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Artur Turek, Aleksander Owczarek
Medical University of Silesia

**DETERMINANTS OF CONSUMPTION
BEHAVIOR OF OVER-THE-COUNTER
MEDICATIONS – THE CASE
OF PAINKILLERS AND
ANTI-INFLAMMATORY MEDICATIONS**

Introduction

The Office for Registration of Medicinal Products, Medical Devices and Biocidal Products announced that in 2010, Poland had been the sixth largest medications market in Europe (URPL, 2010). For several years in Poland a gradual increase in spending on medications can be observed. As far as in 1995, the typical Pole spent on average PLN 5 on medications monthly, while in 2009, they spent already PLN 29 (Skrzypczak, 2011). During recent years the increase in expenditure on medications in Poland was confirmed by various independent sources concerning the sale and the consumption on the pharmaceutical market (CBOS, 2010a; Money.pl, 2010; Monitor Zdrowia OSOZ, 2010; URPL, 2010; Skrzypczak, 2011).

In this context, high consumption of over-the-counter (OTC) medications in Poland (CBOS, 2010a) and customer behavior on the pharmaceutical market are particularly interesting. OTC medications belong to the group of medications which are sold directly to the consumers without a prescription (Dz.U., 2001). Various determinants influence the behavior pattern on this market in different ways and with various power (Smith, 1991; Smith and Coons, 1992; Holdford, 2007; Smith et al., 2009).

OTC medications were, are and will be taken by consumers in various situations. They are not always really needed because medications may help, harm or have no therapeutic effect. The behavior of the majority of consumers on the market of OTC medications may be partly a reflection of the typical model of stimulus-response of the buyer. In this model, various determinants of consumption behavior may play a certain role in the presence of ailments and a different one in case of their lack. Regarding the above mentioned thesis, some determinants influencing OTC medications consumption of consumers, or rather patients or ill people, may take place in the sequence of events: stimulus (ailment), need (take the ailment away), and satisfaction (no ailment). However, the ailments may significantly change the level and the kind of consumption of OTC medications. In turn, other determinants may interact with the marketing stimuli and environmental stimuli, also changing the typical model of stimulus-response of the buyers.

However, in this work determinants of consumption behavior of OTC painkillers and OTC anti-inflammatory medications will be studied. The determinants are closely related to the occurrence or the co-occurrence of ailments, i.e. pain and/or inflammation.

Most often the needs (take the ailment away) for the medications (including OTC medications) result from patho- and physiological stimuli. Secondly, taking into account mainly these stimuli, the needs for the OTC medications are mainly

'created' by biological factors or external factors (e.g. random events). Therefore, they are in large part independent of consumers. Getting satisfaction is directly related to personal factors and often subjective. Undoubtedly, health is one of the needs bringing the highest level of dissatisfaction. Therefore, the increase in spending on OTC medications in Poland may be due to the growing needs of the broadly understood notion of health and also come as the result of aging of the Polish population (Błędowski et al., 2011; GUS, 2011b). However, it should be emphasized that lifestyle belongs to the important factors equally creating the needs on the OTC medications market. Nevertheless, the health needs are amplified by completely external factors. Easy access to medicinal products in Poland is certainly one of the factors determining the consumption level. In 2010, according to Central Statistical Office in Poland (pol. *Główny Urząd Statystyczny* – GUS) there were 11 297 pharmacies and 1161 pharmacy outlets (GUS, 2011c). Moreover, apart from them, non-pharmacy outlets can be found everywhere.

On the other hand, strong demand for medicines in the OTC market in Poland may result from the limited availability of medical visits (CBOS, 2008; CBOS, 2010b). Therefore, it may be assumed that consumer behavior is the result of the substitution of prescription medications (Rx medications) with OTC medications.

Besides, the intense marketing efforts of pharmaceutical companies are also a significant factor in the creation of health needs (Press.pl, 2012). Data obtained in the period 2.27.2012-3.04.2012 provided by Nielsen Audience Measurement revealed that only in Poland spending on television advertising of health products and medicines amounted to PLN 51 915 056.10 (Press.pl, 2012). Therefore, advertising OTC medications belongs to the important marketing stimuli.

In the last decade in Poland, the consumption of OTC painkillers and OTC anti-inflammatory medications was discussed many times in the press (ePacjent.pl, 2004; Wdowiak et al., 2006; Hurtidetal.pl, 2007; Rynekdrowia.pl, 2009). However, the influence of determinants on the consumption behavior was not determined in Poland.

On the presented background of the data there are interesting determinants of consumption behavior of OTC painkillers and OTC anti-inflammatory medications in Poland.

The purpose of this work was to identify the influence of individual determinants on the consumption behavior of OTC painkillers and OTC anti-inflammatory medicines.

The structure of this work consists of three parts and conclusions. The first part has a theoretical character and it is the basis for discussion. The next part, i.e. description of the research method, concerns the methodological issues; the source of data and statistical methods are determined. In the last part the results with their discussion are presented. The conclusion highlights the most important results with comments.

1. Theoretical background

Diseases, ailments and often subjective feelings directly affect the consumption of medications and consumer behavior (Smith, 1991; Smith and Coons, 1992; Holdford, 2007; Smith et al., 2009). Pain is one of them. According to the studies performed in the United States, in case of about one-third of people pain was “disabling” and had a great influence on daily life functions (Portenoy et al., 2004). The study performed by Pentor in Poland revealed that pain was a frequent ailment of Poles. In this study 62% of respondents indicated headaches and migraines, 58% – muscle and joint pain, 52% – backbone pain and 42% – pain in teeth and gums (Pentor, 2010).

In Poland pain as a common ailment is closely related to the increase in expenditure and consumption growth in the use of OTC painkillers and OTC anti-inflammatory medications. According to the data published by Public Opinion Research Center (pol. *Centrum Badań Opinii Społecznej* – CBOS), within 12 months 65% of respondents in Poland used OTC painkillers and OTC anti-inflammatory medications (CBOS, 2010a).

Nowadays, one can speak about the abuse of this group of medications. However, this phenomenon is not only Polish “problem”, but rather a general one (Wazaify et al., 2005; Lodorfos et al., 2006; Tisman, 2010; Calamusa et al., 2012).

What is the reason for this state of affairs? These considerations should start with identifying what the pain and inflammation are and how they are treated. International Association for the Study of Pain (IASP) under the leadership of John Bonica gave the most common definition of pain currently used. According to IASP, “Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (Bonica, 1979).

Pain is a normal reaction that can protect the integrity of the organism in the face of a potentially harmful environmental stimulus. Pain plays the role of a signaling system. If the pain is short, it is quick information; it can be said that the signal (the pain) is “positive” information. However, if the pain lasts a long time (i.e. chronic pain), it becomes a symptom that brings unnecessary suffering to the customers (patients).

Many definitions of inflammation can be found in the literature. According to popular science literature, inflammation is the reaction of living tissue to injury or infection, characterized by heat, redness, swelling, and pain (Thefreedictionary.com). However, from the medical point of view inflammation is part of the non-specific immune response that occurs in reaction to any type of bodily injury and the cardinal signs of inflammation can be explained by increased blood flow, elevated cellular metabolism, vasodilatation, release of soluble mediators, extravasation of fluids and cellular influx (Ferrero-Miliani et al., 2007). In some sense the pain is the consequence of inflammation.

In the Polish pharmaceutical market, the group of OTC painkillers and OTC anti-inflammatory medications is practically represented by non-steroidal anti-inflammatory drugs (NSAIDs) (BLOZ, 2012; Urzędowy wykaz produktów leczniczych dopuszczonych do obrotu na terytorium Rzeczypospolitej Polskiej, 2012). In chemical terms, these drugs are not a homogenous group. However, they are characterized by analgesic and antipyretic effects in low doses and in higher doses they exhibit additional anti-inflammatory effect (Janiec and Krupińska, 1995). The pain and the inflammation are a signal indicating mainly pathological changes in organism. When it occurs, the consumer needs associated with relieving the pain as quickly as possible appear.

Taking into account the fact that OTC painkillers belong to one of the medication groups which are still used most frequently, literature provides relatively little data on the determinants of consumption behavior of OTC painkillers and OTC anti-inflammatory medications considering the whole OTC market (ePacjent.pl, 2004; Wazaify et al., 2005; Hanoch et al., 2007; French and James, 2008; Rynekzdrowia.pl, 2009; Buczak et al., 2010; Monitor Zdrowia OSOZ, 2010; Robinson et al., 2010; Calamusa et al., 2012).

