

# Preferences and attitudes of older adults of Bialystok, Poland toward the use of over-the-counter drugs

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**Purpose:** The aim of the study was to assess preferences and attitudes toward the use of over-the-counter (OTC) drugs among residents of Bialystok aged 60 or older.

**Patients and methods:** The study included 170 people, inhabitants of Bialystok aged over 60: 85 students of the University of a Healthy Senior and the University of Psychogeriatric Prophylaxis, and 85 students of the University of the Third Age in Bialystok. The study made use of a diagnostic survey conducted via a questionnaire prepared by the authors.

**Results:** The vast majority of respondents bought OTC drugs for own use. About one-third of the respondents from each analyzed group bought OTC drugs less often than once every 3 months. Over half of the respondents bought OTC drugs due to a cold. A majority of the respondents were of the opinion that OTC drugs should be sold only in pharmacies. Over 40% of seniors took 1 OTC drug regularly. Most respondents also took vitamins and supplements. The main sources of information on OTC drugs for the studied seniors were their doctor and pharmacist. Respondents did not always consult the treatment method with a doctor or pharmacist. Over half of the respondents familiarized themselves with the contents of the OTC drug package leaflet. Over three-quarters of the respondents were familiar with drug disposal methods; however, despite declarations of being familiar with these principles, a significant percentage did not bring back medication to a pharmacy or clinic, or threw the drugs into the trash.

**Conclusion:** Our study found that in our sample there were many OTC drug consumers who did not always demonstrate responsible attitudes toward using this group of drugs. Thus, older people should be educated on the possible adverse effects of taking OTC drugs without consulting a doctor or pharmacist as well as basic drug disposal principles. Furthermore, legislation should be introduced that will limit the wide availability of OTC drugs, particularly to the elderly; and thus, lower the costs of hospitalization and outpatient treatment of this age group. Also, a wider-reaching study should be conducted. It should include a larger group of elderly people as well as information on intake of prescribed medications in order to be able to determine the frequency of drug consumption in this population, as well as seniors' preferences and attitudes in this regard.

**Keywords:** elderly, geriatric pharmacology, nutritional supplements, polypharmacy, self-medication, vitamins

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## Introduction

An aging population is a major social and health problem to public health. It is estimated that by 2050, 80% of the population of middle-developed and low-developed countries will be more than 60 years old;<sup>1</sup> while people aged 65 and over will account for more than 25% of Europe's population.<sup>2</sup> It is estimated that by 2035 more than one-quarter

of Poland's citizens will be over 65, and in 2060 Poland's population will be one of the oldest societies in Europe.<sup>3</sup>

The high demand for drugs is closely linked to the aging population.<sup>4</sup> A specific feature of older adults is an increasing trend in multimorbidity, which involves the presence of two or more chronic diseases.<sup>5</sup> It is estimated that multimorbidity is present in 62% of people aged 65–74, and up to 81.5% of people over 85 years.<sup>6</sup>

Self-medication with over-the-counter (OTC) drugs is defined as the consumption by patients of drugs not prescribed by a doctor for the treatment of untreated or unrecognized conditions.<sup>7</sup> In recent years, a high intake of OTC drugs among older adults has been observed.<sup>8–12</sup> Previous literature has shown that certain factors, such as female sex and higher education, are responsible for increased OTC drugs consumption.<sup>13</sup> In addition, in the elderly, many diseases and chronic conditions are associated with the phenomenon of polypharmacy,<sup>14</sup> which involves the consumption of more than five prescribed drugs. Consequently, polypharmacy is associated with OTC drugs use.<sup>15</sup>

On the pharmaceutical market there are nearly 100,000 OTC drugs. Their safe use depends largely on the ability of the consumers to properly understand and use OTC drugs, as well as prescription drugs.<sup>9</sup> However, OTC drugs are a bit different because they do not require the doctor's permission to use them and thus impose more decision-making on them.<sup>16</sup> Many hospitalizations and deaths among the elderly occur every year due to adverse drug events (ADEs) caused by drugs.<sup>16–19</sup> Nonetheless, drug consumers often view OTC drugs as less risky and safer than prescription drugs.<sup>18</sup> In particular, this applies to older adults. When reading informational leaflets on OTC drugs, consumers may often misunderstand the information that may contribute to the high number of adverse drug events occurring each year.<sup>16,18,19</sup> Therefore, consumers of OTC drugs need sufficient health knowledge to reduce the risk of hazardous events due to the use of drugs that may result in death. Older people are particularly vulnerable to ADE risk due to aging factors.<sup>16</sup> Currently, there is a risk of overuse of OTC drugs, especially analgesics, in the whole population, and especially among the elderly.<sup>20,21</sup> These concerns lead to an assessment of the needs and outcomes of OTC drugs in different age groups, especially among older adults.

