Knowledge, Attitude and Practice among dispensers of Community Pharmacy on Emergency Contraceptive Pills in Kathmandu Valley: A cross-sectional study

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Abstract

Background Unintended pregnancies, the primary cause of abortion, can consequence in severe negative effects such as infertility and maternal death. Adequate knowledge of emergency contraceptive pills (ECPs) and a positive attitude among the dispensers in community pharmacy is a prerequisite for timely access to ECP thus ultimately abating the incidence of unintended pregnancies. This study intended to explore the knowledge, attitude and practice of dispensers of community pharmacy toward ECPs in Kathmandu valley.

Methods A cross-sectional study was conducted in community pharmacies located in three districts of Kathmandu valley. A convenient sampling method was employed to interview dispensers in 227 community pharmacies using a validated questionnaire. The questionnaire assessed the demographic characteristics, knowledge, attitude and dispensing practice of the dispensers. The data were subjected to descriptive and inferential analysis using SPSS 18 (SPSS Inc., Chicago, IL, USA).

Results Respondents’ knowledge was statistically significant with dispensing practice and had a positive relation [AOR= 11.86, 95% CI (5.821-24.190)]. Approximately (74.9%) of respondents had a good practice and about 65.6% had a good knowledge on dispensing ECP. Majority (93.4%) had a positive attitude towards ECP yet some of the respondents (54.2%) had conservative belief about the Over the Counter (OTC) availability of ECP. ECP related knowledge was higher among the age group 40-49 years, Bphamacy degree holders with experience above 10 years and pharmacies located inside the city and in the Kathmandu district. After adjusting the possible confounder variables, age, degree and district of pharmacy were significantly associated with knowledge. Similarly, respondents’s practice towards ECP was higher among the age group 40-49 years with experience above 10 years and pharmacies located inside the city and in the Kathmandu district. Adjusted for other variables, only pharmacies located at Kathmandu district was significantly associated with practice.

Conclusion The dispensers lacked specific significant information on ECP and posed a conservative perception of its’ OTC availability, despite good overall knowledge and positive attitude. Hence, training on proper counseling strategies should be afoot to refine service delivery.

Background

Unintended pregnancy is the underlying cause of abortion which can result in serious negative impacts such as infertility and maternal death [1, 2]. Globally, it is estimated that about 38% of the 210 million pregnancies are unintended whereas 22% of such unintended pregnancies are terminated with unsafe techniques and 18% end up in unplanned births thus imposing an economic burden on the health system [3]. According to the Nepal Demographic and Health Survey (NDHS) 2011, more than one in five births (21%) is unwanted and one in seven (14%) is mistimed [4] and 58% of women succumb to complications of clandestine abortion [5]. Early age at the time of menarche and late marriage are the underlying factors contributing to pre-marital sex and unintended pregnancies. Ten to twenty percent of adolescents in Nepal participate in premarital sex. Out of them, only 9 percent utilize a technique for contraception [6].

Emergency contraception (EC) is any method of contraception that a women can use after unprotected sexual intercourse and before the potential time of implantation [7]. Emergency contraceptive pills (ECPs) are safe and effective drugs used to prevent the risk of pregnancy after unprotected or inadequately protected sexual intercourse [8]. ECP was first introduced in Nepal through the social marketing program which was held in 2004 [9]. Nevertheless, various barriers exist that keep young women from having easy access to ECPs. These barriers incorporate healthcare provider’s knowledge and perception, distribution system for ECPs, legal and social barriers and cost. [10]

Pharmacies stand as an important access point for obtaining ECPs as well as serve as a salient venue offering counseling services to the public and the first place to approach for drugs owing to its’ flexible time of operation [11, 12]. Pharmacies thus play a pivotal role in a woman’s access to ECPs which is further influenced by the
dispensers’ knowledge and attitude [11, 12]. Appropriate knowledge and a positive attitude are crucial elements that enable the dispensers to provide comprehensive counseling and create awareness regarding ECP and maximize its rational use thus preventing unwanted risk [13, 14].

To the best of our knowledge, no published studies assessing knowledge, attitude and practice (KAP) of dispensers’ towards ECP in Nepal is available. This is the first survey about ECPs that incorporates dispensers of community pharmacies from a diverse practice setting. This study was thus initiated considering the lack of information regarding KAP of dispensers of community pharmacies towards ECP in Kathmandu Valley.

Methods

Study Design and study site

This was a cross-sectional study carried out at community pharmacies located in Kathmandu valley (Kathmandu, Lalitpur and Bhaktapur districts) from May to October 2019. Kathmandu is the capital city and the three districts are located in the central part of Nepal.

Study Population

The study population included the community pharmacies listed in the Department of Drug Administration (DDA) directory. The total registered allopathic pharmacy outlets in Nepal and the aforementioned three districts of Kathmandu Valley were 12,865 and 2,871 respectively till November 2018.

Inclusion Criteria

- The pharmacy shops located at Kathmandu, Lalitpur and Bhaktapur districts of Kathmandu Valley
- The pharmacies which were registered to DDA.
- The dispensers working at community pharmacy willing to participate in the study.

Exclusion Criteria

- Dispensers not willing to participate in the study and pharmacises not registered in DDA.

Sampling Method and Technique

The sample size was calculated using the list of registered community pharmacies obtained from the DDA directory. The community pharmacies located at Kathmandu, Lalitpur and Bhaktapur districts were used for the sampling frame. This study was restricted to these areas because urban agglomeration covers a large population due to facilities such as employment opportunities, health, transportation facilities, and so on. The Raosoft sample size calculator was used for calculating the required sample size (i.e. 227 calculated) with a 5% margin of error, 95% confidence interval, and 20% response distribution [15, 16]. The questionnaire was distributed to a random sample of dispensers of community pharmacies by using a convenient sampling method and then the sample was stratified by three districts of Kathmandu valley. As per the stratification result, the samples taken from Kathmandu, Lalitpur and Bhaktapur districts were 170, 37 and 20 respectively.