Another object of the studies is the consumption of painkillers and anti-inflammatory medications available on prescription. Literature provides more data on the consumption of Rx painkillers (Hancock et al., 1992; Gilbert et al., 1993; Johnson et al., 1995; CDC, 2009). However, the consumption of these two groups of medications can strongly correlate.

Several authors discuss consumer behavior on the whole pharmaceutical market. Haldford (2007) highlighted the importance of economic, social and personal determinants in the process of consumer decision. Other authors also indicated determinants influencing the consumer behavior and/or consumption in a classical way (Smith, 1991; Smith and Coons, 1992; Holdford, 2007; Smith et al., 2009). However, the behavior of consumers in a situation of feeling pain may totally change the influence of particular determinants on OTC painkillers

and OTC anti-inflammatory medications consumption. Strictly speaking, in the face of pain a number of determinants can change this influence. In the last decade, OTC painkillers and OTC anti-inflammatory medications in term of consumption and consumer behavior and their accompanying effects were discussed in the literature in various ways.

Wazaify et al. (2005) investigated the general public's opinion and perceptions of OTC medicines in terms of their misuse or abuse. The majority of respondents from Northern Ireland were highly aware of the abuse potential of OTC painkillers (Wazaify et al., 2005).

In turn, Hanoch et al. (2007) studied the consumers' knowledge, perceptions, and behaviors with respect to OTC painkillers among the American and German students. It was revealed that significantly more American students took OTC painkillers than did German students. Moreover, it is worrying that the Americans had less knowledge about side effects. This fact might be the result of the situation in which German students consulted medication labels before using OTC painkillers for the first time, which was shown in this study. Furthermore, the Americans were not very likely to consult a doctor in case of pain, but more often used OTC painkillers (Hanoch et al., 2007).

However, French and James (2008) examined the patterns of mild painkillers usage in a sample of 291 students attending a large English university. It was revealed that one sixth of respondents exceeded the maximum dose of the painkiller.

Buczak and co-workers (2010) investigated 267 Polish secondary school students to check how TV commercials affected taking OTC painkillers. The study showed that 40.6% of the students used OTC painkillers very often; almost a half of them, i.e. 47.1%, used medications known from commercials (Buczak et al., 2010).

Calamusa and co-workers (2012) analyzed risk awareness about OTC medicines, and *inter alia* OTC painkillers. 64.3% of respondents from 1206 adults aged 18 years had no knowledge about the fact that people with high blood pressure should use painkillers carefully (Calamusa et al., 2012).

However, scientific literature is rather poor in the scope of indication of consumption determinants of OTC painkillers and OTC anti-inflammatory medications and in the scope of consumer behaviors in this market. This problem is also noticeable in the field of the Polish OTC market. Research in this area may allow limiting the uncontrolled consumption of NSAIDs and perhaps their rationalization. Such studies may also influence the explanation of the causes and effects of the consumption of OTC painkillers and OTC inflammatory medications.

2. Description of the research method

In the present work, the results of the study “Use of OTC medications” performed by CBOS in August 2010 in the field of OTC painkillers and OTC anti-inflammatory medicines in the period of twelve months were used (CBOS, 2010a). The questionnaire interview was implemented using the face to face method in respondents’ homes. It was conducted using the method of Computer Assisted Personal Interviewing (CAPI). The study was performed on a representative sample of Polish adult population (n=1041) who were at least 18 years of age. The sample was selected randomly from the PESEL database (Universal Electronic System for Registration of the Population – pol. *Powszechny Elektroniczny System Ewidencji Ludności* – PESEL).

The following determinants were subjected to the analysis: gender; age; number of persons and children under 14 years of age in the household; place of residence; salary; receiving pension; employment status; level of education; health condition assessment; behavior in case of sickness, pain or any discomfort; number of medical visits; consultation of use of OTC painkillers and OTC anti-inflammatory medications with the doctor or pharmacist if these medications are used for the first time; reading the drug leaflet contents if the drug is used for the first time; views on the possibility of harmfulness of OTC painkillers and OTC anti-inflammatory medications use; concomitant use of gastrointestinal drugs with OTC painkillers and OTC anti-inflammatory medications.

Statistical analysis was performed using STATISTICA 10.0 PL software (StatSoft Polska, Cracow, Poland) and R software environment.

The results were presented as mean values \pm standard deviation for quantitative data and as percentage in case of ordinal or dichotomous data. Distribution of variables was evaluated by the Shapiro-Wilk test. Homogeneity of variances was assessed by the Levene test. Quantitative variables were compared with one-way multivariate analysis of variances. Contingency tables were analyzed with χ^2 test.

Correspondence analysis with hierarchical clustering based on agglomerative algorithm with Euclidean distance and Ward’s agglomeration method were used in order to assess associations between OTC painkillers and OTC anti-inflammatory medications use frequency and demographic, socio-economical and also behavioral determinants. All the tests were two-tailed and considered as statistically significant with a p value of < 0.05 .

3. Results and discussion

Undoubtedly pain is a relatively ‘democratic’ complaint. Without analysis of any data it can be stated *a priori* that pain concerns both genders, all ages, and professional and socio-economic groups of each community. However, the place of residence, the level of education, employment status and salary may influence consumption behaviors of the OTC painkillers and OTC anti-inflammatory medications.

Customers’ behavior in the field of medicines differs from behavior on the market of non-health products (Holdford, 2007). Referring to the theory of Maslow’s hierarchy of needs, the use of OTC painkillers and OTC anti-inflammatory medications resulting in taking the pain away belongs to the most fundamental needs (Maslow, 1943).

Pain has also a crucial impact on the mental state. Pain causes irritability, psychomotor agitation, depletion of interest, depressed mood and proneness to crying. It also disrupts functioning in society. It can be said that painkillers and anti-inflammatory medications re-establish physiological homeostasis of organisms and also homeostasis in a broader sense, i.e. the socio-economic and behavioral one.

In 2010 it was revealed that 65% of Polish respondents used OTC painkillers and OTC anti-inflammatory medications within 12 months (CBOS, 2010a). Other source showed that in Poland in 2009 115 008 267 packages of all painkillers worth about PLN 1 080 273 324 were sold (Monitor Zdrowia, OSOZ, 2010). The studies concerning the use of OTC medications were also conducted in other countries. In the review paper Abbott and Fraser (1998) informed that in Western countries up to 70% of the population used painkillers regularly (Abbott and Fraser, 1998). Generally OTC painkillers and OTC anti-inflammatory medications are often used; nevertheless, they do not have narcotic action (Zejca and Grzegorzczuk, 2002), but can be misused. However, on the market there are medical composite products from the group of OTC painkillers which are commonly used and contain addictive substances, i.a. codeine (Robinson et al., 2010).

In this article, the factors that affect consumption behavior of OTC painkillers and OTC anti-inflammatory medications can be identified as (i) demographic determinants: gender; age; number of persons and children under 14 years of age in the household; place of residence; (ii) socio-economic determinants: salary; receiving pension; employment status; level of education; (iii) behavioral determinants: health condition assessment; behavior in case of sickness, pain or any discomfort; number of medical visits; consultation use of OTC painkillers and OTC anti-inflammatory medications with the doctor or pharmacist if these medications are used for the first time; reading the medication leaflet contents if the drug is used for the first time; views on the possibility of the harmfulness of

OTC painkillers and OTC anti-inflammatory medications use; concomitant use of gastrointestinal drugs with OTC painkillers and OTC anti-inflammatory medications.

Statistically significant and non-statistically significant differences in factors and behavior were noted. Most of the variables were statistically significant. Among them are: gender; age; number of persons and children under 14 years of age in the household; salary; receiving pension; health condition assessment; behavior in case of sickness, pain or any discomfort; number of medical visits; consultation with the doctor or pharmacist and reading the medication leaflet contents if the drug was used for the first time; views on the possibility of the harmfulness of OTC painkillers and OTC anti-inflammatory medications use; concomitant use of gastrointestinal drugs with OTC painkillers and OTC anti-inflammatory medications. However, place of residence, level of education, and employment status were not statistically significant.

Four out of five analyzed demographic determinants, i.e. gender, age, number of persons and children under 14 years of age in the household, were statistically significant in this study.

