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RESEARCH ARTICLE

Knowledge and opinion of pharmacists on emergency contraceptive pills in Hungary

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Abstract *Background* Emergency contraceptive pills (ECPs) are used to prevent unintended pregnancy. There is a worldwide intention to improve access to ECPs; therefore, identifying potential barriers to introducing over-the counter (OTC) access is of utmost importance. As pharmacists are the key personnel to convey accurate drug information, their knowledge and attitude on ECPs is important. *Objective* We aimed to conduct a nationwide study to assess pharmacists' knowledge on ECPs and to survey their opinion on sales category change of ECPs (i.e. to introduce OTC access in pharmacies). *Setting* Registered pharmacists in Hungary. *Method* A prospective cross-sectional study was conducted with an anonymous, web-based questionnaire. Univariate analysis (Mann–Whitney U test and Fischer's exact test) was used to identify factors associated with supportive opinion toward OTC provision. *Main outcome measure* Knowledge level of pharmacists, proportion of pharmacists with supportive opinion on OTC access. *Results* 357 out of 2019 pharmacists completed the questionnaire, yielding a 17.7% response rate. Almost 30% of pharmacists (N = 99) agreed that ECPs should have an OTC availability in Hungary. More than 40% of pharmacists (N = 145) considered ECPs as contraceptives. On average, 55.18% (standard deviation: ±12.40%) of the answers were correct, showing moderate knowledge of the pharmacists. Age and rating ECPs as contraceptives were significantly associated with supportive opinion toward OTC provision ($p < 0.001$). The effect of knowledge on the pharmacist's opinion was significant in young pharmacists ($p = 0.02$). *Conclusion* Pharmacists' knowledge and opinion on ECPs should be improved, especially that of the young ones. Currently the attitude of pharmacists does not favor sales category changes of ECPs in Hungary.

Keywords Emergency contraceptives · Knowledge · Hungary · Opinion · OTC · Pharmacists · Questionnaire

Impacts on practice

- The majority of Hungarian pharmacists does not support the over the counter dispensing of emergency contraceptive pills (ECPs) in pharmacies and have knowledge gaps on ECPs.
- Future sales category changes of ECPs should be preceded by educational measures amongst community pharmacists.
- Graduate and postgraduate education of pharmacists is needed to enable and stimulate adequate counseling on ECPs.

Introduction

Emergency contraceptive pills (ECPs) are used after unprotected sexual intercourse, when a contraceptive method has failed, or after sexual violence. They have a potential effect in reducing unintended pregnancies and possibly abortion rates [1]. Beside the insertion of a copper

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intrauterine device, there are two dedicated emergency contraceptive agents available worldwide: the progestin only levonorgestrel 'LNG' products and the selective progesterone receptor modulator ulipristal acetate 'ULP' containing products [2, 3]. However, ECP use is possible up to 72 h (LNG) or 120 h (ULP), they work best if taken within 24 h after sexual intercourse, as a delay in access can compromise efficacy [1, 3]. Therefore, the World Health Organization (WHO) and several other professional organizations and associations endorse ECP use [4]. Availability of ECPs differs around the world: in 2016, ECPs were marketed in more than 140 countries worldwide, and they were available without prescription (over the counter—OTC) in 60 countries [4]. Moreover, in a few countries (e.g. Norway, the Netherlands), ECPs are available as general sale list medications, which means that patients can pick up the ECP from the shelf without a need to interact with a health professional (in these countries ECPs are often available in drug stores).

To further ease access to ECPs in Europe, the change in the sales category of ULP (from prescription only medicine—"POM" to OTC) was recommended by the European Medicines Agency (EMA) [5], which was followed by an implementing decision from the European Commission in 2015. Consequently, in almost all European countries at least one type of ECP is available as OTC medication from a pharmacy [4]. Hungary has not followed yet the EMA/EU recommendation: 3 different ECPs are available on the Hungarian drug market: (two containing levonorgestrel (0.75 and 1.5 mg), and one containing ulipristal), and all these ECP products are prescription only medicines (POM).

There were two main reasons for surveying Hungarian pharmacists regarding ECPs. First, the sales category of ECPs might change in the future (from POM to OTC), so it is important to examine if Hungarian pharmacist are prepared for it, or there are barriers present. Secondly, (regardless of the sales category of ECPs) pharmacists have a major role in patient education, counselling and referring; therefore, their knowledge is essential to provide accurate drug related information, dispel misconceptions, and shape users appreciation.

