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Executive Summary

Background

In developing countries, post-partum haemorrhage (PPH) and complications related to unsafe abortions are direct causes of maternal death. In Senegal, actions have been undertaken by the Government to reduce this burden and significant advances have been made in these areas in recent years. However, progress is still necessary to achieve the Millennium Development Goals (MDGs) for the reduction of the Maternal Mortality Rate (MMR) from 392 deaths per 100,000 live births in 2010–2011 to the target of 127 deaths per 100,000 live births by 2015. Misoprostol, a synthetic prostaglandin medicine, is recognized as essential for the management of PPH and for post-abortion care (PAC), hence its inclusion on the List of Essential Medicines (LEM) of the World Health Organization (WHO) and of the Senegal Ministry of Health. Recent studies in Senegal showed high levels of efficacy and acceptability of misoprostol for PPH and PAC.

Objectives

The objective of the study was to understand the knowledge about, availability of and the practices in the provision of misoprostol at pharmacies in Dakar, Senegal, to ensure correct delivery of the product. The results will guide strategies for provision of misoprostol and for the reduction of maternal morbidity and mortality.

Methodology

A Knowledge, Attitudes and Practices (KAP) survey was conducted among 110 pharmacists to gather information about misoprostol provision. Data were collected on: 1) availability of misoprostol; 2) pharmacists' knowledge of misoprostol; and 3) reported misoprostol provision practices.

Results

A large proportion of pharmacists (72%) had heard of misoprostol, but there was low product availability, with only 34% of pharmacists selling misoprostol at the time of the study. Three brands were available: Cytotec, Misoclear and Arthrotec. Few respondents reported selling misoprostol for gynaecological purposes, with most reporting that the product was sold primarily for gastric and duodenal ulcers (70%) and occasionally for PAC (3.7%); no pharmacist reported selling misoprostol for management of PPH (0%). An average of 58 tablets was sold monthly by pharmacies. Almost half of pharmacists (48%) who are not currently selling the product expressed interest in doing so.

Almost two-thirds (62%) of pharmacists who have heard of misoprostol have been trained in or informed about the product; most were self-taught. Knowledge about the registration status, gynaecological uses, dosage and route of administration, side effects and storage condition for misoprostol were low. Half of those surveyed did not feel comfortable providing misoprostol to women, and 85% of pharmacists would like to have more information and documentation on the product.

Discussion and recommendations

Despite little knowledge and provision of misoprostol by pharmacists, the majority have expressed a wish for training in order to put the product on the market in an adequate manner. Training has shown some positive effects on product knowledge and improving pharmacists' capacity to provide the product correctly. Demand for the sale of misoprostol exists, but pharmacies cannot provide the product without a prescription. Therefore, health care providers who can prescribe this product play an essential role that needs to be explored to better understand the reasons for the current low level of prescriptions and, consequently, sales.

Senegal has committed itself to the fight against maternal morbidity and mortality, with commitments made at the international level. It is now recognized that misoprostol is a medicine that can save lives. Thus, its availability is

important to strengthen strategies to reduce the disastrous consequences of PPH and complications linked to incomplete/ unsafe abortion. This is reinforced by the presence of misoprostol on the LEM. Pharmacists are the key intermediaries because they are an integral part of misoprostol provision to both individuals and health facilities. Thus, it is imperative that they be involved in the national implementation plans for the availability, safe delivery, and scaling up of the product throughout the country.

Introduction

Over the past two decades, Senegal has made progress in reducing maternal mortality; however, improvement is still needed especially in regard to achieving the Millennium Development Goal (MDG) to reduce the Maternal Mortality Ratio (MMR). In 2010-2011 DHS, the MMR was estimated at 392 per 100 000 live births. Senegal aims to reduce the rate to 127 deaths per 100 000 live births by 2015ⁱ.

Major complications that contribute to maternal deaths are severe bleeding, infections, hypertension and unsafe abortionsⁱⁱ. Maternal deaths most often occur during labour, delivery and during the immediate post-partum period, or following complications from an abortion. In 2006, a systematic review showed that postpartum haemorrhage (PPH) caused more than 30% of maternal deaths worldwideⁱⁱⁱ. In Senegal, it is estimated that PPH causes 25% of maternal deaths^{iv}.

