

ANALYSIS OF FACTORS INFLUENCING THE CHOICE OF DAIRY PRODUCTS BY POLES. POFPRES STUDY

*Jolanta Czarnocińska¹, Lidia Wądołowska², Juliusz Przysławski³,
Małgorzata Schlegel-Zawadzka⁴, Ewa Babicz-Zielińska⁵*

¹*Department of Hygiene and Human Nutrition, A. Cieszkowski Agricultural University, Poznań;*

²*Department of Human Nutrition, University of Warmia and Mazury, Olsztyn;*

³*Chair and Department of Bromatology, K. Marcinkowski University of Medical Sciences, Poznań;*

⁴*Department of Human Nutrition, Medical College of Jagiellonian University, Kraków;*

⁵*Department of Commerce and Services, Maritime Academy, Gdynia*

Key words: choice factors, dairy products, adolescents, students, adults, region, place of inhabitation

The study included 9339 people aged from 13 to 75 years, inhabiting 6 macro regions of Poland. Thirty choice factors of dairy products were evaluated. A statistical analysis of the results obtained was carried out after separating the following factors: sensory, functional, health, economic and socio-cultural ones. Dairy product's choice was more affected by sensory and functional factors than the socio-cultural, economic and health ones. The average importance of all groups of factors influencing dairy products' choice was significantly correlated with sex, age and region of inhabitation. The size of the place of inhabitation differentiated significantly the average importance of economic and socio-cultural factors. The results obtained show that Poles underestimated the role of dairy products and they had consumption motives in food choice.

INTRODUCTION

Food choice is connected with particular behaviour, depending on a complex of outer and inner conditions of a man [Babicz-Zielińska, 1998]. Market development contributed to an increase in the number of factors that can have an impact on choosing a particular product. Most authors divide them into three categories, *i.e.* connected with (i) product – describing its physicochemical, sensory and functional characteristics and nutritive value, (ii) consumer – describing individual characteristics, psychological and physiologic factors, and (iii) environment – including economic, cultural and social factors [Babicz-Zielińska, 1999]. It is underlined that food choice is also affected by the context which is a result of time, place, circumstances, habit and with whom and how the product is consumed [Babicz-Zielińska, 2001].

The inclusion of dairy products into daily menu constitutes the basic criterion of proper nutrition for people of every age group. Milk is one of the most valuable food products in human nutrition. It includes easily absorbed proteins of high nutritive value and considerable amounts of easily absorbed calcium; it is also a valuable source of vitamins B2, A, E and D, as well as phosphorus, potassium, magnesium and sodium and easily absorbed fats [Gawęcki & Zielke, 2003]. Milk products supply from 60% to 80% of calcium in a daily diet [Wądołowska *et al.*, 2002]. Such an

insufficient intake poses the risk of calcium deficiency, which may lead to the development of osteoporosis in the future [Masi & Bilezikian, 1997]. It is also worth underlining that in osteoporosis prophylactics nutrition manner in childhood and adolescence is of major importance, as it is conducive to obtaining high peak bone mass [Kalkwarf *et al.*, 2003]. In Poland unfavourable changes in particular dairy products intake have been observed [Augustyniak & Brzozowska, 2002; Górnicka & Gronowska-Senger, 2005], which leads to low calcium intake, reaching in some groups as little as 50% of the recommended level [Duda & Przysławski, 2002; Ołtarzewski *et al.*, 2003].

The insufficient intake of dairy products is determined by a number of factors. Their understanding may facilitate elaboration of effective nutrition rationalization programs. The aim of the undertaken study was to analyse choice factors influencing dairy products' choice by Poles.

MATERIALS AND METHODS

The study was carried out in the years 2001–2003 on 9339 Poles aged from 13 to 75 years. The study included school youth, students and adults inhabiting 6 macro regions of Poland: Kaszuby, Kujawy, Małopolska, Pomorze Zachodnie, Warmia and Wielkopolska. Random respondent drawing was used, asking pupils of elementary and secondary schools, university students, employees, free-lancers

and unemployed for taking part in the study. Respondents were informed of the aim of the research and instructed on how to answer the questions before filling in the test.

