

MONIKA WÓJTA-KEMPA^{A-F}, DOMINIK M. KRZYŻANOWSKI^{A, B, E, F}

Correlates of Abusing and Misusing Over-the-Counter Pain Relievers Among Adult Population of Wrocław (Poland)

Department of Public Health, Faculty of Health Science, Wrocław Medical University, Poland

A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of article

Abstract

Background. Almost 90% of households in Poland buy medicines on their own initiative. The most popular OTC medicines bought by Polish consumers are painkillers and non-steroid-anti-inflammatory drugs.

Objectives. The aim of this article was to recognize and describe the most important predictive factors of the abuse and misuse of over-the-counter pain relievers among adults in Wrocław (Poland). The groups of users were selected and described. Some examples of misuse were analyzed.

Material and Methods. Three hundred eighty six adult inhabitants of Wrocław took part in the survey. The quota sample was representative referring to the most important socio-demographic factors (sex and median age).

Results. Almost 91% of participants declare taking OTC pain relievers, and 1.3% of them are their daily users. Only 6.2% of adult inhabitants of Wrocław never take OTC pain relievers. The category of “heavy users” embraces 11% of participants. The most important risk factors of overusing OTC pain relievers are sex (female), age over 55 years and the low health status. Only half of participants read the box label regularly and 25% of users admit they have modified recommended doses. Over 60% shortened recommended intervals between doses and 16% took two or more different pain medications (containing different substances). The non-medical purposes of using OTC pain relievers were: tiredness (7%), stressful situations (5.4%), and discomfort (18.4%). Some users take pain medications to cure hangovers (26%), or instead of the appropriate medicine (7%). About 20% take pain medications without a doctor’s advice for longer than the recommended 3 days, and 10% never consult taking such medications with doctors.

Conclusions. Pain should be treated aggressively and successfully, especially among chronically ill patients. We should monitor the consumption of OTC pain relievers and limit their current excessively supply and high availability (*Adv Clin Exp Med 2016, 25, 2, 349–360*).

Key words: chronic pain, OTC drugs, misuse of taking OTC pain medications.

Self-medication and health self-management are becoming more and more popular in Poland. This phenomenon has its positive effect on individuals, especially in the case of restrictions on access to health benefits. Due to the fact that over-the-counter (OTC) medicines are widely available, purchasers become active participants in decisions pertaining to their own health and treating illnesses, thereby reducing the amount of unnecessary medical interventions and, therefore, decreasing the costs of the public health system. According to the Central Statistical Office, almost 90% of households in Poland buy medicines on their own ini-

tiative [1]. The accessibility of OTC drugs is increasing, even for the less well-off Polish citizens. According to the research conducted in 2011 by the Public Opinion Research Center (CBOS), the most popular OTC medicines bought by Polish consumers are painkillers and non-steroid-anti-inflammatory drugs (57%), followed by flu and cold remedies (19.5%), vitamins and minerals (13%), heart remedies (5%), and cures for digestive system ailments (2%) [2]. Taking pain relievers is probably the most frequent way of seeking self-medication solutions and everyone is a potential user. The value of OTC products market is still

increasing and its growth rate in Poland amounts to 6.6% per year [3].

Many adults and adolescents regularly use OTC medicines on their own, combining different active ingredients and types of painkillers. Also, most people using OTCs are unaware of their potential harm [4]. The abuse of OTC medicines applies to citizens of many developed countries, and this is an internationally recognized problem. Easy access to OTC medicines and the lack of necessary health literacy skills to appropriately self-administer them are the challenges for public health policy and for practitioners [5]. Growing costs of hospitalizations as a result of side effects resulting from abusing OTC medicines, or using them without professional control, have induced a number of protective measures within the framework of health policy and public health institutions. They include both restrictions in advertising them and control measures of the quantities of pills in one box; expert groups are developing strategies for the safe distribution of drugs without prescriptions [6]. It should be, however, remembered that attempts to limit the availability of non-prescription drugs have been met with the strong criticism of pharmaceutical companies which, in order to protect their own interest, indicate that self-treatment can reduce the costs of public health care even by 60% [7]. The availability of OTC medicines in Poland saves about PLN 3.5 bn per year [8].

When analyzing reasons of OTC drugs abuse in developed countries, two kinds of factors should be taken into consideration: macro-social background (welfare, public health system etc.), and individual health conditions, attitudes and preferences. Individuals make independent decisions and match OTC products with self-diagnosed symptoms. The increasing consumption of over-the-counter medicines comes from their wide accessibility (they can be bought in pharmacies, at gas stations, or other points of sale), but also from the lack of doctors' advice and limited medical services. In ageing societies, the consumption of drugs, including painkillers, will increase. Easy access to OTC drugs is a challenge to patients' safety. Moreover, the increasing wealth of Polish society cannot be ignored. In 2013 Poles spent approx. PLN 35 million on private care (in 2013 one third of the total costs for health care system came from the private sector).

