

CHARACTERISTICS OF SELF-MEDICATION FOR PAIN RELIEF AMONG FIRST-YEAR HEALTH CARE STUDENTS IN ZAGREB, CROATIA

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SUMMARY

Background: Taking over the responsibility for one's own health and active participation in eliminating the existing health problems is ever more widespread in the world. Self-medication in the form of using any kind of therapy without previous consultation with medical professionals has been ever more common among student populations in many countries. The aim of this study was to determine the attitudes about self-medication for pain relief and features of self-medication in first-year students of the University of Applied Health Studies in Zagreb.

Subjects and methods: The study was conducted using an anonymous questionnaire, which was completed by 389 respondents.

Results: Taking painkillers in the past year was reported by 74.6% of respondents, significantly more by female students (80.8%); 62.6% of female students used painkillers once a month versus 45.7% of male students taking analgesics once a year. Ibuprofen was preferred by female students and acetylsalicylic acid by male students. Headache was the most common indication for taking painkillers (76.6%), followed by menstrual discomforts in female students (66.2%) and toothache (28.6%). Significant sex differences were recorded in the choice of drugs, indications for self-medication, and frequency of drug use. There were no differences between study courses.

Conclusions: Appropriate student education and improved information transfer between professionals and students are the key elements to ensure judicious, quality and knowledge based use of drugs among students.

Key words: self-medication for pain relief – painkillers - health care students - Croatia

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INTRODUCTION

Taking over the responsibility for one's own health and eliminating the existing health problems has been ever more widespread all over the world. The occurrence of pain is one of the symptoms associated with some health problems. The International Association for the Study of Pain describes pain as an unpleasant emotional and sensorial experience associated with a real or potential tissue damage (IASP 1994). Epidemiological studies have shown that even one-third of the population in industrialized countries suffer chronic pain, which poses a huge health, economic and social problem. In the USA, total annual health care costs for pain management in 2010 amounted to 560-635 billion \$, including medical cost of pain treatment and economic cost related to sick-leaves, reduced wages and lower productivity (IOM 2011). The objective of pain elimination is to enable normal functioning of the individual in his/her working and daily activities. There are many ways to treat and alleviate pain, with variable efficacy. Some persons tend to reduce pain by physical exercise, use of dressings, rest or other non-pharmacological methods of pain management. Relaxation and distraction can occasionally offer some relief. Yet, pain is most frequently removed by taking painkillers. Pain may occur suddenly,

as a distraction, frequently in the situations requiring concentration and engagement from the person. Therefore, there is the need to eliminate pain quickly, mostly on one's own decision, taking pharmacological agents for pain relief without consulting a physician or pharmacist. Self-medication for pain relief is taking painkillers on one's own, without previous consultation with a physician or pharmacist about the type of analgesic to be used and the intensity and localization of pain to be relieved. The reasons for self-medication are numerous and multifaceted. Self-medication is perceived as advantageous for saving time (making appointment, waiting for examination at doctor's office), avoiding payment for examination, and availability of pharmacies everywhere on daily routine. Studies have demonstrated that self-medication is influenced by factors such as age, sex, family, income, society, level of education, previous medical knowledge, previous experience with the same or similar discomforts, attitude about one's own health, satisfaction with and perception of one's own health (Aljinović-Vučić et al. 2005, Figueiras et al. 2000). High education level and professional status also are predictive factors for self-medication (Martins et al. 2002). As expected, scientific research has revealed that self-medication is more common in health care professionals than in the general population (Aljinović-Vučić et al. 2005), probably

because they feel safer when turning to self-medication due to their sharing a great body of health information on a daily basis and attending health care courses during education. Analgesics and antibiotics are the groups of drugs that are most frequently used for self-medication (Hughes et al. 2001). Non-opioid analgesics that are most commonly used as painkillers in Croatia are available as over-the-counter (OTC) drugs; some of them are found on the Croatian Institute of Health Insurance Supplementary List of Drugs but still are the drugs of choice for pain relief in the population. The present study also included spasmolytics as a group of drugs relaxing intestinal smooth muscles and alleviating spasms and accompanying pain. These agents are used for spasm and pain in the gastrointestinal tract, biliary system, urogenital system, and for spastic states in gynecology (inflammation, dysmenorrhea).

