

CHANGES IN DAILY DIETARY SUPPLY OF ENERGY AND BASIC NUTRIENTS TO PENSIONERS BETWEEN 1989-2004

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Abstract. The aim of the present studies was to determine the changes in daily dietary supply of energy, total protein, animal protein, total fat and carbohydrates in pensioners' households during beginning and stabilization of market economy in Poland, i.e. in the period of 1989-2004. The calculations were based on data from the Statistical Yearbooks of the Republic of Poland, sections "Household Budgets" from 1990-2005, published by the Central Statistical Office (CSO). Daily dietary supply of energy and fat in pensioners' households was excessive over the study period (150% and 200% of reference intake, respectively). Superfluous dietary fat supply could have resulted from the fact that the method used for these studies did not account for fat losses during frying and 10% inevitable wastage, which might also have contributed to overestimation of percentage of the reference intake for protein and total carbohydrates. There was a declining tendency in supply of all nutrients and energy over the study period, with the largest decrease in carbohydrate supply and the smallest for protein.

Key words: nutrients supply, pensioners, Statistical yearbooks of CSO

INTRODUCTION

Adequate food consumption from the first days of human life till old age is a significant factor affecting health, fitness and mental capacities. Appropriate intake of energy and all vital nutrients supports proper function of the whole organism. It is also an element of risk reduction for many diseases, particularly noncontagious chronic diseases, like diabetes, atherosclerosis, obesity, hypertension and cancer [De Groot et al. 2004, Myszkowska-Ryciak et al. 2003, Van Dam et al. 2003, Waijers et al. 2006, Word Health... 2003].

Constant rise in elderly population in Poland and in the world incited increasing interest in health problems occurring in this period of human life. Prolonged life expectancy and increased elderly population are two main factors urging the responsible bodies

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to take actions aimed to secure acceptable living conditions for this group and to adjust health care system and food quality regulations to meet this challenge. Awareness of benefits of required diet in limiting complaints of old age and in upholding physical and mental fitness calls for propagation of knowledge about dietary problems and actual biological status of the elderly [Gibson and Green 2002, Leszczyńska and Pisulewski 2004].

Transition to market economy in Poland, which began in 1989, caused many changes in food market. Besides market supply with a great variety of products, there were structural changes in dietary habits and income of customers. Their monitoring and investigation of consumption trends can be helpful in establishing directions of actions, planning of food policy and regular assessment of nutritional status of the society.

The aim of the present studies was to determine the changes in daily dietary supply of energy and basic nutrients to pensioners living in households, that occurred between 1989-2004, i.e. in the period of beginning and stabilization of market economy in Poland.

MATERIAL AND METHODS

Data for analysis regarding daily dietary supply of energy, total protein, animal protein, total fat and carbohydrates in pensioners' households during the period between 1989-2004, were taken from Statistical Yearbooks of the Republic of Poland, chapters "Budgets of Households" from 1990-2005 published by the Central Statistical Office (CSO).

These data were analysed to evaluate trends of the changes in supply of the above mentioned components. Average consumption was calculated and compared with reference daily intake. The following reference values for subjects > 60 years of age were accepted: energy 2000 kcal/person/24 h, total protein 70 g/person/24 h, fat 60 g/person/24 h, total carbohydrates 350 g/person/24 h [Ziemiański 2001].

RESULTS AND DISCUSSION

Figure 1 shows the changes in average daily dietary supply of energy in pensioners' households during 1989-2004, compared with reference daily intake for the elderly.

The results indicate a slight but systematic decrease in dietary energy supply from 3325 kcal in 1989, before transition to market economy, to 2770 kcal in 2004. Dietary energy supply remained below 3000 kcal since 1994. Average dietary energy supply over the study period was 3025 kcal, which corresponded to 151% of the reference value for the elderly. The lowest energy supply of 138% of the reference value was noted in the last study year 2004.

Studies of nutritional patterns of the elderly conducted in our country have indicated unequivocally excessive dietary energy intake, often markedly exceeding recommended values.

Studies carried out by Szponar [1994] in an elderly residential care home estimated daily dietary energy content of inhabitants at 2640 kcal. Similar results were obtained by Roszkowski and Brzozowska [1994] in their studies on a large elderly population. They found that dietary energy value in this age group was higher than the recommended value.

