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## Knowledge of medical abortion among Brazilian medical students

Karayna Gil Fernandes <sup>a</sup>, Rodrigo Pauperio Soares Camargo <sup>a</sup>, Graciana Alves Duarte <sup>b,\*</sup>, Anibal Faúndes <sup>b</sup>, Maria Helena Sousa <sup>b</sup>, Nelson Lourenço Maia Filho <sup>a</sup>, Rodolfo Carvalho Pacagnella <sup>c</sup>

<sup>a</sup> Faculdade de Medicina de Jundiaí, Jundiaí, Brazil

<sup>b</sup> Cemicamp – Center for Research on Reproductive Health of Campinas, São Paulo, Brazil

<sup>c</sup> Faculdade de Medicina – Universidade Federal de São Carlos, São Carlos, Brazil

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## ABSTRACT

**Objective:** To assess the knowledge of Brazilian medical students regarding medical abortion (MA) and the use of misoprostol for MA, and to investigate factors influencing their knowledge. **Methods:** All students from 3 medical schools in São Paulo State were invited to complete a pretested structured questionnaire with precoded response categories. A set of 12 statements on the use and effects of misoprostol for MA assessed their level of knowledge. Of about 1260 students invited to participate in the study, 874 completed the questionnaire, yielding a response rate of 69%. The  $\chi^2$  test was used for the bivariate analysis, which was followed by multiple regression analysis. **Results:** Although all students in their final year of medical school had heard of misoprostol for termination of pregnancy, and 88% reported having heard how to use it, only 8% showed satisfactory knowledge of its use and effects. Academic level was the only factor associated with the indicators of knowledge investigated. **Conclusion:** The very poor knowledge of misoprostol use for MA demonstrated by the medical students surveyed at 3 medical schools makes the review and updating of the curriculum urgently necessary.

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## 1. Introduction

Medical abortion (MA) is widely used not only in countries with liberal abortion laws but also, clandestinely, in many countries with very restrictive abortion laws.

In Brazil, abortion is legally permitted when pregnancy is the result of rape or if it threatens the woman's life. It is also often authorized by judicial order when the fetus has a malformation incompatible with extrauterine life. The Ministry of Health encourages access to legal termination of pregnancy in those circumstances and has published guidelines on the comprehensive care of women and adolescents subjected to sexual violence and on the humanizing of abortion care—the latter including guidelines on the use of misoprostol for legal pregnancy termination [1]. Obstetricians and gynecologists in Brazil and most other countries also use misoprostol for other indications. A product containing misoprostol is manufactured and marketed in Brazil for labor induction at term, in cases of fetal death, and for pregnancy termination within the law.

Brazilian medical students are expected to receive complete information on the different uses of misoprostol, including for MA, in the course of their studies. The present study was carried out to assess the extent of their knowledge regarding MA and the use of misoprostol for MA, and to explore factors that may contribute to their receiving

and retaining information on these matters. The study also investigated the students' familiarity with mifepristone, which in many countries is used for MA in combination with misoprostol. However, since mifepristone has not been approved for use in Brazil, it was not expected that most medical students would be familiar with the drug.

## 2. Participants and methods

All students from 3 medical schools of the state of São Paulo were invited to participate in a survey. At the hospitals associated with at least 2 of these schools, legal abortion services are provided to women who fulfill the conditions stated in the Brazilian Penal Code or after judicial order. Three trained research assistants were responsible for contacting the students in their classroom, explaining the study objectives to them, and collecting completed questionnaires in a locked ballot box.

A pretested, structured, self-administered questionnaire consisting of items with precoded response categories was used to obtain information. It collected the following information about the students: age, sex, marital status, the geographic region of birth, year of medical school admission, year of medical studies (from first to sixth), religion, and importance of religion in the student's life. It also included a series of questions to test students' knowledge of MA and the use of misoprostol and mifepristone in MA.

All students present in the classrooms when the questionnaire was distributed were also handed a letter explaining the study objectives and methodology. As required by the Brazilian Ministry of Health, the letter also contained information on all ethical aspects of the study

\* Corresponding author at: P.O. Box 6181 Campinas, São Paulo, Brazil 13084971. Tel.: +55 19 32892856.

