

A DIAGNOSIS OF NUTRITIONAL AWARENESS AND HABITS OF POLISH CONSUMERS – THE PILOT

Maria Dymkowska-Malesa^{1*}, Grzegorz Suwała²

^{1*} State University of Applied Sciences in Koszalin, The Institute of Sport and Health Studies,
1 Leśna St., 75-582 Koszalin, Poland, ORCID 0000-0002-7946-235X,
e-mail: m.dymkowska-malesa@pwsz-koszalin.pl

² Krakow University of Economics, Department of Food Product Quality,
5 Sienkiewicza St., 30-033 Kraków, Poland, ORCID 0000-0002-7857-2282

* Corresponding author

Abstract: A rational diet is of particular importance today. The increasing pace of life and intensive work are important factors determining the quality of nutrition. Nutritional awareness is one of the main determinants of the appropriate diet. In order to understand the subtleties of the definition and essence of nutritional awareness, it is necessary to realise its close relationship with lifestyle, health, economic status and mass culture. The aim of the study was to assess the awareness and nutritional behaviour of Polish consumers. The research was carried out using the diagnostic survey method, i.e. the author's questionnaire. The research has shown that the respondents know the principles of rational nutrition, although they do not always adhere to them, and the choice of food products is largely determined by the price and brand of the product. Respondents are familiar with the concept of "nutritional awareness" and believe that it has a huge impact on health.

Keywords: rational nutrition, eating habits, nutritional awareness, economic status.

1. INTRODUCTION

The proper development and functioning of the human body depends not only on nutrition but also on many other factors, knowledge of which is becoming indispensable today. Technical progress, the opening of borders and ongoing transformation in health care make health prevention increasingly important, involving raising awareness of existing threats and shaping appropriate social attitudes and behaviour [Wiśniewska et al. 2017; Aniśko et al. 2020]. Nutritional awareness is closely related to lifestyle, health, economic status and mass culture. Every day, people decide several times what to eat, how much, when, where and with whom. These decisions are sometimes impulsive, sometimes deliberate but they are always underpinned by many interrelated factors of nutritional awareness. Recognising and understanding these factors is the starting point for modifying decisions and eating habits [Tobiasz-Adamczyk 2000; Dąbrowska, Janoś-Kresło

and Lubowiecki-Vikuk 2020]. Shaping views on health determines, to a great extent, the development of civilisation, because they build the psychophysical condition and well-being of current and future generations and their social development [Kobos et al. 2007]. The popularisation of proper nutrition occurs at different levels and takes different forms. It has two dimensions: dissemination of information on nutrition, aimed at raising the level of knowledge about the principles of proper nutrition in the society and nutritional education of specialists – nutritionists, nutritionists and food and nutrition technologists – professionally dealing with matters of nutrition of others [Gawęcki and Mossor-Pietraszewska 2007; Gawęcki and Roszkowski 2009; Gawlik 2018]. The aim of the study was to assess the awareness and eating habits of Polish consumers. The subject of the research was the level of knowledge about rational nutrition and the analysis of its conditions. The data for the evaluation was obtained from an anonymous survey conducted in an area of northern Poland.

2. NUTRITIONAL RECOMMENDATIONS AND HABITS

The implementation of a properly balanced diet plays a key role in the prevention of diet-related diseases, which drives organisations such as the WHO to undertaking various activities in the field of health policy [World Health Organization 2018]. Building public awareness in this area also requires work at national level. This was reflected in the 2016 amendment to the guidelines on recommendations for a healthy population presented in the graphic form of the Pyramid of Healthy Nutrition and Physical Activity in 3 versions, depending on the stage of life. The first is intended for children and adolescents from 4 to 18 years of age, the second for adults, the third for the elderly.

Basic nutritional recommendations for the Polish population have been defined in 10 principles which describe concisely and simply the most important rules of healthy eating and recommend the number of meals consumed, proportions of ingredients of plant and animal origin, fluid intake and the exclusion of products bad for health. Both the Pyramid and the recommendations are preventive and are addressed primarily to healthy people to help them maintain proper health [Jarosz 2016; Wolańska-Buzalska and Wiśniewska 2019]. The diet of the population of Poland was analysed at a general level [Public Opinion Research Center 2019], or in relation to preferred lifestyles and their socio-demographic determinants [Borowiec, Aranowska 2018] or the specifics of work of employees of a fast food franchise [Michota-Katuliska, Zegan and Grzebuła 2016]. In the context of the above research, it was considered reasonable to identify which of the basic individual characteristics determine awareness and eating habits to the greatest extent and to what extent, in the turbulently changing socio-economic situation, the gender of consumers determines possible differences in this area.

