Effect of bread type choice on nutrition quality in elderly

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UDC 613.2-053.9 : 664.66

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ABSTRACT

Physiologic and functional changes during aging result in changes in nutrient needs. Older adults have specialized requirements because of aging effects on absorption, utilization, and excretion. They need less energy but have higher needs of some micronutrients like folic acid, vitamin B_6 and B_{12}. The aim of this study was to evaluate how small choices can influence dietary intake in elderly nursing home resident with limited selection of foods.

Monthly menus in which only choice that residents have is white or brown bread were analysed and compared regarding energy and nutrient content. Obtained values were compared to recommendations for the elderly based upon the presumption that the whole portion was eaten. Gender and age of residents were also taken into consideration during these comparisons.

Brown or white bread choice did not have impact on energy, proteins or fats, but small change in carbohydrate intake was noticed. Brown bread choice positively influenced intake of dietary fibres, which is especially important in male population where white bread choice results in fibres intake below the recommendations. Among minerals brown bread choice the most positively influenced iron intake, while in the group of vitamins increase was noticed for thiamine, riboflavin, niacin, vitamin B_6 and folate.

In conclusion the simple choice of brown instead of white bread results in improved intake of dietary fibres and B group of vitamins, as well as the intake of certain minerals.

Keywords: energy value, nutrient content, food, nursing home, elderly

INTRODUCTION

Individuals aged 65 and over are generally considered to be elderly population. Their rate in the overall human population is rapidly growing in almost all parts of the world, and with the increase of elderly people number, the specific nutrition-related problems of the elderly years take on greater significance [1].

Aging brings about a progressive decline in the functioning of all organs and systems [1, 2]. Physiologic and functional changes during aging result in changes in nutrient needs [3]. Older adults have specialized requirements because of aging effects on

absorption, utilization, and excretion. Energy needs decline but requirements for many nutrients increase [4]. In elderly, adequate protein intake is essential for the prevention of muscle mass losses, fibres intake for decreasing constipation [5]. Therefore elderly should select nutrient-dense foods to meet their nutritional needs [1, 2]. Additionally, co morbidity, whether acute or chronic, presents challenges in planning the diet of elderly persons.

Malnutrition is correlated with institutionalization, hospitalization and rehabilitative care, especially in elderly [5, 6]. At the same time, due to the modern lifestyle, more and more elderly individuals relies on the nursing homes where, unlike in family, many residents depend exclusively on the food provided by the institution. Only few choices are available, and even those are limited due to the habits which are not so easy to change in this stage of life. Therefore the aim of this study was to evaluate, in nursing home residents, how small choices like bread type choice can influence total dietary intake of macro and micronutrients with the focus on those most often being deficient in the elderly population.

SUBJECTS AND METHODS

Participants of this study were indirectly residents of the nursing home. At the moment of the study nursing home had 161 residents, 65 of which were males and 96 females. Both genders were represented by individuals of age groups 50-70 (20 males and 28 females) and over 70 (45 males and 68 females) years of age.

Complete monthly menus offered to nursing home residents were assessed in order to get dietary intake of macro and micronutrients. Detailed information about the menu and food preparation processes was gathered from the kitchen staff.

In order to convert the menus to nutrients, the food composition database [7] and specialised NutriPro software were used.

Only dietary choice which residents had in this institution was to choose between white or brown bread and therefore all nutritional calculations were done with both choices to compare influence of this choice on energy and nutrient intake.

Obtained values were compared to recommendations for the elderly [4] based upon the presumption that the whole portion was eaten. Both, gender and age of residents were taken into consideration during these comparisons.

RESULTS AND DISCUSSION

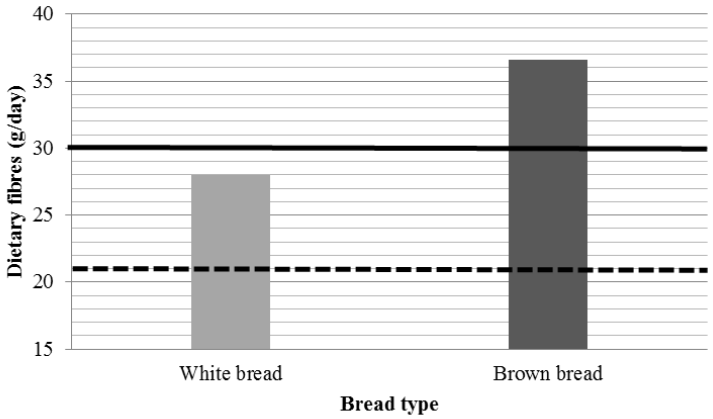
Wheat bread has to contain more than 90% of wheat flour. If it is produced of white wheat flour with the ash content up to 0.60% it is called white bread, and if it is produced of wheat flour with the ash content higher than 1.05% it is called brown bread [8]. Considering the differences in white and brown bread nutrient composition, and their quite high daily consumption, it was assumed that brown bread choice could have

an important positive effect on the overall nutrient intake in elderly, and especially on the intake of micronutrients.

