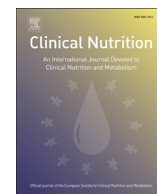




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Original article

Nutrition behavior of the middle-aged and elderly: Compliance with dietary recommendations of the food pyramid

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SUMMARY

Background & aims: During the aging process, human physiology changes noticeably, mostly to the disadvantage of the individual. A healthy lifestyle that includes sufficient physical activity as well as a balanced and diverse diet contributes to healthy aging. One key factor that elderly people need to be aware of is compliance with nutritional recommendations. There is very little data concerning eating patterns, consumption behavior, and compliance with food guides (food pyramid) and nutritional recommendations among the Swiss, particularly for the middle-aged and elderly. The objective of this study was to gather new and representative information about these issues, concentrating on people aged 50+ and living in Switzerland.

Methods: A questionnaire in online and written form was distributed to a representative sample of middle-aged and elderly people living in Switzerland.

Results: In total, 632 people returned the survey. Of those respondents, 71% knew the Swiss Food Pyramid but only 38% said they comply with it. Based on self-reports, only a few participants met the recommendations for the different food groups listed in the food pyramid, whether in the *pyramid-comply* or *pyramid-non-comply* group.

Conclusion: The survey shows that the middle-aged and elderly living in Switzerland need more nutritional guidance to help them to meet dietary recommendations. As usage and understanding of food guides seem limited among this population group, new tools must be explored for transfer of recommendations to real applications.

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1. Introduction

The percentage of elderly people in Switzerland's population continues to grow [1]. In 2011, the proportion of the population older than 65 years was 17.2%, with a strong tendency to further increase in the coming years, in line with observations made in other European countries, the USA and Australia [2]. The aging process is accompanied by many physiological changes and comorbidities, including for

example loss of muscle mass, digestive problems and deterioration of oral health, as well as frailty and the development of non-communicable diseases such as cardiovascular disease, diabetes mellitus and osteoporosis. In addition, degradation of sensory functions results in changed perception of consumed food and beverages [3]. All of these restrictions and changes, and especially the increase of non-communicable chronic diseases, represent major challenges for our healthcare system that are sooner or later likely to overstretch its capacity, particularly in regard to financing [4]. For these reasons, it is important that people maintain a healthy phenotype into old age. A healthy lifestyle that includes a high level of physical activity and a balanced diet is an important factor in reaching this goal. Consumers of all ages in many countries receive advice and guidelines from official bodies regarding balanced diet and healthy nutrition, in the form of dietary recommendations. In Switzerland, these recommendations consist of written advice such

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as “three portions of milk and dairy products per day”, depicted in the form of the Swiss Food Pyramid [5], which covers the recommendations for adults. With regard to the specific nutritional needs of the elderly population, recommendations for nutritional intake for the middle-aged and elderly are almost the same as the recommendations for adults. However, while energy requirements diminish with aging, the supply of proteins (e.g. for preservation of muscle mass), vitamins and minerals (e.g. for bone health) should remain at least the same or preferably slightly enhanced. In consequence, nutrient-dense food choices are recommended for older adults [5,6]. A recent study investigated how level of adherence to dietary recommendations influences frailty and cardiovascular disease as well as all-cause mortality in older persons. The findings indicate that higher adherence to these recommendations lowered the risk of all-cause mortality, cardiovascular disease mortality and coronary heart disease events [7]. The results of another study indicated a direct link between compliance with dietary recommendations of the German Society for Nutrition and a lower risk of suffering from frailty for older consumers [8].

These findings demonstrate the importance of knowing more about the use of dietary recommendations as well as of knowledge about and compliance with the food pyramid, especially for middle-aged and older people. This research identifies important gaps between recommendations and actual behavior, and future research in this area should be based on these identified gaps.

To this end, we developed a questionnaire for the Swiss people aged 50+ and asked them about general health issues, including knowledge of the food pyramid and consumption frequencies for single food groups recommended in this guide.

