BRIEF REPORT

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The level of knowledge on dietary supplements among patients of pharmacies in the Greater Poland region

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ABSTRACT

Introduction. An appropriately balanced and varied diet should cover the body's demand for energy and all necessary nutrients. In case of health disorders caused by malnutrition, a change of eating patterns or introduction of temporary dietary supplements containing deficient nutrients should be considered.
Aim. Assessment of the level of knowledge among patients of pharmacies in Poznań/Greater Poland on nutritional supplements and factors which influence or decide about their use in everyday life.
Material and Methods. A study concerning the use of dietary supplements was conducted on the basis of an original survey in a group of 401 persons, both men and women. The survey consists of 17 single choice questions and one multiple choice question. In order to assess preferences within the scope of use of a chosen group of supplements, a five-grade hedonic scale was used.
Results. The study showed that most patients considered their knowledge to be at least at a good level. Those results were not confirmed by an objective assessment of their knowledge. The most preferred supplements were products including Omega-3 and Omega-6 acids, vitamin D, probiotics and prebiotics, calcium and vitamin and mineral complexes. The preferences among women and men in relation to the choice of specific groups of dietary supplements were similar.
Conclusion. The study showed a varied level of knowledge on dietary supplements – especially on the legal aspects of their introduction on the market. The general level of knowledge on supplements was higher in the group of women.

Keywords: pharmacy patients, dietary supplements, assessment of the level of knowledge.

Introduction

Appropriate nutrition should be based a balanced and varied diet, covering the body's demand for energy and all necessary nutrients – proteins, fats, carbohydrates, vitamins and minerals [1, 2]. Non-compliance with the aforementioned requirements reflected in over or undersupply of nutrients leads to nutritional disorders and, as a consequence, to development of diet-related diseases [3, 4, 5]. In a situation, where it is impossible to balance the daily food ration using components naturally occurring in food, compensation of deficiencies by introduction of a dietary supplement should be considered [6]. Supplementation of a deficient nutrient/deficient nutrients should take the form of a short-term intervention carried out under the supervision of a physician or a pharmacist [7]. According to the definition, a dietary supplement is a product intendent for ingestion, whose aim is to complement a regular diet and provide a concentrated source of vitamins and minerals or other substances with a nutritional or physiological effect [8]. It is launched onto the market in a form "allowing for its dosing – capsules, tablets, pellets or

other, similar ones, as well as powder sachets, ampules with liquid, bottles with droppers or other similar forms of liquids or powders allowing for ingestion of its small and carefully measured quantities with the exception of products with properties of a medicinal products within the understanding of the pharmaceutical law" [8, 9]. The basic difference between a medicinal product and a dietary supplement is visible in the definition itself. While medicines are intended for people suffering from diseases and are supposed to improve the state of health pharmacologically or metabolically, dietary supplements are always recommended to healthy persons suffering from temporary deficiencies of some nutrients, serve a nutritional function and support correct functioning of the body [10]. A dietary supplement (for example, vitamin C) is subject to food regulations, and a medicine – to pharmaceutical regulations, which means that these are different products of the same commercial presentation [11, 12]. The issue related to the maximum content of selected vitamins and minerals in dietary supplements have not been solved yet, not to mention the problem with "third components" which are – according to the definition – other substances with a single or complex nutritional or physiological effect. They pose a threat of exceeding the recommended intake of vitamins and minerals, not to mention other active pharmacological compounds, whose content is not standardised [13]. In addition, pushy advertising in the press, radio and TV assures us that dietary supplements are a necessary component of our diet, guaranteeing physical and psychological health [14, 15].

Aim

The aforementioned premises became an incentive to study the level of knowledge of patients of pharmacies in Poznan/Greater Poland on the subject of dietary supplements and factors which influence or are decisive for their use in everyday life.

