Research Article

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The Analysis of Nutritional Habits of the Third Age Students in Poznań

Abstract: In recent years have seen increasing percentage of the elderly in the overall population. This has driven the attention to the lifestyle factors that influence the health and quality of life of this social group, including their nutrition and physical activity. Universities of the Third Age (U3A) are a valuable platform for the dissemination and broadening of the knowledge related to these topics. The nutritional habits of 61 U3A students in Poznań were evaluated on the basis of a modified KomPAN questionnaire. Their nutritional status was determined using the body mass index (BMI) and waist to hip ratio (WHR) indices. Nearly half of the respondents were overweight and 16% had first degree obesity. The WHR index in women was on average 0.8, while in men it was 1.01. Only 13% of the students declared regular eating, with 60% consuming 4-5 meals a day. Women were found to eat snacks between meals more often than men. It was also found that the majority of the elderly do not add salt to ready meals or sweeten beverages with sugars. Taking into account the observed nutritional problems and the occurrence of improper eating habits of the elderly, it is recommended to continue the education on the prevention of common diet-related diseases.

Keywords: U3A; Older adults; Elderly people in Poland; BMI; Quality of life

1 Introduction

Demographic data of The World Health Organization is clearly indicating changes in the proportions of individual age groups in most societies. Development of medicine has resulted in prolonged life expectancy and the widespread pursuit of a successful life has resulted in limited birth rates. These factors have driven global population aging (WHO 2011). This trend has also manifested itself in Poland. According to a report of Statistics Poland, people over the age of 65 made up almost 14% of Polish society in 2010. It is estimated that in 2035 elderly people will constitute 23% of the total population of Poland (Ożga and Małgorzewicz 2013).

Seniors are a diverse group in terms of health, physical activity, or knowledge about proper nutrition (Skiba et al. 2015). Also, their socio-economic status is diverse, which makes it difficult to formulate universal recommendations for this social group (Langley-Evans 2014; Pędich 1998). Analysis of nutritional habits and assessment of the quality of the elderly are crucial for proper arrangement of health programs addressed to them (Krzepota et al. 2015). In addition, aging of the society is associated with growing expenses for medical care. In the case of Poland, the costs of medical care of seniors are even four times higher than for the people aged 15-54 (Ożga and Małgorzewicz 2013). Lifestyle, including physical activity and diet, has a significant impact on health. The most common problems related to the state of nutrition among the elderly are obesity, protein and protein-calorie malnutrition as well as vitamin and mineral deficiencies (Humańska and Kędziora-Kornatowska 2009). Unhealthy eating habits that have started at a young age, health problems and common poor financial condition of the elderly often lead to an unbalanced diet and cause deficits of some nutrients (Niedźwiedzka and Wądołowska 2010).

Noteworthy, Universities of the Third Age (U3A) are becoming more and more popular among seniors. They allow the participants not only to broaden their interests but also to earn knowledge on medical and related topics that are of special importance to this social group. They are also a meeting place which strengthens the awareness
of being still a significant part of society (Zielińska-Więcz-
kowska et al. 2011b). Participation in group activities is
known to significantly improve the quality of life by lim-
iting the feeling of loneliness (Konieczna-Wozniak 2005)
and by giving a sense of independence (Kaczmarczyk
and Trafialek 2007). U3A is therefore a suitable place
to provide knowledge about the relation between diet,
health and quality of life of the elderly.

To date, only a few U3A surveys have been carried
out in Poland. Unfortunately, disproportions in the living
standards, income and opportunities in various parts of
the country do not allow easy application of the results
obtained from other cities to develop an appropriate edu-
cational program. Therefore, the aim of this study was to
determine eating habits of the U3A students in Poznań
and evaluate the impact of diet on body mass index (BMI)
and Waist to Hip Ratio (WHR) of this group.

2 Respondents and methods

Initially, 83 respondents from 3 different unpaid U3As par-
ticipated in the study and completed the questionnaire.
Subsequently, the questionnaires were verified and the
ones that were incompletely filled were excluded from the
study (n=22). Eventually, the study was performed on a
population of 61 students of U3A in Poznań.