The next reason for the growing consumption of OTC drugs is a widely spread belief that such medicines are safe and cannot be overused. The market activity of pharmaceutical companies and advertisements of their products do not carry proper information [9], but build the illusion of

safety suggesting the need for constant supplementation. It is also important to underline that information concerning pain relievers' safety is often unequivocal and unclear. The users are informed that, for instance, aspirin can cure heart diseases and ibuprofen can reduce the risk of developing Parkinson's disease. Such reports may, especially among ill people, foster the belief among patients that OTC medicines can cure their health and that they have more benefits than side effects. The health experts often change their opinions regarding the maximum dosages of popular OTC products, and in this way they misinform the public opinion [10].

Producers of medicines run promotional campaigns to maintain their sales and they constantly introduce novelties and promotions to refresh the brand and to increase the consumers' interest. Purchasers are induced to buy larger packages. It is easy to overdose painkillers when they are advertised for different medical problems, with different names and physical characteristics, but containing the same active ingredients. Such advertising tends to trivialize the threat of overusing OTC medicines. Of course, not all aches and pains should be reported to a physician. Taking OTC medicines originates from the assessment of medical advice, confidence in the physician and, on the other hand, the lack of control over a patient. We can observe the diminishing level of authority of this occupational group – according to the Public Opinion Research Center (CBOS) 28% of Polish citizens have little or very little confidence in their doctors [11]. Also, the family doctors are no longer gatekeepers to coordinate medications taken by their patients. They tend to self-diagnose and self-administer OTC products without any medical advice. The small number of medical staff, the unavailability of medical services and the lack of confidence in the doctors' advice are the main reasons of the growing consumption of painkillers.

In spite of the fact that OTC analgesics are the most popular medicines taken without prescription, the problem is currently incompletely described and understood. Taking into account many issues resulting from taking OTC medicines, multidisciplinary research in the field is needed. First of all, we should specify the scale of the abuse. There is also a lack of findings which evaluate interventions and capture individual experiences. Such research may play a significant role in the information policy, regulations and further effective interventions. In this situation, the main purpose of this survey research was to supplement the lack of data related to the number of patients using and overusing OTC pain relievers in Polish public statistics and scientific literature.

In this article the authors present results of the survey conducted among 400 citizens of Wrocław, Poland. Wrocław is the capital of the Lower Silesia Region. With its 630,000 inhabitants, Wrocław remains an important center of science and local culture. In the research the authors raised several issues focusing on the frequency of using OTC pain relievers, preferences in taking such medicines and other factors affecting consumers' decisions like, for example, common knowledge and social beliefs referring to the safety of painkillers. Such perceptions and attitudes to pain may play an integral role in patients' adherence to painkillers. The report concerns the conditions which may affect the possibility of drug abuse among the population of adults in Wrocław.

The authors understand the misuse of painkillers as a situation in which patients use medicines in a manner contrary to their purpose (e.g. not to eliminate pain, but to avoid insomnia or tiredness), and when they incorrectly combine medicines with other drugs and substances, overdose or consume them contrary to professional recommendations. Factors affecting the possibility of painkillers' misuse are: health status, the frequency and the manner of using pain relievers, education and literacy skills (knowledge of safe usage, dosing, combining with other drugs etc.).

In this article the authors present some correlates of abuse and misuse over-the-counter pain relievers. Socio-demographic variables, opinions about safety of OTC pain relievers, and also some facts of users' compliance and adherence were analyzed (reading labels, combining substances, shortening intervals between doses). The authors sepa-

rated and characterized the group of heavy users who take OTC pain relievers more often than several times a month. The authors have collected more data during the survey research (knowledge of proper usage and self-administration of OTC pain relievers, the possibility of unintentionally deviating from standard use), but they have not been presented in the article.

The main goal of the research was to find answers to the following questions: 1) What is the percentage of adult inhabitants of Wrocław abusing OTC pain relievers? 2) What is the percentage of users modifying the directions of using OTC pain relievers? 3) Which social and demographic correlates differentiate the patterns of using OTC pain relievers?

Material and Methods

The report concerns abuse of pain relievers among adult citizens of Wrocław. The authors have prepared the quota sample to prove their point. This is a non-probabilistic way of sampling, but it is partly representative for the population, although individuals have not been randomly chosen. Quota sampling requires that representative individuals are chosen out of a specific subgroup. Table 1 shows selected data referring to the population and to the sample.

To minimize the uncertainty of data and to make the sample reliable, the authors have tried to maximize its resemblance to the population's characteristic by selecting participants by specified attributes: sex, age and level of education. The au-

Table 1. The comparison of Wrocław's population and used research sample

Parameter	Population	Sample
The population over 15 years old	553,801	386
Sex (%)	men: 48 women: 52	men: 47 women: 53
Median age	total: 39.7 men: 37.4 women: 42.4	total: 40.0 men: 50.0 women : 43.0
Level of education (%)	higher: 30.5 medium: 34.5 occupational:14.5 primary: 19.5	higher: 42 medium : 38.6 occupational:14.5 primary: 4
Age groups	age 15–24 – 8% age 25–34 – 22% age 35–44 – 15% age 45–54 – 15% age 55–64 – 18% age 65+ – 18%	age 15–24 – 11.6% age 25–34 – 17.9% age 35–44 – 17.9% age 45–54 – 19.2% age 55–64 – 21.2% age 65+ – 12%

thors think that the parameters of the sample allow them to treat findings of the research as valid and significant. The research was conducted between April and September 2013. The research was conducted within the statutory activities of the Department of Medical Social Sciences of the Wrocław Medical University.