Aim of the study

Based on the above facts and the lack of national data for Hungary, a nationwide study was conducted to assess the opinion of pharmacists on a possible sales category change of ECPs (from POM to OTC). The pharmacists' knowledge on ECPs was also assessed. Information from this study will be helpful in developing educational programs and may help us identify the barriers related to a sales category change of ECPs.

Ethics approval

The study and questionnaire were approved by the Hungarian Medical Research Council, and it was in full accordance with the Declaration of Helsinki (1961) (Approval No: 24934/2012/EKU).

Methods

Questionnaire development

The web-based questionnaire was developed by our research team, including obstetricians and gynecologists and pharmacists, and it was based on the review of literature [6–9]. Another 15 pharmacists were invited to the field test interviews ('pilot study') to assess the language and structure of the questionnaires. Questions were polished and finalized according to their feedback.

The questionnaire consisted of four main parts: (1) characteristics of respondents, (2) ECP dispensing practice, (3) attitude to ECPs (e.g., opinion on OTC dispensing) (4) knowledge on ECPs. Close and likert scale test questions were used depending on the question in focus.

Recruitment

All members of the Hungarian Chamber of Pharmacists (HCP) with work email addresses were invited to participate (n = 2019) in an online questionnaire survey. HCP registration is compulsory for all active pharmacists in Hungary. The provision of the email address is not compulsory, and nearly 40% of HCP members signed up for news by giving their email address.

Invitations were placed in the 2014's bulletins, and members with email contact were accessed by the Chamber Secretariat. In order to achieve an adequate response rate from all regions, several reminders (n = 12, i.e., each month) were sent via a merged advertisement in the newsletter. Participants anonymously submitted the questionnaire. On completing the study, the survey portal offered information about the main outcomes of the study that all participants could access.

Evaluation of questionnaires and statistical analysis

Based on support/rejection of OTC availability of ECPs, participants were classified into two groups. Group 1, who supported OTC availability of ECPs, and Group 2, who were against OTC availability of ECPs. In the knowledge section, correct answers were scored one point, incorrect answers were scored zero or minus 1, depending on the

importance of the question (see details in the corresponding Table). The maximum number of knowledge points was 14 (100%). Categorizing ECPs as contraceptive and abortive agents on a scale of 1–5 was performed by the respondents. For further analysis, this contraception–abortion scale was dichotomized. To assess relationships between different variables (age, gender, workplace, ECP dispensing frequency, knowledge, rating ECPs as contraceptives, and supportive opinion toward OTC provision of ECPs (i.e., Group 1)), univariate analyses (normality test: Kolmogorov–Smirnov test, Mann–Whitney U test, and Fischer's exact test) were performed (SPSS version 22, IBM, Armonk, NY, USA). To express the amount of uncertainty around the effect estimate, the confidence interval was calculated [10]. by the R 'binom' package. Internal consistency of responses related to attitude questions was tested by Cronbach alpha [11].

Results

General characteristics

Three hundred and fifty seven pharmacists completed the questionnaire, yielding a 17.7% response rate (regional response rate ranged between 12.9 and 20.8%). Internal consistency of responses related to attitude of the pharmacists had a Cronbach alpha of 0.807. Table 1 presents the characteristics of the respondents. In both genders, the majority of the respondents were aged below 40 years (the average age of male and female respondents was 35.02 ± 11.23 and 36.5 ± 11.74 years, respectively). More than half of the respondents dispensed at least one ECP monthly.

Knowledge of the pharmacists

The number and proportion of correct answers for the specific questions are summarized in Table 2. The answers were correct in 55.18% (SD: 12.40%; minimum: 16.7%; maximum: 88.9%). The highest rate of correct answers was obtained for questions related to timing of administration (Q2 and Q4). Moderate knowledge was found to questions on the mechanism of action (Q1), effectiveness (Q3), and its effect on the fetus (Q6). Knowledge did not differ considerably between pharmacists from different regions or different workplaces (data not shown). Forty-four percent of pharmacists considered ECPs as contraceptives. Pharmacists who agreed on the future OTC provision of ECPs (Group 1) had identical or higher rate of correct answers for almost all questions and considered different ECPs as contraceptives in a substantially higher rate (Fig. 1).