Evaluation of the nutritional habits was based on
data obtained from anonymous questionnaires based on
the KomPAN questionnaire provided by Science Commit-
tee on Human Nutrition of the Polish Academy of Sciences
(Poland) that involved our own modifications (Kow-
alkowska et al. 2018) including the assessment of indexes
developed based on the questionnaire. In total, the study
involved 954 subjects aged 15–65 (53.9% females. The
questionnaire consisted of 19 questions divided into
2 sections. The first part included questions that con-
cerned eating habits. Respondents were asked to declare
the amounts and frequency of meals as well as snacks
between the meals. This was followed by questions con-
cerning the frequency of consumption of individual prod-
ucts, i.e. meat and sausages, fish, including their type,
vegetables, fruits and dairy products. The questionnaire
also included questions about the consumption of ready-
made dishes or sweetened hot drinks. The respondents
were also asked to evaluate their own health condition.
The second part of the questionnaire concerned students’
education level and social-economic status (Walczak and
Kwiatkowska 2016).

Measurements of body mass, height, waist and hip
circumference were also performed in accordance with the
rules adopted in anthropometry (Anthropometry proce-
dures manual 2007; Sánchez-García et al. 2007). According
to the WHO STEPS protocol for measuring waist circumfer-
ence, the measurement was made at the approximate mid-
point between the lower margin of the last palpable rib
and the top of the iliac crest (World Health Organization
2011). The hip circumference was measured around the
widest portion of the buttocks (waist circumference and
waist–hip ratio). Measurements of waist and hip circum-
ferences were made using a tape measure. Data on body
mass and height were declared by respondents. Values
of weight and body height, waist and hip circumference
allowed to calculate BMI and WHR index. BMI was calcu-
lated as the ratio of body mass [kg] to height squared [m²],
while WHR was defined as a ratio of waist circumference
to hip circumference according to the method described
by Czernichow et al. (2011).

3 Results

3.1 Characteristics of analyzed group

Of the investigated population (n=61), 50 were women
and 11 men. The results of anthropometric measurements
(height, body weight, waist and hip circumference) as well
as age are presented in Table 1. The analysis of the age of
U3A students indicates a significant variation in the study
group. The average age was 65 years, with the youngest
student less than 40 years old. Anthropometric studies
also showed significant differences between students.
The average height was 165 cm, with men having a higher
average height than women (174 and 163 cm, respec-
tively). The average body weight of U3A students was 72
kg (minimum 44 kg, maximum 112 kg). Women were char-
acterized by a lower waist circumference (85 cm), while
a higher average hip circumference (106 cm), compared
to men (103 and 101 cm, respectively). The results of the
height and weight measurements of the respondents were
used to calculate WHR index (Ashwell and Gibson 2016),
which was 0.8 in women, and 1.01 in men.

Detailed BMI values for individual groups of respond-
ents are presented in Table 2. Nearly half of the surveyed
people were overweight, and 16% manifested 1st degree
obesity. Extreme values that suggest 2nd degree obesity
or underweight were observed only in women, and
accounted for less than 5% of the subjects. Only 1/3 of the
respondents were characterized by a correct BMI value.
The respondents also answered questions about their socio-economic status (Table 3). It was found that half of U3A students (47.55%) are people with higher education, and 36.06% were people with secondary education. Students with lower education constituted only 16.39% of the population. The economic situation of older people in Poland is difficult and may affect the choices of food products and eating habits. Only slightly more than half of the respondents had an income higher than the minimum salary (above PLN 1500 net). Nearly 41% of the respondents indicated incomes close to the minimum retirement income in Poland and 5% had an income even below the threshold of 1000 PLN. Most women perceived their health as good (56%) or very good (20%), while men rated their health as middling (45%) and good (36%).

### 3.2 Characteristics of nutritional habits

Analysis of the general eating habits of the U3A students revealed that the majority of respondents consumed between 4 to 5 meals a day (Table 4). Only 14 women and 2 men did not eat an adequate number of meals per day. It is noteworthy that half (31 respondents) admitted to regular consumption of only some of their daily meals. Based on the conducted research, it was found that women consumed snacks between meals more often than men (20 female respondents declared that they consume snacks every day). Only 11% of the students stated the lack of snacks in their daily diet.

The frequency of consumption of selected groups of food products is presented in Table 5. About 75% of the respondents declared that they do not add salt to dishes at all, while 23% of respondents stated that they add salt to some dishes. It was found that about 57% of the respondents did not sweeten hot beverages, such as coffee and tea. Less than 20% of the respondents sweetened beverages by adding one spoon of sugar or honey, while 8% used sweeteners.

