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« FRUIT & VEGETABLES INTAKE IN OLDER ADULTS »

Editorial

Nutrition and physical activity (PA) play a central role in healthy aging and the prevention of chronic illness, especially cardio-vascular diseases. As part of our lifestyle choices, nutrition and PA can be changed and should therefore form an essential part of prevention policies directed towards the elderly.

Fruit and vegetables (F&V) contain many antioxidants such as carotenoids, polyphenols and vitamin C that may act as a protectant against various diseases. Lo and al have shown in a prospective study conducted in Taiwan among people 65+ years, that higher F&V consumption was predictive of higher survival rates. Aging is associated with a weakened immune function and a higher risk of infectious diseases, which is even higher in a context of poor nutritional status. Gibson and al have shown that increased F&V consumption (five portions versus two portions) may improve the response to anti-pneumococcal c vaccination in elderly people aged 65-85 years after 16 weeks. These results are very encouraging for the prevention of lower pulmonary infectious diseases with pneumococcal that commonly affect the elderly.

The amount of time devoted to physical activity declines with age, and an excessively sedentary lifestyle is linked with an increased incidence of chronic disease, frailty and disability. It has been shown that combining nutritional balance and physical activity can help improve health outcomes in the elderly. Sodergreen and al have recently demonstrated that one additional serving of F&V, or a 15-minute brisk walk improves the reporting of good health among older adults.

Recent research and earlier data alike suggest that an increase in F&V intake is associated with lower morbi-mortality rates and improved well-being. Together with physical activity, a higher fruit and vegetable intake can help achieve healthier aging. It should be strongly encouraged.

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Associations between fruit and vegetable intake, leisure-time physical activity, sitting time and self-rated health among older adults: cross-sectional data from the WELL study

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Lifestyle behaviours, such as diet, physical activity and sedentary behaviour, are key factors to prevent chronic disease and to maintain health throughout the life-course. Although these lifestyle behaviours frequently coexist and are amenable to interventions, the relationships between them and how they interact with each other have received little attention. In addition, relatively little research has explored these behaviours and their shared association with health indicators in the 55-65 years age group, an increasing group of older adults in transition to retirement. Later adulthood is an important period because the impact of behavioural risk factors increases with age and many chronic diseases will present during this life-stage. People reaching retirement will also have access to more leisure-time which may impact their opportunities to engage in healthy or unhealthy behaviours.

Wellbeing, eating and exercise for a long life

The Wellbeing, Eating and Exercise for a Long Life ("WELL") study is a population-based cohort study that aims to identify how intrapersonal, social and environmental factors influences nutrition and physical activity behaviours of older adults across urban and rural Victoria, Australia. A random sample of adults aged 55-65 years, completed a postal survey at baseline (2010). In analyses of cross-sectional data (n=3,644) we explored the relationships between fruit and vegetable intake, leisure-time physical activity, and sitting time, and their individual and shared association with good self-rated health, controlling for known confounders.

F&V intake and leisure-time physical activity were positively associated with self-rated health

The findings show that each additional serving of fruit and vegetable or 15 minute brisk walk per day, was associated with an approximately 10% increase in the odds of reporting health as good or better among women and men. The relationship remained statistically significant when all three lifestyle behaviours were included in the model, and after adjusting for BMI, smoking, long-term illness and socio-demographic characteristics (education, marital status and housing tenure). No significant association was found between sitting time, and self-rated health, but we discovered an interaction between sitting time and fruit and vegetable intake. This means, that the simultaneous influence of sitting time, and fruit and vegetable intake on self-rated health is not additive. Instead, the association between fruit and vegetable intake and self-rated health is dependent on sitting time and additional time spent sitting affected this association differently in women and men. Among men the association between fruit and vegetable intake and self-rated health strengthens with less time spent sitting (<10hr/day). Whereas, the reverse effect for added time spent sitting (>5hr/day) was found for women. It is possible that the different associations for men and women are a result of different patterns of sitting time, for example, prolonged periods versus intermittent sitting bouts.