Material and Methods

The assessment of the level of knowledge on dietary supplements was carried out using a survey – a direct, face to face interview conducted among the patient of pharmacies in Poznan and Wielkopolskie Voivodeship. The study was conducted between 2015 and 2016 on a group of 401 persons – 296 women (age average: 45 years old) and 105 men (age average: 39 years old). The research tool was an original survey created on the basis of the literature available and own observations of the authors concerning the sales of dietary supplements in the pharmacy. The survey consisted of 17 single choice questions, among which two were matrix questions with the answer ranging from 1 (insignificant) to 5 (very significant) and one multiple choice question. Preferences relating to the choice of a selected group of supplements were tested using a 5-point scale marked with designations from 1 "insignificant" to 5 "very significant" and a neutral field – 3 "neither significant nor insignificant". In order to rank the preferences, the average values of preferences (x) were classified to one of the three ranges of values: $x < 2.34$ – low preferences, $2.34 <= x < 3.67$ – medium preferences and $x >= 3.67$ – high preferences. The results obtained from the survey were inputted into a MS Excel spreadsheet, and then – for the needs of their further analysis, to a MS Access relational database. The results were statistically processed using an arithmetic average calculated for all respondents' responses to a specific question, or a variant average in case of an analysis of relationships between gender, age and education. To assess the relationship between the significance of choice of a specific group of supplements among men and women studied, a nonparametric Kendall's tau rank correlation test at the significance level of $\alpha = 0.05$ was conducted. The statistical analysis was carried out using the Statistica 12.0 PL statistical software created by StatSoft – Tulsa, USA.

Results

The socio-economic specification of the patient group studied is showed in **Table 1**, whose analysis shows that in terms of the place of residence, the respondents of the study were men and women from cities of the number of residents of over 100 thousand (39.9% of women and 45.7% of men of the total number of respondents) and cities of up to 50 thousand residents (43.2% of women and 38.1% of men of the total number of respondents). Considering the level of education, 96% of women and 100% of men taking part in the study belonged to the group of those with secondary, incomplete higher (Bachelor degree) or higher education. The financial situation of the patients studied was good or average (82.4% of women and 81.9% of men). A small percentage of the respondents (about 3.0%) declared that their financial situation was bad, while 15.0% described their situation as good. **Table 2** shows the results of the self-assessment of the patients studied concerning the level of their knowledge on dietary

Table 1. Socio-economic specification of the patients' group

Parameter analysed	Parameter characteristics	Gender	
		Women n(%)	Men n(%)
Place of residence	City of over 100 thousand residents	118 (39.9%)*	48 (45.7%)
	City of 50–100 thousand residents	20 (6.8%)	6 (5.7%)
	City of < 50 thousand residents	128 (43.2%)	40 (38.1%)
	Rural areas	30 (10.1%)	11 (10.5%)
Education	Higher	118 (39.8%)	66 (62.9%)
	Incomplete higher education	39 (13.2%)	22 (20.9%)
	Secondary	128 (43.3%)	17 (16.2%)
	Vocational	3 (1.0%)	0 (0%)
	Primary	8 (2.7%)	0 (0%)
Financial situation	Very good	43 (14.5%)	16 (15.2%)
	Good	114 (38.5%)	37 (35.2%)
	Average	130 (43.9%)	49 (46.7%)
	Bad	9 (3.1%)	3 (2.9%)

* – the number of respondents and its percentage in comparison to the total number of respondents

Table 2. The respondents' level of knowledge on dietary supplements according to themselves – the percentage of all respondents