3. RESEARCH METHODOLOGY

The research was conducted in 2021 using the diagnostic survey method and results of direct interviews carried out in northern Poland, among people from different parts of the country spending their holidays at the Polish seaside. The selection of study participants was non-probabilistic. Based on the research sample size calculator, the study population size was determined at 96 people for the pilot study. This number allows us to conclude in relation to the population of the country with a maximum measurement error of 10%, which will be the starting material for planning the full-scale study. The respondents were 75 women (83.3% of the sample) and 15 men (16.7%) (n = 96). The participants of the project were aged from 26 to 45. 83% of respondents declared professional activity. The material for the study consisted of data obtained based on the author's questionnaire which contained questions characterising the participants of the study and 19 closed multiple-choice questions implementing the purpose of the study.

This method allowed us to obtain information about the level of consumer knowledge about food and the principles of healthy eating and provided arguments to assess the nutritional awareness of the studied group.

A nutritional interview was conducted in the first part of the survey to assess the diets of consumers and ask about their food preferences. Questions were asked about the determinants of choices made when buying food, about the number of meals consumed and about which of them was the most important. They were asked to characterise their weekly menu and to try to determine their daily energy needs. We checked what determined the diets of individual respondents. The state of nutritional knowledge was tested in the second part of the survey. The respondents were asked about the best sources of protein, dietary fiber and which of the nutrients plays the greatest role in supplying energy. They were asked about the frequency of eating fruit and about the rational time of eating the last meal. The third part of the survey examined the level of nutritional education. We obtained information about sources of knowledge about food and nutrition, asked the respondents to define the concepts of „proper nutrition” and „nutritional awareness”. They were also asked about the impact of awareness on health and the assessment of its development over the last few years. The questionnaire ended with a request for self-assessment of the level of nutritional knowledge.

4. RESULTS

In order to characterise the nutritional status of the studied population, the BMI index was used. It was calculated based on the height and weight values provided by the respondents in the survey. The studied group was characterised by a BMI values in the range of 18.96 to 30.0 kg/m². Normal body weight was found in 68% of women

and only in 30% of men; it is worrying that 70% of men were found to be overweight. indeed, one man had grade “I” obesity. Factors influencing food choices depend more on economic constraints than on individual preferences.

When asked about the main factors determining the purchase of food, nearly half of the respondents (48%) said it was the price. This factor turned out to be more important for women than men. The importance of this determinant increased significantly compared to earlier studies, such as that conducted among adults by Suliga (2010), where only 27% of respondents declared a price barrier when buying food. Thus, the observation about the impact of economic factors on purchasing decisions is confirmed. The brand of the product turned out to be the next important factor for 15% of women and for 7% of men. 17% of the respondents chose the energy value, with men more often checking this answer. Other determinants of the choice of products in the store included taste, quality and freshness (15%) and we can see a decrease in the importance of these determinants: in Suliga’s study the choice of food was primarily determined by taste and habits [Suliga 2010].

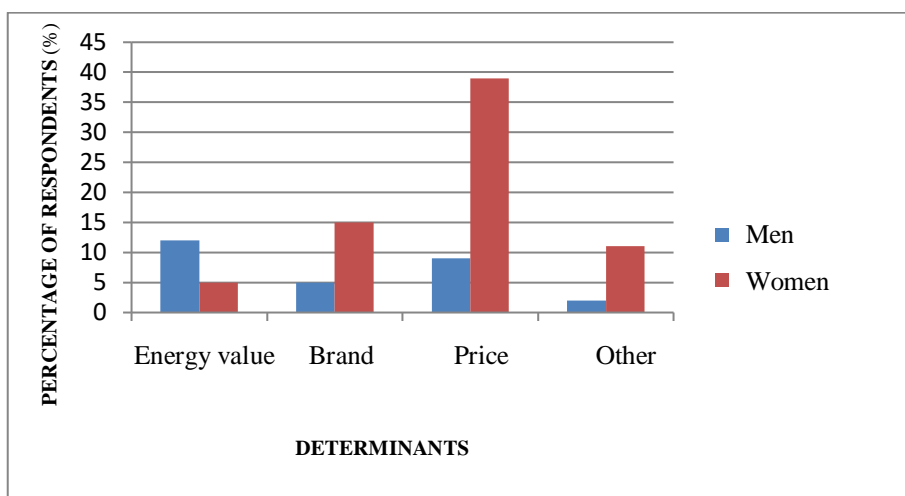


Fig. 1. Determinants of choice when buying food products [own study]