Even small differences in lifestyle behaviours may influence the health status of the population

This study contributes to the scarce literature related to lifestyle behaviours and their association with health indicators among older adults. Results from the study provide further support that even small differences in lifestyle behaviours may influence the health status of the population. Furthermore, the results give justification for looking at health behaviours in combination, and the importance to examine both additive and synergistic effects on health outcomes. The WELL study will provide opportunities to examine lifestyle behaviours and their determinants longitudinally.

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BMC Public Health. 2012 Jul 25;12:551. doi: 10.1186/1471-2458-12-551

Improving the immunity of older adults: Can eating fruit and vegetables help?[1]

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Ageing is associated with a decline in immune function[2] and increased risk of infection[3] which may adversely affect nutritional status[4]. Older populations have low intakes of fruit and vegetables (F&V)[5,6], and it is possible that increasing F&V consumption may benefit the health of older people. Indeed, several of the micronutrients associated with F&V-rich diets, such as carotenoids, flavonoids and vitamin C, have been shown to have a beneficial effect on immune function[7]. We therefore carried out a randomised controlled trial to examine whether increasing F&V intake could improve immune function in older adults.

The Ageing and Dietary Intervention Trial (ADIT)

We randomised 83 healthy volunteers aged 65-85 years with low F&V intakes (≤2 portions/day) to either increase their F&V intake to five portions/day, or to follow their normal diet (≤2 portions/day) for 16 weeks. A portion was based on the Food Standards Agency guidelines i.e. an 80g serving (e.g. one apple, orange or banana, three heaped tbsp of vegetables, or 150ml fruit juice). At week 12, participants were administered a Tetanus and Pneumovax II (both 0.5 mls intramuscular) vaccine. Antibody response was assessed as a clinically relevant marker of immune function (total IgG for tetanus and total IgG and IgG2 for pneumococcal capsular polysaccharide).

We designed the study in a way that reflected a 'real life' setting whereby participants consumed their preferred F&V. Participants were not offered a prescriptive list of F&V at any time during the study. Rather, consumption of a wide variety of F&V was encouraged and the five portions/day F&V dose was designed to be achievable and in line with the '5-a-day' public health recommendations.

Compliance with the intervention

Compliance was closely monitored throughout the intervention by diet history and by assessing biomarkers of micronutrient status. One-to-one dietetic advice was provided to help participants' incorporate the F&V into their daily diet. Participants also received a free, weekly home delivery of F&V.

At the start of the study, participants were consuming on average 1.4 portions of F&V/day. This changed significantly over the 16 weeks with those in the five portions/day group having a larger increase in F&V intake compared to those in the two portions/day group (mean F&V increase 4.6 versus 0.4 portions, respectively). Greater changes in micronutrient status (vitamin C, zeaxanthin, β-cryptoxanthin and lycopene) were also evident in the five portions/day group compared to the two portions/day group.

Increasing F&V intake improved immune function

Those assigned to the five portions/day group had a greater antibody response to the Pneumovax II vaccine compared to those who continued to eat a low F&V diet. Antibody binding to the pneumococcal capsular polysaccharide (total IgG) increased significantly in the five portions/day group compared to the two portions/day group (geometric mean (95% CI) of week 16 to baseline ratio: 3.1 (2.1,4.4) and 1.7 (1.3,2.1), respectively; p=0.001). This was particularly evident in those who had never received the Pneumovax II vaccine before. An extra portion of F&V/day was estimated to increase total IgG and IgG2 response by 18% and 17%, respectively. We found no difference between the two groups in immune response to the tetanus vaccine.

Public health relevance

Although it's not entirely clear what the link is between F&V and the enhanced immune response, our results suggest that increased F&V intake in some way boosted the function of the T-cell antibody pathway, resulting in greater immune response. Given that immune systems of older adults are less effective than that of younger individuals and are characterised by higher rates of chronic disease and susceptibility to infection, our findings have potential public health impact, particularly when considering the impact of vaccination programmes.