E-mail address: graduarte@cemicamp.org.br (G.A. Duarte).

and stressed that participation was voluntary and the participants' identity confidential [2]. The study topic being controversial, with legal implications, students were not asked to sign an informed consent form. It was understood that by completing and returning the questionnaire they were giving their consent to participate. If all registered students had been present at all 3 medical schools at the time of recruitment, the total number of returned questionnaires would have been 1260. As 874 questionnaires were returned, the response rate was 69% at minimum. Data collection began on April 1 and ended on July 7, 2011. The research protocol was evaluated and approved by the Ethical Review Committee of the Faculty of Medicine of the State University of Campinas, São Paulo, Brazil, and by the WHO Research Ethics Review Committee.

Knowledge about misoprostol for MA was evaluated by presenting 12 statements and requesting the students to indicate for each whether they thought it was true or false, or whether they did not know. The 12 statements were the following: (1) Misoprostol/Cytotec (Cytotec being the trade name [Pfizer, New York, USA]) is indicated in all cases to safely induce first- and second-trimester abortions [true]; (2) The longer the gestational duration, the higher the dose to be used [false]; (3) The vaginal route of administration causes fewer adverse effects than the oral or sublingual routes [true]; (4) A dose of 800 µg of misoprostol alone, by the vaginal route, is effective and associated with a low risk of complications [true]; (5) The best results are obtained by taking 400 µg by mouth and 400 µg vaginally [false]; (6) Misoprostol used sublingually is not effective [false]; (7) Cramping occurs in almost every woman who undergoes abortion with misoprostol [true]; (8) In most cases, the expulsion of the uterine contents occurs within the first 24 hours [true]; (9) Expected temporary unwanted effects of misoprostol are nausea, vomiting, diarrhea, fever, and shivering [true]; (10) Misoprostol is more effective in inducing abortion when taken orally [false]; (11) Vaginal bleeding is the most frequent complication when using misoprostol [true]; (12) Misoprostol can be used without admission to a hospital up to 9 weeks of gestation [true]. The answers to statements 2, 3, 4, 5, 6, 10, and 12 permitted to evaluate knowledge about the use of misoprostol whereas those to statements 1, 7, 8, 9, and 11 permitted to evaluate knowledge about misoprostol effects. One point was attributed to each correct answer, and no point was attributed to incorrect answers or if the respondent had never heard about misoprostol. A general score was reached by adding up the scores for the 12 answers. The FIGO recommendations for the use of misoprostol for pregnancy termination in the first trimester were used to formulate the questions and evaluate the correctness of the answers [3].

A student was considered to have satisfactory knowledge if 75% of the questions were answered correctly. However, because the numbers of questions about knowledge of misoprostol use and knowledge of misoprostol effects were different, cutting points were 71% for use knowledge (at least 5 of 7 items correct), 80% for effects knowledge (4 of 5 items correct), and 75% for general knowledge (9 of 12 items correct).

Six dependent variables were analyzed: (1) whether the student had ever heard about misoprostol as a means to induce abortion; (2) whether the student had ever heard how to use misoprostol to induce abortion; (3) whether the score on how to use misoprostol was 5 or higher; (4) whether the score on effects of misoprostol was 4 or higher; (5) whether the score on general knowledge about misoprostol was 9 or higher; and (6) whether the student had ever heard about mifepristone to induce abortion.

The predictor variables investigated for all models were the following: age; sex; marital status; religion; importance of religion for the student; attendance at lectures on MA; and year of medical school. All predictor variables were initially included in all models, and backward elimination criteria were used to retain only the significant ones. When a predictor variable was not significant, it was excluded and a new model was estimated without it.

For the bivariate analysis, the statistical significance of relationships between predictor and dependent variables was assessed using the

Yates  $\chi^2$  test for 2-category predictors and the Pearson  $\chi^2$  test for the other relationships [4]. Poisson multiple regression analysis was used to study the relationships between knowledge about MA and the predictor variables while controlling the effects of other predictors [5]. Prevalence ratios are presented for the predictors that were statistically significant.

Data were entered in 2 separate databases by 2 different persons and any inconsistencies were resolved. Verification and analysis were done using SPSS software, version 17.0 (IBM, Armonk, NY, USA). STATA software, version 7.0 (STATA, College Station, TX, USA) was also used in some cases.