There were 30 dairy products' choice factors analysed, without separating products' assortment. The factors analysed were recognised in the pilot study. To evaluate factors' importance use was made of a test based on a 3-point scale with statements: "I do not take into consideration" (1), "I take into consideration to a small degree" (2), and "I take into consideration to a high degree" (3). The results obtained were calculated into a scale of 0÷100 points. All factors had mean values of importance and standard deviations calculated, and next there were separated 5 groups that had also the same statistic measures calculated. The following groups of factors were separated: (1) sensory (taste, flavour supplements), (2) functional (availability, ease of usage, packaging form, information of the packaging, freshness, durability, quality), (3) health (calcium, protein, fat content, fermented milk beverages biological activity, impact on health, beauty care), (4) economic (product price), and (5) socio-cultural (habit from home) [Babiczy-Zielińska, 2001]. The statistical analysis was carried out using the Kolmogorow-Smirnow (K-S) and Kruskal-Wallis (K-W) tests [Stanisz, 1998]. Calculations were made using the STATISTICA PL v.7.1. software.

RESULTS AND DISCUSSION

As shown in Table 1, sensory and functional factors are taken into consideration to a high degree (81 points and 71 points, respectively), whereas the socio-cultural, economic and health ones are taken into consideration to a small extent (61 points, 60 points and 54 points, respectively), while choosing dairy products by the total population studied. Sex influenced the mean importance of all factors groups, but those factors determined women's choices stronger. Mean importance of the separated groups of factors was also significantly differentiated in particular age

TABLE 1. The importance of dairy products choice factors in the total studied population and with reference to sex (mean ± standard deviation).

Choice factors	In total N=9339	Sex		
		Women N=4139	Men N=5200	Test K-S p
Sensory	81±19.9	83±19.3	78±20.3	<0.001
Functional	71±18.2	73±17.4	69±18.9	<0.001
Socio-cultural	61±30.2	62±30.2	59±30.1	<0.01
Economic	60±30.2	62±29.5	58±30.9	<0.001
Health	54±25.9	59±24.5	48±26.3	<0.001

TABLE 3. The importance of dairy products choice factors with reference to inhabitation region (mean ± standard deviation)

Choice factors	Kaszuby N=661	Kujawy N= 675	Małopolska N=1000	Pomorze Zachodnie N=1947	Warmia N=1313	Wielkopolska N=3743	Test K-W p
Sensory	80±21.1	80±19.8	82±17.7	79±21.3	83±18.7	81±20.0	<0.001
Functional	70±19.4	72±18.5	73±16.7	71±19.1	72±16.9	71±18.2	<0.05
Socio-cultural	59±31.0	58±30.4	65±30.9	60±29.2	60±30.6	62±30.2	<0.0001
Economic	58±30.4	59±29.8	69±28.9	57±29.8	67±29.2	58±30.4	<0.0001
Health	54±27.1	55±24.7	52±27.4	56±25.1	54±25.6	53±26.0	<0.001

groups of the population under study (Table 2). Students, in comparison to youth and adults, definitely more often took into consideration sensory, socio-economic and especially economic, while less often health factors. On the other hand, functional factors were of the highest importance while choosing dairy products by adults, and of the least importance by the youth. Region of inhabitation also influenced significantly the mean value of importance of all groups of factors (Table 3). Sensory factors were taken into account to the greatest extent by the inhabitants of Warmia, while to the lowest degree by the inhabitants of Pomorze Zachodnie. Functional and socio-cultural factors were of the highest importance while choosing dairy products for Małopolska inhabitants, and of the lowest importance for the respondents from Kaszuby with reference to functional factors and those from Kujawy with reference to socio-economic factors. Economic factors determined most strongly choosing the dairy products by the inhabitants of Małopolska, in contrast to those of Pomorze Zachodnie. In the case of health factors, a reverse relationship was observed for those two regions. The size of inhabitation place differentiated significantly the mean importance of economic and socio-cultural factors (Table 4). Economic factors were taken into consideration to the highest degree by country inhabitants, and to the lowest degree by citizens. Socio-cultural factors less strongly differentiated the population studied with reference to the size of inhabitation place, while they had the smallest importance for people living in the country.