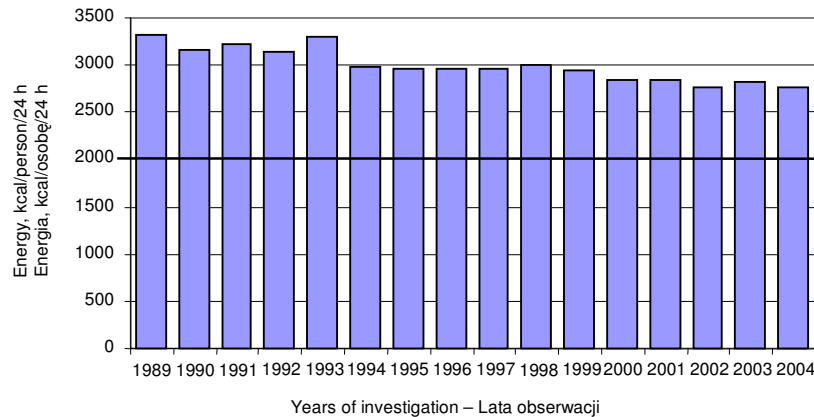


Fig. 1. Changes in average daily dietary energy supply in pensioners' households during 1989-2004

Rys. 1. Zmiany wartości energetycznej przeciętnej racji pokarmowej emerytów i rencistów w gospodarstwach domowych w latach 1989-2004

Hryniewiecki et al. [1995] obtained different results on a selected population of inhabitants of the city of Poznań aged > 65. Based on 24-hour dietary records, they showed that average energy intake was at about reference level, and was even lower than the recommended intake in ~30% of the population.

However, a majority of recent studies have indicated that dietary energy intake by pensioners is too high. A very low level of awareness of dietary issues was suggested to be one of causes of such situation [Klebanik et al. 2003, Kołajtis-Dołowy and Tyska 2004]. Dietary energy intake by the elderly should be by about 30% lower than by young people, because of their lower physical activity, oxygen consumption and basal metabolic rate. The latest results on elderly dietary patterns in other countries demonstrated that dietary energy intake was lower than that cited above and ranged between 1600-2850 kcal [Marshall et al. 2002, St-Onge et al. 2007, Vinken et al. 1999, Waijers et al. 2006].

A declining tendency in dietary energy supply, observed in our country in the last 16 years is very beneficial, however, the decrease is too slow and the recommended value has not been achieved yet. Energy excess in the diet of elderly people may contribute to mood distortion and health problems since it may lead to obesity and associated diseases and may aggravate already existing disorders [Manini et al. 2006, Roszkowski 1997, Speakman et al. 2002].

The changes in average daily dietary supply of total protein to pensioners living in households that occurred during 1989-2004, in comparison with the reference daily intake for the elderly are presented in Figure 2.

The highest daily dietary supply of total protein was noted in 1989 and amounted to 89 g which corresponded to 127% of reference daily intake for the elderly. Protein supply in the next years fluctuated with minimal value of 78 g observed in 1994-1997. Dietary protein supply significantly rose to 87 g and 88 g in 1998 and 1999, respectively. Then it systematically declined to 81 g in 2004. Average daily dietary supply of

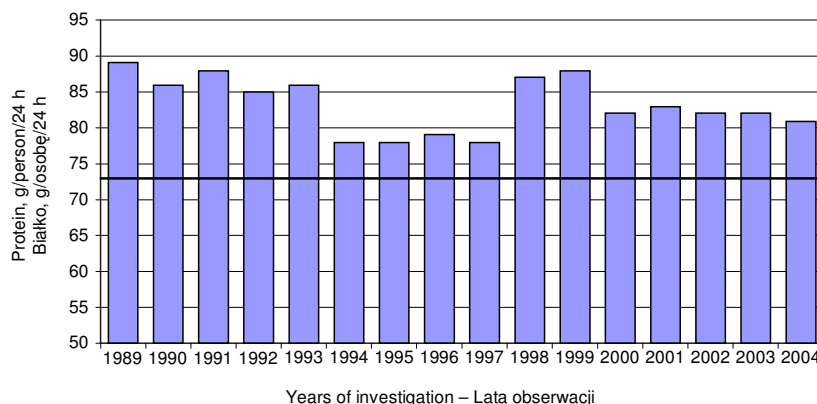


Fig. 2. Changes in average daily dietary supply of protein in pensioners' households during 1989-2004

Rys. 2. Zmiany w podaży białka w przeciętnej racji pokarmowej emerytów i rencistów w gospodarstwach domowych w latach 1989-2004

protein in pensioners' households in the period between 1989-2004 was 84 g, i.e. 119% of the reference daily intake.