### 3. Results

The percentages of the students who had heard about misoprostol as a means to induce abortion and about how to use it for abortion were 72% and 52%. However, the answers to the questions specifically testing their knowledge of the use and effects of misoprostol for abortion indicated that less than 5% of the students had satisfactory use knowledge, less than 20% had satisfactory effects knowledge, and less than 3% had satisfactory general knowledge. More than half (55%) scored zero on use knowledge and 44% scored zero on effects knowledge. Few students achieved the maximum score for either of these categories (Table 1).

Of the students aged 25 years or older, 91% had heard of misoprostol as a means to induce abortion whereas only 40% of those younger than 20 years had. Female students and those in a marital union were more likely to have heard of misoprostol than were male or single students. All those differences were statistically significant. The relationship between knowledge of misoprostol and religion was also examined on the hypothesis that those belonging to the Catholic church, which is opposed to induced abortion in all circumstances, might not have paid as much attention as other students to media and lectures teaching how to terminate a pregnancy. However, neither religion nor the importance given to religion was associated with having heard of misoprostol as a means of inducing abortion (Table 2). When the same predictors were used to compare levels of knowledge on misoprostol use, the only significant association found was with marital status (data not shown).

Nearly all students who had attended lectures on MA said that they had heard about misoprostol, compared with two-thirds of those who had not (Table 3). Just over one-third of first-year students, more than

**Table 1**

Number and percentage of medical students who knew that misoprostol could be used to induce medical abortion (MA) at 3 university hospitals in São Paulo, Brazil.

Knowledge statement <sup>a</sup>	No. (%)
Ever heard of misoprostol to induce MA (n = 869)	622 (71.6)
Ever heard how to use misoprostol for MA (n = 860)	446 (51.9)
Use knowledge score (n = 853)	
7	1 (<0.1)
5–6	39 (4.6)
3–4	108 (12.7)
1–2	236 (27.7)
0	469 (55.0)
Effects knowledge score (n = 853)	
5	28 (3.3)
4	131 (15.3)
3	148 (17.4)
1–2	169 (19.8)
0	377 (44.2)
Total knowledge score (n = 853)	
11–12	2 (0.2)
9–10	22 (2.6)
7–8	81 (9.5)
5–6	141 (16.5)
3–4	164 (19.2)
1–2	87 (10.2)
0	356 (41.7)

<sup>a</sup> The numbers vary between indicators because of missing answers.

**Table 2**  
Percentage of medical students who had ever heard of misoprostol to induce medical abortion, according to their background characteristics.

Variable <sup>a</sup>	No. (%)	P value
Age, y		
<20	96 (39.6)	<0.001
20–24	610 (71.6)	
≥25	155 (91.0)	
Sex		
Male	355 (67.6)	<0.05
Female	514 (74.3)	
Marital status		
Single	829 (70.7)	<0.05
In union	32 (90.6)	
Religion		
None	240 (70.4)	NS <sup>b</sup>
Catholic	403 (71.2)	
Other	210 (72.4)	
Importance of religion		
Very important	214 (66.4)	NS <sup>b</sup>
Important	310 (74.5)	
Unimportant/No religion	333 (71.8)	

<sup>a</sup> The numbers vary because of missing answers.

<sup>b</sup> Not significant.

50% of second-year students, 90% of fourth-year students, and all students in their final year had heard about misoprostol for inducing abortion. In contrast, the proportion who had heard of mifepristone for abortion was very low, rising from just over 1% among first-year students to about 8% among those in their final year. Only about 10% those who had attended lectures on MA had heard about mifepristone for pregnancy termination.

Only one-fifth of the first-year students reported hearing how to use misoprostol to induce abortion, a proportion that increased with the year of study, reaching 88% among students in their final year. Similarly, fewer than half of those who had not attended lectures on MA had heard how to use misoprostol, compared with 83% of those who had attended lectures (Table 4).

Even though most students in their final year reported having heard how to use misoprostol for abortion, the answers to the specific questions showed that only a small proportion had a satisfactory knowledge of the use and effects of misoprostol. Less than 1% of the first-year students had satisfactory use knowledge and just 10% had satisfactory effects knowledge. Around 20% of students in their last years obtained satisfactory scores on these 2 indicators of MA knowledge. Curiously, the greatest improvement on the use knowledge score appeared between the fifth and sixth year, whereas there was no improvement in effect knowledge score after the fourth year. An

**Table 3**  
Percentage of medical students who had heard about misoprostol or mifepristone to induce medical abortion, according to exposure to lectures on MA and year of medical studies.<sup>a</sup>