Gender determines many kinds of behavior. In this study, statistically significant difference in gender distribution in particular groups of frequency of painkillers and anti-inflammatory medications use were observed ($\chi^2 = 59.3$, $p < 0.001$). Women used OTC painkillers and OTC anti-inflammatory medications more frequently (Table 1). 74.43% of women and 25.57% of men used OTC painkillers and OTC anti-inflammatory medications many times, several times – 61.39% of women and 38.61% of men and occasionally – 48.99% of women and 51.01% of men. It should be noted that nearly 60% of men never used this group of medications.

These results correspond with other data concerning purchases of OTC medications in Poland which revealed that the medications were predominantly purchased by women (Wdowiak et al., 2006). In turn, in another study conducted by CBOS, it was also shown that women treated themselves more often (CBOS, 2008). However, Smith and co-workers indicated another aspect of medications use by women: women used more medications than men because they live longer. Moreover, women also buy the medications for family members and others (Smith et al., 2009). Analyzing the market of OTC painkillers and OTC anti-inflammatory medications and also demographic and epidemiological variables, one sees that women play an important role in all communities and also on the pharmaceutical market.

According to National Center for Health Statistics in the United States, in 2004 27.1% of women and 24.4 % of men were in pain in general population (National Center for Health Statistics, 2006). The data considering only migraine

(common pain disorder) only in the United States have shown that women suffer from this complaint approximately 3 times more than men (Lipton, 2001). However, an important role in women's consumption of OTC painkillers and OTC anti-inflammatory medications may be played by various physiological and pathophysiological features, such as hormones and obesity (Peterlin et al., 2012; Racine et al., 2012; Wandner et al., 2012). Painful experience modulation is also determined by gender (Palmeira et al., 2011). On the other hand, unambiguous stereotypes function in various societies. Moreover, much of the advertising of OTC painkillers taken when feeling pain is addressed to women. In Poland, there are some medical products for women containing apparently 'specially' designed composition of the pharmacologically active substances, such as Nurofen Menstrual, Ibuprom Duo or No-spa (which does not exert analgesic action).

Table 1. Influence of gender on use frequency of OTC painkillers and OTC anti-inflammatory medications

OTC painkillers and OTC anti-inflammatory medications use frequency	Gender [%]	
	Male	Female
Many times	25.57	74.43
Several times	38.61	61.39
Occasionally (1-2 times)	51.01	48.99
Never	58.06	41.94

Source: CBOS (2010a).

The next analyzed demographic determinant was age. This determinant is obviously related to gender because women live longer than men. Logically thinking, age is the factor which should have the strongest influence on the use frequency of OTC painkillers and OTC anti-inflammatory medications. However, age is an important factor in creating the personal behavior of consumers on the whole OTC medication market. Consumers buy medications at all stages of their lives. It is a known fact that older people use more medicines than the younger people. Moreover, in the total population the proportion of the elderly is growing in developed countries (Smith et al., 2009).

From the medical point of view, age is an important variable determining the use of all medications. Strictly speaking, it concerns the biotransformation of medications, the process which makes a substance more water-soluble, resulting in the increase of the rate of its excretion through the urine. The process involves the microsomal enzyme whose activity is reduced in old age. Older consumers should not take some medications at all, or only in smaller doses.

In the present study, age significantly influenced the use frequency of OTC painkillers and OTC anti-inflammatory medications. Statistically significant

differences ($F = 10.8$, $p < 0.001$) at the mean age in particular groups of use frequency of painkillers and anti-inflammatory medications were shown. OTC painkillers and OTC anti-inflammatory medications were used most frequently by the respondent group with the mean age of 50.8 (Table 2). Several times and occasionally these medications were used by consumers at the mean age of 48.0 years and 44.9 years, respectively. However, according to the other study from 2006, in Poland the group of OTC painkillers were predominantly purchased by consumers younger than 40 years of age (Wdowiak et al., 2006). However, buying does not mean using.

One cannot generalize, but pain may occur in each age group. However, the study of Crook and co-workers (1984) has revealed that any change in the overall prevalence of pain was not associated with an increasing age. Moreover, the authors also pay attention to the fact that the pattern of pain prevalence may change in different parts of body with age. From the social point of view, the extent to which pain interferes with everyday life increases incrementally with age (Crook et al., 1984). However, the inflammations are treated generally more frequently in older representatives of the population. Nevertheless, the presented studies in this work involved adult population with the range of 20-88 years. In Poland, NSAIDs TV advertising is often targeted at the safety and effectiveness in the elderly part of population, as in case of Apap or Aleve. Studies of influence of TV commercials on the use of painkillers by Polish secondary school students have shown that 40.6% of participants use them very often. 47.1% of them reach for medications which they know from advertisements (Buczak et al., 2010).

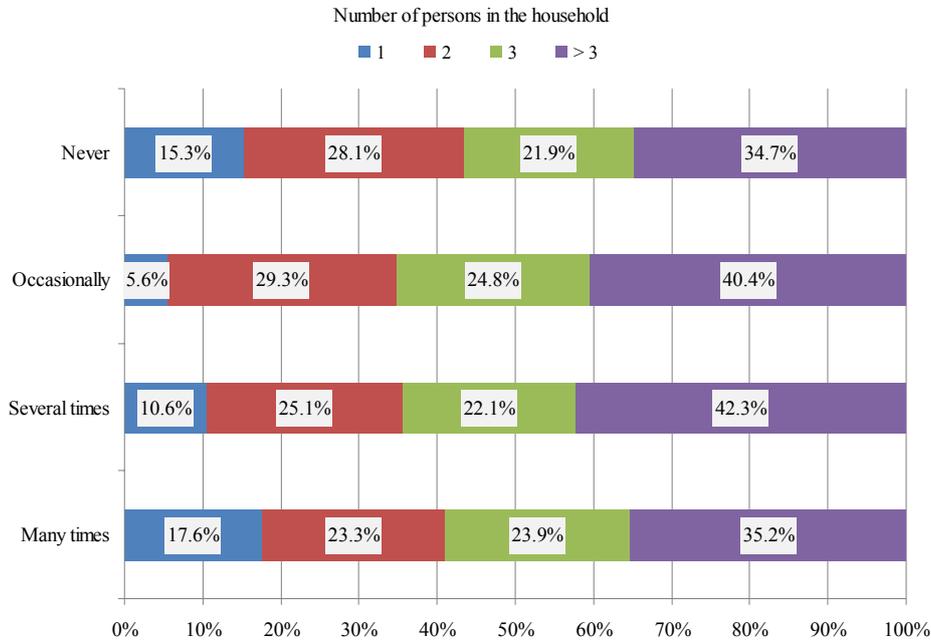
The consumption of OTC painkillers and OTC anti-inflammatory medications is significantly affected by a number of persons in the household. People from birth to achieving their independence affect the parents' interest in the different groups of medications, including OTC painkillers and OTC anti-inflammatory medications.

Table 2. Influence of mean age on OTC painkillers and OTC anti-inflammatory medications use frequency

OTC painkillers and OTC anti-inflammatory medications use frequency	Age (mean) [years]	SD
Many times	50.8	18.2
Several times	48.0	18.5
Occasionally (1-2 times)	44.9	16.8
Never	53.4	18.6

Source: CBOS (2010a).

Figure 1. Influence of the number of persons in the household on OTC painkillers and OTC anti-inflammatory medications use frequency



Source: CBOS (2010a).

In 2010 GUS revealed data concerning general information on households in Poland. According to them the average number of persons in the household was 2.89 and the average number of consumption units in the household in case of marriage without children was 1.85, in case of marriage with one dependent child – 2.48, with two dependent children – 3.13, and with three and more dependent children – 4.10, while in case of mother or father with dependent children it was 1.87 (GUS, 2011a).

In this study, there were revealed statistically significant differences in the distribution of the number of persons in the household in particular groups of use frequency of OTC painkillers and OTC anti-inflammatory medications ($\chi^2 = 23.4$, $p < 0.05$) (Figure 1).