Taking drugs for self-medication has been increasingly recorded in the student population worldwide (Burak & Damico 2000, Sawalha 2008). It is quite understandable in the light of the World Health Organization (WHO) promotion of self treatment and assuming responsibility for one's own health. In addition, there is an increasing influence of media on the information and modes of treatment of particular discomforts. Internet has become the main source of health information for many individuals, offering promising solutions in the domain of self-medication. Headache, cold and dysmenorrhea are most frequently mentioned as health problems for which students turn to self-medication. The main reasons for which students opt for self-medication to relieve some health problems include previous experience and mild pain (Gutema et al. 2011). Yet, students are a vulnerable group because they are still in the process of setting their opinion about health issues, while their attitudes about self-medication are influenced by numerous factors. Parental impact is being gradually fading away, while the individual starts making his/her own decisions on health and its protection, along with various impacts exerted by the society, media, Internet and medical courses. All this suggests that student population differs from adult population in their attitudes about self-medication.

The aim of the study was to assess the attitudes about self-medication for pain relief and characteristics of self-medication in first-year students of the University of Applied Health Studies in Zagreb, Croatia.

SUBJECTS AND METHODS

A questionnaire, consisted of three separate parts contained questions which was used to collect data on the leading health problems for which painkillers were used: which drugs were most commonly used and how frequently; the level of students' knowledge about drug side effects and whether they read drug package inserts at all; and use of methods for pain relief other than medication.

The study conducted at the University of Applied Health Studies in April and May 2013 included full-time first-year students attending 6 different studies: Nursing; Physiotherapy; Medical Laboratory Diagnosis; Radiologic Technology; Occupational Therapy; and Sanitary Engineering. Students were asked to complete the survey 15 minutes before or after the course of a certain study. A main researcher explained in detail the objectives and purpose of the research, the concept of the questionnaire and instructions were given. Data on all study subjects were collected by anonymous questionnaire on a voluntary basis. The questionnaire contained questions providing information on socio-demographic characteristics (age, sex, study course); general health of the respondents; characteristics of and attitudes about self-medication (taking painkillers or not; if yes, which drugs and how frequently, for what health problems; the intensity of pain for which analgesic is used; using other methods for pain relief). The study was approved by the University of Applied Health Studies Ethics Committee.

Statistical analysis

The Statistica version 10 (StatSoft Inc., Tulsa, OK, USA) software was used for data entry and analysis. The following statistical methods were employed: descriptive analysis, χ^2 -test or Fisher exact test, and t-test. Statistically significant differences were expressed at the 95% level of confidence ($p=0.05$).

RESULTS

The study sample included 389 students, 297 (76.3%) female and 92 (23.7%) male. Student distribution according to study course and sex is shown in Table 1.

Table 1. Distribution of the University of Applied Health Studies students according to sex and study course

	Female	Male	Total per study course
Study course			
Physiotherapy	63	39	102
Nursing	73	10	83
Occupational Therapy	36	5	41
Radiologic Technology	35	26	61
Medical Laboratory Diagnosis	52	8	60
Sanitary Engineering	38	4	42
Total per sex	297	92	389

As many as 290 (74.6%) subjects reported taking analgesics in the past year, whereas 99 (25.4%) did not. Taking painkillers in the past year was reported by a significantly greater number of female (80.8%) than male (54.3%) students (Pearson's $\chi^2=25.91$; $df=1$; $p<0.0001$).

Study subjects were asked to perform a subjective self-assessment of pain on a 1-7 scale, where 1 denotes mild pain and 7 very intense pain. The subjects marked the intensity of the pain they tried to alleviate by drugs. A statistically significant difference was found in pain intensity self-assessment between the groups of subjects having and those not having taken painkillers in the past year. The students having used painkillers in the past year ($n=290$) reported taking these agents for the mean pain intensity of 5.44 on the scale, whereas those not having taken these agents ($n=99$) considered it necessary for the mean pain intensity of 6.23 (t -test=-5.42; $df=387$; between-group difference -0.791; 95%CI -1 to -0.5).