One of the most important principles of rational nutrition is to eat 4–5 meals during the day, every 3–4 hours. It is important to construct our diet in such a way as to ensure a specific constant supply of nutrients [Jarosz 2016]. The majority of respondents (69%) behave in accordance with the recommendations regarding the minimum number of meals per day. There were more women than men in this group. For 27% of the surveyed women the number of meals depends on the amount of time they have. This factor is not important for men, only one of whom did not have enough time to eat 3–5 meals. Also, one of the men ate less than three meals a day. 29% of all respondents admitted that the amount of time had an impact on the number

of meals eaten by them during the day, so it can be concluded that lifestyle significantly affects the eating behaviour of the surveyed population. On the other hand, Suliga's study (2010) revealed that men had a tendency to eat more meals than women and almost 10% of his respondents declared eating only two meals a day [Suliga 2010].

According to Public Opinion Research Center's surveys (2011), Poles followed the recommendations regarding the minimum number of meals per day (76%) [Wądołowska 2010]. One of the ways to achieve optimal nutrition is to eat all the recommended meals during the day. It should be remembered that none of them should be left out in order to meet our body's demand for nutrients. 50% of the surveyed population considered breakfast to be the most important meal of the day. Not much less, 45%, of respondents believe that lunch is equally important. However, it is disturbing that almost all respondents underestimated the role of the second breakfast (brunch), and 2% of respondents described dinner as the most important meal.

According to Public Opinion Research Centre (2011), every fifth Pole gave up daily breakfast, and every fourth did not have time even for three meals a day [Wądołowska 2010].

The study by Stoś et al. (2021) showed that 3 meals a day were eaten by 53.5% of men and 49.2% of women aged 18–64 and by 59.3% of men and 57.6% of women aged 64+. 4 meals were eaten by 29.7% of men and 31.1% of women aged 18–64 and about 27% of older men and women. A small percentage of the respondents ate 5 or more meals per day: about 10% of men and women aged 18-64 and slightly more than 8% of older people [Stoś et al. 2021].

The basis of rational nutrition is to diversify meals for the avoidance of nutritional deficits. It consists in choosing products from each basic food group. The research also tried to evaluate the presence of basic product groups in the menu of consumers. The survey revealed that only 23% of the respondents declared daily consumption of meat, and 69% of them ate meat frequently. Fish is rarely eaten (only 20% of respondents ate it frequently). About 40% of the respondents ate fruits and vegetables daily or "often". This result shows that consumers neglected this aspect of the menu. The diet of more than half (54%) of the study group was also too low in dairy products. Also eating sweets contributes to a significant deviation from the healthy eating model: more than half of the respondents (51%) consumed them too often.

The study by Szmidi (2019) showed that although vegetables and fruits played an important role in the nutrition of the elderly, most seniors did not consume these products with the recommended frequency (5 servings per day) or in the recommended amounts (they should constitute at least half of what is consumed during the day) [Szmidi et al. 2019].

Suliga's study (2010) on the habitual frequency of consumption of selected products among adults showed that 62% of his respondents ate fruit at least once

a day, of whom 30% several times a day. Over 20% of the respondents ate vegetables several times a day, while 12% ate them less frequently than once a week. Only over 28% of the respondents declared daily consumption of sweets, men almost twice more than women. Dairy products were consumed at least once a day by 20% of men and by more than 67% of women. The percentage of men who ate meat several times a day was twice as high as that of women. Also, just over 20% of the respondents ate fish at least several times a week [Suliga 2010].

Also in the Public Opinion Research Center's survey (2011) attempts were made to quantify the basic groups of products in the menu of the average Pole. The results showed that about 62% of respondents ate fruits and vegetables once a few days, the diet of 56% of respondents was low in dairy products and 77% definitely ate fish too rarely. There was also a significant deviation from the healthy eating model in terms of eating sweets: 55% of the respondents ate them too often [Wądołowska 2010].