However, it is hard to say clearly why the number of persons influenced OTC painkillers and OTC anti-inflammatory medications use frequency. Analyzing data presented in Figure 1 and accepting some generalizations, one can assume that in case of one person in the household the children were not raised. In this case only 17.16% of respondents used OTC painkillers and OTC anti-inflammatory medications many times. In case of the other groups minimum one child or possess older people under the care might be present. The potential for

transmission of diseases manifested by pain and inflammation was more possible. Forming one group from the households represented by 2, 3 and 3 and more persons can account for the fact that 82.40% of respondents used OTC painkillers and OTC anti-inflammatory medications many times (Figure 1). Still, it can only be a certain hypothesis on the correlation between the number of persons in a household and the level of consumption.

However, this hypothesis could be not confirmed directly in the next case concerning the influence of the number of children under 14 years of age in the household on OTC painkillers and OTC anti-inflammatory medications use frequency. However, the relationship between use frequency of OTC painkillers and OTC anti-inflammatory medications and the number of children under 14 years of age in the household was also revealed. Statistical analysis showed significant differences in the distribution of the number of children under 14 years of age in the household in particular groups of use frequency of OTC painkillers and OTC anti-inflammatory medications ($\chi^2 = 13.0$, $p < 0.05$). Still, the more children, the less frequent use of OTC painkillers and OTC anti-inflammatory was shown (Table 3). Thus, being in a larger group did not influence the increase of OTC painkillers and OTC anti-inflammatory medications use frequency. It can be assumed that the respondents who do not have children under 14 years of age in the household could simply be older. As mentioned above, there were significant statistical differences in the average age in particular groups of use frequency of painkillers and anti-inflammatory medications (Table 2). Older respondents used more OTC painkillers and OTC anti-inflammatory medications. On the other hand, the respondents who have children are particularly interested in health.

Table 3. Influence of the number of children under 14 years of age in the household on OTC painkillers and OTC anti-inflammatory medications use frequency

OTC painkillers and OTC anti-inflammatory medications use frequency	Number of children under 14 years of age in the household		
	0	1	2 and more
Many times [%]	67.59	25.52	6.90
Several times [%]	65.31	20.30	14.39
Occasionally (1-2 times) [%]	71.12	19.25	9.63
Never [%]	67.21	16.72	16.07

Source: CBOS (2010a).

Out of socio-economic determinants only two, i.e. salary and receiving pension had significant influence on the use frequency of OTC painkillers and OTC anti-inflammatory medications.

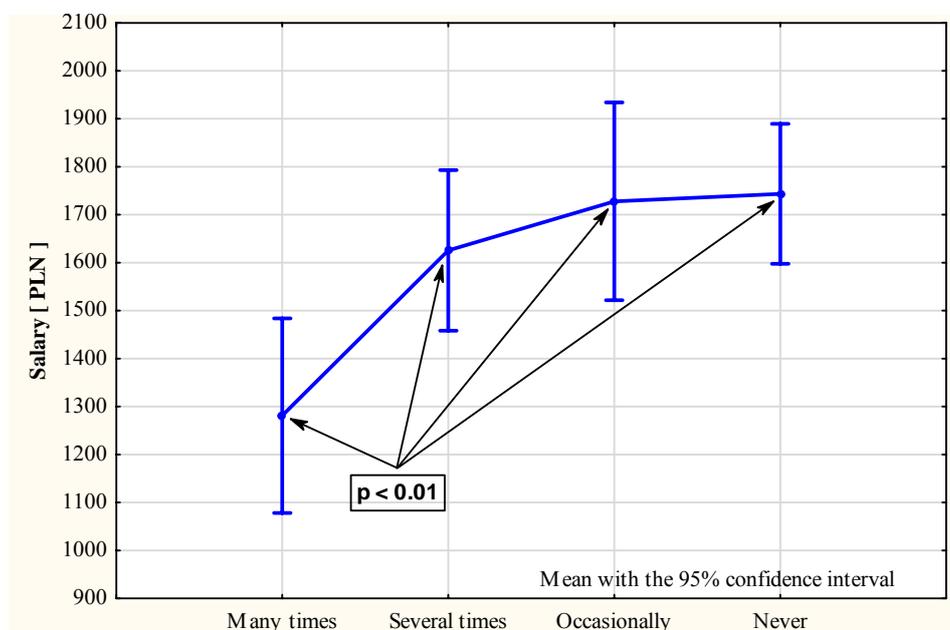
In this study, statistically significant differences in salary in particular groups of the use frequency of OTC painkillers and OTC anti-inflammatory medications were shown ($F = 6.8$, $p < 0.001$) (Figure 2). Generally, salary belongs to the significant factors of consumer behavior. However, in various fields of market it plays a different role. According to Smith and co-workers, economic status is an important variable regarding the use of Rx or OTC medications (Smith et al., 2009). In this study, the group of respondents taking OTC painkillers and OTC anti-inflammatory medications many times had the lowest salary, i.e. PLN 1281.10 ± ± 787.6 (Figure 2). It is assumed that this group of respondents may have difficult access to medical care due to economic reasons. The respondents from this group might experience the higher frequency of pain symptoms.

The analogies may be found in the study conducted by Gfk Polonia, according to which every third Pole looks for medications with lower prices (Rynekapteka.pl, 2010). Undoubtedly, low-salary consumers are looking for the cheapest drugs. However, another author gave the different opinion. Salary is not necessarily the primary determinant of consumer behavior in the pharmacies. Consumers suffering sporadically are not sensitive to the price of medications. However, hypochondriacs expect a good drug and the price does not play a significant role (Szalonka, 2005). It must also be noted that the value of OTC painkillers market in Poland reaches a billion PLN and is still growing. Nonetheless, the main factor influencing the growth of the market is still the rising price of the package, which has increased by 52% during nine years (Monitor Zdrowia OSOZ, 2010).

The differences in the distribution of receiving pension in particular groups of use frequency of painkillers and anti-inflammatory medications were observed ($\chi^2 = 22.9$, $p < 0.001$).

In Poland, pensioners are the important part of society and play an undeniably significant role on the market of OTC painkillers and OTC anti-inflammatory medications. According to the study of GUS, in 2010 the number of pensioners in Poland was more than 9 million persons (an exact 24.2% of population). Benefits were paid because of age and inability to work (GUS, 2012). Therefore, generally pensioners should use medications more often than non-pensioners. However, in this study it was revealed that 42.05% of customers receiving pension used OTC painkillers and OTC anti-inflammatory medications many times, 33.99% of pensioners used them several times and 27.27% used them occasionally. This group of medications was more frequently used by non-pensioners: many times they were used by 57.95% of pensioners, several times – by 66.01% of them and occasionally – by 72.73% of them (Table 4). This situation might result from the fact that pensioners might have contraindications to the use of NSAIDs because of health condition or they used only Rx painkillers and Rx anti-inflammatory medications.

Figure 2. Comparison of the salary between groups using OTC painkillers and OTC anti-inflammatory many times, several times, occasionally or never



Source: CBOS (2010a).

Table 4. Influence of receiving pension on OTC painkillers and OTC anti-inflammatory medications use frequency

OTC painkillers and OTC anti-inflammatory medications use frequency	Pensioners [%]	Non-pensioners [%]
Many times	42.05	57.95
Several times	33.99	66.01
Occasionally (1-2 times)	27.27	72.73
Never	46.11	53.89

Source: CBOS (2010a).

In this work, all of analyzed behavioral determinants were statistically significant. Among them were: health condition assessment; behavior in case of sickness, pain or any discomfort; number of medical visits; consultation with the doctor or pharmacist and reading the drug leaflet contents if the drug is used for the first time; views on the possibility of the harmfulness of OTC painkillers and OTC anti-inflammatory medications use; concomitant use of gastrointestinal drugs with OTC painkillers and OTC anti-inflammatory medications.

Analyzing the influence of OTC painkillers and OTC anti-inflammatory medications use frequency one should define the kinds of patients (consumers). According to one of the divisions cited in Polish sources there are: (i) experimenters, who treat themselves reading medical literature, track the advertising of new medications, often turn to the pharmacist and a doctor for advice and are interested in a rapid removal of the ailment; (ii) subservient patients, who care about their health, regularly check the condition of their health, use recommendations of doctors and buy only prescribed medications; (iii) hypochondriacs, who care too much about their own health, continually developing medical knowledge, and buy a lot of new medications; (iv) ignorant patients, who do not care about their health, do not visit the doctor, and in case of ailment locate it and go to the pharmacy (Pilarczyk, 2004).

Generally, this division will not always prove right in case of OTC painkillers and OTC anti-inflammatory medications.