Data Collection Tool

A self-administered questionnaire (ANNEX B) was designed after reviewing the previous similar surveys with some modifications [17]. The questionnaire consisted of both closed-ended and open-ended questions. The questionnaire was hand-delivered and was framed in the English language. It was divided into four sections: socio-demographic characteristics, knowledge, attitude and dispensing practice. The draft of the questionnaire was pretested on 23 (10% of 227) randomly selected subjects. The content validity of the questionnaire was done by obtaining opinions from the experts in this field and the internal consistency of the questionnaire was measured by calculating Cronbach’s alpha value. Cronbach’s alpha was found to be 0.70 which means there is acceptable reliability and consistency between the set of test items. An alpha of 0.70 indicates acceptable
reliability and 0.80 or higher indicates good reliability [18].

To measure the dispensing practice and knowledge of the respondents on ECP, selected variables were used and, then the correct answer was coded as ‘yes’ which means ‘1’ and an incorrect answer was coded as ‘No’ which means ‘0’. The cumulative and mean scores were calculated. Respondents who scored above the mean score were defined as having “good practice” and good knowledge” and those who scored below the mean score were defined as having “poor practice” and “poor knowledge”. The attitude of respondents was calculated with the help of a five-point Likert scale ranging from; ‘Strongly agree’ i.e. ‘1’ to ‘Strongly disagree’ i.e. ‘5’. Based on the cumulative score, the respondents who scored below the mean score were defined as having a “positive attitude” and those who scored above the mean score were defined as having a “negative attitude”.

Data Management and Analysis

Data processing and analysis were done by using statistical package for social sciences (SPSS) version 18 (SPSS Inc., Chicago, IL, USA). Data were analyzed for descriptive and inferential statistics. Descriptive analysis was performed using frequencies and percentages and was presented in the form of text, figures, and tables. The Pearson Chi-square test ($X^2$) was used to determine associations among categorical variables. A p-value <0.05 was considered as statistically significant. Crude, as well as Adjusted odds ratios and 95% confidence intervals, was derived from bivariate and multivariate logistic regression models respectively to identify determinant variables associated with dispensing practices, knowledge, and attitudes; crude and adjusted odds ratios were considered significant at p ≤ 0.05.

Results

Socio-demographic characteristics

Table 1 shows the socio-demographic information of the respondents working at a community pharmacy. A total of 227 dispensers participated in the study. Majority of the respondents were of the age group 20-29 (47.1%). Among the total respondents, 57.7% were male and most of them had a Diploma in pharmacy (D Pharmacy) degree. The highest number of respondents had work experience of fewer than 5 years and a median length of work experience in the present study was found for 5-10 years.

Dispensing practice of ECPs

Table 2 outlines the dispensing practice of respondents towards ECP for selected practice variables. The overall dispensing practice of ECP in community pharmacies was good. Out of 227 respondents, 99.1 % reported that they had dispensed ECP. Majority stated that on average they dispensed 1-10 ECPs daily.

Association of demographic characteristics and dispensing practice

Chi-square test was used to determine the association between socio-demographic characteristics and dispensing practice as presented in Table 3. There was a significant association of age, primary position, years of experience, location of pharmacy and district in which the pharmacy is situated with dispensing practice ($p<0.05$) whereas gender, religion, and level of education were not significantly associated with dispensing practice ($p>0.05$)

Dispensers’ Knowledge on ECPs
Table 4 depicts the knowledge of respondents towards ECP. An overall 149 (65.6%) had good knowledge while 78 (34.4%) had poor knowledge of ECPs. The fact that ECPs work by preventing or delaying ovulation was agreed upon by the majority of the participants (63.4%). When asked about how many times in the past years they had received information about ECP, a lower percentage of the partakers (21.1%) responded: “yes, more than once”. Majority (81.5%) believed that ECPs should be taken after unprotected sexual intercourse to be clinically effective. Quite interestingly, a majority of the participants presumed that “Levonorgestrel” is the main chemical constituents of ECP (76.7%). When asked about the dose of ECP, the majority (68.3%) of the respondents reported the dose as “Single dose of 1.5 mg or 2 doses of 0.75mg”. Furthermore, 63.4% incorrectly stated that ECP can harm a developing fetus. A majority of the respondents (75.3%) correctly believed that ECP does not offer protection against sexually transmitted infections (STI). The maximal percentage (67.4%) responded that they know about the side effects of ECP.

Common side effects of ECP

The most common side effects specified by the respondents were irregular menstruation (%) followed by vaginal bleeding (35.9%) nausea/vomiting (35.2%), infertility (28.1%) and headache (18.8%) as presented in Figure 1.

Figure 1: Percentage of common side effects of ECP as specified by respondents

Association of demographic characteristics and knowledge level

A significant association was found between age, degree, primary position, years of experience, location of pharmacy, district of pharmacy and the respondents’ knowledge level (p<0.05) whereas no significant association was observed between gender, religion and the respondents’ level of knowledge (p>0.05)

Attitude of dispensers of community pharmacies toward ECP

Table 6 shows the attitude of respondents towards ECP. Majority of the respondents had a positive attitude towards ECP (93.4%). More than half of the study participants believed that ECPs are safe to use (53.4%). Only 25.6% reported that adolescents (teenagers) should be given easy access to ECPs and 34% of the respondents agreed on the recommendation of ECP use. Regarding the medicalization of ECP, 36.5% of the respondents presumed that the government of all countries should medicalize ECPs. The majority of the respondents approved that all sexually active women should be aware of ECP (91.6%). Similarly, a large percentage believed that routine information about ECP should be included in contraceptive counseling (87.7%). Regarding information and formal training of ECP, a maximal percentage favored that information regarding ECP should be included in sex education in school (94.3%) while 86.4% of respondents believed that formal training is needed to enable the dispensers to appropriately dispense ECP. Also, the majority of the participants believed that ECP without prescription will promote unsafe sex (65.2%).

Association of demographic characteristics and attitude level of the respondents

No significant association was found between the demographic variables and their level of attitude (p<0.05) (Table 7).
Association of dispensing practice of respondents with their level of knowledge and attitude

A significant association was obtained between the dispensing practice of respondents and their knowledge level (p=0.000) whereas no significant association was found between the dispensing practice of respondents and their level of attitude (p=0.578). The multivariate analysis illustrated that the respondents having good knowledge were 11.86 times more likely to have good practice compared to those having poor knowledge of ECP [AOR = 11.86, 95% CI (5.821-24.190)] (Table 8).