Patients' ability to "self-report" OTC drug use varies in the literature. Some studies have demonstrated a high level of understanding between self-reporting and other methods.<sup>22–24</sup> Other studies have found less support for this practice.<sup>25</sup> Pit et al<sup>26</sup> showed that the accuracy and withdrawal

of self-medication depend on a multitude of factors, such as the length of the withdrawal period and the drug class. The benefits of self-reporting may include the use of OTC drugs and asking patients for information about the use of these drugs, which is often not possible with other methods such as databases for pharmaceutical claims or biochemical measures.<sup>27</sup>

The aim of the study was to assess preferences and attitudes toward the use of OTC drugs among residents of Białystok aged 60 or older. Furthermore, we decided to evaluate correlations between preferences and attitudes of older people toward the use of OTC drugs and the respondents' socio-demographic data (age, sex, group of origin).

## Patients and methods

### Participants

The study was conducted in 2 groups:

- Group I – students of the University of a Healthy Senior (UHS) and the University of Psychogeriatric Prophylaxis (UPP) (85 people, including 67 women (78.82%) and 18 men (21.18%)), carried out at the Faculty of Health Sciences of the Medical University of Białystok. The UHS was established in October 2013. Its main objectives include: promoting healthy lifestyle and healthy attitudes, expanding knowledge in the field of medical care improving the quality of life of older people, the use of modern methods of diagnostics and treatment, as well as the use of medications and dietary supplements, and pharmacoeconomics in diseases of older people; prevention of loneliness and social activation of older people. The curriculum of UHS is based on three main pillars: lectures, practical classes (exercises), and optional activities. Due to the large interest in the continuation of education and further broadening of knowledge of health of seniors, and in response to the needs of older inhabitants of Białystok, the second stage of health education, the UPP, was inaugurated in the academic year 2015/2016. The key objectives of the project include promotion of a healthy lifestyle and healthy attitudes from the mental aspect, extending knowledge in the field of medical care to improve the quality of life of older people with mental disorders, the use of modern methods of diagnosis and treatment, the use of drugs in mental diseases of older people, prevention of loneliness and social exclusion, and social activation of older people. The classes are carried out in the form of lectures, where the main groups of mental diseases of older people are discussed.

- Group II – students of the University of the Third Age in Bialystok (UTA) (85 persons, including 63 women (74.12%) and 22 men (25.88%)), which aims at stimulating personal development, intellectual agility and physical fitness, social activation of older people, promotion of gerontological prophylaxis, and actions for the benefit of older people and the disabled. Classes at UTA are carried out in the form of: lectures, optional classes, and classes in sections and teams of interest. Currently UTA has the following sections: painting, embroidery, ballroom dancing, gymnastics, swimming, chess and bridge, peer assistance, table tennis, editorship, but also a choir and theatre, as well as foreign languages courses – English, German, French, and Esperanto.

The study included 170 people in total, residents of Bialystok, aged 60 and over: 130 women (76.47%) and 40 men (23.53%). In the group from UHS and UPP, the youngest respondent was 60 years old, while the oldest was 78. The median age was 67.22 years. Among the students of UTA, the median age was 65.72 years; the youngest respondent was 60, and the oldest 85. The median age of the whole study group was 66.47. In the study group, 80 people (47.05%) probably lived alone (UHS/UPP –  $n=43$ , 50.58%; UTA –  $n=37$ , 43.53%). The respondents' socio-demographic characteristics are shown in Table 1.

Another criterion for inclusion in the study, besides age and place of residence, were the absence of cognitive impairments in the respondents and written consent for participation in the study. Each respondent could withdraw at any time.

Selection of the respondents was intentional. The authors assumed that at least 150 fully completed questionnaires would be collected, 75 from each study group. Finally, 170 full surveys were collected. A greater number of research tool copies were distributed, but not all of the questionnaires were returned to the authors. Eventually, the group of UHS and UPP students included 150 seniors (response rate – 56.67%), while the group of UTA students included 350 seniors (24.29%).