The collected data was processed by STATISTICA 10 (by StatSoft, Inc.) with an academic license for the Wrocław Medical University. To verify the hypothesis about correlation between the users groups (nominal variable) and other variables the χ^2 Pearson's was used. A significance level less than 0.05 ($p < 0.005$) was considered as statistically significant. The obtained results were presented in tables and charts.

Three hundred eighty six citizens of Wrocław (53% of them were female) took part in the survey research. The median age of participants was 40 years. Referring to the most important socio-demographic factors (sex and median age), the authors' sample is representative or approximate to the representative group (Table 1). The weak point of the used sample was an underestimated amount of young men and an overestimated amount of participants with a higher education. Generally, these two categories have their own patterns in using OTC medications. Better-educated, professionally active people expect fast and optimal benefits and have no opportunities to visit their doctors quickly in case of pain. Buying OTC medicines is the best way to relieve pain. Young men usually avoid professional advice in case of common ailments, so they are more likely to self-treat or to neglect symptoms. Both categories may use OTC medicines more often than others. As a result, the final sample, being a basis of statistical calculations, might generate understated data.

Results

In this part of the article the authors have presented the most important survey results regarding the frequency of taking OTC pain medicines and their statistical correlates. Next, the authors have presented data illustrating examples of abusing such medicines in the population of adult participants.

Frequency of Taking OTC Pain Relievers

The results regarding the frequency of using over-the-counter analgesics are presented in Table 2. Almost 91% of participants declare taking OTC pain relievers and 1.3% of them use them on a daily basis. Over 11% take non-prescribed painkillers at least once a week and 19% several times a month. For those users, the risk of getting addicted is the highest, especially when medicines are not taken under a physician's supervision. Using OTC drugs may be a deep-rooted habit that replaces preventive health behavior or professional care. More than half of the surveyed participants use OTC pain relievers only in urgency (54%). Only 6.2% of adult citizens of Wrocław never take OTC painkillers (mostly men).

Additionally, the authors have also analyzed consumers' behavior. Only 11% of participants never buy over-the-counter pain relievers. The most popular medicines contain ibuprofenum (54% of purchasers) and paracetamol (42.8%). Almost 41% of purchasers buy only one medicine, 23% buy two and 13.5% buy three different pain relievers. The most common sources of pain that urge self-medication are headaches (36%), toothaches (17%) and back pains (Fig. 2).

Table 2. Frequency of taking over-the-counter pain relievers, n = 386

Frequency of taking OTC pain relievers, n = 386	Total		Female		Male	
	number	%	number	%	number	%
Everyday	5	1.3	3	1.5	2	1.1
Several times a week	22	5.7	13	6.4	9	4.9
Once a week	15	3.9	8	3.9	7	3.8
Several times a month	73	18.9	50	24.6	23	12.5
Once a month	29	7.5	20	9.8	9	4.9
Only in urgencies	208	53.9	101	49.7	108	58.8
Never	24	6.2	6	2.9	18	9.8
Taking pain relievers on prescription	9	2.3	2	1.0	7	3.8
Total	386	100	203	100	183	100

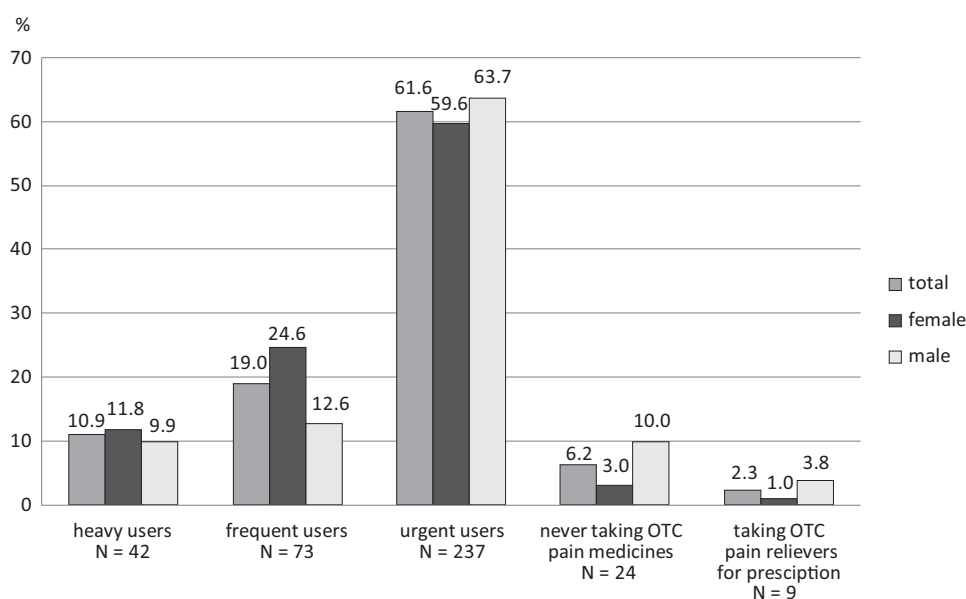


Fig. 1. The frequency of taking over-the-counter pain relievers, n = 386 (% of participants)