TABLE 2. The importance of dairy products choice factors with reference to age group (mean ± standard deviation).

Choice factors	Adolescents N=3710	Students N=3000	Adults N=2629	Test K-W p
Sensory	80±20.1	82±18.7	80±21.0	<0.01
Functional	69±18.4	72±17.1	73±18.8	<0.0001
Socio-cultural	58±29.3	64±30.9	62±30.2	<0.0001
Health	55±25.4	52±26.5	55±25.8	<0.0001
Economic	52±28.9	68±29.2	62±30.4	<0.0001

TABLE 4. The importance of dairy products choice factors with reference to size of inhabitation place (mean ± standard deviation).

Choice factors	Country N=1518	Town <20 thou. N=1326	Town 20–100 thou. N=1655	City >100 thou. N=4563	Test K-W p
Sensory	81±19.9	81±20.4	81±19.6	81±19.9	ns
Functional	71±18.2	71±17.8	72±18.2	71±18.3	ns
Economic	66±29.2	63±30.8	63±29.7	56±30.0	<0.0001
Socio-cultural	59±30.5	61±30.9	62±30.6	61±29.7	<0.05
Health	54±26.2	53±26.6	54±26.9	54±25.2	ns

ns – not significant

The results obtained confirm the thesis of Babicz-Zielińska [1999] that there are some attributes of food choice regardless of its type, and the main determinants are sensory and functional factors, with taste and freshness dominating. The results obtained in this study broaden that thesis, as it turned out to be independent of sex, age, region and size of inhabitation place. On the other hand, quite low importance of health factors suggests that the population studied had low consciousness of dairy products importance in human nutrition. The fact that Poles underestimate the role of those products as a source of nutrients significant for health is confirmed by the evaluation of nutritional attitudes for dairy products' intake carried out in the same population. In the study, too low intake frequency of those products was revealed, correspondent with the frequency of "3–4 times a week" or "once-twice a week" [Czarnocińska *et al.*, 2005]. Nestle *et al.* [1998] observed also that nutrition habits have also been greatly affected by taste than nutritive value of products or food safety. On the other hand, according to Baryłko-Pikielna [1998], consumers expect food to be characterised with high sensory attractiveness and nutritive value, as well as to be safe for health and have no defects. Socio-cultural factors were taken into consideration only to a small degree, which indicates a change of nutrition habits. That change is not easy, as it follows from studies carried out in the Member States of the European Union [Lennernäs *et al.*, 1997], habit is one of the most important factors determining food choice. Economic factors were also taken into account to a small degree, which corresponds well with our previous publications [Czarnocińska *et al.*, 2001, 2003], however there are also studies underlining the significance of economic factors on human nutrition behaviours [Kozłowska-Wojciechowska & Uramowska-Żyto, 1996; Lennernäs *et al.*, 1997; Narojek & Ostrowska, 1997]. It is also worth underlining that the importance of factors determining the choice of dairy products was declared by respondents, concerned thus only the consumers awareness sphere. However, the role of subconsciousness in food choice is a very difficult and complex problem.

CONCLUSIONS

1. Dairy product's choice was more affected by sensory and functional factors than the socio-cultural, economic and health ones.

2. The average importance of all groups of factors influencing dairy products' choice was significantly correlated with sex, age and region of inhabitation. The size of the inhabitation place differentiated significantly the mean importance of economic and socio-cultural factors.