The majority of respondents consumed meat and meat products (such as cured meats, vienna sausages or other sausages) several times a week (about 44% of respondents), while complete avoidance of such products was declared by 13%. 69% of the respondents consumed fish once a week. Marine fishes such as salmon, tuna or herring were most commonly consumed among the respondents (about 82% declared eating marine fish). Moreover, about 23% of respondents consumed fruit few times a day, and 21% of respondents consumed vegetables few times a day. About 10% of the respondents declared...
consumption of fruit only once a week, and 5% of the students declared consumption of vegetables once a week. About 30% of the respondents consumed dairy products several times a week or even daily while about 13% of the respondents pointed that they consume dairy products more often – a few times a day.
Table 5: Frequency of consumption of specific product groups of the respondents

<table>
<thead>
<tr>
<th>Question</th>
<th>Total (n=61)</th>
<th>Women (n=50)</th>
<th>Men (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%T</td>
<td>n</td>
</tr>
<tr>
<td>Adding extra salt to dishes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>46</td>
<td>75.41</td>
<td>36</td>
</tr>
<tr>
<td>Yes, but only sometimes</td>
<td>14</td>
<td>22.95</td>
<td>14</td>
</tr>
<tr>
<td>Yes, most of the times</td>
<td>1</td>
<td>1.64</td>
<td>-</td>
</tr>
<tr>
<td>Adding sugar or honey to hot drinks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>35</td>
<td>57.38</td>
<td>33</td>
</tr>
<tr>
<td>Yes, 1 teaspoon</td>
<td>12</td>
<td>19.67</td>
<td>7</td>
</tr>
<tr>
<td>Yes, 2 or more teaspoons</td>
<td>9</td>
<td>14.75</td>
<td>7</td>
</tr>
<tr>
<td>Yes, I use sweeteners</td>
<td>5</td>
<td>8.20</td>
<td>3</td>
</tr>
<tr>
<td>Frequency of eating sausages and cold meat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>8</td>
<td>13.12</td>
<td>8</td>
</tr>
<tr>
<td>Once a week</td>
<td>9</td>
<td>14.75</td>
<td>6</td>
</tr>
<tr>
<td>A few times per week</td>
<td>27</td>
<td>44.26</td>
<td>24</td>
</tr>
<tr>
<td>Once a day</td>
<td>15</td>
<td>24.59</td>
<td>11</td>
</tr>
<tr>
<td>A few times per day</td>
<td>2</td>
<td>3.28</td>
<td>1</td>
</tr>
<tr>
<td>Frequency of eating fish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>5</td>
<td>8.20</td>
<td>5</td>
</tr>
<tr>
<td>Once a week</td>
<td>42</td>
<td>68.85</td>
<td>33</td>
</tr>
<tr>
<td>A few times per week</td>
<td>12</td>
<td>19.67</td>
<td>11</td>
</tr>
<tr>
<td>Once a day</td>
<td>2</td>
<td>3.28</td>
<td>1</td>
</tr>
<tr>
<td>Type of fish consumed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sea</td>
<td>50</td>
<td>81.97</td>
<td>44</td>
</tr>
<tr>
<td>Freshwater</td>
<td>11</td>
<td>18.03</td>
<td>6</td>
</tr>
<tr>
<td>Frequency of eating fruits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>1</td>
<td>1.64</td>
<td>1</td>
</tr>
<tr>
<td>Once a week</td>
<td>6</td>
<td>9.84</td>
<td>4</td>
</tr>
<tr>
<td>A few times per week</td>
<td>13</td>
<td>21.31</td>
<td>11</td>
</tr>
<tr>
<td>Once a day</td>
<td>27</td>
<td>44.26</td>
<td>22</td>
</tr>
<tr>
<td>A few times per day</td>
<td>14</td>
<td>22.95</td>
<td>12</td>
</tr>
<tr>
<td>Frequency of eating vegetables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>1</td>
<td>1.64</td>
<td>-</td>
</tr>
<tr>
<td>Once a week</td>
<td>3</td>
<td>4.92</td>
<td>1</td>
</tr>
<tr>
<td>A few times per week</td>
<td>17</td>
<td>27.87</td>
<td>15</td>
</tr>
<tr>
<td>Once a day</td>
<td>27</td>
<td>44.26</td>
<td>22</td>
</tr>
<tr>
<td>A few times per day</td>
<td>13</td>
<td>21.31</td>
<td>12</td>
</tr>
<tr>
<td>Frequency of eating dairy products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>3</td>
<td>4.92</td>
<td>3</td>
</tr>
<tr>
<td>Once a week</td>
<td>14</td>
<td>22.95</td>
<td>11</td>
</tr>
<tr>
<td>A few times per week</td>
<td>18</td>
<td>29.51</td>
<td>15</td>
</tr>
<tr>
<td>Once a day</td>
<td>18</td>
<td>29.51</td>
<td>14</td>
</tr>
<tr>
<td>A few times per day</td>
<td>8</td>
<td>13.11</td>
<td>7</td>
</tr>
</tbody>
</table>
4 Discussion

