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

Mateusz Cybulski¹
Lukasz Cybulski²
Elzbieta Krajewska-Kulak¹
Magda Orzechowska¹
Urszula Cwalina³

¹Department of Integrated Medical Care, Faculty of Health Sciences, Medical University of Bialystok, Bialystok, Poland; ²National Security Student, Faculty of Social Sciences, University of Warmia and Mazury in Olsztyn, Olsztyn, Poland; ³Department of Statistics and Medical Informatics, Faculty of Health Sciences, Medical University of Bialystok, Bialystok, Poland

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 Philaxis, 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 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

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;¹ while people aged 65 and over will account for more than 25% of Europe’s population.² 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.³

The high demand for drugs is closely linked to the aging population. ¹ A specific feature of older adults is an increasing trend in multimorbidity, which involves the presence of two or more chronic diseases.⁵ It is estimated that multimorbidity is present in 62% of people aged 65–74, and up to 81.5% of people over 85 years.⁶

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.⁷ In recent years, a high intake of OTC drugs among older adults has been observed.⁵⁻¹² Previous literature has shown that certain factors, such as female sex and higher education, are responsible for increased OTC drugs consumption.¹³ In addition, in the elderly, many diseases and chronic conditions are associated with the phenomenon of polypharmacy,¹⁴ which involves the consumption of more than five prescribed drugs. Consequently, polypharmacy is associated with OTC drugs use.¹⁵

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.⁴ 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.¹⁶ Many hospitalizations and deaths among the elderly occur every year due to adverse drug events (ADEs) caused by drugs.¹⁶⁻¹⁹ Nonetheless, drug consumers often view OTC drugs as less risky and safer than prescription drugs.¹⁸ 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.¹⁶¹⁸¹⁹

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.¹⁶ Currently, there is a risk of overuse of OTC drugs, especially analgesics, in the whole population, and especially among the elderly.²⁰²¹ 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.²²⁻²⁴ Other studies have found less support for this practice.²⁵ Pit et al²⁶ 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 biochemicals measures.²⁷

The aim of the study was to assess preferences and attitudes toward the use of OTC drugs among residents of Bialystok 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 1 – 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 Bialystok. 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 pharmaco economics 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 Bialystok, 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 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.