Regular consumption of meals ensures the delivery of all the necessary ingredients at the right time so that the body can rationally manage them. Therefore, breaks between meals should not last more than 3–4 hours. If this time is extended, there is a desire to quickly satisfy hunger. A high percentage of respondents admitted that they ate between meals (80%). This was also the finding of Stoś et al. (2021) and Babicz-Zielińska, Bartkiewicz and Tańska (2021) who studied irregularities in the eating behaviour of adults and found that almost 90% of Poles ate between meals [Babicz-Zielińska, Bartkiewicz and Tańska 2021; Stoś et al. 2021].

According to a report by FAO / WHO experts, the individual demand for energy derived from nutrients should ensure that the body is maintained in good health for a long time. Therefore, the knowledge of an informed consumer in this area is important. The recommended energy demand standards for women and men aged 26–60 are 2200 and 2900 kcal/day, respectively. 69% of the respondents did not know this recommendation for the daily energy intake. The remaining ones (31%) declared knowledge of this value and all of them knew the right answer.

Rational nutrition depends on many factors including age, gender and physical activity. When planning a diet, it is also necessary to take into account the economic situation of the household and awareness of the effects of poor nutrition. The respondents' declarations show that, in their own opinion, they eat carefully, take care of themselves and like to cook wholesome meals (44% of the respondents). It is important that 31% of the population admitted that lack of time is an obstacle to proper nutrition. 20% of the respondents believe that healthy, rational eating is very costly.

The GfK Polonia's survey (2011) on eating habits and organising free time shows that 52% of Poles like to cook and 31% do this every day [www.gfk.com... 2011; Kugiejko and Kociszewski 2021]. Carbohydrate intake satisfies 50–65% of the demand for energy. Knowledge about the occurrence, and the important role, of this nutrient should be broadly understood by consumers.

The results indicate that only 34% of respondents know which of the given nutrients plays the greatest role in energy supply. 26% of the respondents mentioned vitamins and minerals, 23% proteins. Another important ingredient of a healthy diet is fiber as a great contributor to the efficiency of the digestive system. The recommended intake is about 20–40 g per day. To deliver it to the body in the right dose, you need to know which food products abound in it. A high percentage of the respondents (74%) described correctly the group of foods rich in fibre. Less than one-sixth (16%) mentioned dark bread, white meat and fruit, and 8% of respondents thought that oil, fish and sweets were the main sources of fibre.

Protein is one of the most important nutrients necessary to sustain life. Knowledge of the food products in which it occurs is needed to be able to provide the recommended amounts. 74% of the respondents correctly recognised the group of products with the highest protein content, while 24% of the surveyed population mentioned butter, fish and wheat bread as the best sources of this ingredient. 2% of the respondents believed that bran, fruit and dark bread were the best sources of protein. The results confirm the reports of other authors on the knowledge of sources of selected nutritional ingredients by consumers [Świętochowski and Wawrzków 2020; Babicz-Zielińska, Bartkowicz and Tańska 2021; Stoś et al. 2021].

The next question in the survey asked about the sources of knowledge about food and nutrition. Today, access to this type of information is practically unlimited.

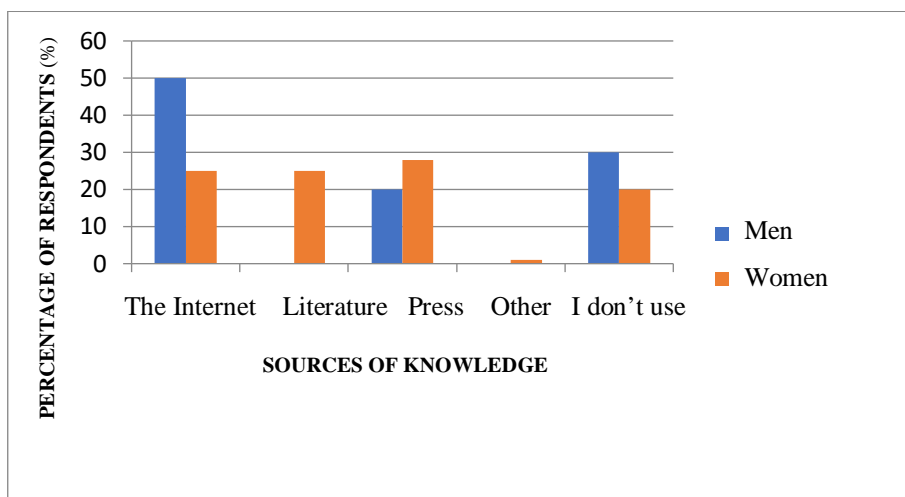


Fig. 2. Sources of knowledge about food and nutrition [own study]

