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SCIENTIFIC PAPER

A STUDY ON CONSUMER HABITS IN THE DIETARY SUPPLEMENTS MARKET

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Abstract: *There has been a continuous increase in the proportion of consumers using dietary supplements worldwide. Evidence based on former surveys suggests that in Hungary more than half of the population buy at least one type of dietary supplement (hereinafter DS). By using secondary research, the authors of the present paper examine the demographic factors determining the consumption of DS on a global scale. Consumption of DS increases with age and is more frequent among women. Consumers with higher qualifications and income tend to buy products containing vitamins and minerals to a greater degree. In the vast majority of cases the purchase and consumption of DS is based on consumers' personal preferences and decisions, rather than on their physicians' advice. It has been found that a high percentage of DS consumers probably do not even need any extra nutrient intake. In our primary research (N=1000) the specific attitudes to and characteristics of DS consumption among Hungarian adults are analysed on the basis of on a nationally representative survey. First, we identify the most important reasons which encourage consumers to buy DS. Consumer awareness concerning DS with a particular vitamin and mineral content and of other sources is examined, and we also assess the consumption of the product which is the most popular. The current paper attempts to identify the outlets Hungarian consumers typically buy DS from, and also what resources they use to keep themselves informed about these products. Consumers who admittedly reported (regular) consumption of a certain kind of DS product 6 months prior to the survey are further examined in relation to certain additional issues. The results of our survey provide an accurate picture of the DS consumption habits of the Hungarian population.*

Keywords: *consumption of dietary supplements, dietary supplement preferences*
(JEL Code: I12, M31)

INTRODUCTION

The importance of maintaining a healthy lifestyle increasingly motivates consumers to use DS to supplement their traditional diet in order to support their physical and mental wellbeing. 68% of U.S. adults consume DS products (COUNCIL FOR RESPONSIBLE NUTRITION, 2015) the commercial value of which amounted to 38.8 billion US dollars in 2015. (NUTRITION BUSINESS JOURNAL, 2016). The global phenomenon of the prevalence of DS consumption in both developed and developing countries has been perceptible in Hungary, too. Relying on secondary research the present study aims to explore the special characteristics of DS preferences and consumption according to demographic and lifestyle criteria. At the same time, in our primary research the characteristic features of DS consumption of Hungarians have been analysed, involving the results of a nationally representative survey we conducted with the participation of 1000 people in 2018.

There is considerable variation in the interpretation of the term DS. In the U.S. the regulatory framework for DS is provided by the DSHEA (Dietary Supplement Health and Education Act). As it is defined there, DS products are as those which:

- are supplementary ingredients of the diet;
- are not intended to substitute for a traditional diet;

- cannot be sold as traditional food;
- intended to be taken by mouth in capsule, pill, tablet or liquid form;
- are not classified as homeopathic products and topical applications (BROWN, 2017).

According to the American Food and Drug Administration (FDA), dietary supplements are all products (other than tobacco) that are designed to supplement the diet and contain one or more dietary ingredients from the following list: vitamins, minerals, amino-acids, herbs or other botanicals and their concentrates, constituents and combinations. (AKILEN, et al., 2014, FDA, 2015).

In Hungary the Regulation on DS products - 37/2004 (IV. 26.) ESZCSM (Ministry of Health, Social and Family Affairs) - is in accordance with the European Union directives concerning DS. According to this regulation, DS products are types of food which contain - nutritionally or physiologically important - nutrients, separately or in combination. They are intended to supplement a traditional diet and they differ from traditional food in terms of their appearance. (LUGASI, 2014).

Numerous types of DS are available in the market in various forms and external appearance, but the present study is limited to a discussion of the consumption of vitamins and minerals only. According to a survey conducted by EUROMONITOR in 2017, Hungarians tend to pay more attention to health preservation in order to avoid major health problems. Although fortified / functional food and drinks play a significant role in the market, the majority of Hungarian consumers have more confidence in the efficacy of pills (in particular vitamins and minerals) (EUROMONITOR, 2017). According to a survey by the Nutrition Business Journal, which recorded sales in the DS industry, DS products containing vitamins and minerals accounted for 43% of the total purchases in 2015 (JOHNSON, 2015). Globally, vitamin consumption is typically higher than that of other DS products. Based on a survey carried out by STATISTA (2018), the following products proved the most popular among U.S. adults in 2017. (Table 1)