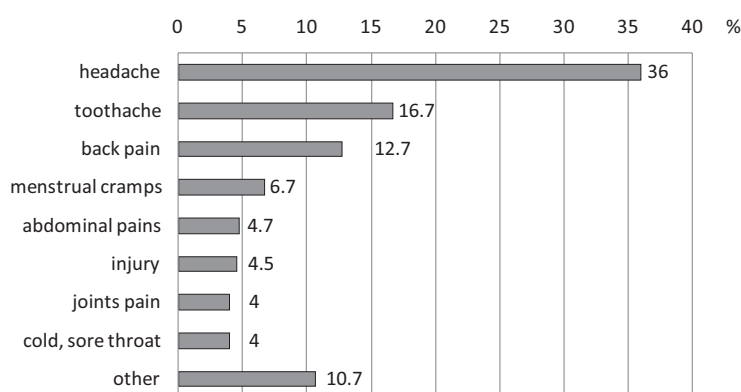


Fig. 2. The most common reasons for the use of pain medication without a prescription, n = 400 (% of answers)

Buying medicines does not mean consuming them, but possessing an increased possibility of their use. Over 26% of participants try to always have OTC pain relievers by their side (in a handbag, rucksack, in a car, etc.), and the following 24% make such “analgesic resources” from time to time. The authors have observed that half of adult inhabitants think, all the time or at least occasionally, that relieving pain is going to be necessary.

Despite the fact that advertised OTC medicines can be bought at any time and at any place, users make pharmacological intervention possible anytime there is a need. Among heavy users who take painkillers a minimum of several times a week, the percentage of people protecting themselves against unexpected pain have increased to almost 43%.

To make results more clear the authors have separated and described 3 categories of partici-

Table 3. Characteristics of “heavy users”, “frequent users” and “urgent users” groups compared to total population scores

Characteristic/variable	Heavy users n = 42	Frequent users n = 73	Urgent users n = 237	Total (users and non-users) n = 386
	in %			
Median age	56.5	45.0	43.0	40.0
Age:				
15–24	7.1	19.2	11.4	11.6
25–34	2.4	9.6	22.8	17.9
35–44	21.4	17.8	19.0	17.9
45–54	9.5	27.4	19.0	19.2
55–64	38.1	15.0	18.6	21.2
65+	21.4	11.0	9.3	12%

Table 3. Characteristics of “heavy users”, “frequent users” and “urgent users” groups compared to total population scores – cont.

Characteristic/variable	Heavy users n = 42	Frequent users n = 73	Urgent users n = 237	Total (users and non-users) n = 386
	in %			
% of female	57.1	68.4	51.0	53
The level of education, p = 0.01:				
higher	28.8	45.2	45.7	42.0
medium	38.1	28.8	40.1	38.6
occupational	23.8	21.9	9.7	14.5
primary	9.5	4.1	2.5	4.0
Opinion about OTC pain relievers' safety:				
safe	40.5	39.7	21.8	27.7
not safe	59.0	60.3	78.1	72.3
Health self-esteem, p = 0.0000:				
less than good health	76.2	46.6	26.6	35.5
good or very good	21.4	53.4	71.3	62.9
It's difficult to say	2.4	0.0	2.1	1.5
Reading box instructions:				
always	47.5	35.6	45.7	44.8
often	30.0	57.5	42.6	43.2
no	20.0	5.4	8.2	9.1
I don't remember	2.5	1.4	3.4	2.9
Modification of recommendations:				
never or very rare	35.0	59.7	64.5	61.0
sometimes	27.5	30.5	19.5	20.5
often or very often	15.0	4.0	4.9	5.3
I don't remember	22.5	5.5	12.1	11.8
Stocking OTC pain relievers:				
I carry pain pills all the time	39.0	45.8	21.1	26.1
I carry pain pills from time to time	31.7	26.4	25.4	24.3
never	29.3	27.7	53.4	47.4
Chronic diseases:				
yes	88.1	54.9	37.6	46.4
Shorten intervals between doses:				
never	17.1	9.7	23.2	19.7
yes	17.1	41.6	19.4	22.0
yes, but only in case of severe pain	43.9	33.3	35.8	33.7
yes, but by mistake	2.4	4.2	5.2	4.4
I don't remember	19.5	11.1	16.4	16.6
Taking two different substances at the same time:				
yes	25.0	22.2	15.0	16.3
no	40.0	44.4	53.8	50.7
I don't know	7.5	11.1	13.2	11.9
I don't remember	27.5	22.2	18.0	18.9
The longest period of taking OTC pain relievers without physician's advice:				
max. 3 days	52.5	51.4	75.2	68.8
week	20.0	20.8	13.9	15.3
2–3 weeks	5.0	8.3	1.7	3.3
1 month	0.0	1.4	0.4	0.5
longer than 1 month	7.5	4.2	0.0	1.6
I never consult taking OTC pain relievers with a doctor	15.0	12.5	8.7	10.1
another answer	0.0	1.4	0.0	0.3