Opinion of the pharmacists on sales category change of ECPs

Twelve percent of the questioned pharmacists had neutral opinion ('do not know' N = 29) on the possible sales category change of ECPs in the future (i.e., to introduce OTC access for it), and they were excluded from further analysis. 30.18% of the respondents supported (Group 1; confidence interval: 24.86–35.18%) OTC provision of ECPs in the future. The opinion of pharmacists working in different regions or workplace (rural or urban) did not differ considerably (data not shown).

Determinants of pharmacists' opinion

Results of the univariate analyses are summarized in Table 3. In univariate analysis, differences were found between the attitude of pharmacists (Group 1 or Group 2) in age and ECP adjudication (i.e. categorizing ECP as a contraceptive).

It means that pharmacists in older age groups and those who were more familiar with the mechanism of action of ECPs (rating ECP as a contraceptive) were more supportive towards the OTC provision of ECPs. The effect of

Table 1 Pharmacists 'characteristics (N = 357)

Age (years; mean ± SD)	36.17 ± 11.59
Rate of respondents under the age of 40 years N (%)	235 (66%)
Gender (Number of answers = 343)	
Male (%)	83 (24%)
Female (%)	260 (76%)
Workplace (Number of answers = 346)	
Community pharmacy (%)	287 (83%)
Other (%)	59 (17%)
Frequency of Rx dispensation of ECPs (Number of answers = 291)*	
Minimum once a month (%)	168 (58%)
Fewer than once a month (%)	123 (42%)

Table 2 Number and percentage of pharmacists giving correct answers to knowledge questions stratified by attitude

	Group 1[a] N = 89	Group 2[b] N = 210	Total N = 299[c]
Q1 What is the mechanism of action of ECPs?			
Discourage implantation (likely/possible/**not likely**)	4 (4.5%)	5 (2.4%)	9 (3%)
Cause withdrawal bleeding (likely/possible/**not likely**)	38 (42.7%)	68 (32.4%)	106 (35.5%)
Act on the endometrium receptor (**likely**/possible/not likely)	34 (38.2%)	57 (27.1%)	91 (30.4%)
Inhibit motility of uterine tubes (**likely**/possible/not likely)	8 (9%)	26 (12.4%)	34 (11.4%)
Inhibit motility of sperms (**likely**/possible/not likely)	7 (7.9%)	15 (7.1%)	22 (7.4%)
Inhibit ovulation (**likely**/possible/not likely)	32 (36%)	52 (24.8%)	84 (28.1%)
Q2 In how many hours after unprotected intercourse can ECPs be used?[d]			
Levonorgestrel containing product (12 h/24 h/48 h/**72 h**/120 h)	84 (94.4%)	194 (92.4%)	278 (93%)
Ulipristal containing product (12 h/24 h/48 h/72 h/**120 h**)	56 (62.9%)	136 (64.8%)	192 (64.2%)
Q3 In what rate can ECPs prevent pregnancy?			
If taken within the first 24 h (<25/25–50%/50–75%/ ~ 85%/ ~ **95%**)	70 (78.7%)	158 (75.2%)	228 (76.3%)
If taken within 24–48 h (<25/25–50%/50–75%/**~85%**/ ~ 95%)	60 (67.4%)	132 (62.9%)	192 (64.2%)
If taken within 48–72 h (<25/25–50%/**50–75%**/ ~ 85%/ ~ 95%)	44 (49.4%)	100 (47.6%)	144 (48.2%)
Q4 On what days of the menstrual cycle can ECPs be used?[d]			
(**Any day**/only in the second half of the cycle/only in the first half of the cycle)	86 (96.6%)	202 (96.2%)	288 (96.3%)
Q5 How many times can ECP use be repeated in one menstrual cycle? (**1**/2/4)	75 (84.3%)	155 (73.8%)	230 (76.9%)
Q6 Does ECP has effect on the fetus?[d]			
(Teratogenic, **not proven to cause harm**)	67 (75.3%)	129 (61.4%)	196 (65.6%)

Correct answers are indicated bold after each question

[a] Group 1: agree with the future OTC provision of ECPs

[b] Group 2: disagree with the future OTC provision of ECPs

[c] To avoid bias due to missing values, only participants with at least 50% response rate to knowledge questions were included in the analyses

[d] Based on its importance, incorrect answers to these questions were scored by minus one point

