Case theme session*

Fruit and vegetables

Rapporteur's report

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Presentations

Health perspectives of higher vegetable and fruit intake in Europe
Frans Kok, Wageningen University, The Netherlands
Developing food-based dietary guidelines – fruit and vegetables as a case
Liisa M. Valsta, National Public Health Institute, Finland
Promoting fruit and vegetable consumption: implementation of food-based dietary guidelines, considerations from Working Party 3
Barrie Margetts, University of Southampton, UK
Increasing children's consumption of fruit and vegetables
C. F. Lowe et al, University of Wales, UK
Presented By Tim Lang, Thames Valley University, UK

Keywords
Fruit and vegetables, Nutrition policy, dietary guidelines

A parallel session was held to discuss fruit and vegetables in the context of developing a framework for European food-based dietary guidelines. To this end, four panel presentations addressing 1) the science base of fruit and vegetable recommendations, 2) the translation of nutrients to foods, 3) foods and people and 4) related policies were given. A discussion ensued out of which general recommendations as well as recommendations specific to the four inter-linked themes were drawn up.

It was agreed that fruit and vegetable consumption should be increased to at least 400g/d on a population basis. "Fruit and vegetables" is loosely defined as excluding potatoes and equivalent starchy roots but including a portion of fruit juice.

This 400g value will allow the EU to set the direction for policy and enable Member States to establish their own food-based dietary guidelines for fruit and vegetables;

The 400g value should be kept under review as further research and health promotion programmes are evaluated.

Recommendations

Working Party 1 - Science base

1. Due to limited funding, it is currently difficult to determine the dose-response relationship between fruit and vegetable consumption and health. Longer-term controlled trials (approximately 10 years) on disease end-points, intermediate end-points, precursors of disease and quality of life are needed.
2. The molecular mechanisms of the protection provided by fruit and vegetables are not fully understood. A better understanding of these molecular mechanisms in the fruit and vegetable - health relationship would inform a comprehensive research strategy.

Working Party 2 - Nutrients to Food

1. Both research and implementation of fruit and vegetable promotion are hampered by a lack of comparable data at the EU level on fruit and vegetable intake, including socio-demographic data and other factors influencing consumption. Such data need to be generated.
2. Monitoring should be set up in such a way that fruit and vegetables can be disaggregated for analysis.
3. Increasing vegetable intake is a greater challenge than increasing fruit intake: vegetables differ from fruit in nutrient composition as well as in the way they are processed and cooked in a wide variety of dishes. This should be recognized and taken into account in programmes that promote fruit and vegetable consumption.

Working Party 3 - Food and people

1. Nutrition information and education alone are not enough to change behaviour. A holistic approach is needed. This will require member states to:
2. Identify critical points such as availability, access, price and skills in food preparation as well as other factors which affect consumption.
3. Recognise that poverty and inequality are issues in many member states and this influences fruit and vegetable intake.
4. The EU should encourage Member States to establish recommendations to increase fruit and vegetable consumption within a range of settings such as schools, workplaces, etc.
5. Health professionals will need the necessary skills and training to help their clients achieve adequate intake of fruit and vegetables.
6. All health promotion interventions should be set up in such a way that they can and should be evaluated for efficacy and cost-effectiveness.

Working Party 4 - Policy

1 Production, processing, trade and marketing of fruit and vegetables influences their availability. The impact of the Common Agricultural Policy (CAP) on this supply chain is not fully understood. A health impact assessment of the EU Fruit and Vegetable regime in CAP is recommended.

2 Absence of structures within the EU restricts both scientific review and implementation of nutrition policy at EU level. A high level pan-European review group is required to advise on policy in relation to fruit and vegetable consumption

Abstracts

Health perspectives of higher vegetable and fruit intake in Europe

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Keywords
Vegetables, fruits, preventable proportion, cancer, cardiovascular disease

Objective: Quantification of the public health benefit of fruits and vegetables on the prevention of cancer and cardiovascular disease (CVD), using currently available human data.

Design: Over 250 observational studies on cancer and CVD have been reviewed. Relative risks (RRs) for high versus low intake of fruits and vegetables were obtained. The preventable proportion of chronic diseases, i.e. the per cent of cases attributable to low consumption of fruits and vegetables, was estimated using three scenarios: best guess, optimistic (using stronger RRs) and conservative (using weaker RRs and eliminating the contribution of smoking and/or drinking). The preventable proportion was calculated for increasing average intake from the current 250 g per day to the recommended 400 g per day among the general Dutch population.