Association of the level of attitude of respondents with their level of knowledge

Table 9 shows an association of the level of attitude of respondents with their level of knowledge. No significant association was observed between the level of attitude of the respondents and their knowledge level (p=0.109).

Determinant factors related to knowledge and practice of ECP

1. Determinant factors related to respondents’ Knowledge of ECP

Age, degree of education, years of experience, location of pharmacy and district of pharmacy are the variables that met the inclusion criteria in multivariate logistic regression analysis as per the results obtained from the bivariate analysis. After subjecting these variables to multivariate analysis, participants being aged 20-29, 30-39 and 40-49 years, [AOR= 4.779, 95%CI (1.179-19.372), 14.775 (2.456-88.862) and 27.030 (2.043-357.546)] compared to age less than 20 years was significantly associated with knowledge level on ECP with higher odds.

Respondents having Community Medicine Assistant (CMA), D Pharmacy and other degrees were less likely to be knowledgeable about ECP as compared to respondents with a Bachelor of Pharmacy degree. [AOR= 0.122, 95% CI (0.027-0.537), 0.26(0.080-0.848), 0.128(0.026-0.629)]. Similarly, respondents whose pharmacy is located at Lalitpur and Bhaktapur districts were less likely to know about ECP compared to those whose pharmacy is situated at Kathmandu district [AOR= 0.079, 95% CI (0.024-0.260), 0.010 (0.001-0.125)] after adjusting for the confounding variables. [Table 10].

1. Determinant factors related to respondents Dispensing Practice of ECP

Age groups, years of experience, location of pharmacy and district of pharmacy were the variables that met the inclusion criteria in multivariate logistic regression analysis as per the results obtained from the bivariate analysis. After adjusting the possible confounder variables in multivariate analysis, respondents whose pharmacy is situated at Lalitpur and Bhaktapur districts were less likely to have practiced on ECP compared to those whose pharmacy is situated at Kathmandu district. [AOR= 0.062 95% CI (0.024-0.164), 0.069 (0.021-0.230)] respectively as shown in Table 10.

Discussion

The present study was done to assess the knowledge, attitude, and practice (KAP) of ECP and their associated factors among dispensers of community pharmacies of Kathmandu valley. In this study more than half of the respondents were male (57.7%) which was similar to the study conducted in Gondar Town, Northwestern Ethiopia (60%) and Nigeria (57.3%) [14, 19].

Practice of dispensers of community pharmacy on ECP
A large majority of the respondents in the present study had ever dispensed ECP and the majority of the product was sold on patient requests without a prescription which was similar to the study carried out in Managua, Nicaragua and Ibadan and Lagos Metropolis, Nigeria.\[14, 17\]

Only 35.3% of the respondents in our study had received formal training/ education on dispensing of ECP which was consistent with the study conducted in Gondar Town, Northwestern Ethiopia (38.3%) but was lower than the findings by Ehrle et al., and Belachew et al., in which 50% of respondents had received information about the method in the past year \[17, 19\]. This contrast may be due to the difference in the training facilities in two settings and the lack of awareness of the place and time where the training is conducted.

In this study, 30.8% of respondents felt ECP should be categorized under OTC drugs. This result was slightly lower than the study conducted in Jamaica and Barbados in which 50.3% and 40.3% of respondents voted for the provision of making it available without prescription respectively \[20\]. This difference may be due to the unsubstantiated belief of the dispensers that ECP without prescription would increase promiscuity towards sexual behavior and result in unsafe sex along with repeated use of ECP. Therefore, positive aspects of ECPs should be highlighted during training with proper educational messages.

Counseling was reported to be an essential facet of dispensing by 92.1% of respondents and quite evidently, 70% of the respondents did counsel all the users while dispensing ECP. This statistic was somewhat lower than the studies carried out in Turkey and Ethiopia in which counseling was offered as an indispensable service by almost all of the pharmacists \[19, 21\]. This difference may be due to lack of private counseling areas in the community pharmacies of Kathmandu Valley which was reportedly present in 75% of the pharmacies in Turkey.

Most of the dispensers in our study were willing to dispense ECP to men seeking ECPs for their partner (77.5%) which was similar to the study conducted in Nicaragua (83.9%) \[17\].

**Knowledge of the respondents towards ECP**

This study illustrated that about 149 (65.6%) of the respondents possessed a good knowledge of ECP. The result of the present study was slightly lower than the study conducted in New Mexico in which the pharmacists had overall knowledge scores of 71.2±11.3 \[22\]. This contrast may be due to differences in training facilities and no systematic continuing medical education regarding ECP in Kathmandu valley. Regarding the mechanism of action of ECP, 63.4% gave the correct answer which was consistent with the study done in Managua, Nicaragua in which more than half of the respondents (59%) knew how the emergency contraceptive pills worked \[17\].

Despite WHO assertion, 57% of respondents in Managua, Nicaragua, and 68% in New Mexico incorrectly believed that ECP could cause harm to the developing fetus versus 63.4 % in the present study. In this study, the majority (81.5%) of the respondents reported that ECP should be taken after unprotected sexual intercourse to be clinically effective which is in agreement with the findings of research conducted on Nicaraguan pharmacists in which this awareness was observed in 79% of the respondents \[17, 22\]. Most of the partakers reported that ECP should be taken within 72 hours after unprotected sexual intercourse but very few knew that it was also effective if taken within 120 hours of unprotected sexual intercourse. This corroborates the findings of studies conducted in Jamaica and Barbados and South Africa \[20, 23\]. A study conducted in South-Eastern Hungary which reported that nearly all (97%) pharmacists were aware of the active agent of the ECP reflects a higher statistic than our study where only 76.7% of the respondents voted for levonorgestrel as the active constituents of ECP. Side effects mentioned by the dispensers in this study were no different from those stated by another author \[24\]. In the present study, 67.4% of the respondents knew about the side effects of ECP and 68.3% reported the right dosing which was lower than the study carried out in South Africa. The reason for this result may be due to the difference in educational level. Only pharmacists were interviewed in the study conducted in South Africa whereas all the dispensers of community pharmacy irrespective of their degree or level of education were enrolled in the present study. This may be the reason that the present study may have lower knowledge regarding the side effects and dosing schedule of ECP compared to the study conducted in South Africa \[23\].

A good proportion of the respondents (75.3%) correctly believed that ECP does not offer protection against sexually transmitted infections (STI), underpinning the findings of Szucs et al. \[24\].