Polish consumers are looking for knowledge about nutrition and food mainly on the Internet. This answer was given by 28% of the female and 50% of the male respondents. A high percentage of the women also used literature and the press (25%), while none of the men declared using this type of source. 20% of the women

and 30% of the men admitted that they did not use the available sources knowledge about nutrition at all. One of the women pointed to a different source of knowledge: a dietitian. Niewczas-Dobrowolska’s study (2021) showed that the most frequently chosen sources of information about food, according to consumers, were: the Internet (86.4%), TV (63.5%) and friends (57.1%). Only 4% of consumers admitted that they did not seek information about food at all [Niewczas-Dobrowolska 2021].

The term “proper nutrition” is defined as compliance with the principles of rational nutrition, that is, eating in accordance with the norms and recommendations. The correct answer was given by 69% of the women and 50% of the men. One of the ladies believed that using diets was the proper nutrition. However, 50% of the men decided that eating everything in small amounts was the definition of the term.

In research conducted by Waśkiewicz (2010), conclusions were drawn about the disturbingly low level of nutritional knowledge in the population of young adult Poles, while a study published by the Public Opinion Research Center in 2019 showed that the vast majority of the Centre’s respondents (80%) were convinced that they ate healthily or very healthily [Public Opinion Research Center 2019]. The next question of the survey asked about understanding of the term “nutritional awareness”.

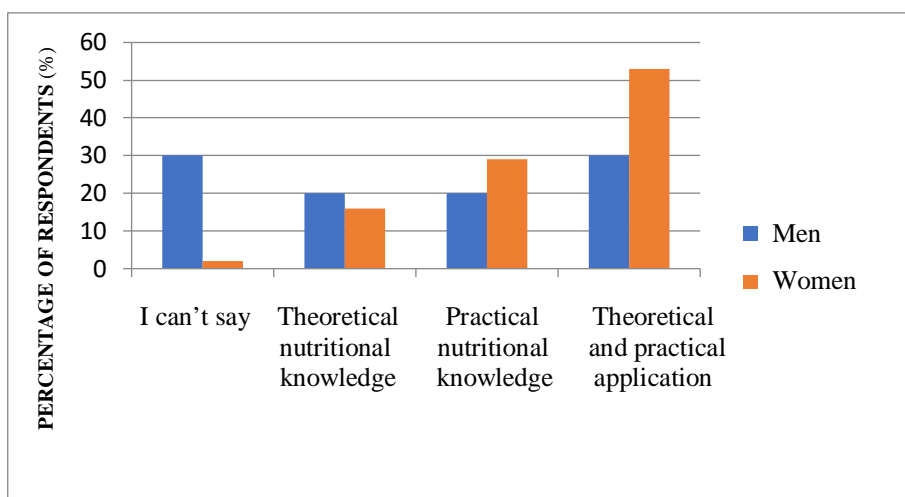


Fig. 3. Understanding of the term “nutritional awareness” [own study]

Of all the respondents, as many as 46% answered correctly that the term “nutritional awareness” means theoretical and practical application of knowledge about proper nutrition and continuous education on the subject. The correct answer was given by more women (53%) than men (30%). Only 1 woman and 3 men could not guess this definition (Fig. 3). The survey went on to ask whether they felt that a high level of nutritional awareness had an impact on health (Fig. 4).

