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Thiamine deficiency in the western diet and dementia risk

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In their recent systematic review, ter Borg and colleagues estimated that 50% of older (≥65 years) men and 39% of older women are failing to reach the estimated average requirement (EAR) for thiamine [1]. This is noteworthy since thiamine plays a unique role in brain physiology as an essential cofactor for glucose metabolism; it is especially important for normal cognitive function in the elderly [2]; and thiamine insufficiency is linked with an increased risk of Alzheimer's disease [3].

Nevertheless, as noted by ter Borg et al, concerns over thiamine deficiencies are generally discounted in western countries. This is partly because white flour products and breakfast cereals are commonly fortified with thiamine, and this vitamin also occurs naturally in a wide range of foods: good sources include whole grains, trout, pork, peas and beans. However, some sectors of the elderly population may be making dietary choices that compromise their thiamine intake and increase their vulnerability to thiamine insufficiency. For example, an increasing number of elderly people in western countries are being diagnosed as gluten intolerant [4]. When they replace wheat-based products with gluten-free products they are at increased risk of thiamine deficiency since gluten-free products - unlike wheat-based products - are not usually fortified with this vitamin [5]. A second cause for concern relates to the rise in the consumption of ready meals and convenience foods by the elderly [6]. Sulphites destroy thiamine, and yet in the UK they are a common preservative in convenience meat products such as pork sausages, in canned pulses and in many ready meals and convenience foods containing potatoes. For example, consumption of fresh pork is declining in the UK diet [7]. And whereas a grilled pork chop is an excellent source of thiamine (0.78 mg/100g), grilled sausages contain only trace amounts [8]. Losses of thiamine during the production of ready meals are also likely since this vitamin is very heat-sensitive and leaches into cooking water [9]. The extent to which this occurs during ready meal production is not known.

Despite the wide range of factors affecting thiamine levels in foods, the National Diet and Nutrition Survey (NDNS) in the UK has reported very low levels of deficiency in the over 65 year olds [10]. Thiamine levels were determined by

measuring activation of the thiamine-dependent enzyme transketolase by thiamine pyrophosphate - the erythrocyte transketolase activation coefficient (ETKAC). However, this assay has not been fully validated for measuring thiamine status in the elderly, it is subject to limitations, and hence it has been recommended that the ETKAC should be used in conjunction with other measurements [(11)]. Direct measurement of thiamine levels to complement the ETKAC would also help address inconsistencies between NDNS data and the study by ter Borg et al. Since new eating trends mean that some sectors of the elderly population are increasing their likelihood of thiamine insufficiency, consideration could be given to not using sulphites in sausages (as is already the case in some countries) and to fortifying gluten-free products with thiamine. It is likely that many micronutrient deficiencies contribute to Alzheimer's disease and other forms of dementia [(12)], and thiamine certainly deserves more attention to ensure that it is not one of these contributors.

Conflict of Interest

None

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