Out of 290 students having used painkillers in the past year, 53.7% reported taking these agents once a month. There was no significant difference in the frequency of using painkillers according to study courses. However, the frequency of using painkillers yielded a statistically significant sex difference (Pearson's $\chi^2=64.817$; $df=4$; $p<0.0001$). More than half of female students ($n=186$; 62.60%) reported taking painkillers once a month and 80 (26.6%) once a year. In contrast, 42 (45.7%) and 23 (25.0%) male students reported taking painkillers once a year and once a month, respectively, whereas 24 (26.1%) male students did not use them at all (Table 2).

Table 2. Frequency of analgesic self-medication according to sex

	Female n (%)	Male n (%)
Never	12 (4.0)	24 (26.1)
1/year	80 (26.9)	42 (45.7)
1/month	186 (62.6)	23 (25.0)
1/week	16 (5.4)	2 (2.2)
Daily	3 (1.0)	1 (1.1)

In female students, the most common indications for self-medication with analgesics were menstrual-related problems ($n=192$; 80.0%), followed by headache ($n=187$; 77.9%) and toothache ($n=72$; 30.0%). In males, the most common discomforts requiring self-medication included headache ($n=35$; 70.0%), sports injuries ($n=22$; 44.0%) and hangover ($n=15$; 30.0%). As expected, statistically significant sex differences were recorded in the indications of menstrual discomforts, present exclusively in female population, and sports injuries and hangover as significantly pronounced indicators for pain self-medication in male population (sports injuries: Pearson's $\chi^2=55.439$; $df=1$; hangover: Pearson's $\chi^2=14.220$; $df=1$; $p<0.0001$ both). Sex differences in the indications for pain self-medication are shown in Table 3.

Male and female students preferred different drugs chosen as self-medication for pain (Table 4). As many as 70% of female students used analgesics from the group of ibuprofen and 30% those from the group of paracetamol, while 24.2% used acetylsalicylic acid. Ketoprofen and diclofenac were taken by a lower proportion of female students (17.9% and 15.8%, respectively). Male students preferred acetylsalicylic acid as self-medication for pain (54.0%), yielding a statistically significant difference from female students (Pearson's $\chi^2=17.775$; $df=1$; $p<0.0001$). In addition, male students also used analgesics from the groups of ibuprofen (48.0%), paracetamol (34.0%) and diclofenac (22.4%). There were no other statistically significant sex differences.

Out of 290 subjects having reported self-medication with painkillers in the past year, a high proportion ($n=222$; 76.6%) used to read package inserts. Of these, there were 190 female and 32 male students, accounting for 79.2% and 64.0% of the female and male study population, respectively. The difference between the female and male students was statistically significant (Pearson's $\chi^2=5.303$; $df=1$; $p=0.021$). The group of 68 students not reading package inserts consisted of 50 (20.8%) female and 18 (36.0%) male subjects. Almost half of the study subjects ($n=144$; 49.7%) having used painkillers in the past year considered they were properly informed on drug side effects. Of these, there

Table 3. Sex differences in the indications for pain self-medication

	Female n (%)	Male n (%)	χ^2 value	p value
Headache	187 (77.9)	35 (70.0)	1.445	0.229
Sports injuries	14 (5.8)	22 (43.0)	55.439	<0.0001
Hangover	24 (10.0)	15 (30.0)	14.220	<0.0001
Menstrual discomforts	192 (80.0)	0 (0)	118.367	<0.0001
Migraine	37 (15.4)	4 (8.0)	1.875	0.171
Toothache	72 (30.0)	11 (22.0)	1.296	0.255
Abdominal pain	48 (20.0)	7 (14.0)	0.969	0.325
Articular pain	17 (7.1)	3 (6.0)	0.076	0.783
Back pain	10 (4.2)	4 (8.0)	1.323	0.250