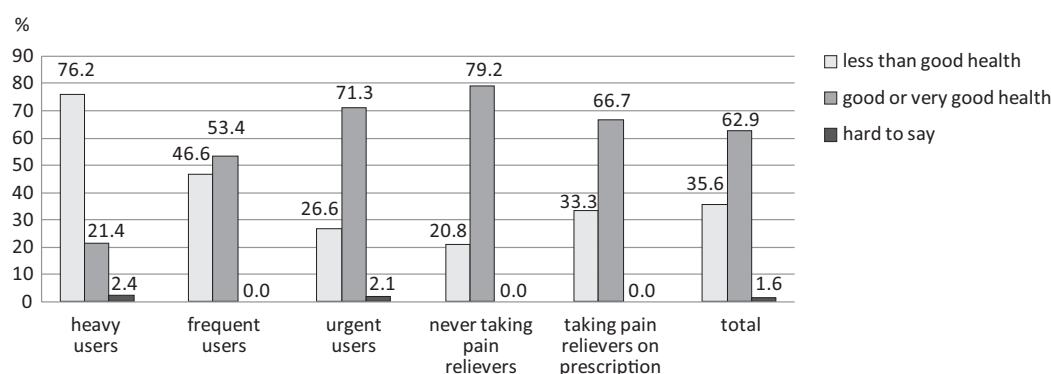


Fig. 3. The frequency of OTC pain relievers and health self-esteem

pants (Fig. 1, Table 3). The first category of “heavy users” comprises of people who take OTC pain relievers every day, several times a week, or once a week. This group embraces about 11% of participants (n = 42) and 12% of them take pills every day. They usually buy medicines with ibuprofenum. The authors have thoroughly analyzed this group, indicating potential overusing risk factors in the further part of the article. The next category of users is “frequent users” (n = 73) containing up to 19% of participants (they are consumers who take pain medicines several times a month). Both groups of users may be regarded as potentially addicted to pain substances. The third category is “urgent users”, who take pain relievers occasionally, once a month or only in emergencies (n = 237). The risk factors of OTC pain relievers abuse were compared within all groups of users.

Table 3 contains characteristics of all groups of consumers in comparison to the population (both users and non-users). The most significant correlates of taking OTC pain relievers are sex, age, health self-esteem and heard opinions regarding the safety of OTC drugs. The participants of all separated groups of consumers also differ when it comes to the consumers’ behavior (buying medicines for the future) and the compliance or adherence to use given instructions, which will be characterized in the further part of this article.

OTC pain relievers are more popular among women (p = 0.00063). Moreover, the assumed correlation between age and frequency of taking pain pills is statistically significant (p = 0.002). The median age of “heavy users” (n = 42) is about 16.5 years higher than the median age of the population. Compared to “urgent users” (taking OTC remedies only in urgencies) heavy users are about 11 years older. Older people, due to their ill health, are more inclined to take pain relievers. As it has been observed, participants over 55 years constitute 60% of users taking pain pills minimum once a week. About 3% of older participants take pain-killers every day, 9.3% take them several times

a week and 7% use them once a week. This means that about 1/5 of participants over 55 years old possibly overuse OTC pain medicines. They are often female users: 27.3% of female and only 13.7% of male participants over 55 years old are heavy users. Next group of users are participants between 35–45 years old; they have a tendency to use OTC pain relievers, because they lack time or they cannot visit a physician during work time. The next alarming indicator is the high percentage of young participants (> 24 years old) constantly taking pain relievers (7% were heavy users and 19% were frequent users).

Education plays a significant role as a predictive factor of the abuse of OTC pain relievers. The assumption of high impact on frequency and compliance was partly confirmed (p = 0.01). The authors have found that there were 27% of heavy users in the less educated group of participants and only 7% in the group of highly educated citizens. The authors have also noticed that education differentiated beliefs regarding the safety of OTC pain medicines: 83% of highly educated and only 58% with occupational education express the opinion that taking OTC medicines may be harmful for health. The obtained results suggest that education may protect against the abuse of OTC pain drugs. However, it should be remembered that education is positively correlated with better health self-esteem and the lack of illnesses. The most important factors implying health behaviors are not only knowledge and literacy skills, but also general health status and lifestyle. It has been presented that almost 1/3 of heavy users are well-educated participants.

The most significant predictor of frequent taking OTC pain relievers is health self-esteem (p = 0.000). The worse is the health self-esteem, the higher is level of pain self-cure (Fig. 3). Almost 90% of heavy users declare the occurrence of chronic illness (hypertension 54%, allergy or asthma 14%, diabetes 14%, sclerosis 14.3%) and over 75% claim that their health is poor or very poor. However,