Undoubtedly, health condition assessment always has a strong influence on the behavior. Another study underlined that this determinant was particularly important for older customers (Świtła, 2009). The respondents with lower assessment of health condition have to pay more due to the necessity of purchasing goods and services related to health. The most frequently memorized marketing message was the advertisements of health products and especially medications (Świtła, 2009). Undoubtedly, this was due to the hierarchy of needs of the elderly, as well as to the mechanism of needs formation. In the present study, the influence of health condition assessment on OTC painkillers and OTC anti-inflammatory medications use frequency was shown. Statistically significant differences in the distribution of health condition assessment in particular groups of use frequency of OTC painkillers and OTC anti-inflammatory medications were observed ($\chi^2 = 45.7$, $p < 0.001$). As mentioned earlier, according to different sources, in 2010 Poles were the European leaders in medications use (URPL, 2010). The part of population declaring their health condition as bad or very bad should use relatively large quantities of medications. However, in the present study the opposite phenomenon was observed in case of taking OTC painkillers and OTC anti-inflammatory medications. Only 16.48% of respondents declaring the health condition as bad and only 5.11% of respondent declaring the health condition as very bad used OTC painkillers and OTC anti-inflammatory medications many times. Nonsensically, the group declaring the health condition as good (27.84%) and as average (39.77%) used OTC painkillers and OTC anti-inflammatory medications often (Table 5).

In this case, properties of NSAIDs as medical products and health condition were significant. The interactions of NSAIDs with other pharmacologically active substances (Rainer, 1983; Verbeeck et al., 1983; Peláez-Ballestasa et al., 2005) and side effects (Bavry et al., 2011) are commonly known. Thus, two groups of respondents, i.e. declaring the health condition as bad and very bad, could not apply OTC painkillers and OTC anti-inflammatory medications from purely medical reasons. This does not indicate that these consumers did not need this medication group. What is more, it does not mean that they did not use drugs prescribed by a doctor.

Table 5. Influence of health condition assessment on OTC painkillers and OTC anti-inflammatory medications use frequency

OTC painkillers and OTC anti-inflammatory medications use frequency	Health condition assessment [%]				
	Very good	Good	Average	Bad	Very bad
Many times	10.80	27.84	39.77	16.48	5.11
Several times	13.53	39.93	32.01	11.22	3.30
Occasionally (1-2 times)	23.23	46.46	23.74	5.05	1.52
Never	15.56	38.06	31.67	9.17	5.56

Source: CBOS (2010a).

The analysis considering the study of behavior in case of sickness, pain or any discomfort and the influence on OTC painkillers and OTC anti-inflammatory medications use frequency provided interesting data. Statistically significant differences in the distribution of behavior in case of sickness, pain, or any discomfort in particular groups of OTC painkillers and OTC anti-inflammatory medications use frequency were noted ($\chi^2 = 58.6$, $p < 0.001$).

On the basis of obtained data various kinds of behavior in case of sickness, pain or any discomfort were shown. However, three dominant groups were observed which use OTC painkillers and OTC anti-inflammatory medications with the greatest frequency, i.e. (i) consumers who used reliable household methods, (ii) consumers who used an immediate medical visit and the Rx medications, and (iii) consumers who did not use a medical visit and used OTC medications. Other groups were less important in the consumption of OTC painkillers and OTC anti-inflammatory medications, i.e. (iv) consumers who did not take action and waited until the symptoms disappeared and (v) consumers who used alternative medicine, or reacted in any other way (Table 6).

The first group used reliable household methods and OTC painkillers and OTC anti-inflammatory medications many times (31.61%), several times (29.00%) and occasionally (35.35%). These consumers could be experimenters

and/or hypochondriacs. In general, proven household methods are accepted and commonly used. As showed in other studies, this method of treatment was used by 52% of Polish respondents (CBOS, 1998). Other studies performed by Braun and co-workers indicated that pharmacy customers widely used herbal medicines and nutritional and dietary supplements, i.e. complementary medicines (Braun et al., 2010). On the one hand, this phenomenon might be the result of traditional approaches to therapy, avoidance of the side effects of medical products or the limited availability of medical visits. On the other hand, it is hard to indicate the effectiveness of the use of reliable household methods in the treatment of pain, particularly in case of chronic pain. Household methods can be the last resort, but are they proven methods? Literature data showed that complementary medicine may be used in the treatment of musculoskeletal pain as an alternative (Grazio and Balen, 2011). However, it should be remembered that many medical products include the substance which come from natural products. Their use is strongly anchored in the tradition. For a long time, in case of the therapy of pain and inflammations the use of the plant material, e.g. willow bark, has been commonly known. It is worth emphasizing that the history of aspirin started in ancient Egypt (Vainio and Morgan, 1997). What is more, the alternative to NSAIDs is still searched for in the botanic world to avoid side effects (Yang et al., 2012).

It was also revealed that significantly fewer consumers who used alternative medicine or reacted in any other way used OTC painkillers and OTC anti-inflammatory medications many times (1.72%), several times (2.00%) and occasionally (3.03%) (Table 6). The phenomenon observed in this work is completely understandable because consumers who use alternative medicine should avoid medical products proper, including OTC painkillers and OTC anti-inflammatory medications. This group of consumers could also be experimenters and/or hypochondriacs. However, in case of pain and inflammation alternative medicine should only be an addition to conventional medicine, not the basis.

The consumers who used an immediate medical visit and the Rx medications used OTC painkillers and OTC anti-inflammatory medications as follows: many times – 27.59%, several times – 28.33% and occasionally – 22.22% – Table 6. It can be said they are more ‘patients’ than ‘consumers’ and according to the above shown divisions of patients they are subservient patients and/or hypochondriacs. They care about health, often excessively. One can risk and say they use too many medications and use them too often.

The significant number of respondents who did not visit the doctor and took OTC medications used also OTC painkillers and OTC anti-inflammatory medications many times 29.89%, several times 32.00% and occasionally (28.79%)

– Table 6. This consumer behavior could be the result of a desire to quickly meet the needs or of the limited availability of medical visits (CBOS, 2008; CBOS, 2010b), or of easy access to medicinal products. From psychological point of view those could be experimenters and/or ignorant patients.

The last analyzed group of consumers in case of sickness, pain and other discomfort did not act and waited until the symptoms disappeared. These consumers used OTC painkillers and OTC anti-inflammatory medications many times in 9.20%, several times in 8.67% and occasionally in 10.61%. It is assumed that these consumers did not normally use medications, but in extreme situations they used OTC painkillers and OTC anti-inflammatory medications. This behavior may indicate that these consumers belong to the ignorant group.

According to the obtained results, it is not possible to say clearly that such behavior as: using reliable household methods; an immediate medical visit and the use of the Rx medications; no medical visit and the use of OTC medications; no action, waiting until the symptoms disappeared; using alternative medicine, or any other reaction took place only in case of the therapy of pain and inflammation to remove these negative symptoms. The presented results only indicate the fact of the use frequency of OTC painkillers and OTC inflammatory medications in the aspect of consumer behavior in situations such as sickness, pain or any discomfort.

Table 6. Influence of behavior in case of sickness, pain or any discomfort on OTC painkillers and OTC anti-inflammatory medications use frequency

OTC painkillers and OTC anti-inflammatory medications use frequency	Behavior in case of sickness, pain or any discomfort [%]				
	The use of reliable household methods	The immediate medical visit and the use of the Rx medications	No medical visit and the use of OTC medications	No action, waiting until the symptoms disappeared	The use of alternative medicine or any other reaction
Many times	31.61	27.59	29.89	9.20	1.72
Several times	29.00	28.33	32.00	8.67	2.00
Occasionally (1-2 times)	35.35	22.22	28.79	10.61	3.03
Never	29.81	33.98	13.09	18.66	4.46

Source: CBOS (2010a).