Results: It is estimated that in the Netherlands cancer incidence could be reduced by 19% (12000 cases annually, best guess), ranging from 6% (conservative) to 28% (optimistic). Cardiovascular deaths could be reduced by 16% (8000 deaths annually, best guess), ranging from 6% to 22%. Evidence is most abundant

https://doi.org/10.1017/S1368980001001641 Published online by Cambridge University Press

for gastrointestinal cancers, followed by hormone-related cancers, but limited for other sites and CVD.

Conclusions: Increasing consumption of fruits and vegetables carries large public health potential. Population trials and biological mechanisms should eventually provide scientific proof of their efficacy. The available evidence is sufficient to justify public health education and promotion aimed at a substantial increase in the consumption of fruits and vegetables.

It will be discussed to what extent these recommendations are also applicable to other European countries with different levels of vegetables and fruits consumption and different patterns of morbidity and mortality.

Developing food-based dietary guidelines – fruit and vegetables as a case

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Keywords
food-based dietary guidelines, fruit, vegetables, nutrient density, dietary surveys, food consumption patterns

Background: An increased intake of fruit and vegetables is now close to becoming a pan-EU recommendation. Fruit and vegetables are known to be good sources of several vitamins, minerals, antioxidants, fiber as well as other bioactive compounds. Because their energy content is generally low, their nutrient content in relation to energy (nutrient density) is especially high. However, knowing good sources for certain nutrients of interest is only one step in developing food-based dietary guidelines. More data on similarities and differences in the dietary intake and food consumption patterns of the target populations are needed. Such information helps to evaluate the possibilities of making changes in the consumption of certain foods and to understand how introducing changes may affect the overall food consumption pattern.

Method: Comparison of food consumption patterns, % consumers, and nutrient intake among subjects in the target populations with high and low consumption, respectively, of fruit and vegetables. Dietary data for selected EU member states (Belgium, Finland, Germany, Greece, Ireland, Italy, Netherlands, and Sweden) were used [1]

Results: The intake of fruit, and to a lesser extent vegetables, among subjects in the lowest quartile in all countries in the analysis was found to be rather low. The differences in average intake of fruit between the lowest and highest intake quartiles varied from about fivefold in Finland, Italy and Sweden to over tenfold in Belgium, Greece, Ireland and the Netherlands. The differences in the average intake of vegetables between the intake quartiles were smaller (three to eightfold). Patterns of food intake between subjects with low and high intake of fruit and vegetables varied between countries. High intake of fruit and vegetables was associated with a high intake of potatoes in all countries except Finland, where fruit and vegetables seem to be replacing potatoes in the diet. In most countries a higher fat energy % was found among those in the lowest quartiles of intake for fruit and vegetables compared to the highest quartiles of intake. When comparing % consumers and mean intakes among consumers, large differences were found in the % consumers of fruit (especially in Belgium, Greece, Ireland and the Netherlands, and to a lesser extent in Finland and Sweden) between the high and low fruit and vegetable intake quartiles.

Low levels of % consumers were in some countries due to short study periods (e.g. 1-day).The difference in % consumers of vegetables was considerably smaller and the proportion of consumers close to 100% even in the lowest intake quartile in Finland, Ireland and Sweden.

Conclusions: In addition to the well-known between-country variation in fruit and vegetable consumption, large within-country variation as well is seen in many EU countries. The consumption patterns of fruit and of vegetables seem to be different. Thus, instead of combining fruit and vegetables as a single aggregated food group, it may be more effective to distinguish between them when making recommendations to increase their consumption levels in the population. A further analysis of the high intake levels of fruit and vegetables, or of high levels of consumers (close to 100%) even in the lowest fruit and vegetable intake quartiles in some

https://doi.org/10.1017/S1368980001001641 Published online by Cambridge University Press

countries may help in developing strategies for increasing fruit and vegetable intakes.

Reference

1. Report by the Working Party 2.

Promoting fruit and vegetable consumption: implementation of food based dietary guidelines, considerations from Working Party 3

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Keywords
fruit, vegetables, evidence-based goals, promotion, evaluation cost-effectiveness, inequalities, access

The best ways to promote and maintain optimal dietary patterns in general have been articulated by working party 3. These may be summarised into five broad points. 1) The need for clear evidence-based goals; 2) an approach that is integrated, multidisciplinary and comprehensive, whilst being sustainable; 3) the need for social marketing- i.e. target group involvement (specific to objectives) throughout development and implementation; 4) the creation of a supportive environment that enhances potential for success; 5) a support skills base where appropriate; 6) access and availability in the widest sense need to be considered; and 7) the importance of considering cost-benefit and evaluation (consider approaches for monitoring) of programmes.

