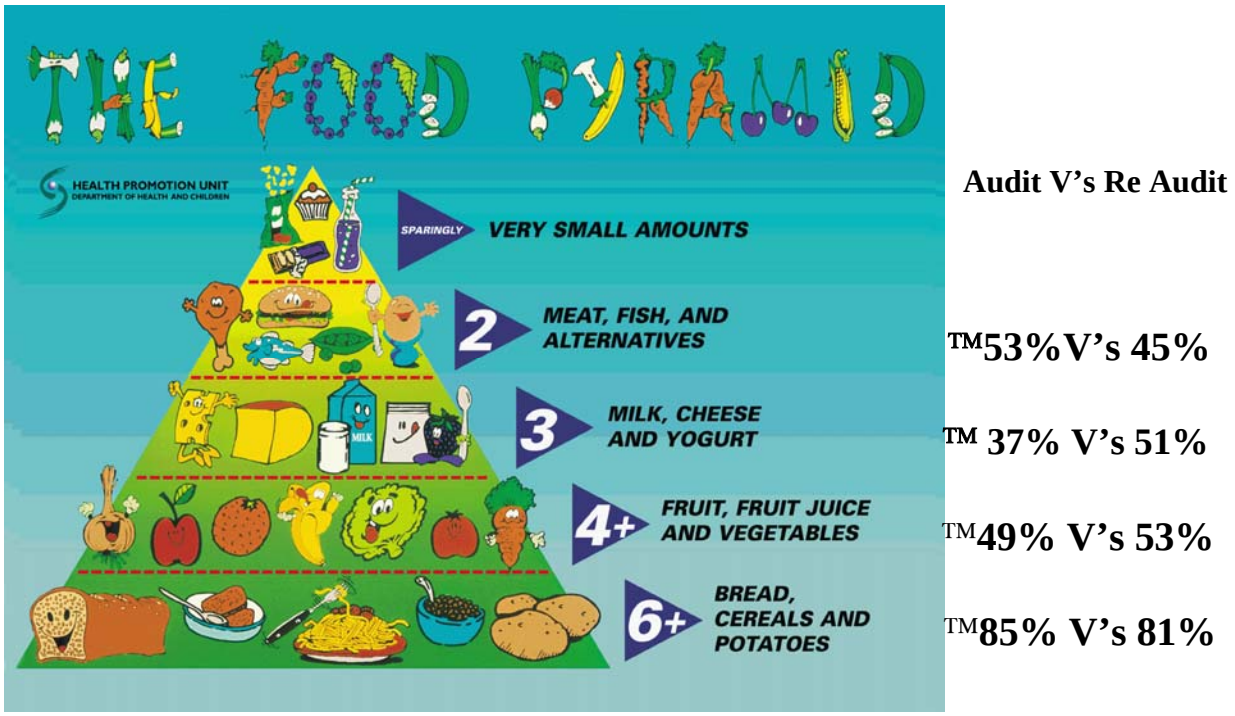


Fig 7: Snack Profile Across the Assessments

3.3 Food Pyramid Analysis

Table 3: Summary of Nutritional Requirement Achieved by Food Pyramid Category.



Further analysis based on the categories outlined in the food pyramid indicated that the majority of students, both at baseline and re-audit, were getting the recommended daily intake of bread. Marginal increases were observed in those achieving the recommended daily intake of fruit/vegetables, 49%-53%. The largest increase was observed in the recommended daily intake of milk/cheese from 37%-51%. There was a drop in consumption of the recommended daily intake of meat and fish from 53% to 45%.

3.4 Effect of Banning

Of those schools that chose to progress with developing a written food policy 2 out of the 4 choose not to enforce bans. St. Joseph's Co.Offaly and Scoil Eoin Phol both adopted the policy to ban certain foods. To enable comparisons to be made on a small scale the effect of banning was examined by looking at St Joseph's Co.Offaly compared to St Joseph's Co. Longford, which had a similar size profile. No significant differences were found in the lunch profile between these schools however favourable changes in both the drink and snack profile was reported for both schools.

4.0 Discussion

Children, even those of primary school age, increasingly have more choice over the food that they consume. There is concern that this may lead to some children having diets of poor nutritional value. A number of studies have looked at the food habits and nutrient intake of children (McNeil et al, 1991; Adamson et al, 1992). Nelson (1994) reviewing such studies, expressed concern that some children are consuming diets high in fat (particularly saturated fat) and sugar but low in essential nutrients such as calcium, iron and possibly anti-oxidant vitamins which could have adverse effects on their health both in the short and long term.