It was found that despite the good overall knowledge, dispensers lacked specific information about ECP such as
side effects, dosing schedule, time frames and so on. This could eventually affect the information given during counseling by the dispensers to their users. For instance, very few respondents knew that ECP can be taken up to 120 hours which can lead to the delivery of misinformation to the ECP users that pills would no longer be effective and can result in unwanted pregnancy or abortion. Hence, educational and awareness programs should be designed to address these issues.

**Attitude of the respondents towards ECP**

The present study found that a large majority of the respondents (93.4%) have a positive attitude. More than half of the study respondents agreed that ECPs are safe to use (53.4%) which is similar to the study conducted in Ethiopia [19]. Only 25.6% agreed whereas 45.4% disagreed that adolescents should be given easy access to ECPs. This result was in agreement with research conducted in South Africa in which a significant number of pharmacists doubt their appropriateness for women younger than 18 years of age [23].

Regarding the Medicalization of ECP, 36.5% of the respondents agreed that the government of all countries should medicalize ECPs while more than two-thirds (68.3%) of the study respondents of Ethiopia favored deregulation of ECPs and proposed it to be OTC drug. [19]. This difference in result may be due to the concern of dispensers of the pharmacy of Kathmandu Valley regarding unwise use of ECP by the adolescents and the risk of an increase in unsafe sex, which is evident from the proportion (65.2%) of dispensers consenting to the statement that ECP without prescription will promote unsafe sex. This finding was in line with the study conducted in South Africa in which the majority stated that the use of pills promoted promiscuity, repeat use and increased risk of contracting HIV and other STIs [23].

In the present study, a large proportion of respondents agreed that routine information about ECP should be included in contraceptive counseling (87.7%) as well as all sexually active women should be aware of ECP (91.6%). These results were higher in comparison to the study conducted in Ethiopia with a percentage of (75%) and (58.3%) respectively [19] and similar to the study conducted in Turkey with a percentage of (85%) and (92%) respectively [21]. Majority of the respondents (94.3%) believed that ECP should be a part of comprehensive sexuality education in schools. This data was higher than the study carried out in Turkey in which only 73.1% of the respondents agreed with the above statement [21]. Approximately 86.4% of respondents were in the favor of conducting formal training focused on enabling the dispensers to appropriately dispense ECP which reflects the opportunity to design and run educational campaigns that can aid in mainstreaming ECP use. In the same vein, Kishore et al. pointed out a significant improvement in knowledge, attitude and dispensing practice of the providers after attending training programs on ECP (p <0.05) [25]. Due to growing awareness of the existence of ECP and people’s willingness to use it, ECP users should be counseled properly by the dispensers of the community pharmacy since lack of counseling can result in inappropriate and ineffective use of the drug. Despite their positive attitude towards ECPs, our study respondents have more conservative beliefs about the OTC availability of ECP in comparison to another study conducted in Sweden [26].

**Determinant factors associated with knowledge and practice of ECP**

Age, primary position, years of experience, location of pharmacy and district of pharmacy were found to be the determinant factors statistically associated with dispensing practice. Age and years of experience shared a positive relationship with dispensing practice in bivariate analysis and a district in which pharmacy was situated was found to be a statistically significant factor for dispensing practice in the multivariate analysis. There was no significant association of gender, religion, and level of education with dispensing practice. In the study conducted in Delhi, India, age, years of experience were found to have statistical significance with the dispensing practice of ECP which was consistent with the present study [25]. Years of experience was found to have a positive relation with dispensing practice in the study conducted in Ethiopia which was in agreement with the present study [19].

Age, degree, primary position, years of experience, location of pharmacy and district of pharmacy were found to be statistically significant factors for the level of knowledge. In bivariate analysis, age and years of experience were found to show positive relation with the level of knowledge. In multivariate analysis, age showed a positive
relationship with the level of knowledge of dispensers about ECP whereas years of experience and location in
which pharmacy was situated were found to share negative relation with their level of knowledge. There was no
significant association between gender and religion with their level of knowledge. The result is similar to the
study conducted in South Dakota in which years of experience was found to be statistically significant with the
level of knowledge [27].

The extent of knowledge of respondents towards ECP was a statistically significant factor for the good dispensing
practice of respondents and had a positive relation [AOR= 11.86, 95% CI (5.821-24.190)]. This result was
consistent with the studies conducted in India [25] and Florida [26] in which the dispensing practice of providers
was found to be positively correlated with their knowledge (p< 0.05).

Even though the majority of the participants possessed a positive attitude, demographic variables, dispensing
practice and knowledge level of the respondents towards ECP did not show any significant association with their
level of attitude. However, this result was not consistent with the studies done in Sweden [28] and India [25] in
which the older group, aged 45–64 years, were more positive towards routine information of ECP in
contraceptive (p=0.001) and a significant association of attitude was observed with dispensing practice
(p<0.05) respectively. This contradiction may be accounted to the possibility that some of the respondents may
have filled in responses they perceived to be desirable rather than their actual perceptions. Despite having a
significant association between attitude and dispensing practice, a positive attitude without adequate
knowledge does not correspond at all with the level of dispensing practice. It is the knowledge that holds a great
role in decision making in dispensing practice. [25]

Limitations

The study included only three districts of the Kathmandu valley. All the pharmacies in other districts of Nepal
were not included in the study. Along with that, convenience sampling was done in this study therefore; the
findings may not be representative of the target population of Nepal. Some of the respondents might have given
the answers which the interviewer wants to hear rather than their actual performance and behavior in day to
day practice.

Recommendations

The outcomes of this study are presumed to aid in assessing the existing level of KAP of the dispensers towards
ECP that demands refinement. Educational campaigns focusing the pharmacists and other healthcare
professionals are imperative to enhance the knowledge, improve the dispensing practice and exterminate the
misbelief of the dispensers towards ECP which will help to loosen the existing reservation notions. Furthermore,
the curricula relating to reproductive medicines and contraceptives should be strong as finding from this study
showed that the major source of information of most of the respondents was textbooks.