## Measurements and procedure

The study was performed from April to July 2017. The study design was cross-sectional. We used the diagnostic survey method with a proprietary questionnaire consisting of 23 single-answer and multiple-choice closed questions. The questions pertained to socio-demographic characteristics (sex, age, marital status, place of residence, education, financial status), the method and frequency of OTC drug purchase, the amount of OTC drugs consumed, reasons

**Table 1** Respondents' socio-demographic characteristics

Feature	UHS/UPP		UTA		Total	
	n	%	n	%	n	%
Gender						
Women	70	82.35	64	75.29	134	78.82
Men	15	17.65	21	24.71	36	21.18
Age						
≤70 years	70	82.35	76	89.41	146	85.88
≥71 years	15	17.65	9	10.59	24	14.12
Marital status						
Married	39	45.88	46	54.12	85	50.00
Widowed	27	31.76	23	27.06	50	29.41
Single	2	2.35	1	1.18	3	1.76
Divorced	14	16.47	13	15.29	27	15.88
Separated	3	3.53	2	2.35	5	2.94
Financial situation						
Very good	5	5.88	5	5.88	10	5.88
Good	33	38.82	34	40.00	67	39.41
Rather good	17	20.00	20	23.53	37	21.76
Average	30	35.29	24	28.24	54	31.76
Rather bad	0	0.00	1	1.18	1	0.59
Bad	0	0.00	1	1.18	1	0.59
Education						
Higher education	37	43.53	40	47.06	77	45.29
Secondary	40	47.06	36	42.35	76	44.71
Technical	6	7.06	2	2.35	8	4.71
Vocational	2	2.35	3	3.53	5	2.94
Primary	0	0.00	4	4.71	4	2.35
Total	85	100.00	85	100.00	170	100.00

**Abbreviations:** UHS, University of a Healthy Senior; UPP, University of Psychogeriatric Prophylaxis; UTA, University of the Third Age.

for taking OTC drugs, intake of nutritional supplements by respondents, factors affecting their decision to buy OTC drugs, sources of obtaining information on OTC drugs, as well as seniors' opinions and attitudes toward basic safety principles on proceeding with OTC drugs (reading drug information leaflets found in the package, taking the suggested drug dosage, familiarity with drug disposal methods, how to proceed with expired or unnecessary drugs, OTC drug points of sale). The purpose of the study was not analysis or history of adverse events, management of drug-related injuries or parameters of awareness of self-medication or OTC medication. The questionnaire content for all sections was guided by the literature, but where none existed, items were created by drawing on researcher experience.

Respondents received paper copies of the questionnaire, which they filled out at home after receiving detailed information from members of the study team.

## Ethics

The Bioethics Committee of the Medical University of Bialystok approved this study (statute no R-I-002/35/2017); participants provided written informed consent.

## Statistical analysis

Comparisons of two groups in terms of quantitative characteristics were done using Pearson's chi-square test and chi-square test with Yates correction. In the case of ordinal features, the U Mann–Whitney test was used. Statistical analysis was done with STATISTICA 12 software. Statistical significance was set at  $p < 0.05$ .

## Results

### Method of making decisions on purchasing OTC drugs

UHS/UPP students as well as people aged 71 and older most often bought OTC drugs for own use, without consulting a doctor. UTA students, both women and men, as well as people aged up to 70 most frequently made a decision to buy OTC drugs in connection with a doctor's recommendation. Detailed numerical data are presented in Table 2.

### Characteristics of buying OTC drugs

Results pertaining to older people's preferences and attitudes toward buying OTC drugs are detailed in Table 3. The vast majority of respondents bought OTC drugs for own use. Almost all seniors bought OTC drugs in pharmacies. Statistical analysis indicated statistically significant differences between the UHS/UPP group and the UTA group and purchasing OTC drugs at grocery stores. About one-third of the elderly respondents from each analyzed group bought OTC drugs less frequently than once every 3 months. Over half of the respondents bought OTC drugs due to a cold. Subsequent reasons for buying OTC drugs by the elderly included muscle and joint pain as well as headaches. There was a statistically significant difference between those aged under 71 and those 71 years and older and purchase of OTC drugs due to cystitis. The most frequently indicated factors determining OTC drug purchase by the respondents included: the possibility to purchase right away, OTC drug effectiveness, and a pharmacist's

professional advice. Statistical analysis revealed statistically significant differences between the group of people under 71 and those over 71 years old and drug effectiveness as a factor determining OTC drug purchase. A majority of the respondents were of the opinion that OTC drugs should be sold only in pharmacies. We found statistically significant differences between UHS/UPP students and the UTA group, and the opinion that OTC drugs should be available only in pharmacies. Detailed results are presented in Table 3.