In this study, statistically significant differences in the distribution of the frequency of medical visits in particular groups of use frequency of OTC painkillers and OTC anti-inflammatory medications were also revealed ($\chi^2 = 73.0$, $p < 0.001$). The respondents using medical visits 5 and more times took OTC painkillers and OTC anti-inflammatory medications with the highest frequency,

i.e. they declared the use of these medications ‘many times’ (47.65%), ‘several times’ (35.29%) and ‘occasionally’ (20.00%) – Table 7. Certainly, these groups were not subservient patients. Despite the medical visit, they used the additional drugs. This group might be experimenters or hypochondriacs or simply they were sick, in pain or the treatment by prescribed medications was not sufficiently effective. It is one of the proofs that taking the pain away belongs to the most fundamental needs. However, if OTC painkillers and OTC anti-inflammatory medications were used in agreement with the doctor or pharmacist, it is correct behavior, and if not, then it is a disturbing phenomenon because of the possibility of interactions with other medications. 36.36% of respondents who used medical visits 5 and more times never took OTC painkiller or OTC anti-inflammatory medications. Undoubtedly, these consumers were subservient patients.

Further analysis of the influence of the number of medical visits on OTC painkillers and OTC anti-inflammatory medications use frequency revealed also that 14.71%, 18.34%, and 24.74% of consumers who did not use medical visits used OTC painkillers and OTC anti-inflammatory medications many times, several times and occasionally, respectively (Table 7). This part of respondents could belong to the ignorant group or were generally healthy persons who were in pain.

Table 7. Influence of the number of medical visits on OTC painkillers and OTC anti-inflammatory medications use frequency

OTC painkillers and OTC anti-inflammatory medications use frequency	Number of medical visits [%]					
	0	1	2	3	4	5 and more
Many times	14.71	11.18	10.00	10.00	6.47	47.65
Several times	18.34	14.88	15.92	8.30	7.27	35.29
Occasionally (1-2 times)	24.74	22.11	16.32	9.47	7.37	20.00
Never	33.52	11.08	7.10	7.10	4.83	36.36

Source: CBOS (2010).

Consultation with the doctor or pharmacist regarding the use of OTC painkillers and OTC anti-inflammatory medications is an important element of pain therapy. These consultations are significantly important if these medications are used for the first time. Doctors, pharmacists and media play various roles in the societies (Fennis, 2003). From *inter alia* the ethical point of view one of them is education about health, treatment, and medications. This is also reflected in information provided in the advertisements of medical products. According to the Disposition of the Ministry of Health on the advertising of medicinal products (Dz.U., 2008) the patients (customers) should, in case of use of medical products, follow information included in the package or presented during commer-

cials: "Before the use read the content of the leaflet insert in the package or consult the doctor or pharmacist because each drug used inappropriately threatens your life and health".

In this study, statistically significant differences in the distribution of consulting the doctor or pharmacist in particular groups of OTC painkillers and OTC anti-inflammatory medications use frequency if these medications were used for the first time were observed ($\chi^2 = 71.0$, $P < 0.001$).

Undoubtedly, such professions as a doctor or a pharmacist belong to the group of public confidence. Still, the analyzed data revealed that the group of respondents that used OTC painkillers and OTC anti-inflammatory medications many times (45.45%), several times (52.81%) and occasionally (48.73%) never consulted information about using them with the doctor or pharmacist if the medications were used for the first time (Table 8). This fact is certainly not the result of falling confidence in these professions. It is rather a result of the fact that in Poland there are problems in communication: doctor – patient (consumer) or pharmacist – consumer (patient). The cause of poor communication in Polish pharmacies between costumers and pharmacists can be partly the glass barrier and the impairment of hearing of older people. On the other hand, the respondents who did not consult the doctor or pharmacist and consumed OTC painkillers and OTC anti-inflammatory medications if these medications were used for the first time might be the ignorant patients.

The role of communication skills between consumers and pharmacists was studied in the United Kingdom and the necessity of training these communication skills for medicine counter assistants was underlined (Watson et al., 2007).

It should be emphasized that quality and type of consultation during the medical visit and in the pharmacy is different. Certainly, the respondents in the consulting rooms feel more like patients and in the pharmacies more like consumers. Low quality of the health care system and practical absence of pharmaceutical care in Poland makes it impossible to conduct effective consultation.

However, 25.57%, 16.83%, or 17.26% of respondents who used OTC painkillers and OTC anti-inflammatory medications many times, several times or occasionally (respectively) always consulted their use with the doctor or pharmacist if these medications were used for the first time. This group could be determined to obtain information and might also be classified as hypochondriacs or subservient patients.

Customers buy OTC painkillers and OTC anti-inflammatory medications in the pharmacies, pharmacy outlets and non-pharmacy outlets. People working in these places represent various levels of pharmaceutical education and the infor-

mation about the medications they provide is of varying quality. OTC painkillers and OTC anti-inflammatory medications are bought especially in the emergency situations. In case of chronic pain Rx medications are prescribed. Customers in emergency situations do not expect any consultation, but satisfying the needs (take the pain away). On the other hand, customers cannot expect professional consulting in non-pharmacy outlets, i.e. a gas station or grocery.

It is highly probable that the consumers which answered that they never consulted the information with the doctor or pharmacist if they used the medication for the first time use the same medical product and consultation becomes redundant. They know what they use, they do not change medications and do not use the consultation. The results of this analysis may also indicate a specific brand loyalty to OTC painkillers and OTC anti-inflammatory medications. It should be remembered that consumers have relatively much to lose when changing the medication (no satisfaction).

Table 8. Influence of consulting the doctor or pharmacist on OTC painkillers and OTC anti-inflammatory medications use frequency if these medications are used for the first time

OTC painkillers and OTC anti-inflammatory medications use frequency	Consultation with the doctor or pharmacist about the consumption of OTC painkillers and OTC anti-inflammatory medications if these medications are used for the first time [%]			
	Always	Sometimes	Never	Lack of medications use
Many times	25.57	27.27	45.45	1.70
Several times	16.83	28.38	52.81	1.98
Occasionally (1-2 times)	17.26	30.96	48.73	3.05
Never	19.55	17.32	49.16	13.97

Source: CBOS (2010a).

Lack of consultation with the doctor or pharmacist considering taking OTC painkillers and OTC anti-inflammatory medications if these medications are used for the first time may also be a proof that the consumers (patients) might have good general knowledge about using medications or that they read the medication leaflet contents. Where could they get information from?

The next analysis has clearly shown that the majority of respondents always read the medication leaflet contents: in case of the group taking the medications many times it was 66.48%, in case of the group taking the medications several times it was 62.71%, and in case of the group taking the medications occasionally it was 59.09%, if the medication is used for the first time (Table 9). Moreover, this analysis showed statistically significant differences in the distribution of medication leaflets reading in particular groups of painkillers and anti-

inflammatory medications use frequency if the drug is used for the first time ($\chi^2 = 72.7$, $p < 0.001$). Leaflet reading may also be the evidence of impaired communication: doctors – patients (consumers) or pharmacists – consumers (patients). The consumers prefer to read the information than to consult it. These consumers as patients may also be classified into groups of experimenters or hypochondriacs.

Table 9. Influence of leaflet reading on OTC painkillers and OTC anti-inflammatory medications use frequency if the medication is used for the first time

OTC painkillers and OTC anti-inflammatory medications use frequency	Reading the medication leaflet contents if the medication is used for the first time [%]			
	Always	Sometimes	Never	Lack of medications use
Many times	66.48	23.86	9.09	0.57
Several times	62.71	27.72	9.24	0.33
Occasionally (1-2 times)	59.09	29.29	10.10	1.52
Never	55.18	18.49	16.25	10.08

Source: CBOS (2010a).

The next analysis confirms the above mentioned thesis. The obtained data considering views on the possibility of the harmfulness of OTC painkillers and OTC anti-inflammatory medications use also revealed significant differences in the distribution of evaluation of non-prescription medicines as harmful in the particular groups of the use frequency of OTC painkillers and OTC anti-inflammatory medications ($\chi^2 = 43.9$, $p < 0.001$). It can be said that the majority of respondents had a view of the possibility of harmfulness of taking OTC painkillers and OTC anti-inflammatory medications. These consumers taking the medications many times (32.39%), several times (17.16%) and occasionally (24.24%) decisively thought that this group of medications had the possibility of harmful action. ‘Rather yes’ was the thought of 43.75%, 49.50% and 42.93% respondents who used this group of medications many times, several times, and occasionally (respectively). The consumers who had general knowledge about the possibility of the harmfulness of OTC painkiller and OTC inflammatory medications answered ‘definitely yes’ or ‘rather yes’. They may be experimenters and/or hypochondriacs. It can be suggested that in case of the first time use of OTC painkillers and OTC anti-inflammatory medications the respondents read the leaflet and remember information about their harmfulness. Part of them might have information from the doctors or pharmacists.