Table 1. Vitamins and minerals most frequently consumed in the USA

Product	Use (%)
Multivitamin	73
Vitamin D	37
Vitamin C	32
Calcium	32
Vitamin B / complex	24

Source: Authors' own construction, based on Statista (2018)

As has been confirmed by several previous studies DS consumption increases with age, and the level of consumption is much higher among women (BAILEY et al. 2011, 2013; RADIMER et al. 2004; DICKINSON&MACKAY, 2014; ROVIRA et al. 2013). Surveys conducted by NHANES (National Health and Nutrition Examination Surveys) over the past 20 years have proved that DS consumption is more widespread among those with higher qualifications than among people of lower socio-economic status. (DICKINSON & MACKAY, 2014).

By identifying nutritional factors it has also been established that a high percentage of DS consumers do not even need any extra nutrient intake. This primarily applies to women who lead a healthy lifestyle (by consuming a lot of fruit and vegetables, being physically active, being non-smokers and avoiding the consumption of alcohol), and who are also of a higher socio-economic status. (VANTANPARAST et al., 2010). By examining certain factors of health behaviour in their research sample, REEDY and his colleagues (2005) found that those using DS could be characterised by higher fruit and vegetable consumption.

Findings provided by BAILEY et al., (2013) clearly show that adult Americans buy DS to preserve and ensure their health. However, in the vast majority of cases the products are not purchased upon medical advice, consequently consumers use DS voluntarily. This justifies the inverse hypothesis mentioned in numerous previous studies, according to which consumers attribute a special role to DS, with the help of which the development of bad health conditions can be avoided. (BAILEY et al., 2013). WILLIS and STAFFORD (2016) revealed a significant relationship between DS consumption and health awareness. Based on their findings it can be stated that the more health conscious people consider themselves to be, the more likely they are to use one or several types of DS. In their survey DICKINSON and her colleagues (2014) concluded that people consuming DS on a regular basis were more likely to make an effort to follow a balanced diet, to go to health screenings and to do physical exercise, than non-users.

MATERIALS AND METHODS

The consumer behaviour of Hungarian adults concerning DS use has been looked at in a questionnaire-based survey involving 1000 people on a nationally representative sample. The examination of DS consumption constitutes only a part of our questionnaire. The present paper does not cover further elements involved in our complete working material.

A market research consultancy was commissioned to conduct the survey, and data were collected by interviewers who were prepared on the topic in advance, on a nationally representative sample between 1 June 2018 and 30 June 2018. The distribution of major background variables is demonstrated in Table 2.

Table 2: Sample distribution according to major background variables

Types of variables	Sample distribution	
	Number of people	%
Total number of respondents		
Total	1000	100

Gender		
Male	480	48.0
Female	520	52.0
Age		
18-29	230	23.0
30-39	145	14.5
40-49	201	20.1
50-59	183	18.3
above 60	241	24.1
Highest level of education		
Primary, maximum 8 grades	104	10.4
Vocational high school, technical school	339	33.9
High school diploma	396	39.6
College degree	161	16.1
Marital status		
Married	423	42.3
Living with a partner	202	20.2
Widow / widower	75	7.5
Single	185	18.5
Divorced	109	10.9
Separated from spouse	6	0.6
Legal situation, employment, main activity		
Active blue-collar worker	393	39.3
Active white-collar worker	261	26.1
On maternity leave	29	2.9
Retired	225	22.5
Pupil, student	37	3.7
Housewife	8	0.8
Unemployed	27	2.7
Other inactive employed	16	1.6
Other dependant	4	0.4
Monthly household income		
Affluent income with savings	40	4.0
Moderate income with little savings	286	28.6
Low income, with no savings	526	52.6
Hardly sufficient	80	8.0
Regularly facing problems of immediate survival	22	2.2
Does not know / Does not answer	46	4.6
Subjective health awareness		
Not health conscious at all	68	6.8
Mostly not health conscious	170	17.0
Partly health conscious	393	39.3
Mostly health conscious	298	29.8
Highly health conscious	32	3.2
Does not know / Does not answer	39	3.9
Region		
Central Hungary	298	29.8
Central Transdanubia	109	10.9
Western Transdanubia	100	10.0
Southern Transdanubia	94	9.4
Northern Hungary	119	11.9
Northern Great Plain	148	14.8
Southern Great Plain	132	13.2

Source: Authors' own construction, 2020

In order to avoid misinterpretation of questions, the term DS was sufficiently clarified at the beginning of the set of questions relating to the purchase and consumption of DS.