### Number of OTC drugs taken as well as use of vitamins and supplements

The study results show that over 40% of the studied seniors, including over half of men, took 1 OTC drug regularly. In the studied group of 170 older people, 2 women under 71, who were UHS/UPP students, regularly took 10 or more OTC drugs. Most respondents also took vitamins and nutritional supplements (Table 4).

### Sources of information on OTC drugs

The main sources of information on OTC drugs for the studied seniors were their doctor and pharmacist. UTA students, women, and those 71 or older preferred a doctor; while UHS/UPP students, men, and those under 71 preferred a pharmacist. Detailed information is presented in Table 5.

### Respondents' preferences and attitudes on the safety of OTC drug use

The studied older people did not always consult the treatment method with a doctor or pharmacist. Their decision was dependent on the symptoms. Depending on symptom intensity, they either consulted the treatment method with a doctor or pharmacist, or made a decision on their own. It is worth emphasizing that half of the respondents aged 71 and over always consulted the treatment method with a doctor or pharmacist. Statistical analysis indicated a statistically

**Table 2** Respondents' methods of making decisions on purchasing OTC drugs

Method of making decisions on purchasing OTC drugs	UHS/UPP		UTA		p-value	Females		Males		p-value	≤70 years		≥71 years		p-value
	n	%	n	%		n	%	n	%		n	%	n	%	
Always or almost always it is my decision	19	22.35	25	29.41	0.100	34	25.37	10	27.78	0.825	40	27.40	4	16.67	0.269
More often out of my own need, without consulting a doctor	32	37.65	18	21.18		40	29.85	10	27.78		39	26.71	11	45.83	
Usually in connection with a doctor's recommendations	23	27.06	32	37.65		42	31.34	13	36.11		48	32.88	7	29.17	
Always or almost always in connection with a doctor's recommendations	11	12.94	10	11.76		18	13.43	3	8.33		19	13.01	2	8.33	
Total	85	100.00	85	100.00		134	100.00	36	100.00		146	100.00	24	100.00	

**Abbreviations:** OTC, over-the-counter; UHS, University of a Healthy Senior; UPP, University of Psychogeriatric Prophylaxis; UTA, University of the Third Age.