Worldwide, 13% of maternal deaths are caused by complications linked to abortion. Senegal has a very restrictive abortion law; abortion is illegal except in the case of saving the woman's life. In Senegal, available statistics show that 4% of maternal deaths are due to unsafe abortions, and for every 4 women who die following an abortion, 10 others are struck with illness or disability^v. These figures are probably a large underestimation because maternal deaths due to the disastrous consequences of illegal abortions often go unreported in official statistics.

Misoprostol is a synthetic prostaglandin medicine which received approval for introduction in more than 85 countries since its appearance on the market in 1985 for the prevention and treatment of gastric ulcers. Because the medicine is an uterotonic, it causes the ripening of the cervix and uterine contractions. It is therefore widely used in the prevention and the treatment of PPH and for post-abortion care (PAC).^{vi} It is also used for the treatment of intrauterine foetal death and cervical ripening during certain surgeries. In 2011, misoprostol was included in the 17th edition of the WHO's List of Essential Medicines (LEM) for several gynaecological and obstetric uses, including the prevention of PPH when oxytocin is not available or cannot be used safely, for labour induction and PAC^{vii}.

Since 2013, misoprostol has been on the LEM in Senegal as an anti-haemorrhagic and a haemostatic, and the product is available in the country for several uses including gastric ulcers, PAC and the prevention and treatment of PPH. However, the current availability of the product is low, only 1% of public and private health facilities in Senegal have the product available.^{viii} In 2014, the National Pharmacy of the Ministry of Health (MoH) launched a tender to buy misoprostol for the first time, but at the time of this report the product was not yet available for sale through the National Pharmacy.

Research was conducted in Senegal to assess the effectiveness and acceptability of misoprostol for PPH and PAC. In 2010, a study was conducted on the use of misoprostol in health huts in Senegal by the Ministry of Health in partnership with USAID, ABT/Associates and the Centre for Research and Training in Reproductive Health (CEFOREP).^{ix} It showed that misoprostol could be successfully administered by birth attendants (under supervision) in health huts for the prevention of PPH. The results also showed that administration of misoprostol soon after birth could reduce the risks of haemorrhaging and is practically the only means to control PPH. Moreover, because misoprostol does not require refrigeration and can be taken orally, administration is easier by providers at the community level.

In the same vein, ChildFund and Gynuity conducted a study in 2013 to understand the efficacy and acceptability of two products (oxytocin and misoprostol) for the prevention of PPH and the feasibility of their use without supervision in health huts by birth attendants trained to prevent PPH. The results showed a very high level of efficacy of misoprostol and total satisfaction (100%) with the product by the women^x.

A recent study showed that of 481 women who went to health huts for treatment of incomplete abortions, 99.4% of them received effective PAC treatment with misoprostol and 99.6% were satisfied or very satisfied with the product^{xi}. Misoprostol is therefore deemed effective and easy to administer for PAC including at the community level in Senegal. Previously, PAC techniques were limited to dilation, curettage and manual or electric vacuum. Misoprostol offers an opportunity to avoid surgical procedures in resource poor environments because it is easy to store and administer.

While it is important to ensure access to a high quality product and extend the geographical availability of misoprostol, it is as important to monitor and maintain the quality of services related to the practices of prescribers and sellers of misoprostol. All the benefits of misoprostol cannot be achieved without complete knowledge of appropriate treatment, an understanding of laws pertaining to misoprostol provision and an understanding of the side effects and possible complications.

Several studies have shown that pharmacies are the main resources for certain populations for services related to health^{xii}. Indeed, these represent an important source of information, advice and supply of medicine. Nevertheless, even if they cannot replace a health care provider, a pharmacist, an actor in the health field, can always advise or refer clients in order to meet their needs. Pharmacies are often more accessible to the population in regards to geographic location, opening hours, wait times and do not require any consulting fees.

In Senegal, pharmacies are part of the supply system of pharmaceutical medicines, not only for individuals but also for health care providers. Medical staff (midwives, nurses and doctors) in the public and private sectors can have access to medicines through pharmacies that buy and keep a stock of them. There are approximately 900 pharmacies in Senegal and 60% of these are in Dakar, in other words, 557 pharmacies.