High BMI is associated with increased risk of cardiovascular diseases, decline in quality of life and shorter lifetime (Anandavadivelan et al. 2016; Murray et al. 2017; Xu et al. 2015). Excessive body mass has been observed in over 60% of U3A students in Poznan. Similar observations were made by Walczak and Kwiatkowska (2016) in their study conducted on U3A students in Koszalin. In Perissinotto’s et al. study (2002) the average BMI for women was 27.6 kg/m², and 26.4 kg/m² for men, which indicates overweight. Whereas among elderly people from Spain, 40% of woman were overweight or obese, and 49% and 31.5% of men were overweight or obese, respectively (Gutiérrez-Fisac et al. 2004). Excess of fat tissue and increased waist circumference among seniors is associated with several diseases such as arterial hypertension and type II diabetes (Kvamme et al. 2012).

As a result of the loss of height, BMI as an index of adiposity is likely to be overestimated in older adults. The height lost with aging drives an increase in BMI because the denominator in the equation used to calculate its value (weight/height²) is decreased. As a result, BMI could have different interpretations for adults at different ages without any significant changes in adiposity (Onwudiewe et al. 2011). Lack of physical activity (Ogonowska-Słodownik et al. 2016) and not following healthy eating guidelines may result in increased waist circumference (over 80 cm in women and above 94 cm in men) (Han et al. 2017). Abdominal obesity is common in men as well as in perimenopausal women (Bogl et al. 2016; Larsson et al. 2017; Ross et al. 2015). Based on the WHR index, about 47% of respondents were classified as abdominally obese. Abdominal obesity can lead to metabolic complications. Among women, the average value of WHR was 0.8, while in men – 1.01. In the study of Perissinotto et al. (2002), the average WHR index value was 0.94 among women and 0.97 among men, which indicates android fat distribution.

In addition to health condition, assessment of elderly people’s well-being is also crucial. 70% of the respondents defined their health as good or very good. In a study among auditors from Bydgoszcz, almost 55% defined their well-being as good and did not point to any issues (Zielińska-Więczkowska et al. 2011b). Higher values (70% and 86%) were noted among respondents in other studies (Kozieł and Trafiałek 2007; Zielińska-Więczkowska et al. 2011a).

According to the National Food and Nutrition Institute in Warsaw (Jarosz 2017), people should consume between 5 to 6 meals per day. Frequent consumption of small portions is advised. Based on conducted research, only about 10% of respondents declared such an answer. In previously published studies, the majority of the respondents consumed 3-4 meals per day (43%) or 4-5 meals (36%) (Tańska et al. 2013). Elderly women from Szczecin consumed 3-4 meals a day in over 50% of cases, while 40% consumed 5-6 meals (Krajewska-Pędzik et al. 2014).

Regularity of eating is an important element of the daily diet. Intervals of 2-3 hours between meals are preferred as indicated by the Pyramid of Healthy Eating and Physical Activity (Jarosz 2017). The aim of regularity is to prevent fluctuations in blood glucose levels and help regulate hunger and satiety to prevent the need to search for food to be consumed (Ciampolini and Bianchi 2006). Lack of regularity of meals may contribute to increased consumption of snacks between meals to temporarily satisfy hunger. The phenomenon of snacking was observed among the majority of respondents. Only 11% of them never consumed any additional products during the day. 36% of the respondents admitted to snacking once a day. In the case of auditors from Szczecin, 43% did not consume food between main meals. Among almost 17% of women, the issue of regular daily snacking was identified (Krajewska-Pędzik et al. 2014).