**Table 3** Characteristics of buying OTC drugs by respondents

Feature	UHS/UPP		UTA		p-value	Females		Males		p-value	≤70 years		≥71 years		p-value
	n	%	n	%		n	%	n	%		n	%	n	%	
OTC drug recipients	65	76.47	60	70.59	0.651	102	76.12	23	63.89	0.248	106	72.60	19	79.17	0.524
I buy them for myself	4	4.71	6	7.06		8	5.97	2	5.56		8	5.48	2	8.33	
I buy them for relatives (family)	16	18.82	19	22.35		24	17.91	11	30.56		32	21.92	3	12.50	
I buy them for myself and for my family	85	100.00	85	100.00		134	100.00	36	100.00		146	100.00	24	100.00	
Total															
Place to buy OTC drugs**	83	97.65	81	95.29	0.678	128	95.52	36	100.00	0.433	142	97.26	22	91.67	0.169
Pharmacy	3	3.53	14	16.47	0.005*	11	8.21	6	16.67	0.133	15	10.27	2	8.33	0.941
Small grocery store	2	2.35	6	7.06	0.277	6	4.48	2	5.56	0.863	8	5.48	0	0.00	0.513
Supermarket															
Frequency of buying OTC drugs	2	2.35	0	0.00	0.964	2	1.49	0	0.00	0.654	2	1.37	0	0.00	0.231
Once a week or more often	6	7.06	9	10.59		11	8.21	4	11.11		13	8.90	2	8.33	
Once every 2 weeks	26	30.59	23	27.06		38	28.36	11	30.56		43	29.45	6	25.00	
Once a month	38	45.29	24	28.24		33	24.63	9	25.00		37	25.34	5	20.83	
Once every 3 months	12	14.12	24	28.24		46	34.33	11	30.56		49	33.56	8	33.33	
Less frequently than once every 3 months	32	37.65	25	29.41		46	34.33	11	30.56		49	33.56	8	33.33	
I don't buy OTC drugs	1	1.18	4	4.71		4	2.99	1	2.78		2	1.37	3	12.50	
Total	85	100.00	85	100.00		134	100.00	36	100.00		146	100.00	24	100.00	
Reasons for buying OTC drugs	29	34.12	33	38.82	0.524	51	38.06	11	30.56	0.406	56	38.36	6	25.00	0.208
Headache	11	12.94	8	9.41	0.465	14	10.45	5	13.89	0.561	17	11.64	2	8.33	0.633
Fever	47	55.29	45	52.94	0.758	72	53.73	20	55.56	0.845	80	54.79	12	50.00	0.662
Cold	24	28.24	22	25.88	0.730	33	24.63	13	36.11	0.169	40	27.40	6	25.00	0.806
Pain and sore throat	28	32.94	30	35.29	0.746	41	30.60	17	47.22	0.062	51	34.93	7	29.17	0.581
Muscle and joint pain	13	15.29	21	24.71	0.125	30	22.39	4	11.11	0.133	32	21.92	2	8.33	0.123
Cough	18	21.18	20	23.53	0.713	31	23.13	7	19.44	0.637	31	21.23	7	29.17	0.387
Gastrointestinal disorders	8	9.41	3	3.53	0.119	9	6.72	2	5.56	0.896	10	6.85	1	4.17	0.621
Migraine	8	9.41	9	10.59	0.798	12	8.96	5	13.89	0.381	14	9.59	3	12.50	0.660
Allergy	8	9.41	7	8.24	0.787	13	9.70	2	5.56	0.436	9	6.16	6	25.00	0.003*
Cystitis															
Factors determining the decision to buy OTC drugs**	40	47.06	38	44.71	0.758	61	45.52	17	47.22	0.856	65	44.52	13	54.17	0.379
Possibility to buy right away (immediately)	22	25.88	28	32.94	0.313	38	28.36	12	33.33	0.561	47	32.19	3	12.50	0.050*
Efficacy of drugs	30	35.29	21	24.71	0.132	41	30.60	10	27.78	0.743	44	30.14	7	29.17	0.923
A pharmacist's professional advice	8	9.41	10	11.76	0.618	15	11.19	3	8.33	0.620	17	11.64	1	4.17	0.270
Price	5	5.88	10	11.76	0.176	9	6.72	6	16.67	0.062	12	8.22	3	12.50	0.493
Point of purchase, proximity to the place of residence	6	7.06	9	10.59	0.417	10	7.46	5	13.89	0.227	14	9.59	1	4.17	0.385
A friend's recommendation	6	7.06	9	10.59	0.417	10	7.46	5	13.89	0.227	14	9.59	1	4.17	0.385
Lack of need for consulting the purchased product with a pharmacist	6	7.06	9	10.59	0.417	61	45.52	17	47.22	0.856	65	44.52	13	54.17	0.379
Access to OTC drugs															
Only in pharmacies	67	78.82	52	61.18	0.012*	95	70.90	24	66.67	0.623	100	68.49	19	100	0.290
Should be available at other points of sale	18	21.18	33	38.82		39	29.10	12	33.33		46	31.51	5	46	
Total	85	100.00	85	100.00		134	100.00	36	100.00		146	100.00	24	100.00	

**Notes:** \*Statistically significant value; \*\*multiple choice question.

**Abbreviations:** OTC, over-the-counter; UHS, University of a Healthy Senior; UPP, University of Psychogeriatric Prophylaxis; UTA, University of the Third Age.



**Table 4** Number of OTC drugs taken regularly as well as intake of vitamins and nutritional supplements by the respondents