Encouraging endorsement of the '5-a-day'

With the continuing growth in our older population, it is important that more research is undertaken to examine how diet can help to support a healthy immune system. We have shown for the first time that consuming five portions of F&V/day improves antibody response to the Pneumovax II vaccine in older adults. Our findings thus provide a rationale for encouraging older adults to 'eat 5-a-day'.

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Spending on vegetable and fruit consumption could reduce all-cause mortality among older adults.

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Food insecurity in vulnerable groups

The WHO asserts that the global food price crisis threatens public health and jeopardizes the health of the most disadvantaged groups such as women, children, the elderly and low-income families[1]. Economic factors play a crucial role and could affect personal nutrition status and health. Poorer households facing food insecurity may be in fear of running out of food, or money to buy food, and face food scarcity. In many cases, they purchase cheaper foods than usual or simply go without food for a day or more[2].

Economic factors could threaten elderly diets and health

Some elderly people are at risk of malnutrition because of food insufficiency, with consequential lower intakes of various nutrients. In these instances the foods which provide these nutrients, like vegetables and meat are missing from their dietary variety[3]. For this group, the choice and consumption of food is determined especially by quality, taste, health and economic considerations[4]. Moreover, poor elders often have to curb their spending on food to have money for medical expenses (ironically, often nutritionally related)[5].

Better dietary quality costs more

The food cost of healthy diets may be more burdensome. In a recent study, we found that, despite taking account of livelihood and income (personal or household), a more diverse diet was associated with higher total food expenditure among a representative Taiwanese elderly population[6]. Elders of lower socioeconomic status tended to choose foods which would have cost less. In addition, elders with the best dietary diversity spent about twice as much on meats and vegetables as those whose dietary diversity was the worse. Compared to those with poor dietary diversity, the best dietary diversity group's expenditure on dairy and fruits was fourfold and six-fold, respectively.

Vegetable and fruit expenditures are associated with less risk of death in the elderly

Wealthy households have higher expenditures on animal-source foods, vegetables, and fats and oils compared to moderately and severely food-insecure households[7]. Greater vegetable, legume (beans), and fruit intakes are linked to reduced risk of all-cause mortality in older populations[8-10]. This may be because of a corresponding reduction in the intake of other less nutritious foods[11]. In rural Indonesia, households that spend a greater proportion on plant foods have a lower under-5 child mortality[12]. In our study of Taiwanese elders, fruit and vegetable (F&V) - but not other food - expenditures, had a protective effect on all-cause mortality. Those whose vegetable intake was Q4 (61-80th percentiles) but not Q5 (81-100th percentiles) had a 45% lower all-cause mortality compared to those in Q1 (the lowest 20%), and for fruit had a 36% lower all-cause mortality[13]. The amount of food consumed in this group (Q4) for vegetables was 463 g/d and for fruit 377 g/d, which met WHO recommendations. This fits in with public health policy that encourages people to eat five servings of fruit and vegetables a day[10,13]. Moreover, if older adults increased food expenditure by NT$15 (or US$0.50) per day, with vegetables they would have a 12% lower risk of death, and with fruit, a 10% lower risk of death. A NT$15 increase for each of these food expenditures should not be an economic barrier for most older Taiwanese, but may well be for the socioeconomically marginalized.

Policy implications

That greater F&V intakes can benefit survival is evident[9,10]. However, physical factors such as chewing ability[14] and economic factors can limit F&V intakes among older adults. Indeed, the entire food system contributes to the availability, affordability and utility of F&V intakes; in this regard, it is noteworthy that shopping, food storage and food preparation are involved and improve health outcomes[15,16]. Public health policy should not only focus on promoting healthy diets or increasing F&V intake per se, but on the reduction of economic barriers to affordable healthy foods, especially F&V. Health departments also need to plan for seasonality and natural disasters (such as typhoons in Taiwan), which can alter the F&V supply dramatically and drive up prices quickly. The resultant unaffordability for the economically marginalized, notably elders and the socially disadvantaged may thereby be minimized. It is clear that attention to food budgeting, with an emphasis on F&V, should form a part of food and health policy.

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