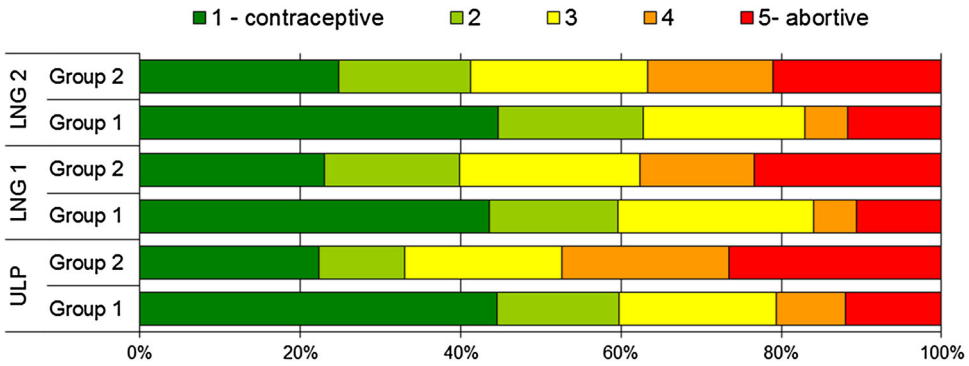

Fig. 1 Adjudication of emergency contraceptives on a five point scale (*1* unambiguously contraceptive; *5* unambiguously abortive). *LNG 1* levonorgestrel 1.5 mg 1 tablet per package, *LNG 2* levonorgestrel 0.75 mg 2 tablets per package, ULP: ulipristal 30 mg 1 tablet per package, *Group 1* agree with the future OTC provision of ECPs, *Group 2* disagree with the future OTC provision of ECPs

knowledge on the pharmacists' opinion was statistically significant when we focused the analysis on the younger (<40 years) age group (59.07 ± 12.76% vs. 54.42 ± 12.14% in Group 1 and Group 2, respectively; $p = 0.026$, Mann–Whitney U test). It means that among young pharmacists (who were generally less supportive to OTC provision of ECPs than the older ones, see above), higher knowledge was associated with a more supportive attitude to OTC provision of ECPs. Therefore, educational measures should primarily target the younger pharmacists.

Table 3 Variables associated with different attitudes towards future OTC provision of ECPs

Variable	Group 1[a] N = 99	Group 2[b] N = 229	Univariate analysis
Gender			Fisher's exact test
Male/Female	19/77	58/162	$p = 0.257$
Age			Mann–Whitney U test
Mean ± SD	40.86 ± 13.27	33.83 ± 9.88	$p < 0.001$
Workplace			Fisher's exact test
Community pharmacy	76	184	$P = 0.634$
Other	21	36	
Frequency of Rx dispensation of ECPs			Fisher's exact test
Minimum once a month	49	109	$P = 0.618$
Fewer than once a month	30	81	
Knowledge % (Mean ± SD)	57.12 ± 12.48	54.37 ± 12.31	Mann–Whitney U test
Min–Max	27.78–88.90	16.67–77.80	$p = 0.152$
Rating ECPs as contraceptives	59 (59%)	86 (38%)	Fisher's exact test $p < 0.001$

[a] Group 1: agree with the future OTC provision of ECPs

[b] Group 2: disagree with the future OTC provision of ECPs

Discussion

The purpose of this study was to assess knowledge and determine current views of the Hungarian pharmacists on ECPs. According to our knowledge, this is the first nationwide report on the knowledge and attitude of pharmacists related to ECPs from a European country, where ECPs are still prescription only medicines (in contrast to most European countries).

The level of knowledge of the pharmacists about ECPs was moderate country-wide; however, the knowledge level varied by the question types. Pharmacists were quite knowledgeable on the administration period and timing of ECP use but had moderate knowledge on the mechanism of action, effectiveness and safety of ECPs. Of note, almost two thirds of the pharmacists thought wrongly that ECPs probably or possibly work via withdrawal bleeding, and more than one third of the pharmacists related teratogenic effects to ECPs. This latter is a serious misunderstanding as acute ECP use is considered category A or B in different pregnancy category risk systems [12, 13]. The knowledge of the mechanism of action seems to be more important in a country where pharmacist can provide ECPs to patients directly, but as the mechanism of action is linked to the adjudication of ECPs, pharmacists should be more knowledgeable in this aspect.

An earlier regional study from Hungary [9] and some international studies, except for an Australian study which proved good knowledge level of pharmacists [7], also showed poor to average knowledge on ECPs [7, 8, 14–17].

Findings of a recent US study are comparable to our results as every second US pharmacist was not aware of the mechanism of action of ECPs and related birth defects to ECP use [7]. In the absence of a standard and validated questionnaire to assess knowledge on ECPs, any comparison should be cautiously interpreted. Nevertheless, the consequences of inappropriate knowledge have been described in several studies with simulated patients, where pharmacists with low knowledge provided inaccurate information [16, 18, 19].