Feature	UHS/UPP		UTA		p-value	Females		Males		p-value	≤70 years		≥71 years		p-value
	n	%	n	%		n	%	n	%		n	%	n	%	
Number of drugs					0.442					0.129					0.891
0	6	7.06	7	8.24		10	7.46	3	8.33		10	6.85	3	12.50	
1	36	42.35	37	43.53		54	40.30	19	52.78		64	43.84	9	37.50	
2	23	27.06	27	31.76		40	29.85	10	27.78		43	29.45	7	29.17	
3	8	9.41	8	9.41		14	10.45	2	5.56		14	9.59	2	8.33	
4	5	5.88	2	2.35		7	5.22	0	0.00		6	4.11	1	4.17	
5	4	4.71	3	3.53		5	3.73	2	5.56		5	3.42	2	8.33	
6	0	0.00	1	1.18		1	0.75	0	0.00		1	0.68	0	0.00	
7	1	1.18	0	0.00		1	0.75	0	0.00		1	0.68	0	0.00	
10 and more	2	2.35	0	0.00		2	1.49	0	0.00		2	1.37	0	0.00	
Intake of vitamins and supplements					0.616					0.935					0.068
Yes	61	71.76	58	68.24		94	70.15	25	69.44		106	72.60	13	54.17	
No	24	28.24	27	31.76		40	29.85	11	30.56		40	27.40	11	45.83	
Total	85	100.00	85	100.00		134	100.00	36	100.00		146	100.00	24	100.00	

**Abbreviations:** OTC, over-the-counter; UHS, University of a Healthy Senior; UPP, University of Psychogeriatric Prophylaxis; UTA, University of the Third Age.

significant difference between people under 71 and those aged 71 and over, and consulting treatment method with a doctor or pharmacist. Over half of the respondents familiarized themselves with the contents of the OTC drug package leaflet every time. The vast majority of respondents agreed with the statement that using active substances in higher doses than recommended can pose an immediate threat to human life or health. Over three-quarters of respondents were familiar with drug disposal methods. UHS/UPP students, women, and those aged 71 and older had more knowledge on this topic.

We found a statistically significant difference between UHS/UPP and UTA students and familiarity with drug disposal methods, as well as between the studied women and men and familiarity with drug disposal methods. Similar differences between the aforementioned groups were demonstrated in the case of proceeding with expired or unnecessary drugs. UHS/UPP students, women, and those aged 71 and

older had more positive attitudes in this matter. Men and those under 71 years old sometimes returned drugs to a pharmacy or clinic. It is worth noting that despite declarations of being familiar with drug disposal principles, a significant percentage of respondents did not bring back medication to a pharmacy or clinic, or threw the drugs into the trash. Detailed results pertaining to the attitudes and preferences of older people in terms of drug use safety are presented in Table 6.

## Discussion

### Average OTC drug intake, including vitamins and supplements

Despite widespread availability, OTC drugs can be both safe and effective if they are used correctly, that is according to a doctor's recommendations or as described in the package leaflet.<sup>28</sup> According to Gallagher et al,<sup>29</sup> elderly people consume on average 40% of the OTC drugs available on

**Table 5** Sources of information on OTC drugs

Sources of information on OTC drugs**	UHS/UPP		UTA		p-value	Females		Males		p-value	≤70 years		≥71 years		p-value
	n	%	n	%		n	%	n	%		n	%	n	%	
Doctor	39	45.88	42	49.41	0.645	63	47.01	18	50.00	0.750	71	48.63	10	41.67	0.527
Pharmacist	41	48.24	40	47.06	0.878	60	44.78	21	58.33	0.148	72	49.32	9	37.50	0.283
Friends	21	24.71	18	21.18	0.584	29	21.64	10	27.78	0.437	34	23.29	5	20.83	0.791
Family	13	15.29	20	23.53	0.175	27	20.15	6	16.67	0.639	31	21.23	2	8.33	0.139
Internet	21	24.71	25	29.41	0.490	34	25.37	12	33.33	0.340	41	28.08	5	20.83	0.459
Television	9	10.59	14	16.47	0.262	15	11.19	8	22.22	0.086	19	13.01	4	16.67	0.628
I don't look for information – I know what ails me	16	18.82	11	12.94	0.294	22	16.42	5	13.89	0.712	21	14.38	6	25.00	0.187
Total	85	100.00	85	100.00		134	100.00	36	100.00		146	100.00	24	100.00	

**Note:** \*\*Multiple choice question.

**Abbreviations:** OTC, over-the-counter; UHS, University of a Healthy Senior; UPP, University of Psychogeriatric Prophylaxis; UTA, University of the Third Age.

