

How to implement dietary changes to prevent the development of metabolic syndrome

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Changing dietary intake is a major challenge to individuals, households and the general public. Promoting the consumption of diets that are low in fat and high in fruits, vegetables and starchy carbohydrate, and managing overweight and central obesity, are important dietary strategies for the prevention of metabolic syndrome. Educational, behavioural and motivational tactics are required to help people achieve overall dietary change. These strategies might usefully be based on intervention models which incorporate behavioural theories and goals through personal, multiple contact with individuals or in small groups, using active involvement and specific behaviour-change strategies. Two particular aspects, namely the impact of computer-generated, personalized nutrition education and social support networks (e.g. family, health centre and community) provide useful adjuncts to traditional dietary counselling and might usefully be incorporated into diet- and lifestyle-change programmes for community-based and individualized approaches for disease prevention. The use of moderate energy-deficit diets, modest targets for weight loss (and maintenance) which can be sustained over the long term, and increased physical activity probably offers the most feasible approach for intervention aimed at reducing overall body weight.

Dietary intervention: Obesity: Behavioural theories

Prevention – population and individual change

Changing dietary intake for disease prevention has been advocated for many medical conditions, but there is little information on effective approaches to altering food behaviour in individuals, households and the community at large. Nutritional strategies for the prevention of insulin-resistance syndrome in the community are similar to national food-based dietary guidelines for health promoted by most European countries (Williams *et al.* 1999), with additional approaches necessary for the management of overweight and central obesity.

Through an integrated nutrition policy approach, a number of Nordic countries such as Finland have succeeded in reducing fat intake and increasing intake of fruits and vegetables in the general population over the past few decades (Pietinen *et al.* 1996). However, there appears to be little evidence that the prevalence of overweight has diminished, suggesting that additional approaches are required to reduce total energy intake and increase physical activity. Encouraging results from the Oslo Diet and Exercise Study (Torjesen *et al.* 1997) on weight loss after 1 year show that a diet and exercise intervention may help to reverse development of insulin-resistance syndrome, but

little is known about compliance outside the trial situation or adherence to prevention programmes. A comprehensive approach to preventing insulin-resistance syndrome might usefully combine population-based strategies through nutrition policy implementation, selective prevention (directed at subgroups of the population with an above-average risk of developing insulin-resistance syndrome), and targeting high-risk individuals.

Effective approaches to dietary change

Effective approaches to healthier eating in the general population have recently been reviewed by Roe *et al.* 1997 who demonstrate that 'despite the difficulties inherent in achieving dietary change in the general population, healthy eating interventions in a variety of settings were effective'. Outcomes in the studies which were reviewed include a reduction in blood cholesterol and a reduction in dietary fat intake. The authors conclude that interventions directed at healthy eating should, at most, address one related risk factor such as exercise. In the context of insulin-resistance syndrome this is an important message and supports the development of programmes that tackle both eating and activity behaviours.

The main characteristics of the effective healthy eating interventions reviewed by Roe *et al.* (1997) provide a useful basis for the design of dietary programmes for high-risk individuals in a wide range of settings, including primary care, community and the workplace, and are as follows:

- using an intervention model incorporating behavioural theories and goals rather than one based solely on the provision of information
- intervention methods emphasizing personal contact with individuals or in small groups, using active involvement and specific behaviour-change strategies
- some degree of personalization of the intervention to individual characteristics, either by contact with trained personnel or use of individualized printed materials
- the provision of feedback on individual changes in behaviour and risk factors
- multiple contact over a substantial period of time
- encouragement of support for individual dietary change by involving family members, colleagues and others.

The traditional healthcare approach of individual counselling interventions shown to be effective was often relatively intense and required substantial resources. In terms of cost-effectiveness it may be necessary to consider a range of communication methods. A combination of educational, behavioural and motivational strategies is required to help people achieve dietary change (Anderson *et al.* 1998), and traditional approaches based solely on 'information transfer' are unlikely to be successful. Moving towards a client-centred approach, where some or most of the control over dietary behaviour is directed by the patient, offers considerable scope for working in partnership towards behaviour-change strategies that can be utilized for a range of personal behaviours. Once the patient has identified the dietary habits which he/she wishes to control, positive feedback methods can help to support further actions and improve self esteem.

One approach which offers a practical route for assisting the delivery of interventions is computer-generated, personalized materials. This method allows messages to be tailored to individual behaviours and circumstances. Studies based on behaviour change theory which employ this methodology indicate that computer-tailored nutrition education is more likely to be read, remembered and experienced as personally relevant and may have greater impact on motivating people to change their diet (Brug *et al.* 1999).

However, eating and drinking are so strongly influenced by social behaviour that contact with nutrition educators and computers are unlikely to achieve dietary alterations without support from the people that most strongly influence food choice, such as family members, colleagues, local leaders and wider community endorsement. Strategies for increasing social support in dietary change interventions, as highlighted by Kelsey *et al.* (1997), are outlined in Table 1. Support methods which are practical in the clinic setting (e.g. bringing the whole family together) may be difficult to undertake but again need to be directed by the patient to suit his/her circumstances. Societal attitudes which accept dietary change as a positive step rather than something to be forgotten, neglected or ignored whilst eating in company also provides a strong background for individual change.

Table 1. Strategies for social support in dietary change programmes

Support	Examples
Couples	Identify personal actions of partner Contract to agree to provide practical support
Family	Group activities Family interactions that influence food consumption
Partnership/buddy	Daily telephone contact Discourage unacceptable behaviour
Support group	Monitor each other's weight Use group problem solving

A major feature of any long-term disease prevention strategy should involve children. The focus of intervention in children must lie with initiating healthy eating and activity habits in early life, including breast-feeding and avoiding solid foods before 4 months of age, both of which have been demonstrated to be associated with greater levels of body weight in childhood (Wilson *et al.* 1998; von Kries *et al.* 1999). In terms of body composition, programmes are needed that aim at increasing lean body mass as children increase in age, allowing for physical and intellectual development.

