**Nutritional standards needed for ready meals to avoid micronutrient deficiencies**

Micronutrient deficiencies contribute to many age-related disorders, although initial effects may be mild and easily missed. For example, B vitamin deficiency may result in mild cognitive decline, thiamine deficiency can contribute to development of type 2 diabetes and lack of vitamin D changes immune function.

The importance of phytochemicals is increasingly recognised. Lutein may reduce the risk of Alzheimer’s disease, some polyphenols reduce glucose uptake and the risk of type 2 diabetes, and some flavonoids improve vascular function. There is increasing recognition of the benefit of interaction between vitamins and phytochemicals.

Cooking from raw ingredients is the best way to achieve a balanced diet, but many older people cannot do this and rely on ready meals, which often have reduced micronutrient levels.

Heat inactivates some vitamins; cooking in excess water causes leaching of water-soluble vitamins and phytochemicals, such as the anti-cancer glucosinolates; use of bicarbonates to retain the colour of green vegetables or soften pulses can destabilise vitamins; and use of sulphite, which is widely used to preserve tinned pulses and some meat products, can destroy thiamine.

Vegetables in ready meals should be slowly stewed rather than boiled and fresh meats should be used. The authors suggest there should be new nutritional standards for ready meals and that they could be sold with slogans such as ‘vegetables slow-cooked for health’.

**Obstructive sleep apnoea-hypopnoea syndrome and cognitive impairments**

Obstructive sleep apnoea-hypopnoea is a common condition involving apnoea (absence of breath) and hypopnoea (reduced airflow). It causes intermittent hypoxia and poor quality, fragmented sleep. As a result, daytime functioning is significantly impaired with excessive sleepiness, fatigue and mood problems.

A recent study of 298 older women found that 45% of those with sleep apnoea-hypopnoea developed mild cognitive impairment or dementia after an average of five years compared with 31% of those without the condition.

The prevalence of sleep apnoea-hypopnoea increases with age, possibly because of changes in the upper airway including pharyngeal collapsibility, fat deposits around the pharynx and decrease in muscular endurance.

As people age the structure of their sleep also changes, with more frequent shifts from sleep to wakefulness.

**Vitamin D supplementation effective in preventing acute respiratory tract infections**

Studies have consistently shown low levels of vitamin D make people more susceptible to respiratory infections. Acute respiratory infections are a major cause of ill health and mortality. Observational studies have shown that people with low levels of 25-hydroxyvitamin D, the major circulating vitamin D metabolite, are susceptible to respiratory infection.

Vitamin D supports the development of antimicrobial peptides in response to viral and bacterial stimuli. This may be the mechanism by which it provides protection against infection.

This study combined data from 23 randomised, double-blind, placebo-controlled trials of supplementation with vitamin D. It found that daily or weekly supplementation protected against acute respiratory infection whereas large bolus doses did not.

The duration of apnoea-hypopnoea may be longer in older people because there is a reduction in the body’s ability to sense and respond to these events. The increase in cognitive impairment may be related to the fact that intermittent hypoxia promotes oxidative stress, which is associated with neuronal cell damage and death. Recent studies have also shown increased plasma markers of systemic inflammation with increased levels of inflammatory cytokines.

**Ongoing research**

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<tr>
<th>Title</th>
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<tr>
<td>Vitamin D supplementation to prevent acute respiratory tract infections</td>
<td>B. S. Tan, J. Miao, Y. et al. (2017)</td>
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<td>10.1051/bioconf/20170801027</td>
</tr>
<tr>
<td>Obstructive sleep apnea-hypopnea syndrome and cognitive impairments</td>
<td>S. Tan, J. Miao, Y. et al. (2017)</td>
<td>BIO Web of Conferences</td>
<td>10.1371/journal.pone.017801027</td>
</tr>
<tr>
<td>Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data.</td>
<td>Martineau A, Jolliffe D, Hooper R et al. (2017)</td>
<td>BMJ</td>
<td>10.1136/bmj.j6583</td>
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