Table 4. Types of analgesics used by female and male students

Type of drug	Female n (%)	Type of drug	Male n (%)
Ibuprofen	168 (70.00)	Acetylsalicylic acid	27 (54.00)
Paracetamol	81 (33.75)	Ibuprofen	24 (48.00)
Acetylsalicylic acid	58 (24.20)	Paracetamol	17 (34.00)
Ketoprofen	43 (17.90)	Diclofenac	11 (22.40)
Diclofenac	38 (15.80)	Combination of paracetamol, propyphenazone, caffeine and codeine phosphate sesquihydrate (Caffetin)	7 (14.00)
Combination of paracetamol, propyphenazone, caffeine and codeine phosphate sesquihydrate (Caffetin)	32 (13.30)	Metamizole	5 (10.00)
Metamizole	14 (5.80)	Ketoprofen	5 (10.00)
Tropium chloride	7 (2.90)	Tramadol	0
Tramadol	2 (0.80)	Tropium chloride	0
Indomethacin	1 (0.40)	Indomethacin	0
Rizatriptan	1 (0.40)	Rizatriptan	0

Table 5. Use of other methods of pain relief according to sex

	Female n (%)	Male n (%)	χ^2 value	p value
Rest	206 (85.8)	41 (82.0)	0.481	0.488
Heating pad	46 (19.2)	5 (10.0)	2.399	0.121
Massage	103 (42.9)	24 (48.0)	0.434	0.510
Dressing	96 (40.0)	18 (36.0)	0.278	0.598
Exercise	64 (26.7)	24 (48.0)	8.910	0.003
Herb tea	118 (49.2)	18 (36.0)	2.881	0.090
Cream	39 (16.3)	12 (24.0)	1.715	0.190
Visiting chiropractor	5 (2.1)	2 (4.0)	0.645	0.422
Blockade	0 (0)	1 (2.0)	0	0
Traditional medicine	1 (0.4)	0 (0)	0	0

were 121 female and 23 male students, accounting for 50.4% and 46.0% of the female and male study population, respectively. In contrast, 119 (49.5%) female and 27 (54.0%) male students reported they were not informed of the side effects of the drugs they used for pain relief. There was no statistically significant sex difference in the knowledge about drugs and their side effects.

Study students also reported using other, non-pharmacological options to relieve pain associated with some health problems. Taking rest was the preferred option for 247 (85.2%) subjects, followed by drinking tea (46.9%), massage (43.8%) and applying dressing over the affected part of the body (39.3%). A statistically significant sex difference was recorded in choosing physical activity for pain relief, which was used by as many as 24 (48.0%) male subjects versus only 26.7% of female subjects (Pearson's $\chi^2=8.910$; $df=1$; $p=0.003$). Comparison of other methods used by study subjects for pain relief is illustrated in Table 5.

DISCUSSION

Our study results revealed the use of analgesics to be very high among the University of Applied Health

Studies students. Taking painkillers in the past year was confirmed by as many as 74.6% of study subjects. Comparable results have been reported by other authors investigating the prevalence and characteristics of self-medication for pain relief on a sample of 291 students in Great Britain, showing that 73% of study students were taking painkillers in the past month (French & James 2008), which is consistent with our finding of 74.6% of study students having used these agents. Our results varied from those recorded in a study conducted among nursing students from Brazil, where 38.8% of students were found to use self-medication for pain relief (Souza et al. 2011). Likewise our study, a higher rate of self-medication among female students was also recorded in Spain (Bassols et al. 2002). A study conducted at the University of Medicine and Medical Sciences in Great Britain yielded similar results on the use of self-medication in male and female students; however, some sex differences were present because female students were more likely to read package inserts and were more careful on using self-medication (James et al. 2006). Similar results have also been reported from the University of Ljubljana, Slovenia. Although there were no statistically significant sex differences in using

painkillers, female students were more careful about doing it and were more likely to seek professional consultation on what drug to choose (Klemec-Ketiš et al. 2011).