Irrespective whether sales category change of ECPs might happen in Hungary or not, education of the pharmacists on ECPs should be reinforced in the graduate training program and should continue at the postgraduate level to fill in knowledge gaps. The World Health Organization's training module on ECPs [20] can be used as a reference document to plan educational curricula.

In this survey, almost two thirds of the pharmacists were against the OTC availability of ECPs in community pharmacies in the future, and no significant differences were found between the attitudes of pharmacists in different regions/workplace. This finding is not unique. A US study from South Dakota in 2003 (when ECPs were POMs in the US) found that only 6% of the surveyed pharmacists agreed that ECPs should be available as OTC medication [8]. No further data from a country with similar legislation (i.e., where ECPs are prescription only medicines, too) are available, which poses a limit to our comparison. Of note, in Sweden, after the sales category change of ECPs, 90% of the pharmacists agreed on the OTC provision of ECPs [21],

showing that Scandinavian pharmacists are supportive of OTC access. In other countries, deregulation from prescription only status resulted in that ECPs were more widely available [22], and it had no negative consequences on sexual behavior or regular contraception [23].

Results showed that supportive opinion on OTC availability was significantly associated with higher age and the consideration of ECPs as contraceptives (i.e., adjudication of ECPs). Moreover, in young pharmacist, higher knowledge was associated with more supportive attitude towards OTC access.

The importance of knowledge on easier access to ECPs has also been highlighted in a recent US study, where the pharmacists' knowledge was found to be the most important predictor of OTC dispensing of ECPs. It means that pharmacists who are aware of the fact that EC does act as a contraceptive are more likely to dispense it [7].

All these show that education of pharmacists is not only important for providing adequate counseling, but it is also required for the success of the sales category change program.

In 2009, Szucs et al. [9] performed a local study in Hungary about the knowledge and attitude of pharmacists regarding ECPs. In their study, comparable knowledge rates and a lower rate of refusal of OTC access to ECPs (45 vs. 61% in this study) have been found. The persistence of knowledge gaps and general non-supportive attitudes towards ECPs has been further proven by this recent nationwide survey. As Hungarian women refuse abortion in a relatively high rate [24], making the access to ECPs easier would be an alternative to prevent unwanted pregnancies and possibly to reduce abortion rates.

The strength of this study is that it provides the first nationwide survey of pharmacists on this important topic. We surveyed all pharmacists (not only those working as a community pharmacist); therefore, we gained insight on the views of the members of this profession.

Limitations

This survey had some limitations, which we need to address. Available labor force data show different age distribution for the active pharmacists (rate of those aged below 40 years is 46 vs. 66% in the survey); therefore, young pharmacists were slightly overrepresented in this survey. Similar concerns have been raised in a recently published Australian study [7], where most respondents of the questionnaire were substantially younger than the national average age of pharmacists. It means that the results cannot be generalized to the whole pharmacist community but rather for the young ones. On the other hand, this limitation had no real consequence as knowledge and attitude of pharmacists who would actively work for decades (i.e., young pharmacists) would be more important in relation to shape future interventions. The second limitation was the response rate. The response rate of online surveys varies considerably in the literature (from <10% to over 80%) [25], and it depends on various factors including the topic, survey type, etc. [26].

As stated in the methods, huge efforts were made to boost response rate. Probably somewhat higher rates could have been achieved with monetary incentives, but we did not have access to them. Despite the low and recently further decreasing response rate of web surveys among health care professionals [26, 27], we considered this type of data collection the most optimal for this delicate issue (e.g., to maintain anonymity). Moreover, the distribution of the link was via an official channel and in an inert way (not linked to advertisements, etc.) to avoid sampling bias and spamming filters.

Considering the frequency of ECP dispensing in Hungary and the sensitivity of the topic, we reached reasonable response rates (similar response rates from Hungarian pharmacists have been achieved recently to a less sensitive topic, the survey on undergraduate education) [28]. Our rate were even higher than some recent studies focusing on Health Care Professionals in US [29] and Germany [27].

Conclusions

The results of this study demonstrate that Hungarian pharmacists have moderate knowledge on ECPs, which can impede adequate counseling on some aspects of ECP use; therefore, the professional background is presently non-supportive to the introduction of OTC access for ECPs.

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