Because of the fact that salivary secretion is impaired and number of taste buds is reduced at an older age, the perception of flavors is diminished (Jabłoński and Kaźmierczak 2005). Therefore, the respondents were asked about the addition of salt to dishes. 23% of respondents added salt to dishes only occasionally, while the vast majority (75%) did not use sodium chloride. Based on literature data, it was found that high content of salt in daily diet has adverse effects on health and is connected with arterial hypertension (Feng et al. 2017; Mazloomy Mahmoodabad et al. 2016). According to current dietary recommendations (Jarosz 2017), the content of salt in the daily food intake should be limited because of the associated risk of arterial hypertension and cardiovascular diseases (Rust and Ekmeckioglu 2016). Therefore, it is recommended to use herbs to enrich the taste of dishes.

Consuming excessive amounts of sugar may contribute to adverse blood glucose level and can supply unnecessary amounts of calories to the body. The use of simple sugars in the daily diet is not recommended because it is known to increase the risk of obesity and type II diabetes (Jurczak et al. 2011). Over 50% of the respondents stated that they do not add sugar or honey to hot beverages. However, 35% of the respondents declared that they add simple sugars to coffee or tea.

Regular and significant consumption of red meat can lead to increased intake of saturated fatty acids. According to the Pyramid of Healthy Eating and Physical
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Activity (Jarosz 2017) the intake of red meat in the daily diet of elders should be reduced. This recommendation includes processed meat product such as vienna sausages and pâtés. 25% of the respondents consumed this kind of products once a day and 3% several times during a day.

Marine fishes are rich source of polyunsaturated fatty acids from the n-3 group (Smith et al. 2015). Polyunsaturated n-3 acids facilitate the delivery of vitamin D to the body and affect cognitive functions (e.g., memory and attention) (Barrea et al. 2017; Cui et al. 2015; Lawrence and Sharma 2016). Almost 70% of the respondents consumed fish once a week. Interestingly, in the studies of Krajewska-Pędzik et al. (2014) only 22% of respondents declared the same.

Fruit and vegetables can provide energy to the body, but they are also a rich source of vitamins and minerals. Therefore, they are important ingredients in the daily diet of elderly. It is recommended that they account for at least half of the products consumed during the day (Jarosz 2017). 44% of respondents consumed fruit and vegetables once a day. The consumption of these products several times a day was declared by 23% and 21% of respondents, respectively. In the study of Krajewska-Pędzik et al. (2014), the authors observed daily consumption of fruit and vegetables in over 70% of respondents.

Dairy products such as curd cheese, yoghurt and cheeses are rich sources of calcium, which is an important element in the diet of elderly. Seniors are a group that is prone to diseases of the musculoskeletal system and osteoporosis. Studies show that a diet rich in calcium contributes to a slower rate of bone loss by 1-2% a year in comparison to diets poor in calcium (Bolland et al. 2015; de França et al. 2016). Intake of this element is crucial for postmenopausal women whose risk of osteoporosis is increased several times compared to men (Mahdavi-Roshan 2015; Yun et al. 2016). Among the subjects, 29% declared consumption of dairy products on a once-a-day basis. The same number of respondents stated they consume such products several times a week. For comparison, a third of the surveyed women declared consumption of dairy products several times a week while almost half of the women stated that they eat these products every day.

5 Conclusions

Only about 1/3 of respondents among the U3A students surveyed in Poznań showed a correct BMI value, and almost half were overweight. About 47% of seniors had abdominal obesity, which is associated with a higher risk of diseases such as hypertension, atherosclerosis and type II diabetes. Based on the study of eating habits, it is recommended to increase the consumption of vegetables and fruit, fish and dairy products in order to supplement the diet of older people with valuable nutrients. At the same time, the consumption of red and highly processed meat products should be limited to prevent cardiovascular disease. When asked about unhealthy eating habits, such as addition of salt to already prepared dishes and sugar to hot beverages, the majority of the respondents declared that they abstain from these practices. Nutritional habits among the elderly should be constantly monitored in order to control their health, improve their quality of life and prevent the occurrence of chronic diseases. It is also important to promote education on proper nutrition among seniors which should include programs focused on the practical aspects of composing healthy meals. Such programs should take into consideration the financial capabilities and often improper habits of this group of people.

Funding: The authors received no financial support for the research, authorship, and/or publication of this article.

Conflicts of Interest: The authors declare that they have no conflict of interest for publishing this research.

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