Although studies have been conducted in Senegal to assess the level of effectiveness and acceptability of misoprostol and its use in different contexts, there has not been any research or any documentation on knowledge and practices of misoprostol provision in pharmacies where the product is currently available and sold. It is with this in mind that this study was conducted, with the objective to assess knowledge, availability and practices of misoprostol provision in pharmacies in Dakar. The results will inform strategies aimed at reducing maternal morbidity and mortality, inform and guide the strategies of product distribution, necessary trainings, awareness campaigns for providers as well as pharmacists and the implementation or strengthening of reference mechanisms.

Methodology

Type of study

A survey of Knowledge, Attitudes and Practices (KAP) was conducted among a sample of pharmacists in Dakar.

Ethical considerations

Before the start of the study, ethical approval was obtained from three sources:

The Institutional Review Board (IRB) of Population Council
The Ethics Review Committee of Marie Stopes International
The National Ethics Committee for Health Research in Senegal

Informed consent forms were submitted to pharmacists to gather their consent before their enrolment in the study. The privacy of interviews as well as the anonymity of the interviewees was assured throughout data collection.

Sampling

The study population consisted of pharmacy owners, managers or staff members working in selected pharmacies and who are involved in the sale of medicines. 110 pharmacies were randomly selected from the list of 557 pharmacies that are in the four districts of Dakar and divided into the following areas: Dakar, Pikine, Guédiawaye, and Rufisque. The final number of pharmacies per district was proportional to the number of pharmacies in each of these areas.

Sample size calculation was based on a 95% confidence interval within 10 percentage points. Using the formula for precision of a single proportion:

$$\text{Sample size } (n) = (z/m)^2 * \pi (1 - \pi)$$

Where: π = proportion (0.5)
m = margin of error (0.1)
z = 95% CI (1.96)

We estimated that a minimum sample size of 96 is required. We increased this to 110 to allow for non-response.

Recruitment and data collection procedures

The Order of Pharmacists' involvement was essential since project inception. In particular, they provided the list of pharmacies in Dakar and addressed Information Letters to pharmacy managers prior to data collection.

Data collectors with social science research experience were trained in interview techniques and in completing questionnaires by a joint team from Population Council and MSI.

A standardized, structured questionnaire was developed for data collection. The questionnaire collected information on characteristics of the pharmacy, the pharmacy's staff, knowledge and practices of pharmacy staff around misoprostol availability, and also included questions regarding the frequency of misoprostol sales.

The questionnaire was pre-tested in eight pharmacies in Dakar. Three pharmacies were assigned to each of the data collectors with an objective to deliver at least two completed questionnaires. This objective was achieved. The research team provided technical oversight of the pre-test phase. A debriefing session was held with the data collectors to discuss the challenges encountered and how best to overcome them.

In the selected pharmacies, the owner or the manager was initially invited to answer the questionnaire if he/she met the following criteria:

- The respondent gave informed consent to participate in the study.
- The respondent was 18 years of age or older.
- The respondent was involved in the sale/distribution of medicines.

If neither the owner nor the manager met the criteria (for example if neither distributed medicines), the questionnaire was administered to the most senior employee responsible for selling medicines. This choice was made because a more junior employee would be more likely to refer a client to a more senior staff member when a client asks questions about products about which their knowledge was insufficient. One employee was interviewed per pharmacy. Data collection took place in September 2013.

Data processing and analysis

Two experienced operators performed a double data entry using Epi Info 3.5.4. A dictionary of variables was developed to document the data correctly. Data were thereafter transferred into STATA version 12. Descriptive analyses were done to interpret the demographic data (age, education, training, etc.). Bivariate analyses were done according to thematic groups such as: 'Information on the pharmacies', 'Knowledge and practices of the pharmacies' and 'Information on misoprostol'.

Qualitative data were transcribed and converted into text files for formatting. Thematic analysis was done through the content analysis.