The following aspects were covered:

1. Has the respondent used any kind of DS over the past 6 months? If the answer was negative, the second question was to be ignored.
2. What are the three most important reasons for purchasing DS? In our analysis the first of these three answers are examined in relation to the background variables.
3. The respondents were asked to indicate their level of agreement with statements concerning DS and food consumed, on a five-point scale (1=strongly disagree, 5=strongly agree).
4. Has the respondent been advised by a physician to use specific vitamins, minerals or other DS products over the past year?
5. Questions concerning the awareness and consumption of vitamins, minerals and DS from other sources. (33 items in total). In our analysis the five most frequently mentioned items have been examined.
6. Are there DS products the respondent consumes on a regular basis, at least 3-4 times a week? In the case of a positive answer, the respondent was asked to specify the products.
7. The place of purchase.
8. How and from where do consumers get their information when deciding to buy DSs?
9. Background variables.

During data assessment, besides using descriptive statistical methods, significance tests were also performed, relying on

cross tabulation analysis to characterise the differences between segments. Data analysis was performed using SPSS 20.

RESULTS AND DISCUSSION

37.4% of all respondents (N=1000) reported consumption of some kind of DS during the 6 months prior to the survey. Consumption was found to be more frequent among women (59.7%) than men (40.3%) ($p<0.01$). No significant correlation can be shown among different age groups; however, the highest consumption rate (42.3%) can be observed in the 40-49 age group. Consumption increases proportionally with higher qualifications ($p<0.01$). More than half of those with a college degree (52.2%) of all respondents reported consumption of some kind of DS over the previous 6 months. Nevertheless, it is interesting to note that if we focus on only these 374 respondents who admit to using DS, those with a high school diploma (44.6%) appear to be overrepresented. No significant correlation with DS consumption can be detected according to marital status and the number of children under 18 years of age in the household. On examining employment and main activities ($p<0.01$), nearly half (49.0%) of active white-collar workers have been found to have used such products during the 6 months before the survey. Considering income, there is no significant correlation; however, it is obvious that with higher income levels consumption tends to become more frequent. Subjective health awareness has proved to be a strong factor when examining these issues. ($p<0.01$).

In the samples DS consumption increases proportionally and dynamically with the degree of health awareness. In the 6 months period before the survey 65.6% of respondents who considered themselves very health conscious reported consumption of some kind of DS. In terms of consumption, regional differences can also be observed ($p<0.01$). The differences between regions are demonstrated in Table 3.

Table 3: Regional differences in DS consumption (N=1000)

Region	Rate of consumption (%)
Central Hungary	52.7
Southern Transdanubia	43.6
Western Transdanubia	41.0
Northern Great Plain	31.8
Northern Hungary	25.2
Central Transdanubia	24.8
Southern Great Plain	23.5

Source: Authors' own construction, 2020

DS consumption is the highest in the Central Hungarian region, while it is the least typical in the Southern Great Plain.

We were also interested to know what might prompt people to people buy DS products. The motivating factors mentioned first by respondents are shown in Table 4.

Table 4: Factors motivating people to buy DS (N=374)

Statement	Number	%
Food products do not contain adequate amounts of nutrients, so it is necessary to supplement them.	167	44.7
I consider my health important, and DS products provide an obvious solution for maintaining it.	153	40.9
It helps recover health after illnesses.	106	28.3
We are surrounded by several harmful environmental factors, so there is a need to compensate for the impacts associated with them, and DS products play a significant role in this process.	97	25.9
I use them to prevent joint and cartilage disorders.	62	16.6
It helps overcome stress and reduce its consequences.	60	16.0
I do sport regularly and it helps improve my performance	53	14.2
Almost everybody uses some kind of DS nowadays, that is why I do, too.	40	10.7-
It helps prevent cardiovascular disorders.	38	10.2
Other	21	5.6
Does not know / does not answer	2	0.5