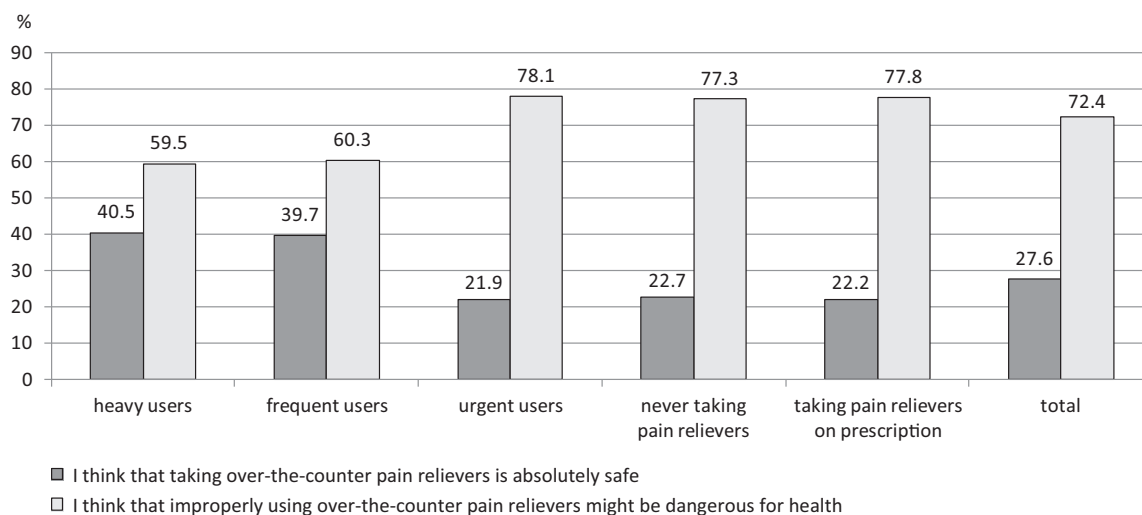


Fig. 4. The types of users and their opinion about safety of OTC pain relievers (n = 370)

this apparently obvious result must be verified: over 20% of such consumers declare good or very good health. This may be the group of users who treat OTC pain relievers as a substitute of professional advice and treatment. Taking medicines on their own can mask symptoms of serious illnesses.

When medicines are taken accordingly to recommendations, patients' low health self-esteem and self-treatment usually do not lead to drug abuse. However, subsequent data presented in this article show that the group of permanent users does not comply with the producer's and/or medical recommendations. Over 20% of heavy users do not read instructions on the packaging and 15% of them modify the dose very often (only 1/3 of heavy users never modify instructions). Every 4 in 10 users mix pain pills containing different substances. The following 15% of heavy users never consult their decisions with physicians. More than 40% think that OTC medicines available on the market are absolutely safe (Table 3, Fig. 4).

The following results highlight the problem of users taking OTC pain relievers several times a month ("frequent users"). In such a case health self-esteem does not determine using these medicines. The authors think that a special problem in this group is the lack of discipline and the adherence to taking non-prescription drugs. Almost 80% of frequent users shorten the intervals between doses, more than 20% combine two or more drugs to relieve pain, and almost half of them carry pain pills to avoid unexpected or unacceptable suffering. Moreover, 40% express the belief that taking OTC pain relievers is absolutely safe. Compared to heavy users, their non-adherence behavior seems to be even more dangerous. These consumers may think that sporadic administration of medicine is safer, even if the medicine is taken in multiple doses.

Their knowledge of the consequences connected with overdosing may be very poor. Moreover, if buying medical products is not determined by the health status, it may be suspected that consumers' decisions are the result of unethical advertisement.

Misuse of OTC Pain Relievers

The authors have analyzed the misuse of pain relievers taking into consideration medical recommendations. The indicators of the problem with compliance located in the authors' questionnaire regarded: modifications in using medicines, shortening intervals between doses, combining different substances, and mixing different medicines. The authors have also investigated how often patients ask doctors for advice if the period of taking painkillers is longer than medically recommended.

Although the majority of participants consider the non-adherence to pain medicines as harmful for their health, the authors have observed many disadvantageous behaviors, which result from an inappropriate following instructions indicated on the label. Only half of participants read labels regularly and 25% of users admit they have modified recommended doses. Over 60% shortened recommended intervals between doses and 16% took two or more different pain drugs (containing different substances). They used OTC pain relievers for non-medical purposes: when tired (7%), in stressful situations (5.4%), or in case of discomfort (18.4%). Some users take pain medicines to cure hangovers (26%), or instead of the appropriate medicine (7%). About 20% take pain medicines without the doctor's advice longer than the recommended 3 days, and 10% never consult taking such medicines with a doctor. Over one-fourth (27%) always carry pain pills with themselves (in their bags or glove com-

partment), and the following 25% do it very often. It seems that many people want to be sure that pain will not interrupt their daily activities.

It has been presented that OTC pain relievers are more popular among women. About 19% of men and only 7% of women never buy OTC pain relievers. It should be, however, remembered that gender has no impact on health self-esteem and on the occurrence of chronic illnesses, so these results show different consumer habits. Regarding the modification of medical recommendations, women read labels more often (49.3% of women always read labels compared to 39.3% of men), but 66% of them have shortened intervals between recommended doses (58.3% of men). Another non-compliance behaviors that occur more often among men are: using pain remedies to cure hangover (31% of men and 22% of women), taking them instead of the appropriate medicine (11.3% of men and 6.4% of women) or before going to sleep (8% of men and 6% of women). Almost 12% of male participants declared that they never ask physicians for professional advice when taking pain medicines. The most spectacular difference between men and women regards stocking OTC pain relievers: 70% of women carry pain killers (and 41% of them do it every day) vs. 33% of men.

The next important variable changing consumers' compliance and adherence is education. As it has been shown, the level of education impacts the frequency of taking pain medicines. The authors have also found that participants with higher education usually modify recommendations unwillingly (only 2.5% do it often or very often). With reference to non-medical reasons of taking pain remedies, participants are usually careful, but with one exception – 33% of higher educated participants use pain drugs to cure hangovers (vs. 21% users with the medium level of education). According to participants' declarations, only 7% of them never consult taking OTC pain relievers with doctors. Unfortunately, the authors have not found statistical evidence for the relation between the consumers avoiding OTC medicine and their level of education. Therefore, other indicators should be treated more seriously: almost 60% of higher educated users keep OTC pain relievers by their side, which increases the possibility of their use. It should also be remembered that during the survey, better-educated participants may give socially accepted answers.