Data presented in Figure 2 indicate that total protein supply in pensioners' households ranged between 111% and 127% of the reference daily intake. Considering that the method used to assess consumption did not account for 10% of inevitable wastage, only a slight exceedance of the reference intake indicates that the reference value was actually met. Insufficient protein intake is more risky for elderly people, since it can lead to protein malnutrition with such symptoms as weight loss, muscular weakness, anemia and impaired immunity. Most of authors involved in protein metabolism research believe that the elderly often suffer from negative nitrogen balance worsened by dietary protein deficit. Therefore, higher intake of this component in relation to reference values is recommended. It can be assumed that optimal protein supply to symptomatically healthy elderly people should be 1.5 g/kg of body weight, with concomitant potassium intake not lower than 60 mM/day [Ziemiański and Budzyńska-Topolowska 1994].

Analysis of sources of dietary protein over 16 years showed the domination of animal protein in the diet of Polish population (60% of dietary total protein). A population of elderly people studied by Roszkowski et al. [1991] consumed animal protein at amounts exceeding recommended intakes. The protein derived from such foods like eggs, meat, meat products and fish. Analysis of 10-day menu data from an elderly residential care home carried out by Klebaniuk et al. [2003] indicated that protein intake of 69 g/day was at the recommended level, but animal protein markedly prevailed. According to Marshall et al. [2002], protein intake by a representative group of the elderly in the USA was 51 or 59 g/day, depending on dental function.

High estimated dietary consumption of animal protein in comparison with recommendations and nearly recommended total protein supply probably resulted from superfluous consumption of meat and its products versus cereal products and leguminous plant seeds, which are not quite desirable in the elderly diet.

Changes in average daily dietary fat supply in pensioners' households in the period between 1989-2004 in comparison with reference daily intake for the elderly are presented in Figure 3.

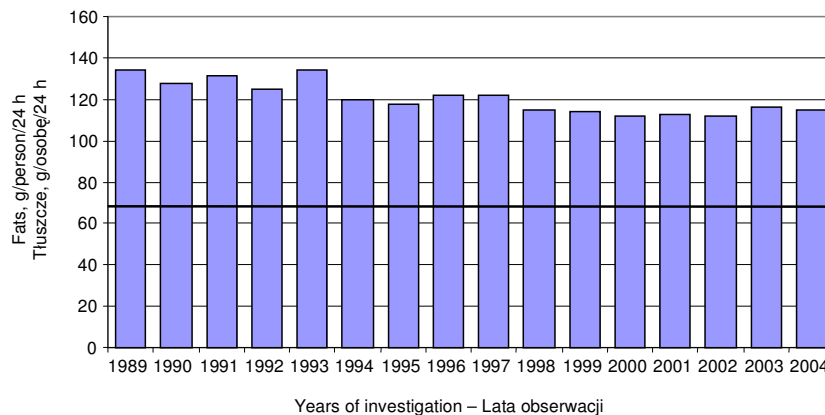


Fig. 3. Changes in average daily dietary fat supply in pensioners' households during 1989-2004

Rys. 3. Zmiany w podaży tłuszczów w przeciętnej racji pokarmowej emerytów i rencistów w gospodarstwach domowych w latach 1989-2004

Daily dietary fat supply in pensioners' households ranged between 112-134 g within the 16-year period, which corresponded to 187-223% of recommended daily intake. The highest fat supply was noted in 1989 and 1993, while the lowest in 2000 and 2002. There was a declining tendency in fat supply between 1993 and 2004 with periodical increases to 122 g in 1996 and 1997 and to 116 g in 2003. The method of consumption estimation from Central Statistical Office data did not account for fat losses during frying, therefore, the percentage of recommended intake values are probably overestimated. Systematic studies carried out in our country have indicated high fat consumption by Polish population, including the elderly. Roszkowski et al. [1991] observed that after transition to market economy in our country, the decreased intake of a majority of nutrients by the elderly was accompanied by increased fat intake. It resulted in changes in proportion between three main energy sources: protein, fat and carbohydrates, that made the diet more atherogenic than diet consumed in previous years. Rejman et al. [1995] estimated changes in food consumption in pensioners' households in the 1990s based on CSO budget data and demonstrated that high energy value of elderly persons' diet was caused by exceedance of recommended intake of fat by 33-50%.

High fat supply in pensioners' households, shown in the cited studies and confirmed by statistical data, could have resulted from their larger use for food preparation, high consumption of fatty meat, low-quality meat products and solid animal fat, that could have been caused by bad dietary habits ("fatty food" means "good food" for many elderly people), but also by economic reasons, since fat belongs to cheap energy sources, giving fast sensation of satiety.