3. The results obtained show that Poles underestimated the role of dairy products and that they had consumption motives in food choice.

ACKNOWLEDGEMENTS

The work was accomplished within the State Committee for Scientific Research project No. 6 P06G 015 20.

REFERENCES

1. Augustyniak U., Brzozowska A., Nutrition patterns of youth in Poland based on literature data from the last decade (1990–2000). *Roczn. PZH*, 2002, 4, 399–406 (in Polish; English abstract).
2. Babicz-Zielińska E., Studies into nutritional preferences and food choice determinants in selected groups of consumers. 1999, Wyd. WSM Gdynia, pp. 48–50 (in Polish).
3. Babicz-Zielińska E., Selected aspects of studies into nutritional preferences. *Żyw. Człow. Metab.*, 1998, 25, 195–202 (in Polish; English abstract).
4. Babicz-Zielińska E., Consumer behaviour towards food and nutrition. *Żywność*, 2001, 29, Supl., 5–15 (in Polish; English abstract).
5. Baryłko-Pikielna N., Sensory analysis in food quality assurance. *Przem. Spoż.*, 1998, 12, 25–28 (in Polish).
6. Czarnocińska J., Babicz-Zielińska E., Wądołowska L., Przysławski J., Schlegel-Zawadzka M., Factors determining preferences of cereal products among youth of Szczecin. *Żyw. Człow. Met.*, 2001, 28, Supl., 502–507, (in Polish).
7. Czarnocińska J., Wądołowska L., Babicz-Zielińska E., Przysławski J., Schlegel-Zawadzka M., Factors influencing the choice of vegetables and fruit consumed by school youth from Szczecin. *Pol. J. Food Nutr. Sci.*, 2003, 12, 95–101.
8. Czarnocińska J., Wądołowska L., Przysławski J., Schlegel-Zawadzka M., Babicz-Zielińska E., Evaluation of nutritional patterns of Poles in respect of the intake of milk and dairy products. *Nowiny Lekarskie*, 2005, 74, 384–388 (in Polish; English abstract).
9. Duda G., Przysławski J., Dietary risk factors for osteoporosis in the elderly. *Pol. J. Food Nutr. Sci.*, 2002, 11/52, 87–91.
10. Gawęcki J., Zielke M., Produkty spożywcze i ich wartość odżywcza. 2003, *in: Żywnienie człowieka. Podstawy nauki o żywieniu* (red. J. Gawęcki, L. Hryniewiecki), Wyd. Naukowe PWN Warszawa, pp. 312–314 (in Polish).
11. Górnicka M., Gronowska-Senger A., Zmiany w spożyciu podstawowych grup produktów spożywczych w latach 1980–2000 w polskich gospodarstwach domowych. 2005, *in: Konsument żywności i jego zachowania w warunkach polskiego członkostwa w Unii Europejskiej*, Wyd. SGGW Warszawa, pp. 201–206 (in Polish; English abstract).
12. Kalkwarf H.J., Khoury J.C., Lanphear B.P., Milk intake during childhood and adolescence, adult bone density and osteoporotic fractures in US women. *Am. J. Clin. Nutr.*, 2003, 77, 257–265.
13. Kozłowska-Wojciechowska M., Uramowska-Żyto B., Vegetable or animal fats. Choices of Polish women in the light of consumer studies. *Czynniki Ryzyka*, 1996, 2–3, 40–43 (in Polish).
14. Lennernäs M., Fjellström C., Becker W., Giachetti I., Schmitt A., Remaut de Winter A.M., Kearney M., Influences on food choice perceived to be important by nationally representative samples of adults in the European Union. *Eur. J. Clin. Nutr.*, 1997, 51, S8–S15.
15. Masi L., Bilezikian J.P., Osteoporosis: new hope for the future. *Int. J. Fertil. Women Med.*, 1997, 42, 245–254.