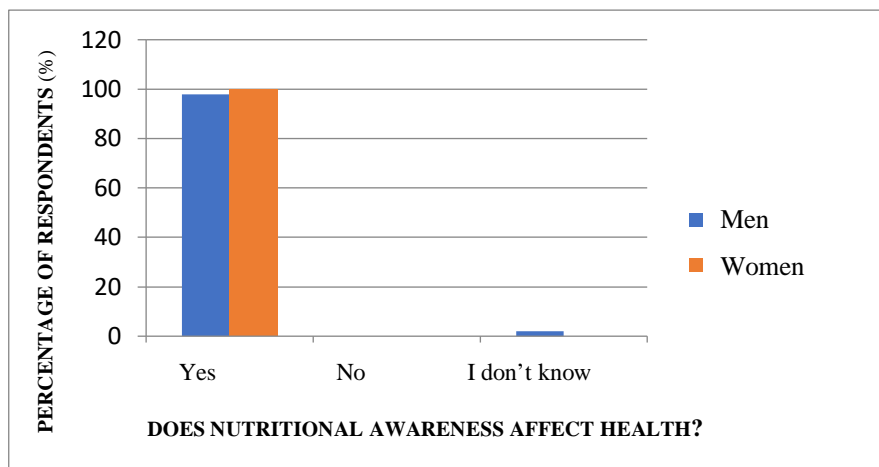


Fig. 4. The impact of nutritional awareness on health [own study]

98% of the respondents admitted that nutritional awareness had an impact on health. All the ladies were sure of this and only 1 man had no opinion on this subject. Given wide access to nutritional knowledge in recent years, interest in healthy rational nutrition is constantly growing. An interesting question is whether nutritional awareness has improved since we have so many publications and news on nutrition, and the multitude of websites on this subject [Aniśko et al. 2020; Świętochłowski and Wawryków 2020; Babicz-Zielińska, Bartkiewicz and Tańska 2021].

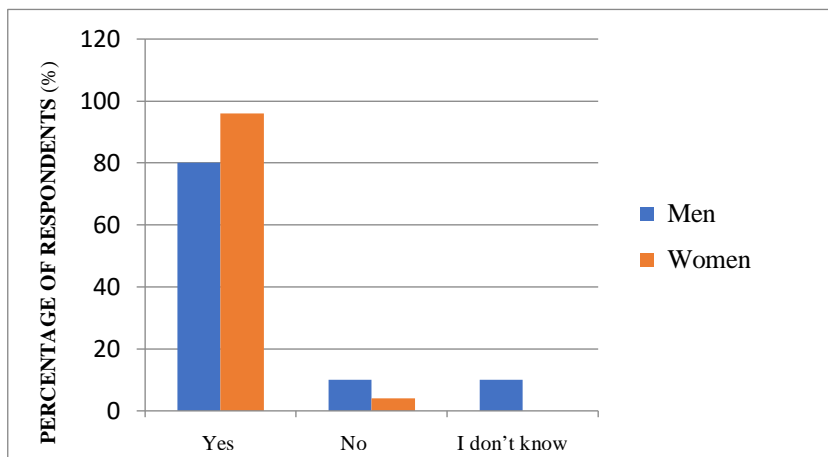


Fig. 5. Has there been an improvement in nutritional awareness? [own study]

When asked to assess whether nutritional awareness has deepened over the past years, 92% of respondents answered in the affirmative. The female respondents (96%) were more confident of this answer than men. In the opinion of one man, there was no improvement, and another gentleman could not give an answer. The closing question of the survey concerned self-assessment of the level of nutritional knowledge. It can be gained and used in everyday life in many ways.

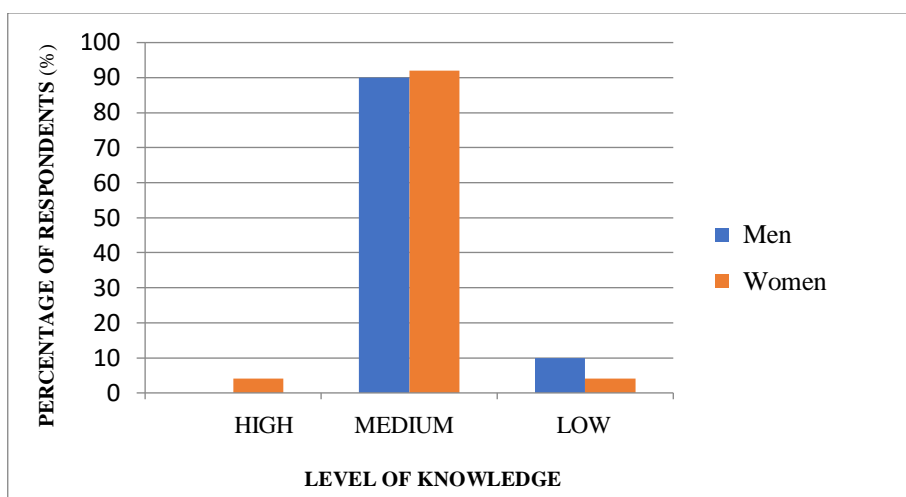


Fig. 6. Self-assessment of the level of nutritional knowledge [own study]