**Table 6** Respondents' preferences and attitudes on the safety of OTC drug use

Feature	UHS/UPP		UTA		p-value	Females		Males		p-value	≤70 years		≥71 years		p-value
	n	%	n	%		n	%	n	%		n	%	n	%	
Consulting treatment method with a doctor or pharmacist					0.373					0.452					0.006*
Always or almost always	21	24.71	19	22.35		28	20.90	12	33.33		28	19.18	12	50.00	
Often	15	17.65	24	28.24		31	23.13	8	22.22		37	25.34	2	8.33	
Depending on the symptoms – sometimes I ask for advice, sometimes I don't	37	43.53	29	34.12		53	39.55	13	36.11		60	41.10	6	25.00	
Rarely	4	4.71	7	8.24		9	6.72	2	5.56		8	5.48	3	12.50	
Never or rarely	8	9.41	6	7.06		13	9.70	1	2.78		13	8.90	1	4.17	
Familiarizing oneself with the drug information leaflet					0.822					0.179					0.633
Yes, every time	47	55.29	49	57.65		78	58.21	18	50.00		80	54.79	16	66.67	
Sometimes or only the leaflets for drugs I do not know	26	30.59	28	32.94		42	31.34	12	33.33		49	33.56	5	20.83	
Rarely	9	10.59	6	7.06		12	8.96	3	8.33		13	8.90	2	8.33	
I never read the leaflet	3	3.53	2	2.35		2	1.49	3	8.33		4	2.74	1	4.17	
Statement assessment: "Intake of active substances in higher doses than recommended can pose an immediate threat to human life or health"					0.963					0.403					0.624
Definitely yes	43	50.59	43	50.59		70	52.24	16	44.44		71	48.63	15	62.50	
Rather yes	31	36.47	33	38.82		51	38.06	13	36.11		57	39.04	7	29.17	
Yes and no – depends on the person	7	8.24	6	7.06		8	5.97	5	13.89		12	8.22	1	4.17	
I have no opinion	4	4.71	3	3.53		5	3.73	2	5.56		6	4.11	1	4.17	
Familiarity with drug disposal methods					0.011*					0.014*					0.392
Yes	72	84.71	58	68.24		108	80.60	22	61.11		110	75.34	20	83.33	
No	13	15.29	27	31.76		26	19.40	14	38.89		36	24.66	4	16.67	
How to proceed with expired or unnecessary drugs					0.014*					0.029*					0.088
Always or almost always I bring them back to a pharmacy or clinic	42	49.41	30	35.29		63	47.01	9	25.00		57	39.04	15	62.50	
Sometimes I bring them back to a pharmacy or clinic	33	38.82	30	35.29		48	35.82	15	41.67		58	39.73	5	20.83	
I do not bring them back/throw away	10	11.76	25	29.41		23	17.16	12	33.33		31	21.23	4	16.67	
Total	85	100.00	85	100.00		134	100.00	36	100.00		146	100.00	24	100.00	

Note: \*Statistically significant value.

Abbreviations: OTC, over-the-counter; UHS, University of a Healthy Senior; UPP, University of Psychogeriatric Prophylaxis; UTA, University of the Third Age.

the market. Vitamins and nutritional supplements are popular medical preparations in this group of drugs. In our study, 70% of respondents declared taking vitamins and supplements. The value we obtained in our study was relatively high compared with other international surveys. Among the 112 elderly people surveyed in the USA, half of the seniors declared herbal supplement intake. In the group of elderly people taking herbal products, 59% believed that consumption of these preparations in old age was safe.<sup>30</sup> In a study by Yoon et al, 33% of 57 women had used one or more herbal products in the previous year.<sup>31</sup> A Canadian study found that the highest frequency (57%) of vitamin and supplement intake was among women aged 50–65 years. Calcium, iron, B vitamins, and glucosamine<sup>32</sup> were the most often supplemented.