16. Narojek L., Ostrowska A., Nutritional behaviours of families living big cities in a new socio-economic situation. Part II. Motivations accompanying the purchase of food products. *Żyw. Człow. Met.*, 1997, 24, 437–447 (in Polish; English abstract).
17. Nestle M., Wing R., Birch L., DiSogra L., Drewnowski A., Middleton S., Behavioral and social influences on food choice. *Nutr. Rev.*, 1998, 56, S50–S74.
18. Oltarzewski M., Szponar L., Rychlik E., Calcium intake among children and youth in Poland. *Żyw. Człow. Metab.*, 2003, 30, 278–283, (in Polish; English abstract).
19. Stanisław A., *Przystępny kurs statystyki w oparciu o program STATISTICA PL na przykładach medycyny*, 1998, Wyd. StatSoft Kraków, pp. 263–283 (in Polish).
20. Wądołowska L., Szymelfejnik E.J., Cichon R., Dairy products as a source of the chosen nutrients in female students weekly food rations. *Pol. J. Natur. Sc.*, 2002, 11, 225–234.

ANALIZA CZYNNIKÓW WPŁYWAJĄCYCH NA WYBÓR PRODUKTÓW MLECZNYCH PRZEZ POLAKÓW. BADANIA POPPRES

*Jolanta Czarnocińska¹, Lidia Wądołowska², Juliusz Przystawski³,
Małgorzata Schlegel-Zawadzka⁴, Ewa Babicz-Zielińska⁵*

¹*Katedra Higieny Żywności Człowieka, Akademia Rolnicza im. A. Cieszkowskiego, Poznań;*

²*Katedra Żywności Człowieka, Uniwersytet Warmińsko-Mazurski, Olsztyn;*

³*Katedra i Zakład Bromatologii, Akademia Medycznej im. K. Marcinkowskiego, Poznań;*

⁴*Zakład Żywności Człowieka, Collegium Medicum Uniwersytetu Jagiellońskiego, Kraków;*

⁵*Katedra Handlu i Usług, Akademia Morska, Gdynia*

Celem badań była kompleksowa analiza motywacji Polaków w zakresie wyboru produktów mlecznych do spożycia. Badaniami objęto 9339 osób w wieku od 13 do 75 lat, mieszkających w 6 makroregionach Polski, stosując przypadkowy ich dobór. Oceniono 30 czynników wyboru produktów mlecznych, bez wyodrębniania ich asortymentu. Weryfikację statystyczną uzyskanych wyników przeprowadzono po uprzednim połączeniu pojedynczych czynników w następujące grupy, które nazwano czynnikami: sensorycznymi, funkcjonalnymi, zdrowotnymi, ekonomicznymi i społeczno-kulturowymi. Czynniki sensoryczne i funkcjonalne były w dużym stopniu brane pod uwagę, zaś społeczno-kulturowe, ekonomiczne i zdrowotne w małym stopniu brane pod uwagę przy wyborze produktów mlecznych przez ogół badanej populacji (tab. 1). Płeć istotnie wpłynęła na średnią ważkość wszystkich grup czynników, przy czym czynniki te silniej determinowały wybory kobiet. Średnia ważkość wyodrębnionych grup czynników była także znamienne różnicowana w poszczególnych grupach wiekowych badanej populacji (tab. 2). Studenci, w porównaniu z młodzieżą i osobami dorosłymi, zdecydowanie bardziej brali pod uwagę czynniki sensoryczne, społeczno-kulturowe, a zwłaszcza ekonomiczne, mniej natomiast zdrowotne. Region zamieszkania również istotnie wpłynął na średnią ważkość wszystkich grup czynników (tab. 3), a wielkość miejsca zamieszkania znamienne różnicowała jedynie średnią ważkość czynników ekonomicznych i społeczno-kulturowych (tab. 4). Uzyskane wyniki wskazują, że Polacy nie doceniali roli produktów mlecznych w żywieniu człowieka oraz mieli konsumpcyjną motywację w wyborze tych produktów do spożycia.