Source: Authors' own construction, 2020

44.7% of respondents are of the opinion that food products do not contain nutrients in sufficient quantities, therefore supplementation is necessary. It is a widely held belief (40.9%) that consumption of DS may help maintain overall health. The third most frequent response among the above factors suggests that consumers deem that the use of DS may speed up recovery after illness. Other responses include strengthening of the immune system and the importance of DS consumption during pregnancy and lactation. On closer examination, significant correlations has been found in terms of gender ($p<0.01$), education ($p<0.01$) and subjective health awareness ($p<0.01$).

Men tend to use DS mostly in order to improve their sports performance (22.5%) and reduce stress (17.2%). Women, on the other hand, buy DS products because they believe these help maintain overall health and wellness (37.2%) and restore health after illnesses (9.9%). Women also typically hold the view that such products can help them fill nutrient gaps in the diet (17.5%) and that DS can counteract the harmful effects of negative environmental factors (6.7%).

Purchasing DS to improve their sports performance was found to be the most typical among respondents with a college degree (19.0%). The main reasons given by those with vocational or technical schooling for using DS were stress reduction (17.0%), regaining health after illnesses (14%), and a peer effect – "I use DS because almost everybody does"- (7%).

Respondents with a high school diploma were found to use DS products for maintaining good health (34.9%), for filling nutrient gaps in the diet (16.3%), and for compensating for the impacts of negative environmental factors (6.6%).

Respondents considering themselves mostly health conscious use DS for maintaining good health (43.4%) and for filling nutrient gaps in the diet (17.2%). Those who claim to be partly health conscious are more likely to use DS for the improvement of their sports performance (20.0%) and for reducing stress (17.0%).

Respondents were then asked to rate different statements by indicating their level of agreement or disagreement with them on a scale from 1 to 5, where 1 stood for strong disagreement, while 5 meant strong agreement. The findings are illustrated in Table 5.

Table 5: Statements relating to DS products and traditional food (N=1000)

Statement	Mean	Standard deviation	Relative deviation, %
DS consumption is indispensable for maintaining adequate overall health.	2.46	1.501	61.016
The amount of vitamins, minerals and other nutrients in my diet is sufficient for the preservation of my health.	3.09	1.456	47.119
I am fully aware of what kind of vitamin-, mineral-, plant-based and other DS products are necessary for me.	2.99	1.366	45.685

Source: Authors' own construction, 2018

Relative deviation appears to be particularly high for all the statements, consequently mean values do not provide exact results, and responses seem heterogeneous. Based on correlation analysis with background variables, several conclusions can be drawn. In terms of gender, women ($p<0.01$) are typically are more likely to feel that DS consumption is indispensable for maintaining adequate overall health. Female respondents ($p\leq0.05$) are also more likely to consider themselves aware of what kind of vitamins, minerals and other DS products are necessary for them. Regarding education, those with a college degree ($p<0.01$) rank first in stating that DS consumption is important in maintaining good health. Graduate respondents ($p<0.01$) claim to know what DS products are necessary for them, therefore they can be considered to be the most conscious group in this respect. Respondents with secondary vocational or technical education ($p\leq0.05$) state that the food they consume contains nutrients in sufficient amounts to preserve their health. In terms of employment and main activities it can be concluded that the awareness in the fields above among graduates is most obvious among white-collar workers. Awareness likewise tends to increase with income. The higher income the respondents have, the more they claim to know what kind of vitamins and minerals they need ($p<0.01$). The same tendency can be observed in connection with health-consciousness ($p<0.01$). It has also been proved that the higher the respondents' subjective health-consciousness, the more consumers tend to believe DS consumption to be indispensable for maintaining adequate overall health ($p<0.01$).

Respondents were also asked whether their physicians had recommended that they take particular vitamins, minerals or other DS products during the previous year. 16.8% of the whole sample gave a positive answer to this question. One third of the respondents (32.9%) reporting the use of certain types of DS six months prior to the survey did so on medical advice. Consequently, the majority of consumers purchase and use these kinds of products because they themselves choose to.