Conclusion

This study provides an empirical assessment of KAP of dispensers of community pharmacies of Kathmandu
Valley. This study identified that more than two-thirds of the respondents had a good practice on dispensing ECP,
more than half of the respondents were found to have good knowledge and a large majority of the respondents
had a positive attitude towards ECP. Although the vast majority of the respondents had a positive attitude, very
few of them felt ECP should be categorized under OTC drugs and more than half of them agreed that ECP
without prescription will promote unsafe sex. The finding also showed that age and years of experience shared a
positive relationship with dispensing practice and knowledge in bivariate analysis whereas in multivariate
analysis only age showed a positive relationship with the level of knowledge of respondents about ECP. In this
study, very few respondents had received formal training/ education on dispensing of ECP which highlights the
need for additional training and educational programs that can benefit the dispensers. Findings from this study showed that dispensers lacked specific information about ECP such as side effects, dosing schedule, time frames and very few knew that it was also effective if taken within 120 hours of unprotected sexual intercourse in comparison to other studies. This could affect the information given during counseling by the dispensers to their users as the extent of knowledge of respondents towards ECP was found to be a statistically significant factor with the dispensing practice of respondents and had a positive relation. Hence, a lack of knowledge can result in the delivery of misinformation to ECP users and can result in inappropriate use of the drug. Hence, educational and awareness programs should be designed to address these issues.

**Abbreviations**

| Abbreviation | Full Form |
|--------------|-----------|
| COFPTP       | Comprehensive Family Planning Training Package |
| CMA          | Community Medicine Assistant |
| D Pharmacy   | Diploma in Pharmacy |
| DDA          | Department of Drug Administration |
| DoHS         | Department of Health Services |
| EC           | Emergency contraception |
| ECPs         | Emergency Contraceptive Pills |
| FHD          | Family Health Division |
| NDHS         | Nepal Demographic and Health Survey |
| NFCC         | Nepal Fertility Care Center |
| NHTC         | National Health Training Center |
| OR           | Odds Ratio |
| AOR          | Adjusted Odds Ratio |
| COR          | Crude Odds Ratio |
| OTC          | Over the Counter |
| PSI          | Population Services International |
| SPSS         | Statistical package for social sciences |
| STI          | Sexually Transmitted Infections |
| WHO          | World Health Organization |

**Declarations**

**Ethical approval and consent to participate:**

Ethical approval was taken from the ethical review board of the Nepal Health Research Council (NHRC) and permission from the concerned authorities was taken before the study. Before data collection, the participants
were informed about the purpose and objective of the study and written consent was obtained from each of them. The identity of the participant was kept confidential. The study was interview-based and does not consist of any human specimen.

Consent for publication

Not applicable.

Competing interests

None of the authors have any competing interests.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Authors’ Contribution:

SS (a) and SS (b) conceived and designed the study. RKS and SS(c) made substantial changes in the conception of the study. SS (b), UG and SS(c) performed the field survey to collect the data. SS (b) conducted a statistical data analysis. SS (a), SS (b), RKS and SS(c) drafted the manuscript with intellectual contributions from all co-authors. All authors interpreted the data, reviewed and approved the final manuscript.

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| Characteristics                      | Frequency | Percentage |
|--------------------------------------|-----------|------------|
| **Age**                              |           |            |
| (Median Age: 20-29 Years)            |           |            |
| <20                                  | 29        | 12.8       |
| 20-29                                | 107       | 47.1       |
| 30-39                                | 51        | 22.5       |
| 40-49                                | 23        | 10.1       |
| Greater and equal to 50              | 17        | 7.5        |
| **Gender**                           |           |            |
| Male                                 | 131       | 57.7       |
| Female                               | 96        | 42.3       |
| **Religion**                         |           |            |
| Hindu                                | 190       | 83.7       |
| Buddhist                             | 32        | 14.1       |
| Muslim                               | 3         | 1.3        |
| Christian                            | 2         | .9         |
| **Degree/Education**                 |           |            |
| Bachelor of Pharmacy                 | 57        | 25.1       |
| CMA                                  | 29        | 12.8       |
| Diploma in Pharmacy                  | 90        | 39.6       |
| Masters of Pharmacy | 13 | 5.7 |
|---------------------|----|-----|
| Others              | 38 | 16.7|

**Primary Position**

| Staff               | 109 | 48.0|
|---------------------|-----|-----|
| Manager             | 12  | 5.3 |
| Owner               | 105 | 46.3|
| Others              | 1   | .4  |

**Years of Experience  (Median: 5-10 Years)**

| <5 years            | 111 | 48.9|
|---------------------|-----|-----|
| 5-10 years          | 61  | 26.9|
| >10 years           | 55  | 24.2|

**Location of Pharmacy**

| Inside city         | 123 | 54.2|
|---------------------|-----|-----|
| Near Hospital       | 69  | 30.4|
| Periphery           | 35  | 15.4|

**District in which pharmacy is situated**

| Kathmandu           | 170 | 74.9|
|---------------------|-----|-----|
| Lalitpur            | 36  | 15.9|
| Bhaktapur           | 21  | 9.3 |
Table 2: Percentage distribution of respondents by their dispensing practice of ECP

| S.N | Practice Variables                                                                 | Response          |
|-----|------------------------------------------------------------------------------------|-------------------|
| 1   | Have you ever dispensed ECP?                                                       | Yes               |
|     |                                                                                   | No                |
| 2   | Which brand of ECP is sold the most?                                               | I Pill            |
|     |                                                                                   | E-72              |
|     |                                                                                   | ECON              |
|     |                                                                                   | Unwanted 72       |
|     |                                                                                   | Max 72            |
|     |                                                                                   | Feminor           |
|     |                                                                                   | Others            |
| 3   | On average, how many ECPs do you dispense every day?                               | 1 to 10           |
|     |                                                                                   | 11 to 20          |
|     |                                                                                   | 21 to 30          |
|     |                                                                                   | 31 to 40          |
|     |                                                                                   | 41 to 50          |
|     |                                                                                   | Above             |
| 4   | Who are the most frequent clients?                                                 | Teenagers         |
|     |                                                                                   | Adult women       |
|     |                                                                                   | Adult men         |
| 5   | Most often the products are sold on?                                               | Patient Request   |
|     |                                                                                   | Patient approaches with prescription |
|     |                                                                                   | On your recommendations |
| 6   | Source of information                                                              | Medical Representative (MR) |
|     |                                                                                   | Text Book         |
|     |                                                                                   | Training          |
|     |                                                                                   | Internet          |
| 7   | Do you feel ECPs should be categorized under OTC drug?                              | Yes               |
|     |                                                                                   | No                |
|     |                                                                                   | Don’t Know        |
| 8   | Received formal training /education on dispensing of ECP                           | > 1year back      |
|     |                                                                                   | <1year back       |
|     |                                                                                   | Not received      |
| 9   | Do you think counseling is an important role of dispensers before dispensing ECP   | Yes               |
|     |                                                                                   | No                |
10. Do you counsel all ECP users while dispensing?  
- Don’t Know  
  - Yes  
  - No