Key study indicators

The key indicators for data collection were the following:

Indicator
a. Availability of misoprostol
Number/percentage of outlets who sell misoprostol to health providers
Number/percentage of outlets who sell misoprostol to end users
Brands of misoprostol that are available
Average cost of 200mcg misoprostol or box of misoprostol
b. Knowledge of misoprostol
Number/percentage of pharmacy staff who know an effective regimen prevention/treatment of gastric ulcers
Number/percentage of pharmacy staff who know an effective regimen for PPH treatment/prevention
Number/percentage of pharmacy staff who know an effective regimen for PAC
Number/percentage of pharmacy staff who can list 4 or more possible side effects of misoprostol
Number/percentage of pharmacy staff who can list possible complications of misoprostol treatment for PAC
Number/proportion of pharmacy staff that express a need for further training / information on misoprostol
c. Reported Misoprostol provision practices
Quantity of misoprostol sold / outlet / month
Number/proportion of pharmacies that sell misoprostol to end users for gastric ulcers
Number/proportion of pharmacies that sell misoprostol to end users for PPH
Number/proportion of pharmacies that sell misoprostol to end users for PAC

Results

Almost three-quarters (72%) of the respondents had heard of misoprostol. The findings from these respondents only are presented below.

Demographics of respondents

Employees and owners were the most represented in the sample, 41% and 43% respectively. Fewer managers were interviewed. The majority of pharmacists were aged between 31 and 50 years old, with 53% under 40. The level of education was high with 77% having a university education and 23% secondary level education; none had only primary level education. In terms of training for the position held in the facility, 73% have received training in a university and 19% have completed training in the private sector, with 6% trained on-site. Higher levels of formal training were found in the department of Dakar, with higher proportions in Pikine, Guédiawaye and Rufisque having received on-the-job training.

Knowledge of Misoprostol

Several misoprostol brands are registered in the country for multiple uses: the treatment of duodenal and gastric ulcers or ulcers caused by taking non-steroidal anti-inflammatory drugs (NSAIDs), the prophylaxis of gastric ulcers caused by NSAID ulcers, the prevention of PPH, the treatment of PPH, PAC, the treatment of intrauterine foetal death and cervical ripening.

However, the study found that many pharmacists were not aware of all the legal uses of misoprostol in Senegal (see table 1). The most commonly reported known use for misoprostol was the treatment of gastric ulcers, and only 61% knew it was registered for this use. Only 13% of respondents knew that misoprostol is registered for use for PAC, yet 38% were aware that it can be used to induce an abortion and 6% wrongly thought it is registered for this use. Knowledge of indications for other gynaecological uses such as cervical ripening (3%) and the treatment of intrauterine foetal deaths (2%) was extremely low. Knowledge of the use and registration of misoprostol for PPH was also very low: only 4% of pharmacists knew of its use for the treatment of PPH and 1% for the prevention of PPH, and only 3% knew that misoprostol is registered for that use in Senegal.

Table 1: Knowledge of uses for which misoprostol is registered

Knowledge of indications	Used for		Registered for	
	n	%	n	%
Duodenal or gastric ulcer	59	75%	48	61%
Post abortion care	10	13%	10	13%
Prophylaxis of NSAID-induced peptic ulcers	5	6%	4	5%
Treatment of PPH	3	4%	2	3%
Prevention of PPH	1	1%	1	1%
Cervical ripening	2	3%	1	1%
Treatment for intrauterine foetal death	1	1%	0	0%

Information and training on misoprostol

62% of pharmacists reported having been trained or having received information on misoprostol. Self-training was the most commonly cited method, including through literature/brochures. Other pharmacists and medical delegates also played a role. Although rarely cited, other sources of information included doctors, university, clients, television and the internet. NGOs were not cited as an information source (Table 2).

Table 2: Information sources and training (N=56)

Information sources/training	n*	(%)
Literature/Brochures	22	(45)
Medical delegates	11	(22)
Colleagues	10	(20)
University	5	(10)
Doctors	4	(8)
Clients	2	(4)
Television	1	(2)
Internet	1	(2)
NGO	0	(0)

*amongst those who had heard of misoprostol

Misoprostol storage conditions

Knowledge of the storage conditions of a medicine is essential to ensure the effectiveness of a product. Although it does not require complex storage conditions, misoprostol should still be kept away from heat and moisture. However, many respondents were not aware of both storage conditions (Table 3). Trained pharmacists had better knowledge about humidity but not for heat.

Table 3: Knowledge around storage conditions according to level of training

Storage conditions	Trained /Informed		Not informed / Not trained		Total	
	n	%	n	%	n	%
Keep away from heat	41	84	25	83	66	84
Keep away from humidity	19	39	3	10	22	28

Misoprostol side effects

Knowledge of side effects of a medicine is important because it allows users to manage potential complications and to reassure themselves about the effectiveness of the medicine. Among trained and informed providers, 37% said that they did not know any side effects of misoprostol, whereas among untrained and/or uninformed pharmacists this figure reached 63%. Only 8 trained or informed pharmacists could name two side effects. The distribution by product training showed that trained or informed pharmacists were more able to name, in particular actual side effects, of misoprostol.