Health status and age are the most important predictive factors of the frequent use of OTC pain relievers. Almost 80% of the surveyed participants who declared poor or very poor health status are chronically ill and 54% buy two or more different

pain remedies. For participants who declare good or excellent health status these indicators come out at 29.2% and 34%. Lower health status correlates with the belief that OTC pain relievers are generally safe (37% vs. 23% of participants with good and excellence health status). This is probably the reason why the authors have observed a higher amount of users declaring frequent compliance exceptions (8.3%) than those with better health self-esteem (3.7%). People who complain about their health take pain medicines more often than those who are satisfied, because of tiredness (11.7% and 4.7%), stress (6% and 4.7%) or instead of the appropriate medicine (10.3% and 7.7%). Additionally, 14% declare no activity in seeking professional advice when taking pain pills longer than it has been recommended (participants with better health self-esteem – 8.2%). One third of these users carry pain pills with themselves.

The authors report that one of most important considerations of pain medicine abuse are consumers' opinions regarding the safety of medicines. Indeed, the vast majority of participants (72.4%) express the opinion that using OTC pain relievers might be dangerous for their health (Fig. 4). The belief in the safety of painkillers is popular among older participants (43.6% is over 55 years old) and those less educated. Participants who believed in the safety of OTC relievers were older (median age – 48 years) than the "careful" users (median age – 44.3 years), less educated (28% declared higher level of education, compared to the "liberal" group – 48.5%). Their health was poorer (more than a half is chronically ill), and almost half of them always take the same kind of pain medicine. They modify recommendations more often than "careful" users (7.1% vs 5.3%). They also take OTC painkillers longer than other consumers, and 14% of them never ask doctors for advice (in the group of "liberal users" only 8%). The authors think that beliefs regarding the safety of OTC pain relievers are an important factor protecting users from abuse. However, they may not play such a role in a situation of very strong or severe pain.

As it has been shown in Fig. 4 (and in Table 3), nearly half of heavy and frequent users claim that taking pain medicines without prescription is absolutely safe. This opinion is probably supported by the belief that medicines available on the market are thoroughly tested and that the producers guarantee their safety. However, according to experts, the abuse of OTC pain relievers may injure the liver, kidneys, brain and cause poisoning. In the USA, a number of hospitalizations result from the abuse of pain relievers. Unfortunately, in some cases, it is not easy to distinguish signs of drug abuse from typical symptoms of chronic illnesses.

Discussion

The most important results of the survey showed that over 91% of the adult, municipal population have taken OTC pain relievers and the risk of abuse covers 11–30% of the population. The authors have demonstrated that the risk of abuse is higher in women, elderly people, those with lower health status. Education may play a role as an abuse-protecting factor, but there is no statistical confirmation for more compliant behaviors. In some situations, the lack of compliance and adherence may result from the belief that OTC pain relievers are safe.

The strong point of this survey is a sample, which highly reflects the structure of the municipal population of Wrocław. The authors are convinced that the advantage of this research is in presenting a portrayal of the users of non-prescription pain drugs, not only the decisions of purchasers. Thus, the most important variables inducing improper health behaviors regarding OTC pain relievers were recognized and thoroughly described.

As it was underlined in the first part of the article, there is a gap between the problem of abusing OTC pain relievers and its representation in scientific and statistical research. Some information has been presented in the cited report carried out by the Public Opinion Research Center (CBOS) and in the publication of the Centre for Healthcare Information Systems (CSIOZ) written by M. Pączkowska “Using drugs and their availability. The Research Report” [12] or on the PMR Research website [13]. Disregarding several reports about the sales market and its structure, the authors of this paper did not find a detailed analysis on the conditions and backgrounds of OTC drugs consumers’ decision. None of the reports of Polish experts regard the correlates of misusing OTC pain relievers.

The Poland-wide consumer survey conducted by PMR Research on a representative sample of 1,000 adult Poles in October 2011 presented that OTC medicines and diet supplements are bought by women living in big cities and by people of medium age (25–54 years old). Similar results were presented in the CIZOZ research. In our survey, women used OTC pain relievers more often than men and only 3% never used such medications. However, definite heavy users were generally older, especially women over 55 years (there were 62% of all female heavy users), and also older men (they represent 55% of the whole male-heavy-users group).

Comparing the obtained results with data delivered by the CBOS report (released in 2010), the authors have observed a slightly higher percentage of consumers (minimum 90% declared using non-

-prescription pain relievers at any time). It was reported by CBOS that 35% of participants did not use such medicines during the last 12 months. Apart from methodological differences, the authors must take into account that this research was conducted among the citizens of an agglomeration, where the availability of medical services and products is higher.

Two cited Polish reports state that the person who buys OTC pain relievers is a middle-aged woman, with a lower level of education and income. The strong point of this research is the fact that the authors have focused not only on buyers but, first of all, on non-prescription pain drugs users. Reconstructing the social portrayal of users the authors found that they are usually older (median age was 56.5 years), with lower level of education and with chronic health problems. The survey confirmed that education may correlate with frequent medicine-taking and its misuse.