Although beneficial quantitative changes in dietary fat supply are not large, a positive tendency in consumption structure has been observed. According to CSO data [1990-2005], butter consumption in 1995 was almost 2.5 times lower than in 1989 whereas consumption of margarine rose almost twice in comparison with 1990. Moreover, animal fat consumption stabilized in this period. Consequently, butter-to-margarine consumption ratio changed from 1:0.6 in 1990 to 1:2.6 in 1995 [Krajewski 1996]. In 2000 and 2002, consumption of plant oil and butter, and also cheese distinctly decreased, which influenced total fat consumption, estimated at 112 g/day [Statistical yearbooks... 1995-2005].

The above data indicate that magnitude and structure of fat consumption in Poland does not meet dietary recommendations, especially those regarding UFA intake. We eat thrice less polyunsaturated fatty acids and almost twice more monounsaturated fatty acids than the recommended intake [Balas 2004]. To meet dietary recommendations, we need to eat more plant oils, fish and seafood, and to limit consumption of products containing large amounts of animal fat.

Fashion and growing dietary awareness increased demand for low-calorie products and forced food manufacturers to produce such products. New vegetable-based and low-fat convenience food products are introduced to the market increasingly frequently. This tendency should be considered beneficial from healthy diet standpoint [Jethon and Grzybowski 2000, Balas et al. 2004].

Changes in average daily dietary supply of carbohydrates in pensioners' households between 1989-2004 in comparison with the recommended daily intake for the elderly are presented in Figure 4.

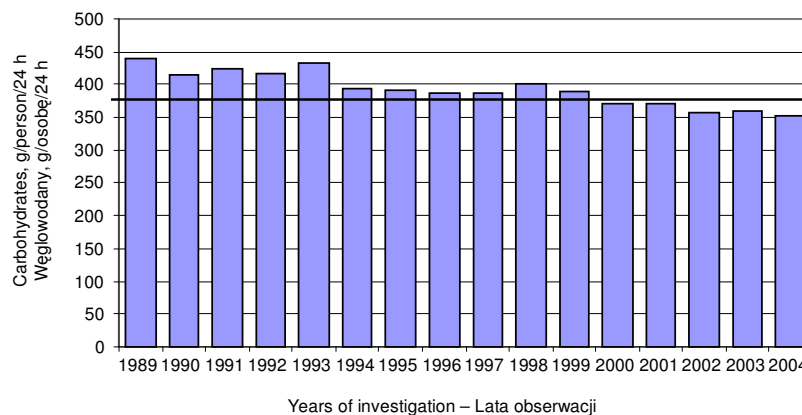


Fig. 4. Changes in average daily dietary supply of carbohydrates in pensioners' households during 1989-2004

Rys. 4. Zmiany w podaży węglowodanów w przeciętnej racji pokarmowej emerytów i rencistów w gospodarstwach domowych w latach 1989-2004

The statistical data indicate that average daily dietary supply of carbohydrates in pensioners' households in the study period can be estimated at 397 g, i.e. 112% of the reference intake. There was a declining tendency in carbohydrate supply from 439 g in

1989 to 352 g in 2004. The decline in carbohydrate supply was particularly conspicuous in 1993, when it amounted to 434 g. CSO data [1990-2005] suggest that consumption of flour, bakery products, groats, rice, breakfast cereal products and potatoes significantly dropped in the study period, which directly influenced total carbohydrate consumption.

Recommended carbohydrate intake by the elderly is estimated at 350 g/day and carbohydrates should cover 55-65% of daily energy intake [Ziemiański 2001]. Diet of the elderly should contain mainly easily assimilable complex carbohydrates (starch) and appropriate amount of dietary fiber, derived from cereals and potatoes. Carbohydrates should be consumed frequently in small portions. The elderly are recommended to particularly avoid refined sugar and sweet products between meals because these products increase satiety and decrease appetite, which may cause insufficient consumption of other valuable food products containing protein, starch, minerals and vitamins [Ziemiańska and Budzyńska-Topolowska 1994]. Lutomirski [1996] emphasized that excessive daily dietary consumption of sweet products and refined sugar was disadvantageous particularly for the elderly since demineralized sugar impairs calcium metabolism causing deficit of this element. Moreover, these products have high glycemic index.

Based on the statistical data, also contribution has been assessed of basic nutrients to average daily dietary supply of energy in pensioners' households (Fig. 5).