90% of the respondents rated their level of nutritional knowledge as average: 92% of the women and 80% of the men. 4% of the women rated themselves highly and another 4% described their knowledge as poor. 20% of the men knew little about nutrition. However, as shown by the research of the Public Opinion Research Center (2011) and other authors, the vast majority of Poles believed that they ate healthily (69%) or even very healthily (7%) [Wądołowska 2010; Gardocka-Jałowiec, Stańczyk and Szalinka 2020, Źysko and Kowalczyk 2020; Stoś et al. 2021].

5. CONCLUSIONS

Nutritional awareness is defined as knowledge of the principles of proper nutrition, storage of food products and preparation of meals. It is one of the factors shaping eating behaviours. The aim of the study was to assess the level of nutritional awareness and behaviour of Polish consumers.

The research shows that respondents know the recommendations for healthy eating, but not all principles are reflected in their daily diets. Studies have also shown that women are more concerned about rational nutrition than men. The subjective

assessment of their own eating styles revealed a desire for taking more care about rational nutrition, but the lack of time is an obstacle to doing so.

According to the surveyed group of consumers, the choice of a given food product was determined mainly by price and brand. The results also show that the respondents know and understand the concept of “nutritional awareness” and, in their opinion, it has an extensive impact on health. When looking for information about food and nutrition, respondents use various sources, and they usually draw knowledge from a number of sources. It may be worrying that the most popular tool for this is the Internet where there is the greatest risk of encountering unverified information.

The research presented in the paper was a pilot project which has shown the decisive influence of gender on eating habits, which will be the starting point for the full-scale study designed to verify what other individual characteristics within each gender group differentiate their eating habits.

REFERENCES

- Aniśko, P., Popławska, P., Sochoń, M., Bijowski, K., Krajewska-Kułak, E., 2020, *Profilaktyka, promocja zdrowia i edukacja zdrowotna – wybrane aspekty* [in:] Bejda, G., Lewko, J., Krajewska- Kułak, E. (eds.). *Zachowania prozdrowotne jako element aktywności życiowej człowieka*, Wyd. Uniwersytet Medyczny w Białymstoku, Białystok.
- Babicz-Zielińska, E., Bartkiewicz, J., Tańska, M., 2021, *Jakość życia osób starszych i jej determinanty*, *Żywność. Nauka. Technologia. Jakość*, vol. 28, no. 1(126), pp. 51–67.
- Borowiec, A., Aranowska, A.E., 2018, *Style żywieniowe Polaków i ich społeczno-demograficzne uwarunkowania*, *Pomeranian Journal of Life Sciences*, vol. 64, no. 2, pp. 93–98.
- Centrum Badania Opinii Społecznej, 2019, *Komunikat z badań*, no. 106.
- Dąbrowska, A., Janoś-Kresło, M., Lubowiecki-Vikuk, A., 2020, *Styl życia wellness a zachowania osób starszych na rynku usług prozdrowotnych* [in:] *Zdrowie i style życia. Determinanty długości życia*, Uniwersytet Wrocławski – Repozytorium, Wrocław.
- Duda, G., Wichura-Demska, A. 2008, *Wpływ wybranych czynników socjodemograficznych na poziom wiedzy osób zdrowych dotyczącej racjonalnego żywienia*, *Nowiny Lekarskie*, vol. 77, no. 4, pp. 290–293.
- Gardocka-Jałowicz, A., Stańczyk, P., Szalinka, K., 2020, *Wpływ żywienia i żywności na stan zdrowia w świetle badań* [in:] *Zdrowie i style życia. Determinanty długości życia*, Uniwersytet Wrocławski – Repozytorium, Wrocław.
- Garncarek, E. 2017, *Zachowania prozdrowotne kobiet młodych, w średnim wieku i starszych*, *Acta Universitatis Lodzianensis, Folia Sociologica*, no. 60, pp. 201–217.
- Gawęcki, J., Mossor-Pietraszewska, T., 2007, *Kompendium wiedzy o żywności, żywieniu i zdrowiu*, PWN, Warszawa.
- Gawęcki, J., Roszkowski, W., 2009, *Żywność człowieka a zdrowie publiczne*, t. 3, PWN, Warszawa.
- Gawlik, D., 2018, *Sposób percepcji zjawisk obecnych w przekazach kultury masowej a zachowania zdrowotne mieszkańców województwa śląskiego*, praca doktorska, Uniwersytet Śląski, Katowice.
- Jarosz, M., 2016, *Piramida zdrowego żywienia i aktywności fizycznej*, *Żywność Człowieka i Metabolizm*, vol. XLIII, no. 2, pp. 77–84.