### 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 Psycho-geriatric Prophylaxis; UTA, University of the Third Age.
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 in 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 n % | UTA n % | p-value | Females n % | Males n % | \( \geq 70 \) years n % | \( \geq 71 \) years n % | p-value |
|--------------------------------------------------|-------------|---------|---------|-------------|-----------|----------------|----------------|---------|
| 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  | 0.392          | 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  | 0.486          | 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    | 0.193          | 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 |
|----------------------------------------------|---------|-----|---------|---------|-------|---------|-----------|-----------|---------|
| **OTC drug recipients**                      |         |     |         |         |       |         |           |           |         |
| I buy them for myself                       | 65      | 60  | 70.59   | 0.651   | 102   | 76.12   | 23        | 63.89     | 0.248   |
| I buy them for relatives (family)            | 4       | 4.71| 7.06    |         | 8     | 5.97    | 2         | 5.56      | 8       |
| I buy them for myself and for my family      | 16      | 18.82| 22.35   |         | 24    | 17.91   | 11        | 30.56     | 32      |
| **Total**                                    | 85      | 100.00| 100.00  | 134    | 100.00| 16       | 36        | 100.00    | 146     |
| **Place to buy OTC drugs**                   | 83      | 97.65| 81      | 95.29   | 0.678 | 128     | 95.52     | 36        | 100.00  | 0.433 |
| Pharmacy                                     | 3       | 3.53 | 14      | 16.47   | 0.000  | 11      | 8.21      | 6         | 16.67   | 0.133 |
| Small grocery store                          | 2       | 2.35 | 6       | 7.06    | 0.277  | 6       | 4.48      | 2         | 5.56    | 0.863 |
| **Supermarket**                              | 85      | 100.00| 100.00  | 134    | 100.00| 16       | 36        | 100.00    | 146     |
| **Frequency of buying OTC drugs**            | 2       | 2.35 | 0       | 0.00    | 0.964  | 2       | 1.49      | 0         | 0.00    | 0.654 |
| Once a week or more often                    | 7       | 7.06 | 9       | 10.59   | 11     | 8.21    | 4         | 11.11     | 13      |
| Once every 2 weeks                           | 30      | 30.59| 23      | 27.06   | 38     | 28.36   | 11        | 30.56     | 43      |
| Once a month                                 | 18      | 21.18| 24      | 28.24   | 33     | 24.63   | 9         | 25.00     | 37      |
| Less frequently than once every 3 months     | 32      | 37.65| 25      | 29.41   | 46     | 34.33   | 11        | 30.56     | 49      |
| I don’t buy OTC drugs                        | 1       | 1.18 | 4       | 4.71    | 4      | 2.99    | 1         | 2.78      | 2       |
| **Total**                                    | 85      | 100.00| 100.00  | 134    | 100.00| 16       | 36        | 100.00    | 146     |
| **Reasons for buying OTC drugs**             | 29      | 34.12| 33      | 38.82   | 0.524  | 51      | 38.06     | 11        | 30.56   | 0.406 |
| Headache                                     | 11      | 12.94| 8       | 9.41    | 0.465  | 14      | 10.45     | 5         | 13.89   | 0.561 |
| Fever                                        | 47      | 55.29| 45      | 52.94   | 0.758  | 72      | 53.73     | 20        | 55.56   | 0.845 |
| Cold                                         | 24      | 28.24| 22      | 25.88   | 0.730  | 33      | 24.63     | 13        | 36.11   | 0.169 |
| Pain and sore throat                         | 28      | 32.94| 30      | 35.29   | 0.746  | 41      | 30.60     | 17        | 47.22   | 0.062 |
| Muscle and joint pain                        | 13      | 15.29| 21      | 24.71   | 0.125  | 30      | 22.39     | 4         | 11.11   | 0.133 |
| Cough                                        | 18      | 21.18| 20      | 23.53   | 0.713  | 31      | 23.13     | 7         | 19.44   | 0.637 |
| Gastrointestinal disorders                   | 8       | 9.41 | 3       | 3.53    | 0.119  | 9       | 6.72      | 2         | 5.56    | 0.896 |
| Migraine                                     | 8       | 9.41 | 9       | 10.59   | 0.798  | 12      | 8.96      | 5         | 13.89   | 0.381 |
| Allergy                                      | 8       | 9.41 | 7       | 8.24    | 0.787  | 13      | 9.70      | 2         | 5.56    | 0.436 |
| Cystitis                                     | 8       | 9.41 | 7       | 8.24    | 0.787  | 13      | 9.70      | 2         | 5.56    | 0.436 |
| **Factors determining the decision to buy OTC drugs** |         |     |         |         |       |         |           |           |         |
| Possibility to buy right away (immediately)  | 40      | 47.06| 38      | 44.71   | 0.758  | 61      | 45.52     | 17        | 47.22   | 0.856 |
| Efficacy of drugs                            | 22      | 25.88| 28      | 32.94   | 0.313  | 38      | 28.36     | 12        | 33.33   | 0.561 |
| A pharmacist’s professional advice           | 30      | 35.29| 21      | 24.71   | 0.132  | 41      | 30.60     | 10        | 27.78   | 0.743 |
| Price                                        | 8       | 9.41 | 10      | 11.76   | 0.618  | 15      | 11.19     | 3         | 8.33    | 0.620 |
| Point of purchase, proximity to the place of residence | 5       | 5.88 | 10      | 11.76   | 0.176  | 9       | 6.72      | 6         | 16.67   | 0.062 |
| A friend’s recommendation                    | 6       | 7.06 | 9       | 10.59   | 0.417  | 10      | 7.46      | 5         | 13.89   | 0.227 |
| Lack of need for consulting the purchased product with a pharmacist | 6       | 7.06 | 9       | 10.59   | 0.417  | 10      | 7.46      | 5         | 13.89   | 0.227 |
| **Access to OTC drugs**                      | 67      | 78.82| 52      | 61.18   | 0.012  | 95      | 70.90     | 24        | 66.67   | 0.623 |
| Only in pharmacies                          | 18      | 21.18| 33      | 38.82   | 0.393  | 39      | 29.10     | 12        | 33.33   | 0.46  |
| Should be available at other points of sale  | 85      | 100.00| 100.00  | 134    | 100.00| 36      | 100.00    | 146       | 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.
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 UTW 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. According to Gallagher et al, 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 n | UHS/UPP n % | UT n % | p-value | Females n % | Males n % | p-value | ≤70 years n % | ≥71 years n % | p-value |
|--------------------------------------|-------------|--------|---------|------------|-----------|---------|--------------|--------------|---------|
| 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    | 1         | 100.00    | 1         | 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 | Females | Males | p-value | Females | Males | p-value | Females | Males | p-value |
|------------------------------------------------------------------------|---------|-----------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|---------|-------|---------|
| Consulting treatment method with a doctor or pharmacist               |         |           |         |         |       |         |         |       |         |         |       |         |         |       |         |
| Always or almost always                                                | 21      | 24.71     | 19      | 22.35   | 28    | 20.90   | 12      | 33.33 | 28      | 19.18   | 12    | 50.00   | 0.373   |       | 0.452   | 0.006* |
| 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     | 9.57    | 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*  | 0.0029*| 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.
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, although our own research did not reveal such significant differences as previously published studies. Qato et al 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.

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 Elżbieta Krajewska-Kulak contributed to the study design; Mateusz Cybulski, Łukasz 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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