Table 4: Knowledge of side effects by training or information on product

Side effects	Trained/Informed		Untrained /Informed		Total	
	n	%	n	%	n	%
Don't know	18	37	19	63.3	37	46.8
Dizziness	10	20	1	3.3	11	13.9
Bleeding	4	8	2	6.7	10	12.7
Diarrhoea	2	4	4	13	6	7.6
Weakness	4	8	1	3.3	5	6.3
Nausea	3	6	1	3	4	5.1
Fever	2	4	1	3	3	3.8
Headaches	3	6	0	0.0	3	3.8

^a Multiple responses could be provided

Misoprostol dosages and administration

Knowledge of the administration of a medicine is essential since it for proper usage by the client and to ensure its true efficacy. The results showed varying degrees of knowledge depending on its use. Of the 30 pharmacists who said that they knew correct dosages for gastric and duodenal ulcers, 25 actually gave the proper dosage (83%). In regards to PAC, of the 11 who stated that they knew the correct dosages, only three gave the correct answer. For PPH, none of the pharmacists interviewed knew the correct dosages for either prevention or treatment (see Table 5).

Table 5: Knowledge of correct dosages of misoprostol for certain indications

Indication	Correct dosage	% of pharmacists that said they know the correct dosage for the indication (n=79)	% of respondents who gave the correct dosage (of those who claimed knowing correct dosage)
Treatment of gastric ulcers	800mcg	38%	83%
Treatment of PPH	800mcg	0%	0%
Prevention of PPH	600mcg	0%	0%
Post abortion care	400mcg to 600mcg*	14%	4%

*dosage depends on if taken orally or sublingually

Product information and training needs

One fifth (21%) of pharmacists reported that health care providers solicit information on misoprostol from them, especially midwives (75%), gynaecologists (42%), nurses (33%) and general practitioners (17%). The type of information solicited was not systematically explored during the interview. Pharmacies receive approximately 4 visits per month from health care providers.

85% of pharmacists expressed a need for support and training in misoprostol. In addition, 51% of respondents reported not being confident in regards to misoprostol provision to users. Over half (58%) expressed a desire for training on all aspects of misoprostol provision; training needs around specific aspects of the product (uses, side effects, complications) are described in Table 6.

Table 6: Themes for which there a training demand expressed

Themes for which there is training demand	n	%
All aspects of the product	39	(58)
Misoprostol uses	25	(37)
Side effects	20	(30)
Dosage	19	(28)
Complications	14	(30)
Administration	5	(8)
Storage conditions	2	(3)

Misoprostol brands available on the market

Several brands of misoprostol exist in the market in Senegal: 1) Cytotec was registered for the treatment of gastric ulcers; 2) Misoclear was registered in 2011 for additional gynaecological uses, including PAC and PPH; and 3) Arthrotec a combination medicine with diclofenac for the treatment of gastric ulcers. Table 7 shows that one third or 27 of the pharmacies sell misoprostol, with Arthrotec (56%) being the most commonly sold brand. The three products are sold in different packaging boxes with 60 tablets for Cytotec, 20 or 30 tablets for Arthrotec and 10 tablets for Misoclear which explains the variation in price per box.

According to pharmacists, the choice of brands sold in pharmacies is justified by two main points: the efficacy of the product and its availability. Compared to the ease of supply, all pharmacists stated that Arthrotec was the easiest to obtain, compared to 82% who said the same for Cytotec and 40% for Misoclear.