The group of consumers who thought that this group of medications probably had harmful action might have problems with communication with the doc-

tor and/or pharmacist. They probably did not understand information included in medication leaflets. The rest of the respondents' answers presented in Table 10 (i.e. groups who thought that the analyzed medication did not have harmful action or they did not know) indicated that they evidently had problems understanding information included in medication leaflets and transmitted in commercials and/or problems in communication with the doctors or pharmacists. It is difficult to call them evidently ignorant patients.

Table 10. Influence of views on the possibility of harmfulness of OTC painkillers and OTC anti-inflammatory medications use on the frequency of taking them

OTC painkillers and OTC anti-inflammatory medications use frequency	Views on the possibility of the harmfulness of OTC painkillers and OTC anti-inflammatory medications use [%]				
	Definitely yes	Rather yes	Probably not	Definitely not	Hard to say
Many times	32.39	43.75	18.18	2.84	2.84
Several times	17.16	49.50	26.07	2.64	4.62
Occasionally (1-2 times)	24.24	42.93	24.75	2.02	6.06
Never	36.67	42.22	13.89	2.50	4.72

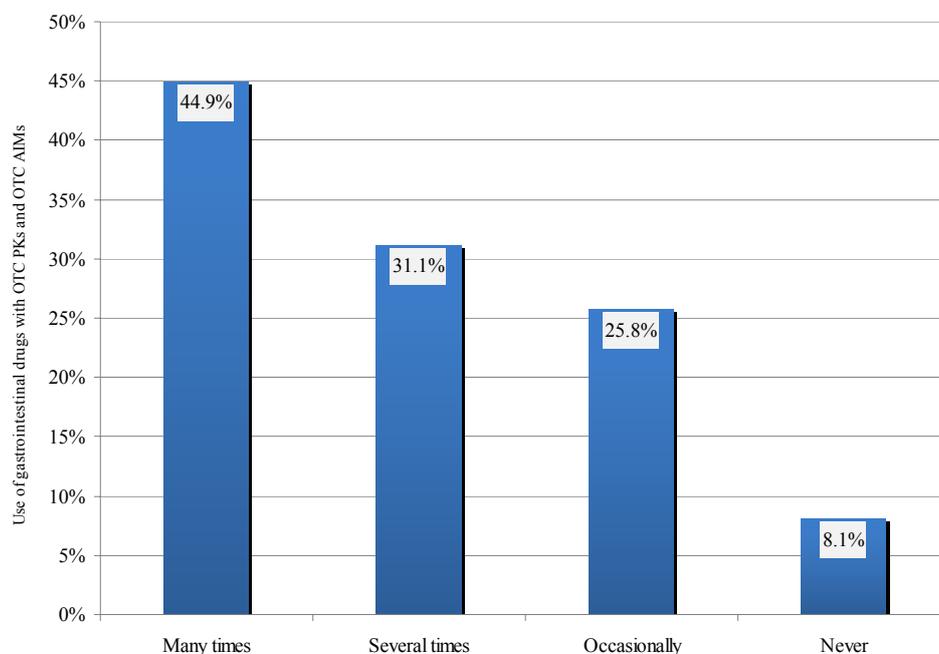
Source: CBOS (2010a).

Consumers want to have the necessary knowledge about the used medications, but do not get it from doctors and pharmacists at the correct level. On the other hand, the information independently obtained from the leaflets can often be incomprehensible. Moreover, in another study in the United States it was shown that some of the older people (65 years of age or older) might not be able to read information about medication because of poor vision (Smith and Coons, 1992). The same problem may also exist in Poland.

The last analyzed determinant, which revealed significant differences ($\chi^2 = 99.4$, $p < 0.001$) in the distribution of concomitant use of gastrointestinal medications with OTC painkillers and OTC anti-inflammatory medications in particular groups of OTC painkillers and OTC anti-inflammatory medications use frequency, also provided interesting information.

The respondents who used OTC painkillers and OTC anti-inflammatory medications many times, several times, and occasionally used concomitantly the gastrointestinal medications in 44.90%, 31.10%, and 25.80% (respectively) – Figure 3.

Figure 3. Influence of use frequency of OTC painkillers (PKs) and OTC anti-inflammatory medications (AIMs) on concomitant use of gastrointestinal drugs



Source: CBOS (2010a).

Gastrointestinal symptoms are often the cause of painkillers and anti-inflammatory medications use (Lanas et al., 2011). Moreover, the medications from gastrointestinal group are often recommended during the therapy by OTC painkillers and OTC anti-inflammatory medications (Gigante et al., 2012). This group of respondents used gastrointestinal drugs had a good knowledge of the harmfulness of OTC painkillers and OTC anti-inflammatory medications. They could be subservient patients. Other group of respondents did not have gastrointestinal symptoms or did not have information from the doctors or pharmacists or did not read the medication leaflet contents. They could also be ignorant about health.

In case of three determinants no statistically significant differences were noted. Such determinants as place of residence, employment status and level of education did not significantly influence OTC painkillers and OTC anti-inflammatory medications use frequency.

There were no significant differences in the distribution of the place of residence ($\chi^2 = 8.7$, $p = 0.1812$), level of education ($\chi^2 = 9.2$, $p = 0.1637$) and employment status ($\chi^2 = 4.8$, $p = 0.1854$) in particular groups of use frequency of OTC painkillers and OTC anti-inflammatory medications.

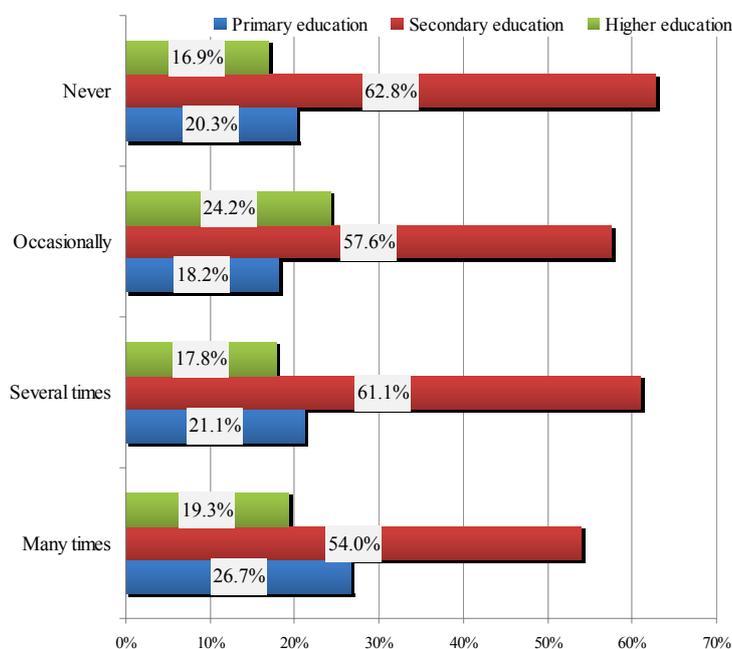
The influence of the place of residence on OTC painkillers and OTC anti-inflammatory medications use frequency was presented in Table 11. Despite the lack of statistical differences the inhabitants of villages and towns up to 20 000 inhabitants used OTC painkillers and OTC anti-inflammatory medications most often. However, it must be underlined that there are significant differences in the availability of medical products between villages and cities. It is a result of the lower density of places selling medications in rural areas and also of Polish legislation (Dz.U., 2001). Currently, pharmaceutical outlets may be located only in rural areas, pharmacies in cities and non-pharmacy outlets everywhere. According to the statistical yearbook of Poland in 2010 it was observed that the number of inhabitants per pharmacy and pharmacy outlet in the cities was 2500, while the number of inhabitants per pharmacy and pharmacy outlet in villages was 5000 (GUS, 2011b). Moreover, according to pharmaceutical law there is different assortment in the pharmacies, pharmacy outlets and non-pharmacy outlets. Practically, the pharmacy has ‘everything’ that is registered. Pharmacy outlets and non-pharmacy outlets have limited portfolio. For example, in the non-pharmacy outlets, there are packages with a smaller number of tablets and medical products which do not contain addictive substances compared with pharmacies. Pain has no geographical boundaries. However, it is commonly known that the inhabitants of villages are older, less educated and have worse access to health care (GUS, 2011b; 2011c). Still, in case of pain it is not significant.