Scientific literature regarding the patients’ compliance, adherence, and persistence is recently more popular in Poland. However, the authors have not found compliance of Polish patients using pain relievers.

The search query of English-language literature available in the databases of the Wrocław Medical University enabled us to review several scientific reports on the issue. One of the most interesting and useful articles is the meta-analysis written by Richard J. Cooper “Over the counter medicine abuse – a review of the literature” [14]. Among cross-sectional articles analyzed by Cooper, methodologically, quantitative approaches have dominated, often using self-completion postal surveys of pharmacist participants. The rate responses were in these cases higher than among those users suspected of abusing OTC medicines. In 2005 Wazaify et al. [15] investigated the general public’s opinion and perceptions of OTC medicines, reporting that 76.4% of survey participants indicated painkillers as the ones always kept at home. In 2008 Major and Vincze [16] surveyed 1486 clients of Hungarian pharmacies asking what kind of OTC medicines could be abused: painkillers were the most frequently identified. Generally, the attempts to describe OTC medicine abuse have been made using a variety of methods and data sources. Also, different types of participants were used: physicians, pharmacists, students, purchasers, sportsmen etc. There is a lack of articles and reports referring strictly to the misuse OTC pain medicines.

In the research conducted among 295 clients of French pharmacies [16] it has been stated that the problem of misusing OTC pain relievers may concern 6.8–17% of users. The risk of

abuse was higher in the case of paracetamol users. In this research the “heavy users” more regularly bought medicines with ibuprofenum (Ibuprofen – 57%, Nurofen – 21%, Apap – 42%, Panadol – 4.7%). It has been also stated that users of medicines with ibuprofenum were less likely to comply with instructions: they modified the recommend doses more often than paracetamol users (7.5% vs. 6.9%), shortened intervals between doses (74.5% vs 57.4%), and painkillers (61% vs. 53.6% of paracetamol users). Over 9% of them declared that they never ask for professional advice when taking OTC pain relievers. It can be stated that the risk of misuse in the surveyed population is higher for ibuprofenum users.

The analysis of the collected data answered three main questions put at the beginning of the article. In the survey research conducted among municipal population, using quota sample, the scale of overusing OTC pain relievers was defined. The risk of overusing these medicines applies to minimum 11% of participants (“heavy users”). The most important risk factors of overusing OTC pain relievers were women, over 55 years old and with low health status. Over 1/4 of participants modify the recommendations and 5% do it very often. Over 60% shortened recommended intervals between doses and 16% took two or more different pain drugs (containing different substances). The users took OTC pain relievers for non-medical purposes: when tired (7%), in stressful situations (5.4%), or in case of discomfort (18.4%). Some users take pain medicines to cure hangovers (26%), or instead of the appropriate medicine (7%). About 20% take pain medicines without doctor’s advice longer than for the recommended 3 days, and 10% never consult taking such medicines with doctors.

Education may play a role as an abuse-protecting factor, but there is no statistical confirmation for more compliant behaviors. In some situations the lack of compliance and adherence to instructions may result from the belief that OTC pain relievers are safe.

The presented results show that self-treatment is still a serious issue in Poland. Teaching patients how to safely reduce pain should be a priority for public health services, especially in ageing societies. Pain should be treated aggressively and appro-

priately, particularly among the elderly and chronically ill patients.

The results presented in this article indicate that treating pain in Poland is still a common problem and the scale of using OTC pain relievers is frequently quite large. Teaching physicians how to treat pain as part of the general medical advice should be a priority in all ageing societies. Pain should be treated aggressively and successfully, especially among chronically ill patients. We should monitor the consumption of OTC pain relievers and limit their current oversupply and high availability.

We should also consider attaching warnings on packages of OTC pain relievers. First of all, we should make physicians more involved in educating their patients how to use painkillers safely, showing them the right doses and possible dangerous interactions with other medications. Pharmacists or nurse staff may also play an important educational role regarding the administration of pain-relieving drugs. We need more research showing how patients use OTC pain relievers on their own. It is important to highlight that pain self-treatment expresses patient’s activity within the area of his/her health and doctor (nurse, pharmacist) should be the source of reliable information about over-the-counter drugs therapy. A Polish national campaign presenting the health consequences of abusing and misusing such medicines and highlighting the potential harm of the accumulation of doses and drug interaction would be also beneficial. This article presents research of consumers’ preferences in the pharmaceutical market. The results describe the issue and its scale in the population of a big city. The significance of our research consists of a detailed analysis of some demographic and social factors of OTC pain relievers’ misuse. The amount of such research in the Polish scientific literature is still insufficient. Their practical potential may be used as a basis for educational interventions addressed to three groups – patients, physicians and pharmacists. In the future we should also consider entering information regarding patients’ use of OTC pain relievers to their records (general patients’ database), so doctors could take a detailed medical history and offer effective treatment.

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Address for correspondence:

Dominik M. Krzyżanowski
Faculty of Health Science
Department of Public Health
Wrocław Medical University
Bartla 5
51-618 Wrocław
Poland
E-mail: dominik.krzyzanowski@umed.wroc.pl

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