11. Do you counsel on the mechanism of action of ECPs?  
- Don’t Know  
  - Yes  
  - No

12. Do you counsel the time at which ECPs should be taken?  
- Don’t Know  
  - Yes  
  - No

13. Do you counsel on the side effects of ECPs?  
- Don’t Know  
  - Yes  
  - No

Summary of Selected Practice Variables

| (Mean Score)               | Number |
|----------------------------|--------|
| Poor Practice (<0.5)       | 57     |
| Good Practice (>0.5)       | 170    |
| Total                      | 227    |

Table 3: Demographic characteristics of the respondents and their dispensing practice

| Variables             | Selected Practice Variables | Poor Practice n (%) | Good Practice n (%) |
|-----------------------|-----------------------------|---------------------|---------------------|
| Age (years)           |                             |                     |                     |
| <20                   |                             | 18 (31.6)           | 11 (6.5)            |
| 20-29                 |                             | 27 (47.4)           | 80 (47.1)           |
| 30-39                 |                             | 10 (17.5)           | 41 (24.1)           |
| 40-49                 |                             | 1 (1.8)             | 22 (12.9)           |
| Greater and equal to 50|                             | 1 (1.8)             | 16 (9.4)            |
| Gender                |                             |                     |                     |
| Male                  |                             | 31 (54.4)           | 100 (58.8)          |
| Female                |                             | 26 (45.6)           | 70 (41.2)           |
| Religion              |                             |                     |                     |
| Hindu                 |                             | 45 (78.9)           | 145 (85.3)          |
| Buddhist              |                             | 9 (15.8)            | 23 (13.5)           |
| Muslim                |                             | 2 (3.5)             | 1 (0.6)             |
| Christian             |                             | 1 (1.8)             | 1 (0.6)             |
| Degree               |        |        |
|---------------------|--------|--------|
| B Pharmacy          | 11(19.3) | 46(27.1) |
| CMA                 | 12(21.1) | 17(10.0) |
| D Pharmacy          | 20(35.1) | 70(41.2) |
| M Pharmacy          | 2(3.5)   | 11(6.5)  |
| Others              | 12(21.1) | 26(15.3) |

| Primary Position   |        |        |
|---------------------|--------|--------|
| Staff               | 39(68.4) | 70(41.2) |
| Manager             | 3(5.3)   | 9(5.3)   |
| Owner               | 15(26.3) | 90(52.9) |
| Others              | 0(0.0)   | 1(0.6)   |

| Years of Experience |        |        |
|---------------------|--------|--------|
| <5 years            | 35(61.4) | 76(44.7) |
| 5-10 years          | 18(31.6) | 43(25.3) |
| >10 years           | 4(7.0)   | 51(30.0) |

| Location of Pharmacy |        |        |
|----------------------|--------|--------|
| Inside city          | 24(42.1) | 99(58.2) |
| Near Hospital        | 18(31.6) | 51(30.0) |
| Periphery            | 15(26.3) | 20(11.8) |

| District in which pharmacy is situated |        |        |
|----------------------------------------|--------|--------|
| Kathmandu                              | 17(29.8) | 153(90.0) |
| Lalitpur                               | 25(43.9) | 11(6.5)   |
| Bhaktapur                              | 15(26.3) | 6(3.5)    |

* indicates statistically significant at p-value less than 0.05

Table 4: Percentage distribution of respondents by their knowledge of ECP
Knowledge variables | Response
---|---
Mechanism of action of ECP | Prevent or delay ovulation
Induce Abortion
Prevent an already established pregnancy
Don’t Know
No
Yes, Once
Yes, More than once
Before unprotected sexual intercourse
During unprotected sexual intercourse
After unprotected sexual intercourse
Don’t Know

How many times in the past years have you received information about ECP?

| | |
|---|---|
| No | |
| Yes, Once | |
| Yes, More than once | |

Do you know when must the pills be taken to be clinically effective?

| | |
|---|---|
| Before unprotected sexual intercourse | |
| During unprotected sexual intercourse | |
| After unprotected sexual intercourse | |
| Don’t Know | |

Within how many hours after unprotected sexual intercourse should the pills be taken?

| | |
|---|---|
| 5 | |
| 24 | |
| 48 | |
| 72 | |
| 120 | |
| Don’t Know | |

Mention the constituents of ECP

| | |
|---|---|
| Levonorgestrel | |
| Levonorgestrel plus Ethinyl est | |
| Don’t Know | |

What is the dose of ECPs?

| | |
|---|---|
| Single-dose of 1.5 mg or 2 doses 0.75 mg | |
| Single-dose of 2.5 mg or 2 doses 1.5 mg | |
| Don’t Know | |

ECP can harm the developing fetus?

| | |
|---|---|
| Yes | |
| No | |
| Don’t Know | |

Do you know the side effects of ECPs?

| | |
|---|---|
| Yes | |
| No | |
| Not Sure | |

Does the pill protect from Sexually transmitted infections (STI)?