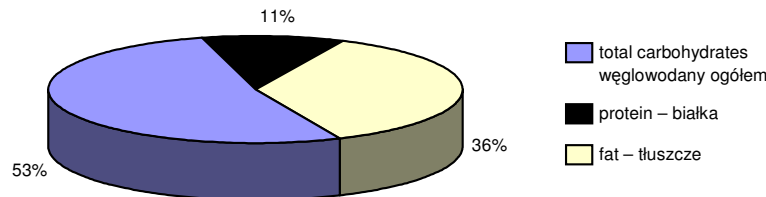


Fig. 5. Energy sources in daily diet in pensioners' households during 1989-2004
Rys. 5. Struktura pochodzenia energii w racjach pokarmowych emerytów i rencistów w latach 1989-2004

It was shown that an average of 11% of energy derived from protein, 36% from fat and 53% from carbohydrates. Average energy supply from protein was close to the recommended value proposed by Ziemiański [2001]. Energy supply from carbohydrates met recommendations but oscillated around the lower limit. Although fat supply showed a declining tendency during 1989-2004, average percentage of energy from fat was high and exceeded the upper limit of the recommended value by 6%. According to Waijers et al. [2006], the estimated percentage of energy from carbohydrates, fat, and protein by old German women, in relation to total energy intake, was 41-50%, 34-37% and 15-17%, respectively. Therefore, those percentages were more disadvantageous than those presented in this work.

The decrease in daily dietary supply of basic nutrients and energy in pensioners' households during 1989-2004, observed in the present study, could partially have resulted from transition to market economy and consequent changes in food prices and pensioners' income. Improvement of market supply with food products and their assortments positively influenced qualitative changes in fat intake, contributing to elevated consumption of protein from meat and its products.

Besides the above-mentioned factors, nutrient intake by the elderly depends also on their dental function. Poor dental function and consequent chewing problems are often decisive for the choice of food products. People with chewing problems were shown to consume less meat, crispy vegetables, certain fruits and less bread. Such pattern can diminish physical and mental fitness, increase vulnerability to infections, and increase incidence of diseases, hospitalizations and mortality [Marshall et al. 2002].

SENECA study indicated that there were differences in dietary patterns and mortality between countries, depending on their geographical location. Low physical activity, smoking and inappropriate quality of diet are factors increasing risk of death [De Groot et al. 2004, Roszkowski and Brzozowska 1994].

CONCLUSIONS

1. Analysis of CSO data from 1989-2004 indicates that daily dietary supply of energy and fat in pensioners' households was too high (159% and 200% of reference intake, respectively). Excessive fat supply could have resulted from the fact that the method used for the studies did not account for fat losses during frying and 10% inevitable wastage, which could also have increased percentage of the reference intake for total protein and carbohydrates.

2. A declining tendency was observed in the supply of all nutrients and energy over the study period, with the largest drop in carbohydrate supply and the smallest for protein.

3. Transition towards market economy and consequent better market supply with food products and a variety of new products on the market positively influenced qualitative changes in fat supply, contributing to the increase in animal protein consumption.

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ZMIANY W PODAŻY ENERGII I PODSTAWOWYCH SKŁADNIKÓW ODŻYWCZYCH W RACJACH POKARMOWYCH EMERYTÓW I RENCISTÓW W LATACH 1989-2004

Streszczenie. Celem podjętych badań było określenie zmian w podaży energii, białka ogółem, białka zwierzęcego, tłuszczu ogółem i węglowodanów w racjach pokarmowych emerytów i rencistów zamieszkujących gospodarstwa domowe, w okresie początku i stabilizacji gospodarki rynkowej w Polsce, tj. w latach 1989-2004. Obliczenia wykonano na podstawie danych pochodzących z Roczników statystycznych GUS z lat 1990-2005 z działu Budżety gospodarstw domowych. Racje pokarmowe emerytów i rencistów cechowała w badanym okresie nadmierna podaż energii (150% normy) i tłuszczów (200% normy). Nadmierna podaż tłuszczu w racjach pokarmowych mogła być wynikiem nieuwzględnienia w zastosowanej metodzie badawczej strat zużytego tłuszczu w wyniku smażenia oraz 10% nieuniknionych strat, które dodatkowo mogły podwyższać obliczone pokrycie normy dla białek i węglowodanów ogółem. Na przestrzeni badanych lat zaobserwowano tendencję spadkową w podaży wszystkich omawianych składników odżywczych oraz energii, największą w wypadku węglowodanów, a najmniejszą w wypadku białka.

Słowa kluczowe: podaż składników odżywczych, emeryci i renciści, Rocznik statystyczny GUS

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