- Kobos, Z., Bertrandt, J., Kłos, A., Bieniek, R., 2007, *Reklama produktów żywnościowych w prasie dla menedżerów*, *Żywnienie Człowieka i Metabolizm*, vol. XXXIV, no. 1/2, pp. 307–312.
- Kugiejko, M., Kociszewski, P., 2021, *Organizacja czasu wolnego w obliczu pandemii COVID-19 – doświadczenie różnych pokoleń (osób młodych i seniorów)*, *Turystyka Kulturowa*, no. 4(121), pp. 157–182.
- Michota-Katulka, E., Zegan, M., Grzebuła, M., 2016, *Zachowania żywieniowe pracowników restauracji sieci McDonald's*, *Journal of Agribusiness and Rural Development*, vol. 1, no. 39, pp. 121–128.
- Niewczas-Dobrowolska, M., 2021, *Preferowane źródła informacji dotyczącej żywności w opinii konsumentów*, *Żywność. Nauka. Technologia. Jakość*, vol. 28, no. 2(127), pp. 132–143.
- Stoś, K., Rychlik, E., Woźniak, A., Oltarzewski, M., Wojda, B., Przygoda, B., Matczuk, E., Pietras, E., Kłys, W., 2021, *Krajowe badanie sposobu żywienia i stanu odżywienia populacji polskiej*, Narodowy Instytut Zdrowia Publicznego PZH – Państwowy Instytut Badawczy, Warszawa.
- Suliga, E., 2010, *Zachowania zdrowotne związane z żywieniem osób dorosłych i starszych*, *Hygeia Public Health*, vol. 45, no. 1, pp. 44–48.
- Szmidt, M., Granda, D., Broda, A., Brzozowska, A., 2019, *Rola warzyw i owoców w diecie osób starszych*, *Kosmos Problemy Nauk Biologicznych*, vol. 68, no. 2, pp. 293–301.
- Świętochowski, W., Wawrzuków, M., 2020, *Motywacja osób dorosłych do realizowania zachowań zdrowotnych*, *Psychologia Wychowawcza*, no. 17, pp. 81–95.
- Tobiasz-Adamczyk, B., 2000, *Wybrane elementy socjologii zdrowia i choroby*, Wyd. UJ, Kraków.
- Waśkiewicz, A., 2010, *Jakość żywienia i poziom wiedzy zdrowotnej u młodych dorosłych Polaków*, *Problemy Higieny i Epidemiologii*, vol. 91, no. 2, pp. 233–237.
- Wądołowska, K., 2010, *Zachowania i nawyki żywieniowe Polaków*, [http:// www.cbos.pl/SPIS-KOM.POL/2010/K_150_10.PDF](http://www.cbos.pl/SPIS-KOM.POL/2010/K_150_10.PDF) (03.06.2022).
- Wiśniewska, E., Zagroba, M., Ostrowska, B., Marcysiak, M., 2017, *Jakość życia w zdrowiu i chorobie – charakterystyka pojęcia*, [in:] Kowalewska, B., Jankowiak, B., Rolka, H., Krajewska-Kułak, E. (eds.), *Jakość życia w naukach medycznych i społecznych*, t. I. Wyd. Uniwersytetu Medycznego w Białymstoku, Białystok.
- Wolańska-Buzalska, D., Wiśniewska, K., 2019, *Dieta Polaków a zalecenia żywieniowe*, *Przemysł Spożywczy*, no. 8(73), pp. 28-32.
- World Health Organization, 2018, *Noncommunicable diseases country profiles*, Geneva.
www.gfk.com/gfkpolonia/htdocs/public_relations/pressreleases/press_articles/007478/index.pl.html
(15.06.2021).
- Żysko, K., Kowalczyk, K., 2020, *Odżywianie się ludzi w podeszłym wieku*, Uniwersytet Medyczny w Białymstoku – Repozytorium, Białystok.