Effective approaches to weight loss and maintenance

Central to the prevention of insulin-resistance syndrome is the avoidance and management of overweight, especially central obesity. There are no long-term studies which demonstrate effectiveness of obesity prevention or weight maintenance, but there is a general consensus on management of the overweight (WHO, 1998). The dietary component of weight management programmes needs to be set in the context of a system which builds in social support and behavioural and exercise management. The combination of a reduced-energy diet and increased physical activity is recommended by the US NIH (1998) on the grounds that it produces weight loss which may also result in decreases in abdominal fat. Behavioural theory-based programmes which incorporate motivation and readiness to implement lifestyle changes enable dietary and activity goals to be negotiated between professional and patient, allowing for modest weight loss or maintenance over a sustained period. Relating dietary advice to social circumstances (especially with consideration of financial resources, shopping and culinary skills, and ethnically appropriate choices) and psychological well-being are further considerations for individual goal setting.

Setting realistic weight management goals is essential for the self esteem of both patient and professional. In prevention terms, a body weight which is kept constant over a decade as a result of a weight management programme represents a successful outcome. Substantial benefits can result from moderate weight losses, e.g. 5–10 kg in 1 year (Goldstein, 1992), if these can be sustained. It is important to recognize that most patients are unable to continue losing weight for longer than 12–16 weeks, and further efforts may result in failure contributing to low self esteem and low perceived behavioural control.

The value of using an individualized, moderate energy restriction for weight loss over the more conventional standardized dietary regime has been demonstrated by Frost *et al.* (1991). In their comparative study they counselled patients on individualized dietary prescriptions of around 2.2 MJ per person below estimated energy expenditure. A mean prescription of 7.1 MJ/d over 3 months produced significantly better results – a 5.0 kg weight loss compared with the 3.0 kg loss achieved with a standard 4.6 MJ/d approach. The results contrast with predicted weight loss of 6 and 13.2 kg, respectively, which should have been achieved if subjects had adhered completely to the prescriptions.

This individualized approach also enables the composition of the diet to be clearly defined by translating the energy prescription into a diet plan using food exchanges. One approach now used nationally by Scottish dietitians in obesity management is an exchange system using 'bread & cereals', 'fruit & veg', 'meat & fish' 'fat & sugary', 'milk & dairy' groupings ensuring <30% energy from fat. Advising on this exchange basis allows an appropriate energy composition to be attained irrespective of weight loss. Saturated fats, sugar and alcohol intake are limited, thus helping to achieve dietary patterns consistent with general healthy-eating guidelines and therefore suitable for the entire household.

Adhering to a weight-loss dietary regimen needs to move beyond nutritional adequacy to practical considerations including dietary patterns such as meal size, meal frequency and meal timing, and food shopping and preparation. The importance of how to achieve healthy food choices when eating outside the home or when limited time and resources are available for meal preparation are now considered essential components of dietary advice. Clearly such an approach cannot be achieved by simply distributing a diet sheet, but time for repeated contact with health professionals is required to educate and motivate the high-risk individual and family.

Using behavioural modification tactics to help patients regain control of eating habits (whether for weight loss or healthy eating) is considered a useful support to achieve dietary change. Self-monitoring, which can be for individual food groups (e.g. fruits and vegetables) or total food intake through diet diaries, is widely used and helps patients to gain greater understanding of personal food intake and personal targets. Stimulus control is aimed at limiting exposure to cues that prompt overeating. These cues will be different for each patient but might include domestic situations such as avoiding eating meals in front of the television where the individual becomes less aware of what is consumed, or shopping situations where purchase of one item is always associated with additional, unnecessary food (e.g. purchasing confectionery when paying for petrol). Cognitive restructuring techniques may be required to address negative attitudes about weight regulation and can be assisted by focusing on the success of attaining other dietary changes for health benefits (e.g. consuming five portions of fruit and vegetables a day). Strategies for relapse prevention and maintaining successful changes in food habits need to be built into programmes which enable long-term adjustments to lifestyle. The success of behavioural modification programmes with adults over 5-year periods

have been limited, but long-term outcomes in children are more promising when family-based therapy approaches have been employed (Epstein *et al.* 1994)

Designing a programme for the prevention of insulin-resistance syndrome

A cost-effective lifestyle programme for the prevention of insulin-resistance syndrome targeting high-risk individuals has yet to be developed. Designing a programme of dietary change that is effective in achieving appropriate nutrient composition and avoiding central obesity, that can be sustained and transferred within different sectors of the population, is a crucial part of lifestyle change. The following steps need to be considered in design:

- (1) How can lifestyle change be prioritized (e.g. should an individual stop smoking before dietary change)?
- (2) How can diet and exercise change be integrated within a long-term strategy?
- (3) What energy value and macronutrient composition is appropriate for high-risk individuals using an individualized moderate energy deficit approach?
- (4) What is the underlying behavioural theory for lifestyle change (e.g. Stages of Change model where interventions are tailored according to people's readiness to change)?
- (5) What counselling is required for patient education on food choices, preparation, cooking and dietary patterns?
- (6) How can interventions be personalized (e.g. computer feedback) and interactive (e.g. addressing problems, discussing and negotiating alterations)?
- (7) What are the resources available to provide professional (e.g. professional or trained lay staff) and non-professional (e.g. family, friends) support for lifestyle change? What follow-up support, feedback and interaction are available for individuals?
- (8) What strategies are available for maintaining weight loss and diet of appropriate composition?

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