| | |
|---|---|
| Yes | |
| No | |
| Don’t Know | |

Summary

| Knowledge of ECP (Mean Score) | Number |
|---|---|
| Poor Knowledge (<0.5) | 78 |
| Good Knowledge (>0.5) | 149 |
| Total | 227 |
Table 5: Demographic characteristics of the respondents and their level of knowledge
| Variables                        | Poor knowledge | Good knowledge |
|----------------------------------|----------------|----------------|
|                                  | n (%)          | n (%)          |
| **Age**                          |                |                |
| <20                              | 25 (32.1)      | 4 (2.7)        |
| 20-29                            | 37 (47.4)      | 70 (47.0)      |
| 30-39                            | 10 (12.8)      | 41 (27.5)      |
| 40-49                            | 2 (2.6)        | 21 (14.1)      |
| Greater and equal to 50          | 4 (5.1)        | 13 (8.7)       |
| **Gender**                       |                |                |
| Male                             | 40 (51.3)      | 91 (61.1)      |
| Female                           | 38 (48.7)      | 58 (38.9)      |
| **Religion**                     |                |                |
| Hindu                            | 61 (78.2)      | 129 (86.6)     |
| Buddhist                         | 14 (17.9)      | 18 (12.1)      |
| Muslim                           | 2 (2.6)        | 1 (0.7)        |
| Christian                        | 1 (1.3)        | 1 (0.7)        |
| **Degree**                       |                |                |
| B Pharmacy                       | 8 (10.3)       | 49 (32.9)      |
| CMA                              | 17 (21.8)      | 12 (8.1)       |
| D Pharmacy                       | 32 (41.0)      | 58 (38.9)      |
| M Pharmacy                       | 4 (5.1)        | 9 (6.0)        |
| Others                           | 17 (21.8)      | 21 (14.1)      |
| **Primary Position**             |                |                |
| Staff                            | 53 (67.9)      | 56 (37.6)      |
| Manager                          | 3 (3.8)        | 9 (6.0)        |
| Owner                            | 22 (28.2)      | 83 (55.7)      |
| Others                           | 0 (0.0)        | 1 (0.7)        |
| **Years of Experience**          |                |                |
| <5 years                         | 48 (61.5)      | 63 (42.3)      |
| 5-10 years                       | 19 (24.4)      | 42 (28.2)      |
| >10 years                        | 11 (14.1)      | 44 (29.5)      |
| **Location of Pharmacy**         |                |                |
| Inside city                      | 32 (41.0)      | 91 (61.1)      |
| Near Hospital                    | 25 (32.1)      | 44 (29.5)      |
| Periphery                        | 21 (26.9)      | 14 (9.4)       |
| **District in which pharmacy is situated** | | |
| Kathmandu                        | 32 (41.0)      | 138 (92.6)     |
| Lalitpur                         | 26 (33.3)      | 10 (6.7)       |
| Bhaktapur                        | 20 (25.6)      | 1 (0.7)        |
* indicates statistically significant at p-value less than 0.05

Table 6: Percentage distribution of respondents' attitude towards ECP

| S.N | Attitude Variables                                                                 | Strongly Agree n (%) | Agree n (%) | Neutral n (%) | Disagree n (%) | Strongly Disagree n (%) |
|-----|-----------------------------------------------------------------------------------|----------------------|-------------|---------------|-----------------|-------------------------|
| 1   | ECPs are safe to use                                                               | 21 (9.3)             | 100 (44.1)  | 57 (25.1)     | 44 (19.4)       | 5 (2.2)                 |
| 2   | Adolescents (Teenagers) should be given an easy access to ECPs                     | 0                    | 58 (25.6)   | 58 (25.6)     | 103 (45.4)      | 8 (3.5)                 |
| 3   | Do you recommend ECPs use?                                                         | 4 (1.8)              | 73 (32.2)   | 73 (32.2)     | 64 (28.2)       | 13 (5.7)                |
| 4   | Government of all countries should legalize ECPs                                   | 16 (7.0)             | 67 (29.5)   | 76 (33.5)     | 63 (27.8)       | 5 (2.2)                 |
| 5   | All sexually active women should be aware of ECP                                   | 64 (28.2)            | 144 (63.4)  | 10 (4.4)      | 9 (4.0)         | 0                       |
| 6   | Routine information about ECP should be included in contraceptive counseling      | 64 (28.2)            | 135 (59.5)  | 22 (9.7)      | 6 (2.6)         | 0                       |
| 7   | Information of ECP should be included in                                           | 79 (34.8)            | 135 (59.5)  | 10 (4.4)      | 2 (0.9)         | 1 (0.4)                 |
sex education in school

Formal training is needed to enable the dispensers to appropriately dispense ECPs

|        | 54 (23.8) | 142 (62.6) | 22 (9.7) | 8 (3.5) | 1 (0.4) |
|--------|-----------|-------------|----------|---------|---------|

ECP without prescription will promote unsafe sex

|        | 32 (14.1) | 116 (51.1) | 38 (16.7) | 37 (16.3) | 4 (1.8) |
|--------|-----------|-------------|----------|---------|---------|

Summary

| Attitude towards ECP (Mean Score) | Number | %  |
|-----------------------------------|--------|----|
| Negative Attitude (>3)            | 15     | 6.6|
| Positive Attitude (≤3)            | 212    | 93.4|
| Total                             | 227    | 100.0|

Table 7: Demographic characteristics of the respondents and their level of attitude
| Variables                        | Negative Attitude n (%) | Positive Attitude n (%) |
|----------------------------------|-------------------------|-------------------------|
| **Age**                          |                         |                         |
| <20                              | 3 (20.0)                | 26 (12.3)               |
| 20-29                            | 9 (60.0)                | 98 (46.2)               |
| 30-39                            | 1 (6.7)                 | 50 (23.6)               |
| 40-49                            | 2 (13.3)                | 21 (9.9)                |
| Greater and equal to 50          | 0                       | 17 (8.0)                |
| **Gender**                       |                         |                         |
| Male                             | 8 (53.3)                | 123 (58.0)              |
| Female                           | 7 (46.7)                | 89 (42.0)               |
| **Religion**                     |                         |                         |
| Hindu                            | 12 (80.0)               | 178 (84.0)              |
| Buddhist                         | 3 (20.0)                | 29 (13.7)               |
| Muslim                           | 0                       | 3 (1.4)                 |
| Christian                        | 0                       | 2 (0.9)                 |
| **Degree**                       |                         |                         |
| B Pharmacy                       | 4 (26.7)                | 53 (25.0)               |
| CMA                              | 4 (26.7)                | 25 (11.8)               |
| D Pharmacy                       | 5 (33.3)                | 85 (40.1)               |
| M Pharmacy                       | 1 (6.7)                 | 12 (5.7)                |
| Others                           | 1 (6.7)                 | 37 (17.5)               |
| **Primary Position**             |                         |                         |
| Staff                            | 6 (40.0)                | 103 (48.6)              |
| Manager                          | 2 (13.3)                | 10 (4.7)                |
| Owner                            | 7 (46.7)                | 98 (46.2)               |
| Others                           | 0                       | 1 (0.5)                 |
| **Years of Experience**          |                         |                         |
| <5 years                         | 10 (66.7)               | 101 (47.6)              |
| 5-10 years                       | 3 (20.0)                | 58 (27.4)               |
| >10 years                        | 2 (13.3)                | 53 (25.0)               |
| **Location of Pharmacy**         |                         |                         |
| Inside city                       | 8 (53.3)                | 115 (54.2)              |
| Near Hospital                    | 5 (33.3)                | 64 (30.2)               |
| Periphery                        | 2 (13.3)                | 33 (15.6)               |
| **District in which pharmacy is situated** |         |                         |
| Kathmandu                        | 9 (60.0)                | 161 (75.9)              |
| Lalitpur                         | 4 (26.7)                | 32 (15.1)               |
| Bhaktapur                        | 2 (13.3)                | 19 (9.0)                |
### Table 8: Association of the level of dispensing practice with their level of knowledge and level of attitude