Variable	Heard about misoprostol No. (%)	P value	Heard about mifepristone No. (%)	P value
Lectures on MA				
No	713 (65.9)	<0.001	712 (2.5)	<0.001
Yes	145 (98.6)		144 (9.7)	
Years of medical studies				
1	148 (36.5)	<0.001	148 (1.4)	<0.01
2	186 (52.7)		186 (2.2)	
3	143 (71.3)		144 (1.4)	
4	158 (89.9)		158 (4.4)	
5	114 (93.9)		111 (7.2)	
6	118 (100.0)		115 (7.8)	

<sup>a</sup> The numbers vary because of missing answers.

even lower proportion of students had a satisfactory total score (the score based on all answers to the specific knowledge questions): even among 6th-year students and those who had attended lectures on MA, just 8% had a satisfactory total score (Table 4).

Even using a much less stringent standard for the satisfactory number of correct answers, 6 of 12, a substantial percentage of the advanced students would be found having less than that minimal level of knowledge. Among the 6th-year students, 49% had wrong or no answers to half or more of the questions; and among the 5th-year students, it was 74%. Indeed, 32% and 11% of the 5th and 6th year students, respectively, gave correct answers to fewer than 4 of the 12 items (data not shown).

The multiple regression analysis showed the students' year at medical school to be the main variable determining their knowledge of misoprostol and mifepristone for MA. Having attended lectures on MA also had a significant effect on their use knowledge of misoprostol and on their having heard of mifepristone. None of the indicators of the students' personal characteristics had a significant effect on any of the knowledge indicators in the multivariate analysis.

#### 4. Discussion

The medical students' knowledge of MA was very poor at the 3 medical schools where the study was conducted. And yet, these schools are located in the region of Brazil considered to be the most developed. Even though all students in their final year had heard about misoprostol to induce abortion, and nearly 90% said that they had heard how to use it, their answers to more specific questions showed that only 1 in every 5 had satisfactory knowledge in these 2 matters. Indeed, nearly half of the 6th-year students gave incorrect answers to at least 6 of the 12 questionnaire items regarding knowledge of MA.

Few medical students had heard about mifepristone as a drug that is used to induce abortion. However, the lack of familiarity with that drug was expected: it is not available in Brazil, it is not included in Ministry of Health guidelines on abortion, and it is therefore not used at hospitals that provide legal abortion.

It is notable that 17% of those who said they had attended lectures on MA also said they had not heard how to use misoprostol to induce abortion. It was not clear whether those students did not retain the information or missed a lecture discussing the topic, or if some of the lectures did not present the topic.

Neither the students' religion nor the importance they attributed to religion had any bearing on their use knowledge of misoprostol for abortion. Nor did age, sex, or marital status have any effect on their overall knowledge about MA once academic year and exposure to lectures were taken into account.

A major limitation of the study is that it is restricted to 3 of the 31 medical schools in the state of São Paulo. The schools were selected by convenience and not randomly, which means that the results cannot be generalized to all students residing in the state of São Paulo and certainly not nationwide. There is, however, no reason to expect that students are better informed about MA at other Brazilian medical schools. Some of the students surveyed in the present study attended the medical school associated with the first teaching hospital to provide legal abortion in Brazil, and this hospital currently serves as a referral center for the service.

The response rate of 69% was considered satisfactory. The study design did not permit to determine whether the willingness to complete the questionnaire was associated with age, sex, or religious beliefs. Even if it was, the effects on the results would probably be small because these variables did not significantly affect the answers once the years of medical studies were taken into account.

The instrument used to assess knowledge of misoprostol for termination of pregnancy was adapted from a questionnaire developed by the WHO for a study among abortion providers and it should be considered appropriate as an assessment tool. However, the present study shows that simply asking respondents whether they know how to use

**Table 4**

Number and percentage of medical students who had heard how to use misoprostol to induce medical abortion (MA), and percentage of those with a satisfactory use, effects, and/or total knowledge score, according to whether they received lectures on MA and their year of studies.