Level of knowledge	Women	Men
Very good	5.7%	1.9%
Good	29.4%	34.3%
Sufficient	43.6%	25.7%
Low	16.9%	27.6%
Very low	4.4%	10.5%

supplements. The analysis of the answers obtained showed that 73.0% of women and 60.0% of men evaluated their knowledge on dietary supplements as good or satisfactory, while only a small percentage (5.7% of women and 1.9% of men) declared that their level of knowledge was "very good". Insufficient knowledge on dietary supplements was declared by about 20% of women and 40% of men. An analysis of the actual level of knowledge of the respondents is shown in **Table 3**. Let us analyse answers to the questions asked in a chronological order (from 1 do 7). The first question concerning equivalence of the terms "medicine" and "dietary supplement" was answered correctly by as many as 98% of the respondents. In case of the second question, only 37.7% of the respondents answered correctly that a leaflet is not required in a packaging of a dietary supplement. Over half of the respondents (52.8% of the total number of respondents) did not know that clinical research is not required in the process of registration of a dietary supplement, and only 38.2% of the persons surveyed were aware that before launching a supplement on the market, no control of its active substances content is done. An appropriate answer concerning the lack reimbursement for dietary supplements from the National Health Fund (NFZ – Narodowy Fundusz Zdrowia) was given by 75.6% of the respondents. Of all the persons surveyed, 88.3% answered correctly that the process of a supplement registration is different than that for a medicine, and almost everyone (93.3%) stated correctly that the packaging of a product must include information if it is a medicine or a supplement. The assessment of preferences and significance of use of a specific group of dietary supplements is shown in **Figure 1** and was completed by the results related to the sex of the respondents, indicated in **Table 4**. As it can be seen in the figure, the surveyed patients deemed that taking dietary supplements with Omega-3 and Omega-6 acids is the most important (an average evaluation of significance: 3.31). Men evaluated this group of preparations slightly higher (3.41) than women (3.27). Then, there were Vitamin D supplements, assessed only slightly lower (average: 3.29), with a grade of 3.35 among women and 3.12 among men. According to the respondents, important dietary supplement include also calcium (women – 3.03; men – 3.08), and then vitamin and mineral complexes as well as probiotics and prebiotics (average: around 3.0). The first of the groups was ranked higher by men (3.41) than by women (2.85), just as it was the case with the latter one (3.15 vs 2.95). An average of

Table 3. The patients' level of knowledge on the legal aspects of the use of dietary supplements – the percentage of all respondents

Question No.	Question	Women		Men	
		YES	NO	YES	NO
1	The terms "medicine" and "dietary supplement" mean the same.	1.0%	99.9%	4.8%	95.2%
2	A leaflet must be included in the packaging of a dietary supplement.	62.2%	37.8%	62.9%	37.1%
3	Clinical research is not required during the process of registration of a dietary supplement.	49.7%	50.3%	40.0%	60.0%
4	The declared content of active substances is controlled before launching the product on the market.	58.4%	41.6%	71.4%	28.6%
5	The National Health Fund does not fund a vast majority of dietary supplements.	70.9%	29.1%	88.6%	11.4%
6	The process of registration of a dietary supplement is the same as for a medicine.	12.2%	87.8%	10.5%	89.5%
7	The packaging of a preparation must state if it is a dietary supplement or a medicine.	91.2%	8.8%	99.0%	1.0%

Table 4. The average assessment of importance of use of a chosen group of dietary supplements in the group of the patients studied, according to the sex of the respondents.

Type of a dietary supplement	Women (x)	Men (x)
Mineral and vitamin complexes	2.85	3.41
Vitamin D (D3)	3.35	3.12
Omega-3, Omega-6 acids	3.27	3.41
Calcium	3.03	3.08
"Weight-loss" products	1.55	1.59
Hair, skin and nails preparations	2.55	2.31
Fish oils	2.89	2.51
Lutein preparations (for good sight)	2.48	2.70
Probiotics, prebiotics	2.95	3.15
Digestion or liver preparations	2.60	2.50
Menopause products	2.53	2.30
Preparations for immune system (ginseng, guarana)	2.43	2.90
Preparations for venous circulation s (diosmin etc.)	2.93	2.70
Kendall rank correlation coefficient	0.5195; $p < 0.05$	

x – value of the arithmetic mean of the frequency

the assessments of significance of menopause as well as hair, skin and nails products was similar and ranged between 2.55 and 2.30. A slightly higher position was assigned to supplements supporting the cardio-vascular system, the immune system (men) and fish liver oils, which are a source of eicosapentaenoic (EPA) and docosahexaenoic (DHA) acids – the significance level was between 2.51 and 2.93. As the least important group of supplements the respondents indicated "weight-loss" preparations, giving them an average grade of 1.56. The calculated value of Kendall tau coefficient indicated that there is a statistically significant rank correlation concerning the choice of chosen supplements by women and men (0.5195; $p < 0.05$).