The results of the subjective pain self-assessment of study subjects proved very interesting indeed. Using the 1-7 scale, the group of subjects having used painkillers in the past year considered that using painkillers to alleviate pain would be required at the mean intensity of pain of 5.44. On the other hand, in the group of subjects that did not take painkillers in the past year the respective mean intensity of pain requiring some pain relief was set at 6.23. As pain is a subjective sensation, it is difficult to objectify the reasons for this difference; the students not using analgesics probably had a higher pain threshold, which may be underlain by a number of reasons such as anatomic and physiologic differences, variable stimulus intensity, psychological factors (do not like to take drugs and would rather suffer pain), culturological differences (men can stand the pain), modes of coping with pain including attitudes, use of non-medicamentous methods for pain relief, etc.

Men and women prefer different drugs for pain relief. As many as 70.0% of female students used analgesics from the group of ibuprofen, while 33.75% used paracetamol and 24.2% used acetylsalicylic acid. In contrast, 54.0% of male students preferred using acetylsalicylic acid for pain relief (statistically significantly different from female students), followed by analgesics from the groups of ibuprofen (48.0%), paracetamol (34.0%) and diclofenac (22.4%). In Croatia, diclofenac has been usually used for pains caused by sports injuries. As sports injuries are a major indication for pain self-medication in male population, it is no surprise that diclofenac was more frequently used by male students. Studies from all over the world have reported results comparable to our results recorded in a population of students attending the University of Applied Health Studies in Zagreb. Students from Great Britain mostly take paracetamol (50%) and ibuprofen (39%) for pain relief, those from Ethiopia use paracetamol (48.44%) and agents from the group of non-steroidal antirheumatics (NSAR) (42.20%), while as many as 83.86% of students from the USA take ibuprofen for pain relief (Burak & Damico 2000, Gutema et al. 2011, French & James 2008).

Headache was the most common indication for self-medication with painkillers, reported by 76.6% of study students, followed by menstrual-related problems (66.2%) and toothache (28.6%). Headache has been identified as the predominant indication for medicamentous treatment in many studies (Burak & Damico 2000, Gutema et al. 2011, French & James 2008, Souza et al. 2011, James et al. 2006). The high prevalence of headache in student population has also been demonstrated in a study investigating the prevalence of headache and migraine in health care students. The study performed in Iran found 68% of students to suffer

from headaches associated with irregular sleep, changing environment, head movements and stress (Menon & Kinnera 2013). A similar study carried out in students in India yielded a headache prevalence of 58.7%. Predictive factors for headache were poor socioeconomic status and year of study (third and fifth years) (Ghorbani et al. 2013). Generally, student population has a higher prevalence of headaches due to stress and inadequate sleep. As many students turn to self-medication due to the shortage of time and because they consider it unnecessary to visit a physician's office for only minor discomforts, it appears reasonable to organize consultations for students on the appropriate use of analgesics near their university premises. As self-medication for pain has also been encouraged by the WHO (WHO 2000), an appropriate approach to the user will enable safer self-medication and making correct decisions on discomfort elimination. Thus, students will assume an active part in taking care of their health status and upgrade their quality of life. Appropriate student education and improved information transfer between professionals and students are the key elements to ensure judicious, quality and knowledge based use of drugs among students. The user can get information on a drug from his/her general practitioner, pharmacist, or from the package insert. Our study revealed that 76.6% of the University of Applied Health Studies students (79.2% of female and 64.0% of male students) used to read package inserts. Comparison with a study on the knowledge, attitudes and use of self-medication among first-year health care students in England (James et al. 2006) showed similar results. In England, package insert was read by 71.6% of students (80% of female and 53% of male students, yielding a statistically significant difference) (James et al. 2006). However, frequently irregular use of drugs suggests that users are not properly informed, pointing to the need of upgrading the transfer of information to make self-medication more judicious, appropriate and based on good knowledge (Sanz et al. 2000). Non-opioid analgesics such as paracetamol and ibuprofen are the most commonly used OTC drugs in western countries such as the USA, Spain, Croatia and Great Britain (Aljinović-Vučić et al. 2005, Burak & Damico 2000, Bassols et al. 2002, PAGB 2005). In Great Britain, paracetamol and ibuprofen accounted for 23% of the overall OTC drug utilization in 2004 (PAGB 2005). Although non-opioid analgesics are easily available to the population at large, they have been associated with a number of side effects. Paracetamol is one of the main causes of drug poisoning (Sheen et al. 2002, Hawton et al. 2004, Morgan et al. 2005), while its high doses have adverse effects on liver function. The use of NSAR such as ibuprofen or acetylsalicylic acid can cause inflammation and ulceration in the gastrointestinal system (Abbott & Fraser 1998). Frequent use of analgesics to alleviate daily headaches can lead to dependence and recurrent headaches upon painkiller withdrawal (Blenkinsopp & Bond 2005). In