| Variables            | Level of Selected Practice Variables | Chi-Square value |
|----------------------|--------------------------------------|------------------|
|                      | Poor Practice                        | Good Practice    |
| Level of Knowledge   | Poor Knowledge                       | 43 (75.4)        | 35 (20.6) |
|                      | Good Knowledge                       | 14 (24.6)        | 135 (79.4) |
| Level of Attitude    | Negative Attitude                    | 5 (8.8)          | 10 (5.9)  |
|                      | Positive Attitude                    | 52 (91.2)        | 160 (94.1) |

Abbreviation: COR = Crude Odds Ratio, AOR = Adjusted Odds Ratio and * indicates statistically significant at p-value less than 0.05

### Table 9: Level of an attitude of respondents and their level of knowledge
| Variables | Level of Attitude | Chi-Square Value | p-value |
|-----------|------------------|-----------------|---------|
|           | Negative Attitude | Positive Attitude |          |
| Level of Knowledge | Poor Knowledge | 8 (53.3) | 70 (33.0) | 2.563 | 0.109 |
|           | Good Knowledge   | 7 (46.7) | 142 (67.0) |       |       |

Table 10: Socio demographic characteristics and determinant variables related to the knowledge and practice of ECP

| Variables | Practice Odd Ratio (95% CI) |
|-----------|-----------------------------|
|           | COR (95% CI) | p-value | AOR (95% CI) | p-value | COR (95% CI) | p |
| Age       |               |         |             |         |             |   |
| <20       | 1             | 0.000*  | 1           | 0.514   | 1           |   |
| 20-29     | 4.848 (2,036-11.547) | 0.000* | 2.538 (0.808-7.970) | 0.111 | 11.824 (3.827-36.536) |   |
| 30-39     | 6.709 (2.419-18.606) | 0.000* | 3.332 (0.761-14.591) | 0.110 | 25.625 (7.256-90.492) |   |
| 40-49     | 36.000 (4.236-305.916) | 0.001* | 5.407 (0.360-81.146) | 0.222 | 65.625 (10.915-394.550) |   |
| Greater and equal to 50 | 26.182 (3.034-225.902) | 0.003* | 4.142 (0.284-60.418) | 0.299 | 20.313 (4.357-94.697) |   |
| Gender    |               |         |             |         |             |   |
| Male      | 1             | 0.558   | -           | -       | -           |   |
| Female    | 0.835 (0.456-1.527) | -       | -           | -       | 0.671 (0.386-1.166) |   |
| Religion  |               |         |             |         |             |   |
| Hindu     | 1             | 0.379   | -           | -       | -           |   |
| Buddhist  | 0.793 (0.342-1.837) | 0.589  | -           | -       | 0.608 (0.284-1.303) |   |
| Muslim    | 0.155 (0.014-0.132) | -       | -           | -       | 0.236 (0.021-2.658) |   |
|                | Christian          | Degree                          | B Pharmacy | CMA        | D Pharmacy | M Pharmacy | Others   |
|----------------|--------------------|---------------------------------|------------|------------|------------|------------|----------|
|                | 0.310 (0.019-5.062)| 0.411 (-)                       | 1          | 0.339 (0.126-0.911) | 0.032 (-) | 0.672 (-) | 0.518 (0.201-1.338) |
|                |                    | 0.473 (0.029-7.687)             |            | 0.115 (0.040-0.330) |          | 0.296 (0.125-0.701) |          |
|                |                    |                                 |            |              |            |            |          |
| **Years of Experience** |                   |                                 |            |              |            |            |          |
| <5 years       | 1                  | 0.006*                          | 1          | 0.624       | 1          | 1          |
| 5-10 years     | 1.100 (0.557-2.173)| 0.783 (-)                       | 0.648 (0.245-1.714) | 0.382 | 1.684 (0.871-3.256) |          |
| >10 years      | 5.872 (1.967-17.527)| 0.002*                          | 1.064 (0.200-5.675) | 0.942 | 3.048 (1.425-6.516) |          |
| **Location of Pharmacy** |                   |                                 |            |              |            |            |          |
| Inside city    | 1                  | 0.023*                          | 1          | 0.931       | 1          | 1          |
| Near Hospital  | 0.687 (0.342-1.381)| 0.292 (-)                       | 0.940 (0.386-2.293) | 0.892 | 0.619 (0.328-1.168) |          |
| Periphery      | 0.323 (0.145-0.723)| 0.006*                          | 1.180 (0.378-3.687) | 0.775 | 0.234 (0.107-0.515) |          |
| **District of Pharmacy** |               |                                 |            |              |            |            |          |
| Kathmandu      | 1                  | 0.000*                          | 1          | 0.000*      | 1          | 1          |
| Lalitpur       | 0.049 (0.021-0.116)| 0.000*                          | 0.062 (0.024-0.164) | 0.000* | 0.089 (0.089-0.203) |          |
| Bhaktapur      | 0.044 (0.015-0.130)| 0.000*                          | 0.069 (0.021-0.230) | 0.000* | 0.012 (0.002-0.090) |          |

Abbreviation: COR= Crude Odds Ratio, AOR= Adjusted Odds Ratio and * indicates statistically significant at p-value less than 0.05
Figure 1
Percentage of common side effects of ECP as specified by respondents