Discussion

The studies carried out on a representative group of patients of pharmacies from Greater Poland allowed for initial assessment of their level of knowledge of on the use of dietary supplements. Residents of Poznan and Greater Poland cities of up to 50 thousand residents were the main group taking part in the study. A great majority of them were persons with a secondary or higher education, describing their economic status as good or quite good. The results presented below concern only a part of the study conducted on focus only on the results concerning the knowledge on dietary supplements according to the participant's

self-assessment (subjective assessment), and an objective assessment based on answers to the set of 7 questions. The studies showed that the majority of respondents (38.9%) assessed their level of knowledge on dietary supplements as sufficient, while 30.7% declared that they were informed at a good level. More woman than men classified their level of knowledge as very good, and less women than men considered it to be low or very low, which can be a result of, among others, greater interest of women in health issues. Krejpcio et al. obtained similar results with as much as 88% of respondents declaring their level of knowledge to be average [16]. A great majority of respondents was aware of the basic differences between a medicine and a dietary supplement – a vast majority (98%) differentiated between the terms "medicine" and "dietary supplement", however, more than a half of respondents did not know the legal aspects concerning the safety and efficiency of supplements, such as the lack of a requirement for clinical studies or control of the content of active substances before placing the supplement on a market. The results obtained are compliant with the study conducted by Wierzejska et al [17], according to which 71% of respondents knew the term "dietary supplement", however, over a half of them did not deem dietary supplements as foodstuffs, just like 19.5% of persons surveyed in the study by Tyrakowska et al [18]. According to Wierzejska et al., such results are a consequence of misleading suggestions in advertisements concerning the healing effect of supplements and the similarity between their form and packaging to those of medicines [17]. In order to characterise the group of patients further by taking into account the type of supplements they prefer and the 5-point scale of preferences, the value of the arithmetic mean of the frequency the proposed answers were chosen was calculated. The answers were as follows: "insignificant", "slightly significant", "neither significant nor insignificant", "significant" and "very significant" and numeric values on a scale from 1 to 5 were assigned to them. During such a procedure, it can be seen that both men and women did not deem the evaluated groups of supplements as very significant (average >3.67). In most cases, the significance of their use/preferences was within the range of medium values (from 2.34 to 3.67). In the group, the respondents deemed that it is the most important to take dietary supplements with Omega-3 and Omega-6 acids, then, in descending order, vitamin D preparations, calcium, vitamin and minerals complexes and probiotics and prebiotics. This data slightly varies from the results of studies of Quato et al., where the most frequently used supplements were vitamin and mineral complexes, and then calcium, while Omega-3 and Omega-6 acids and vitamin D were not ranked so highly [19]. Similar results were obtained in the study of Khoura et al, in which the highest percentage of respondents also indicated vitamin and mineral supplements as the most frequently used ones, which, according to the authors, can be caused by an attempt to protect themselves against deficiencies, as well as their willingness to increase the ration of selected nutrients in the diet [20]. The studies conducted showed that there are marginal differences between men and women in terms of preferences of chosen dietary supplements, but the value of the rank correlation coefficient indicates its statistical significance, which suggest that men and women have similar preferences concerning supplements.

Conclusion

The study showed a varied level of knowledge on dietary supplements – especially in terms of legal aspects related to their placement on the market. The general level of knowledge on supplements was higher in the group of women, while the preferences concerning the choice of a chosen group of supplements were similar between men and women.

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Conflict of interest statement
The authors declare no conflict of interest.

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