Table 6: Misoprostol sales by brand and price

Pharmacies who sell misoprostol*			n	(%)		
			27	(34)		
<i>Brands sold</i>	<i>Dose</i>	<i>Number of doses per box</i>	n	(%)	<i>Average price per box (FCFA)</i>	<i>Average price per pill (FCFA)</i>
Arthrotec	200mcg	30	15	(56)	5,701	190
Cytotec	200mcg	60	11	(41)	16,376	273
Misoclear	200mcg	10	5	(19)	2,162	216

Misoprostol provision

Among pharmacists who have heard of misoprostol, only 34% actually sold it. The product was most often sold per box according to 41% of pharmacists. An average of 58 tablets of 200mcg of misoprostol was sold per month in each pharmacy. However, 19% said that the sale depended on the quantity specified on the prescription. The product was sold primarily to treat duodenal and gastric ulcers (63%). The prophylaxis of gastro duodenal induced by NSAIDs accounted for 7% of sales. Demand for gynaecological uses including PPH and PAC was negligible. 22% of pharmacists stated that clients asked for the product without a prescription, and most often for gastric ulcers. However, only 1 pharmacist reported selling it without a prescription.

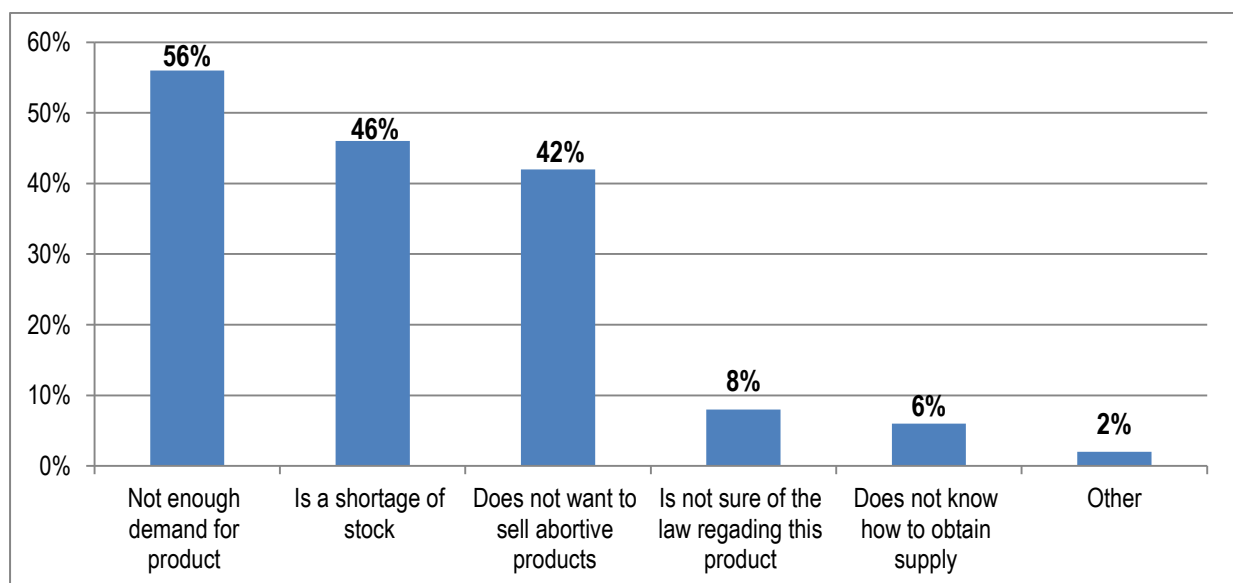
78% of pharmacists believed that all customers were able to pay the price compared to 11% who said that customers cannot afford it.

The profile of customers who buy misoprostol was quite diversified: married men and women were the main customers. However, health care providers were also cited: doctors (19%), midwives (7%) and nurses (4%).

Pharmacies that do not sell misoprostol

Among pharmacists who have heard of misoprostol, 66% were not selling it at the time of the study. Graph 1 below shows the diverse reasons that explain this fact. In addition, pharmacists claimed this situation resulted from the lack of demand for misoprostol (56%), stock-outs (46%) and not wanting to sell products that they consider to be abortifacient (42%). The lack of knowledge of the law and of misoprostol supply chains were other barriers cited. Nearly half (48%) of pharmacists who did not sell the product stated that they wanted to do so, since they see customers who ask for it.

Graph 2: Reasons for not selling misoprostol



Discussion and Recommendations

The pharmacist's role is vital for the health of the general population. As a contact point for the public, it is important that the pharmacist should have a good understanding of and a proper supply of misoprostol. This study allows for a number of conclusions and recommendations. They can be classified as follows.