Table 11. Influence of the place of residence on OTC painkillers and OTC anti-inflammatory medications use frequency

OTC painkillers and OTC anti-inflammatory medications use frequency	Place of residence [%]		
	Villages and towns up to 19 999 inhabitants	Cities (20 000 – 99 999 inhabitants)	Cities (100 000 – 500 000 and more inhabitants)
Many times	45.45	18.75	35.80
Several times	54.46	17.49	28.05
Occasionally (1-2 times)	48.99	24.24	26.77
Never	53.33	17.78	28.89

Source: CBOS (2010a).

Figure 4. Influence of the level of education on OTC painkillers and OTC anti-inflammatory medications use frequency



Source: CBOS (2010a).

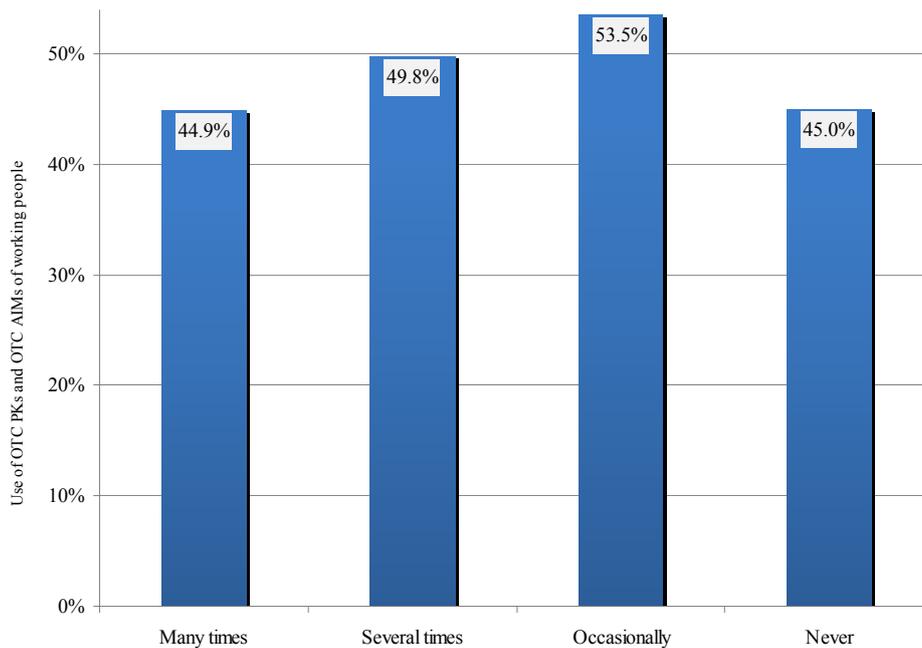
Also despite the lack of statistical differences it was observed that the respondents with secondary education used OTC painkillers and OTC anti-inflammatory medications most often, i.e. many times 54.00%, several times 61.10% and occasionally 57.60% (Figure 4).

Other studies showed that the level of education generally has an influence on the way of medication use. Reading and understanding labels is significantly important (Smith et al., 2009). Moreover, understanding and subsequent execution of verbal instructions of the doctor or pharmacist or the proper use of consultation with the doctor or pharmacist may be a direct result of the education level. However, in this study the education level did not influence OTC painkillers and OTC anti-inflammatory medications use frequency. As mentioned above, the use of OTC painkiller and OTC anti-inflammatory medications is closely related to the most fundamental needs and education has nothing to do with their use, but rather with the method of application.

There were no significant differences in the distribution of employment status. Working people and non-working people felt pain in the same way. Howev-

er, to meet their needs non-working people might buy cheaper medications. Consumption of OTC painkillers and OTC anti-inflammatory medications in particular groups of their use frequency was comparable (Figure 5).

Figure 5. Frequency use of OTC painkillers (PKs) and OTC anti-inflammatory medications (AIMs) of working people



Source: CBOS (2010a).

To sum up, according to the correspondence analysis, with hierarchical clustering, it was discovered that (i) people who do not use OTC painkillers and OTC anti-inflammatory medications are men; (ii) these people do not have children under 14, have a salary below PLN 750, come from a village or a small town and do not use antiulcer medications; (iii) people who use OTC painkillers and OTC anti-inflammatory medications belonged to two complementary groups: (a) first group – people who sporadically use OTC painkillers and OTC anti-inflammatory medications, come from a town (20 000–100 000 inhabitants) and always consult their use with a pharmacist, (b) second group – people who use OTC painkillers and OTC anti-inflammatory medications from time to time and often, come from cities (over 100 000 inhabitants) and use antiulcer medications; finally, they sometimes ask a pharmacist about their use and read a leaflet, have one child in the family and have an salary over 2000.

Conclusions

Understanding of consumption determinants of the OTC painkillers and OTC anti-inflammatory medications is an important feature in the marketing of medical products. On the other hand, the studies on consumption determinants and consumer behavior may also make it possible to determine the features influencing inappropriate consumption of this group of medications. OTC painkillers may help, harm or exert no therapeutic effect. It should be emphasized that pain and inflammation are specific ailments which may change the hierarchy of consumers' needs and consumer behavior. Generally, OTC painkillers and OTC anti-inflammatory medications are used by consumers in symptomatic treatment and mainly in self-treatment. In turn, Rx anti-inflammatory medications, whose usage was not analyzed in this study, are taken mainly in causal treatment. It should be remembered that using OTC painkillers and OTC anti-inflammatory medications is often not a solution to a therapeutic problem. It is rather a short-term solution. Generally, OTC painkillers and OTC anti-inflammatory medications should be an effective and safe way of treatment when they are used rationally. Undoubtedly, high consumption of OTC painkillers and OTC anti-inflammatory medications is a negative phenomenon and may be formed by the influence of various kinds of determinants and also (patho)physiological features and environmental stimuli. High consumption of OTC painkillers and OTC anti-inflammatory medications results from social acceptance and public access. Determinants of consumption behavior in this market do not only depend on their prices. Consumption of this group of medications is closely related to other determinants.

In this work, it was shown that gender, age, number of persons and children under 14 years of age in the household, salary, receiving pension, health condition assessment; behavior in case of sickness, pain, or any discomfort, number of medical visits, consultation with the doctor or pharmacist and reading the medication leaflet contents if the medication was used for the first time; views on the possibility of the harmfulness of OTC painkillers and OTC anti-inflammatory medications use, concomitant use of gastrointestinal drugs with OTC painkillers and OTC anti-inflammatory medications had an influence on the use frequency of OTC painkillers and OTC anti-inflammatory medications.

It is natural that such determinants as gender, age and number of persons and children under 14 years of age in the household had a significant influence on the use frequency of OTC painkillers and OTC anti-inflammatory medications. Pharmaceutical industry produces medical products specially for these segments, i.e. suitable compositions, doses and forms of medications for various

age groups and both genders, as well as bigger, economical packages for numerous families, or captions with larger letters on the packages for the elderly.

Generally, receiving pension and salary are key determinants in consumption level. However, in case of pain these determinants play a secondary role. Lower-salary consumers may simply choose cheaper medications satisfying their needs.

The influence of health condition assessment; behavior in case of sickness, pain or any discomfort; number of medical visits in the aspect of the use frequency of OTC painkillers and OTC anti-inflammatory medications are in turn largely a reflection of (patho)physiological factors and efficiency of health care systems.

The role of consultation with the doctor or pharmacist and reading the medication leaflet contents if the medication is used for the first time is important in health care systems. Good communication on this line makes it possible to maximize the benefits of OTC painkillers usage and minimize the potential side effects. Adequate knowledge about the consumption of OTC painkillers and OTC anti-inflammatory medications may influence the views on the possibility of the harmfulness of OTC painkillers and OTC anti-inflammatory medications and concomitant use of gastrointestinal drugs with OTC painkillers and OTC anti-inflammatory medications.

From the marketing and medical point of view it will be interesting to conduct the study in the same time on a wider geographical area and compare the influence of the determinants on consumption behaviors regarding OTC painkillers and OTC anti-inflammatory medications as well as buying behaviors in the market of these medications.

Studies of consumption behavior and consumer behavior in the market of these medications must also include purely medical aspects. Still, it is cumbersome to include physiologic, pathophysiologic or genetic features in a survey or in a questionnaire interview.

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