1998, Great Britain defined a preventive strategy to control the rate of paracetamol induced poisoning. For this purpose, the legislation was modified as to restrict the amount of tablets that can be bought as an OTC drug. With this measure, the mortality rate due to paracetamol or acetylsalicylic acid overdose was reduced by 22%, while the rate of admissions to departments of nephrology and liver transplantation due to hepatotoxic lesions caused by paracetamol decreased by 30% (Hawton et al. 2004).

Considering all the facts stated above, it appears quite disturbing that only 49.7% of our study subjects reported they were familiar with side effects of the drug they used, suggesting that non-opioid analgesics were not considered as a group of drugs with potential side effects. Similar is the opinion of students from Great Britain, where only 18% and 51% of subjects believed the short-term and long-term use of analgesics to be associated with some risk, respectively (French & James 2008). These data are crucial to highlight the role of student education to instruct them when to seek a physician's or pharmacist's advice. The physician has long been recognized as the authority and consultant on the choice of drug. However, with the increasing proportion of individuals opting for self-medication, the role of the pharmacist has changed. The pharmacist is now the last link in the chain of health care visited by the user before taking drug. Since, the World Health Organization support the self-treatment of pain, proper pharmacist approach through communication and consultations with students can strengthen confidence in seeking advice regarding possible side effects of the drugs. In that case, students will take an active role in caring for their health. That should be taken into account when writing the curriculum of pharmacists education, who will be consultants and educators on a daily basis. The pharmacist should be able to verify the student knowledge regarding drugs and should be able to clearly explain the purpose of the drug, in which dose it needs to be used, which are possible contraindications and how to recognize them. It is the pharmacist's duty to ensure the safest and most efficacious route of drug administration. In the era of self-medication, the consulting role of a pharmacist is of utmost importance since self-medication is usually performed without consulting a physician, therefore the pharmacist is the only professional the user will encounter on choosing the drug for self-medication (Jakševac Mikša 2002).

Using non-pharmacological methods is preferred by medical professionals all over the world as the first-line choice for pain relief; in case of failure, the sufferer will discuss with the professionals on the most efficacious drug and dosage. A study of patient preferences for pain self-medication in a population of 723 subjects in the USA revealed the non-pharmacological methods of pain relief to be used by 68% of study subjects. As many as 40% of them used exercise, 30% reported cooling/warming the body part involved, 22% used relaxation

and 22% massage for pain relief (Vallerand et al. 2005). In the present study, the rate of subjects using massage for pain relief was twofold greater (43.8%), whereas data on subjects using dressings over the affected parts of the body differed considerably (39.3%). A considerably greater proportion of men than women used exercise as a pain relieving technique (48.0% vs. 26.7%).

Different studies have confirmed that senior year students are more likely to use drugs for the purpose of self-medication which is associated with an increase in medical knowledge. In this study were included only full-time first-year students, which is a possible limitation of the study. The research could be extended to full-time students of all three years, in order to compare the attitudes about self-medication for pain relief and characteristics of self-medication among students who have health courses in the curriculum and students without health courses.

CONCLUSION

Taking over the responsibility for one's own health and active role in eliminating the existing health problems have been increasingly recognized all over the world, including Croatia. Self-medication and use of painkillers are also present in students of the University of Applied Health Studies in Zagreb. Self-medication is acceptable if the drug used is free from an unacceptable risk. Inappropriate self-medication and neglecting disease symptoms may lead to symptom worsening and serious health problems associated with even worse pain. Nowadays, the role of the pharmacist in the process of recommendations and selling painkillers is of utmost importance.

The initial results collected in this study assessing the pattern of self-medication in health care students in Croatia can serve as a starting point in future studies investigating the use of painkillers in other population groups.

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