Following this, different DS products were listed to the participants in the survey. First, they were asked to mark the products they knew and then the ones they had already used. The list contained 33 items including vitamin and mineral products and products of plant or animal origin. The 5 best-known products and their consumption rates are shown in Table 6.

Table 6: The 5 best-known DS products and their consumption rate (N=1000)

Product	Is known by (%)	Has been used by (%)
Vitamin C	96.5	67.6
Multivitamin	92.7	47.8
Vitamin D	88.1	16.6
Magnesium	85.8	40.4
Calcium	83.6	39.8

Source: Authors' own construction, 2020

Vitamin C has been found to be the best-known and most frequently used product, followed by multivitamin products. Despite the fact that the majority of consumers know about Vitamin D products, only 16.6% of respondents reported use. This confirms the findings published by the National Institute of Pharmacy and Nutrition, according to which Vitamin D consumption is critically low in our country.

We have also assessed whether there is a DS product (or products) which respondents use on a regular basis, at least 3-4 times weekly. 32.9% of the whole sample responded positively to this question. 77.3% of those who admitted consumption of some kind of DS during the previous six months were found to be using them at the time of the survey, as well.

We also examined what kind of products were being used by respondents in the survey period in the whole sample and then we narrowed the scope down only to those reporting use during the six months prior to the survey. The products in question appeared with the same frequency in both cases. Based on this it can be concluded that the products consumed most in the survey period were Vitamin C, Multivitamin and Magnesium.

It was also our objective to examine where Hungarian consumers typically buy DS products from. The results can be seen in Table 7.

Table 7: Place of purchase of DS products (N=1000)

Place of purchase	Number	%
Nowhere (does not buy)	459	45.9
Pharmacy	296	29.6
Organic shop	70	7.0
Drugstore	58	5.8
Other	33	3.3
Hypermarket–supermarket	56	5.6
Webshop	28	2.8

Source: Authors' own construction, 2020

Those who purchase DS products primarily buy them in pharmacies. Organic shops and drugstores come second and third, respectively. In the category 'Other', MLM businesses were predominantly mentioned.

Finally we surveyed where consumers get information from before buying DS products. The results are shown in Table 8.

Table 8: Sources of information used before purchasing DS products (N=1000)

Source	Number	%
Nowhere	513	51.3
Friends, family members	220	22.0
Pharmacist	152	15.2
GP	125	12.5
Internet lifestyle portals	45	4.5
Other	38	3.8
Coach/personal trainer	32	3.2
Lifestyle magazine	23	2.3
Dietitian	12	1.2
Workout partner	7	0.7

Source: Authors' own construction, 2020

Evidence suggests that consumers are typically unlikely to collect information from any source about DS products before purchasing them. However, if they do so, they mostly consult friends and family members. The first professionally reliable source, the pharmacist, only comes second in their ranking. It can therefore be concluded that credibility is primarily based on trust, and less importance is attached to the recommendations of professional organizations and experts.

CONCLUSIONS

In the present survey the DS consumption habits of Hungarians were examined on a nationally representative sample. The results have been found to be in line with those of numerous previous international studies on DS consumption in terms of demographic segmentation and lifestyle factors. Based on the information collected, it can be concluded that the prevalence of use increases with a higher educational level and higher income. DS use tends to be more frequent in women. A connection has been documented between subjective health- consciousness and DS consumption. The examination of lifestyle factors, such as obesity, overall health or physical activity is beyond the scope of the present study. However, by conducting further investigations we can gain a better insight into this area, something which would be highly desirable in the near future. Consumers claim that food products are short of nutrients, and consequently they need to be supplemented, and this has proved to be the major factor stimulating purchases. It needs to be stressed that consumers tend not to collect information before purchasing these products and that the products are not used on medical advice in most cases. The phenomenon of 'self-medication', often also cited by producers, can be observed in the consumer market. Even when consumers rely on certain sources for orientation, information is primarily gained from sources other than professionally reliable organizations or experts.

These anomalies may result in a predisposition towards different misconceptions, for example that DS products can be applied for the treatment of certain diseases. This issue would have to be addressed both by producers and professional organisations and experts in the field.

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