In our study, 43% of seniors took 1 OTC drug regularly. An identical percentage of women aged 65 and over, studied by Yoon et al, took an average of 2.6 OTC drugs.<sup>33</sup> Canter and Ernst conducted a study in a group of 271 elderly people in Great Britain; they found that the respondents took an average of 2.26 prescription drugs and 5.91 supplements and herbal products.<sup>34</sup> In a study conducted among 1,206 elderly people, Levine et al<sup>35</sup> determined that half ( $n=616$ , 51%) had taken one or more nutritional supplement in the previous year. Moen et al<sup>36</sup> found that 38.4% of the studied respondents took one or more OTC drug, while 8.3% took one or more herbal supplement. In a population of elderly primary health care patients in Germany, the average OTC drug intake was 1.4 preparations.<sup>37</sup> A study of 3,072 out-patients aged 75 and older in the USA found that 82.5% of the studied cohort took at least one nutritional supplement, and 54.5% 3 or more.<sup>38</sup> In a study by Pannu et al,<sup>39</sup> 81.5% of the respondents took at least one natural health product and 64.2% at least one OTC drug. In the USA, almost half of the elderly population regularly takes at least one OTC drug or supplement.<sup>40</sup> Gazibara et al<sup>41</sup> demonstrated that in a total of 354 elderly people included in the study, 202 seniors (57.0%) stated taking OTC drugs in the previous month. Over half of the respondents (55.4%) took 1 OTC drug, and the remaining 44.6% up to 5.<sup>41</sup> A study conducted among a group of 975 elderly American women indicated that 82.2% of them took OTC drugs, and the average number of preparations taken was 1.8.<sup>42</sup> These data illustrate the fact that OTC drug intake in our studied sample was on the lower end, and thus suggests a lower risk of polypharmacy occurrence in the elderly population.

## Reasons for OTC drug purchase

The most frequent reasons the elderly gave for buying OTC medications included colds, muscle and joint pain, as well

as headaches. Similar reasons for OTC drug purchase were indicated by Serbs – almost 40% of respondents bought an OTC drug to improve immunity and almost one-third for muscle and joint pain and headaches.<sup>41</sup> These data point out that older people believe that OTC drugs improve health and eliminate unpleasant symptoms. In our study, as well as the aforementioned study conducted among seniors in Serbia, OTC drugs were mostly bought in pharmacies.<sup>41</sup> Despite the wide availability of this group of drugs, elderly people generally decide to buy them from professionals.

## OTC drug intake and sex

The obtained results prove that men were characterized by slightly lower intake of OTC drugs than women. Thus, they confirm trends described in previous studies;<sup>32,41,43–45</sup> although our own research did not reveal such significant differences as previously published studies. Qato et al<sup>40</sup> obtained similar results, in which women more often than men took nutritional supplements; however, general OTC drug intake was similar for both sexes (41.9% for women and 42.6% for men). It is worth noting that in our study the percentage of participating men (21.2%) was significantly lower than the percentage of participating women (78.8%), which is the result of overrepresentation of elderly women compared with men in Poland. The higher OTC drug intake among women could also be caused by the fact that they might be supplementing certain minerals in accordance with a doctor's indications and principles of public health policy. Furthermore, women's more frequent visits in pharmacies and other OTC drug selling points may be determining factors in the higher intake in this group.

## Pharmacist as a source of information on OTC drugs

Pharmacists are the best experts on OTC drug administration. Over 47% of respondents treated pharmacists as the main source of information on OTC medications. A similar percentage regularly consulted the treatment method with a doctor or pharmacist – it is worth noting that this percentage could and should be higher. This could be partially caused by older persons' belief that pharmacists are primarily responsible for all matters pertaining to prescribed medications, and not dispensing health advice and recommendations for OTC drugs and nutritional supplements.<sup>46</sup>

## Limitations of the study

The conducted study had certain limitations. The study group was too small to be able to refer the results to the whole country. Respondents did not undergo an examination,



nor were they asked in the questionnaire about drugs prescribed by a doctor or chronic diseases. In the future, a wider-reaching study should be conducted, in which a bigger group of elderly people will be included, and which will also include history-taking on chronic diseases and taken prescription drugs, so that the obtained results could be representative for the elderly population in Poland.

## Conclusion

Our study found that in our sample there were many OTC drug consumers who did not always demonstrate responsible attitudes toward using this group of drugs. Thus, older people should be educated on the possible adverse effects of taking OTC drugs without consulting a doctor or pharmacist as well as basic drug disposal principles. Furthermore, legislation should be introduced that will limit the wide availability of OTC drugs, particularly to the elderly; and thus, lower the costs of hospitalization and outpatient treatment of this age group. Also, a wider-reaching study should be conducted. It should include a larger group of elderly people as well as information on intake of prescribed medications in order to be able to determine the frequency of drug consumption in this population, as well as seniors' preferences and attitudes in this regard.

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## Author contributions

Mateusz Cybulski and Elzbieta Krajewska-Kulak contributed to the study design; Mateusz Cybulski, Lukasz Cybulski, and Magda Orzechowska contributed to data collection. All authors contributed toward data analysis, drafting, and critically revising the paper and agree to be accountable for all aspects of the work.

## Disclosure

The authors report no conflicts of interest in this work.

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