Variable	Heard about misoprostol use		Use knowledge score <sup>b</sup>		Effects knowledge score <sup>c</sup>		Total score <sup>d</sup>		No. of students who answered the scored questions <sup>e</sup>
	No. (%) <sup>a</sup>	P value	%	P value	%	P value	%	P value	
Lectures on MA									
No	711 (45.5)	<i>P</i> <0.001	2.3	<i>P</i> <0.001	17.0	<i>P</i> <0.01	1.7	<i>P</i> <0.001	707
Yes	139 (83.4)		15.8		27.3		7.9		139
Years of medical studies									
1	148 (20.9)	<i>P</i> <0.001	0.7	<i>P</i> <0.001	9.5	<i>P</i> <0.001	0.7	<i>P</i> <0.001	147
2	185 (31.4)		0.0		11.9		0.0		185
3	142 (40.8)		1.4		21.3		1.4		141
4	156 (68.0)		4.5		28.0		4.5		157
5	111 (81.0)		7.4		23.1		4.6		108
6	116 (87.9)		19.5		20.4		8.0		113

<sup>a</sup> The numbers vary between indicators because of missing answers.

<sup>b</sup> A satisfactory score was 5 or higher.

<sup>c</sup> A satisfactory score was 4 or higher.

<sup>d</sup> A satisfactory score was 9 or higher.

<sup>e</sup> The numbers of students who answered the scored questions were not always the same as those who answered the question on hearing about misoprostol.

misoprostol to induce abortion can provide misleading information. Many of the students who reported knowing how to use this drug demonstrated very poor knowledge when answering the more specific questions introduced by the authors.

A single other study, carried out in Canada in 2008, seems to have explored the knowledge of medical students or residents on MA [6]. It, too, found that their knowledge was poor. The 2 studies are not strictly comparable because the specific questions differed. However, both found that even though knowledge about abortion improved between the second and the final year at medical school, most students in their final year still did not have adequate knowledge. The findings of the Canadian study implied that many new medical graduates would not, on the basis of their own understanding, be able to provide a woman seeking abortion with information that would be

consistent with her right to accurate, unbiased information from a well-informed physician. In that respect, the Canadian findings are similar to those reported here.

The Ministry of Health of Brazil, and academic leaders interested in the acquisition of medical knowledge as students advance through the stages of their education, should find the present study useful. Its results suggest that there still is reluctance to give adequate attention to the subject of pregnancy termination, even at teaching hospitals where MAs are legally provided to eligible women. It appears that the theoretical curriculum is lagging behind current practice—a lag probably influenced by a mistaken belief that most professionals at their respective medical schools oppose pregnancy termination and teaching the subject. In fact, earlier studies have shown that the great majority of obstetricians, gynecologists, other medical professionals, and lay people are in favor of the provision of abortion services for women who fulfill the legal requirements [7–11].

It is hoped that this paper will contribute to improving the teaching of MA as a safe method for pregnancy termination and stimulate further evaluation in other regions of Brazil and in countries with abortion laws similar to those existing in Brazil.

**Table 5**

Variables associated with several dependent variables in Poisson multiple regression analysis.<sup>a</sup>

Model/Variable <sup>b</sup>	Prevalence ratio (95% confidence interval)	P value
1. Ever heard about misoprostol (n = 867)		
Year at medical school <sup>c</sup>	1.20 (1.15–1.26)	<0.001
2. Whether ever heard about use of misoprostol (n = 858)		
Year at medical school <sup>c</sup>	1.33 (1.25–1.40)	<0.001
3. Satisfactory score on how to use misoprostol (n = 844)		
Year at medical school <sup>c</sup>	2.05 (1.53–2.75)	<0.001
Lectures on medical abortion (yes)	2.91 (1.48–5.72)	<0.01
4. Satisfactory score on effects of misoprostol (n = 851)		
Year at medical school <sup>c</sup>	1.17 (1.07–1.29)	<0.01
5. Satisfactory total score on knowledge about misoprostol (n = 851)		
Year at medical school <sup>c</sup>	1.80 (1.35–2.40)	<0.001
6. Whether ever heard about mifepristone (n = 854)		
Year at medical school <sup>c</sup>	1.33 (1.04–1.69)	<0.05
Lectures on medical abortion (yes)	2.50 (1.15–5.40)	<0.05

<sup>a</sup> Regressions initially included as predictors: age, sex, marital status, religion, importance of religion in the student's life, whether the student had attended lectures on medical abortion, and year of medical school. For each dependent variable, the results are those obtained with the final regression model, which included only the predictors with statistically significant coefficients in the regression analysis.

<sup>b</sup> The numbers vary because of missing answers.

<sup>c</sup> Entered as a continuous variable with values of 1 through 6.

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## Conflict of interest

The authors have no conflicts of interest to declare.

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