2. Material and methods

2.1. Participants and study design

In total, 726 men and women living in rural and urban areas of Switzerland were recruited by telephone interview, conducted by the LINK institute for market and social research from 20 September to 10 October 2012. Participants were selected according to age (between 50 and 80 years), gender and region (German-speaking, French-speaking and Italian-speaking). The distribution of the Swiss population according to language is 72% German, 23% French and 5% Italian. In order to assure a minimal sample size and thus sufficient statistical power for all three language regions, we defined the following quotas: German-speaking region 50%, French-speaking 30% and Italian speaking 20%.

If persons matched the socio-demographic characteristics and consented to participate, they were allowed to decide whether they wanted to complete the questionnaire online or in written form. If participants did not complete the questionnaire within two weeks after dispatch, the LINK institute sent a reminder by e-mail or letter.

The online surveys were collected by the principal investigator (Agroscope, Institute for Food Sciences, Bern), and participants sent completed written forms directly to the LINK institute. Data collection was completed at the beginning of November 2012. As an incentive, participants who completed the questionnaire received a shopping voucher.

2.2. Questionnaire

The questionnaire, entitled *Nutrition Survey for People Aged 50+ living in Switzerland*, was structured as four sections: I) general questions about nutrition and health, II) questions about milk and dairy products, III) questions about meat and meat products and IV) questions about participant's socio-demographic background. In particular, respondents were asked about their consumption habits

and frequencies, nutrition knowledge and about foods of animal origin. As the research focus of the principal investigator (Agroscope, IFS), dairy and meat products were of special interest. A total of 50 questions were asked. Initially, the survey was developed in English and subsequently translated to German, French and Italian. Prior to the translations and in order to optimize quality and quantity of survey questions and answers, eight interviews were conducted with persons aged 50 years and older, in the three different languages (four in German, two in French and two in Italian). As a next step, the revised questionnaires were given to eight persons over 50 years to pre-test understanding of questions and answers and the average time for completing the survey; these eight volunteers were not included in the main study. Based on the results of pre-testing, questions and answers were again reformulated for better comprehension. Finally, two native speakers of each language rechecked the documents. The present article concentrates on selected topics from the first section of the survey, which includes general questions about nutrition and health.

2.3. Self-assessment of nutrition behavior

Using 5-point scales that ranged from “not at all important/healthy” to “very important/healthy”, assessment of older people with regard to healthy eating included the questions “How important is healthy nutrition for you?” and “How would you rate the healthfulness of your overall diet?”.

2.4. Familiarity and compliance with the food pyramid

Respondents were asked whether they knew the Swiss Food Pyramid (“Do you know the food pyramid?” – Yes/No) and about their compliance with this guide (“Do you comply with the food pyramid?” – Yes/No). The next question enabled a rough estimation of how successfully participants complied with the food pyramid: “How frequently do you consume the following foods? 1) milk and dairy products, 2) fruits, 3) vegetables, 4) cereals, potatoes and legumes and 5) meat, eggs and fish?” Answers were recorded on a 7-point scale covering the following frequencies: “less than 1 portion per week”, “1 portion per week”, “2–6 portions per week”, “1 portion per day”, “2 portions per day”, “3 portions per day”, “more than 3 portions per day” and “don't know”. The definition and size of portion was given for each food category (e.g. milk and dairy products: one portion = one glass or cup; fruits/vegetables: one portion = a handful; meat/eggs/fish: one portion = 100–120 g meat or fish or 2–3 eggs).

2.5. Socio-demographic characteristics

Queried socio-demographic characteristics included gender, year of birth, nationality, highest education level, employment type (full-time, part-time, unemployed, retired, housewife/househusband), type of household and weight and height (both self-reported) for calculation of body mass index (BMI).

2.6. Data analysis

Data was statistically analyzed using SYSTAT for Windows version 13.0 (Systat Software, Richmond, CA, USA). Data from the 5-point scales were coded as ranging from “not at all important/healthy” = 1 to “very important/healthy” = 5. Data from the 7-point scale were coded as “less than one portion per week” = 0.5, “one portion per week” = 1, “two to six portions per week” = 4, “one portion per day” = 7, “two portions per day” = 14, “three portions per day” = 21 and “more than three portions per day” = 28. A nonparametric, robust Kruskal–Wallis test was used to assess the impact of

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