In theory, promoting and maintaining optimal levels of consumption of fruits and vegetables should be relatively straightforward as it is a positive message with few apparent negatives.

In Northern Europe considerable effort has been directed towards promoting consumption, but consumption has never been as high as suggested, or increased substantially over the last ten years. In contrast, in Southern Europe consumption appears to be falling, when considerable effort has been directed towards promoting and maintaining consumption.

To date most effort has been directed towards providing people with information or to local food projects operating in a specific community. The effectiveness of these programmes have generally not been evaluated in the sense of impact on behaviour, and these local projects have often been run in relative isolation and unsupported by necessary structural changes to the wider environment in which people live. Social inequalities that affect access and availability need to be considered. A balance between an individual level of activity and responsibility and national (EU) policy-led activity and responsibility is required.

Strategies to promote fruit and vegetable consumption have focused on individuals in different settings (schools, workplace, health care) in different target groups (children, low income) and by different agencies (retailers, government). Programmes have been aimed at developing cooking skills, knowledge and budgeting skills. School based projects have attempted to develop integrated school policies that promote access to, and consumption of, fruit and vegetables over other foods, within the context of a healthy diet. There are many examples of local food projects organised at a small community level. Programmes aimed at increasing local access to the most vulnerable groups have been developed, but generally not in the context of a co-ordinated national policy that addresses the underlying issues. Some authors have suggested free school distribution of fruits which is possible under article 21.1 of EC regulations 1035/72, provided the quantities are additional to those normally purchased by the schools. This scheme has not been taken up in any real way and the cost-benefit of the scheme has not been evaluated. Suggestions to reform CAP need to be evaluated for both short and long term cost-benefit/effectiveness.

In summary, there are many opportunities to promote increased consumption of fruits and vegetables. What is required to make these opportunities successful is a more holistic and integrated approach that addresses the underlying reasons for variation in consumption and enhances opportunities in the widest sense, for increased consumption.

https://doi.org/10.1017/S1368980001001641 Published online by Cambridge University Press

Increasing children's consumption of fruit and vegetables

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Keywords
Fruit, vegetables, children, diet, health

This paper addresses the key issue of how to improve children's diets. It describes a new approach that has proved very effective, both with large numbers and in a variety of settings, in bringing about major and long lasting increases in children's consumption of fruit and vegetables.

In the course of a systematic programme of investigation into children's food preferences,[1-3] we have developed a Food Preferences Learning Programme that draws upon known psychological principles and is designed to influence children to try fruit and vegetables they have previously rejected and, generally, to eat much more of these foods. The Programme has two key elements: (i) a series of videos featuring the heroic young "Food Dudes" who are seen eating and enjoying fruit and vegetables, and who tell the children that, if they do likewise, they can help defeat "General Junk" who plots to deprive the world's children of these foods; and, (ii) small rewards (e.g., stickers, pens, pencil cases, rulers, T-shirts) that are given to the children for tasting or eating the foods.

The Programme was initially conducted with small numbers of 5-6 year-old children in their own homes (using multiple baseline research designs) and brought about substantial increases in consumption, often a doubling or tripling. These effects were still present at follow-up 6 months later. "Dismantling" studies showed that the video alone was not effective, the rewards had some effect, but by far the greatest effects were achieved by the combination of video and rewards together. Further studies were conducted with primary school classes of 5-6 year-olds (approx. 30 children in each class) which again yielded large and long lasting increases in fruit and vegetables consumption. These studies also showed that effects produced at school generalised to the home environment.

In an attempt to determine whether the Programme would be effective with younger children, we ran the Programme with twenty-six 2-4 year-olds in a day-care nursery. The effects were at least as strong as those seen in the studies of the older children and were well maintained in follow-ups, up to 15 months after the main intervention.

Following the success of these initial studies, a new phase of the research was launched last year aimed at developing a form of the Programme that can be implemented entirely by primary schools themselves, across the full range of pupils from 4 to 11 years old. This phase, supported by the UK Departments of Health, Education and Employment, and the Ministry of Agriculture, Fisheries and Food, is funded by the Horticultural Development Council, the Fresh Produce Consortium and six of the UK's leading supermarkets.

We report here on a major study using the new whole-school procedure in which two schools, with 230 children aged 4-11, participated. The results showed very large increases in consumption of fruit and vegetables by children of all ages. School staff and parents responded very favourably to the programme and to the changes it brought about in the children's diets.

This is a low-cost and easily run Programme that could be introduced in all primary schools throughout the EU and beyond. For the children who participate it should have major health benefits in the years ahead.

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