Results of the study shown that brown or white bread choice did not have impact on total energy intake, proteins or fats but small change in carbohydrate intake was noticed (Table 1).

Table 1. Total daily energy intake and contribution of macronutrients through menu with white and brown bread

	Menu with white bread	Menu with brown bread
Total energy intake (kJ)	10738	10558
Total energy intake (kcal)	2568	2524
Energy intake from proteins (kcal)	421	421
Energy intake from fats (kcal)	942	942
Energy intake from carbohydrates (kcal)	1227	1184
% of total energy intake from proteins	16.2	16.5
% of total energy intake from fats	36.4	37.0
% of total energy intake from carbohydrates	47.4	46.5



Adequate intake [4] in adults of 51 years of age or older is presented for males with solid black line and for females with a dash line.

Figure 1. Average daily intake of dietary fibres through the offered menus with white or brown bread

Constipation is a common problem among the elderly population, with prevalence between 25% and 35% among the free-living individuals, and even 50% to 65% among nursing home residents. Gastrointestinal transit times are lengthened due to lack of physical activity, poor hydration and the most importantly a lack of dietary fibres [1]. Brown bread choice positively influenced intake of dietary fibres, which is especially important in male population where white bread choice results in fibres intake below the recommendations (Figure 1).

In the process of considering data obtained for minerals and vitamins intake it was stressed that recommended intakes for individuals vary in dependence on gender and age [4]. Therefore all obtained values were compared with the specific groups for which they differ.

Among minerals bread choice influenced potassium, calcium, phosphorus, iron and selenium intake (Table 2). In these entire cases dietary intake was elevated as a result of brown bread choice.

Although the primary aim of this study was to evaluate the effect of the bread type choice on the overall nutrition quality, it should be stressed that the study revealed enormously high sodium intake.

Table 2. Compliance of average daily intakes of selected minerals through the menus combined with white or brown bread to the recommended daily intakes (% DRI) [4]

Element	Bread type	All	Males	Females	51-70	>70
Na	white				1205.5	1306.0
	brown				1205.5	1306.0
K	white	69.4				
	brown	77.1				
Ca	white	73.5				
	brown	76.5				
P	white	231.9				
	brown	270.5				
Mg	white		50.5	66.3		
	brown		50.5	66.3		
Fe	white	213.1				
	brown	235.6				
Zn	white		29.8	40.9		
	brown		29.8	40.9		
Se	white	312.5				
	brown	391.1				

In the group of vitamins change was evident for thiamine, riboflavin, niacin, vitamin B_6 and folate (Table 3).

Table 3. Compliance of average daily intakes of selected vitamins through the menus combined with white or brown bread to the recommended daily intakes (% DRI) [4]

Vitamin	Bread type	All	Males	Females	51-70	>70
C	white		48.9	58.7		
	brown		48.9	58.7		
Thiamin	white		108.8	118.7		
	brown		129.8	141.6		
Riboflavin	white		130.7	154.5		
	brown		141.8	167.6		
Niacin	white		75.3	86.1		
	brown		100.0	114.4		
B_6	white		59.9	67.9		
	brown		87.4	99.1		
B_9	white	44.9				
	brown	53.0				
A	white		52.8	67.9		
	brown		52.8	67.9		
D	white				17.5	11.7
	brown				17.5	11.7
E	white	11.1				
	brown	8.26				
K	white		107.8	143.7		
	brown		107.8	143.7		

Although results show adequate intake through the meals served in a nursing home it shoud not be forgotten that due to the various reasons elderly often leave soods on the plate. Calvo in his study used three day weighted record of served meals and dietary intake and found that food intake was significantly lower than that served [9]. Villarroel et al. [6] in their study conducted in four Spanish nursing homes found that average percentage of consumption is 81.98% but with significant differences between institutions as well as between meals.

To avoid deficiencies, choices and changes in the menu should be introduced with caution. With lower energy requirements and in some cases increased requirements for other nutrients optimal diet for elderly needs to be nutrient dense [1].

CONCLUSIONS

In conclusion the simple choice of black instead of white bread results in improved intake of dietary fibres and B group of vitamins, as well as the intake of certain minerals. Therefore, small but significant choices like this one should be encouraged in elderly to achieve higher nutrient density without raising the energy intake.

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