The most notable changes evident from this research relate to the drinks and snacks consumed. Both are highly significant given the evidence that barely half of all Irish children brush their teeth more than once a day, more than 75% eat sweets or chocolate at least once in the same time period and 63% consume a can of soft drink every 24 hours (HBSC, 2000). There was a positive shift in the level of fruit squashes consumed with a resultant increase in the level of milk and fruit juices. Similarly the level of chocolate consumption dropped from 31% to 16%. For a nutrition and oral hygiene point of view these represent a positive change

in behaviour as a strong association between dietary sugar and the level of tooth decay has been reported in the literature (Pan European Task Force, 1998).

Analysis in terms of the Food Pyramid indicates that the majority of children both at audit and re-audit were getting their RDA of the bread shelf. The number that were achieving the RDA at baseline for "milk cheese and yoghurt" and "fruit and vegetables" were noticeably lower at 37% and 49% respectively. However the introduction of a healthy food policy did bring about positive changes in these values increasing to 51% and 53%.

The content of the lunch boxes described is not very specific therefore bringing into question should the measurements be more comprehensive? In a recent study conducted by Conway et al (2002) which looked at the content of food in the lunch bags, the number of kilocalories, percentage kilocalories from fat, amount of total fat, saturated fat, cholesterol and sugar and the differences related to gender and grade were all looked at. Results concluded that boys had significantly more kilocalories, total fat, saturated fat, cholesterol and percentage of energy from fat than girls. Significant grade differences were found only for total fat and cholesterol.

It is also vital to consider the impact of advertising and branding on the food selected by children. Increasingly advertisements are targeted at children this has been substantiated by evidence from Sustain the former UK National Food Alliance shows that children are exposed to between two and three times more food advertising than adults. The range of influential factors that impact childhood nutrition are vast, however all efforts should be made to encourage healthy eating where possible. In line with that focus this report will be circulated to all schools involved so that recommendations can be acted in the near future.

Recommendations

- The relationship between diet and health is a complex one and it is recognised that health is influenced by the interactions between diet and other factors including body weight and body fat content and distribution, lifestyle and physical activity levels. Future initiatives should perhaps take a more integrated approach to dietary intervention that also will include physical activity promotion. The HBSC (1999) has particularly highlighted low levels of physical activity amongst young girls, which needs to be targeted. This was

partially targeted in this project with physical activity diaries collected in 2 schools however due to staffing limitations a more comprehensive approach was not feasible.

- This project focused on a broad spectrum of students, it may be a consideration in the future that such a project should be focused on a particular age grouping e.g. 8-10 year old. This is commonly viewed as the "key time" for targeting as the prevalence of overweight as it increases around this time.
- To enable direct comparisons of the effect of an intervention it is vital that pre and post intervention assessments are carried out on the same sample. This would add strength to the findings.
- As outlined in the BHH report there are important ethical considerations to be addressed when conducting research on children. Children are a vulnerable population that need to be accorded special protection from research risks. It is vital that all research involving children has parental approval. Although this permission was gained from the principals and the parent representatives on the working group future research may have to gain individual parental approval. This is in accordance with the long-standing moral and legal tradition that supports parents as the primary decision-makers for their minor children including the right to make proxy decisions for children about participation in research.

Conclusion

The intervention did succeed in both bringing about behavioural change and causing a measurable change in lunch box content, most notably in the snack and drink profile. However the results have to be viewed with caution given the methodological limitations. On a positive note this project served to empower children to become healthier by ensuring that all stakeholders in the school environment became involved. There was an acknowledgement that schools provide an excellent opportunity for health promotion activity. They can offer continual regular contact with children and opportunities for nutrition education and promotion of physical activity both within the formal curriculum and informally through a supportive environment such as healthy school meals and break-time snacks. Thus projects such as this should be encouraged in the future.

We would like to thank all of the primary schools who took part in this initiative; the work, determination and enthusiasm of teachers, pupils and parents is very much appreciated. The positive healthy food changes that were made, and healthy food policies that were created, are a fabulous reflection of the valuable work carried out by all those involved in the initiatives.
Thanks also to the Midland Schools' Health Project steering group, and MHB Health Promotion Officers, Public Health Nurses, Dental Staff and Area Medical Officers, who supported this initiative.

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