Knowledge of use for which misoprostol is registered in the country: These uses are known piecemeal. Although many pharmacists who have heard of the product know that it is registered for gastric and duodenal ulcers, few know that it also has approval for PPH and PAC. Historically, Cytotec has been available in the country for gastric ulcers and it was not until 2011 that a new product, Misoclear, was registered for additional gynaecological indications. Lack of knowledge of the status of registration of misoprostol for gynaecological indications could be explained by the lack of diffusion of this information on the new product with a different status of registration. Information on new medicines in the market and changes of registration status of existing products must be communicated to pharmacies by the Pharmacy and Medicine Division, especially those that are considered *essential medicines*. Effective and timely communication, as well as wide diffusion of the List of Essential Medicines within the health sector, is essential for making misoprostol more accessible on the market.

The lack of knowledge of the legal indications for the use of misoprostol could have an effect on the perception pharmacists have of the product, and could affect their willingness and ability to sell it.

Knowledge of the product and its therapeutic indications: Pharmacists know the product particularly as a medicine for gastric ulcers and PAC. A very small proportion knows other indications such as prophylaxis for gastro duodenal ulcers induced by NSAIDs, and treatment and prevention of PPH. This lack of knowledge of its range of uses can be explained by the history of the product in the country; before 2011, misoprostol was not registered for gynaecological uses. In addition, the role of pharmacies in the supply of the product for gynaecological uses was low because most cases of PAC, PPH, and intrauterine foetal death are handled directly at health facilities. Additional studies are needed to explore how to develop stronger connections between service provision at health facility level and purchases at pharmacy level.

To date, the essential medicines list has not been officially disseminated by the Ministry of Health in the country. Diffusion of this list will contribute to positioning misoprostol as an essential product and clarify the indications it can legally be used for, as well as help de-stigmatizing the product as an abortifacient.

Knowledge of correct dosage: Knowledge of correct dosages varies according to use of the product. Knowledge of dosage for gastric or duodenal ulcers is relatively high, whereas very few know the proper dosages for PAC. No pharmacist was aware of the dosages for other uses of misoprostol, including PPH.

This leaves a gap between the number providing the product and the number who know its correct dosages. The product is sold on prescription which will define the dosage but a pharmacist should know the correct dosages, especially given the nature of a medicine that can have adverse side effects if taken in the wrong dosage.

Knowledge of side effects: Knowledge of side effects remains low and almost half of pharmacists could not name any. However, some side effects are better known than others. Communication on these side effects is an important step in product availability in order to ensure understanding of the possible effects users should expect and which ones require additional monitoring.

Storage and storage conditions: Compliance with the storage conditions is important for the effectiveness of misoprostol. The majority of pharmacists are aware that the product must be kept away from heat, but few are aware of the need to keep it away from moisture.

Misoprostol training: Complete and adequate knowledge of all aspects of the product is essential to ensure proper provision of misoprostol which is an essential medicine that helps to save lives. The study reveals the potentially positive impact of training and information on product knowledge: those who are trained or informed

about the product had a better understanding of protecting against humidity during storage and knew the side effects better than those who had had no such training or information.

Training needs were expressed for gynaecological uses of the product, especially for PAC and PPH; the majority of pharmacists who have heard of misoprostol expressed the wish for more information on all aspects of misoprostol use. The lack of confidence to provide misoprostol may be due in part to lack of training. It is therefore important to put into place training sessions for pharmaceutical staff in order to overcome this lack of knowledge around the uses for which this product is registered in Senegal and to ensure correct knowledge of administration, storage and management of side effects.

Following a presentation of the key findings of this study, the Ministry of Health committed to working with the Order and Syndicate of Pharmacists before the end of 2014 to ensure that essential medicines, including misoprostol, are made available in pharmacies and that pharmacists are trained on how to safely sell this essential product.

Availability of misoprostol in pharmacies: Only 34% of pharmacists who knew of the product were selling misoprostol at the time of the study. This is fairly low for a product deemed essential in the fight against maternal mortality and which has been, moreover, registered since 2011 for new uses, amongst others PAC and the treatment and the prevention of PPH.

Three brands are currently available in Senegal: Arthrotec, Cytotec and Misoclear. These brands differ in the indications for which they are registered, the packaging and the sale price. According to pharmacists, the product price is relatively affordable and does not constitute a barrier to its acquisition by users. For pharmacies that sell misoprostol it is mainly for uses linked to gastric ulcers.

This research has also shown that a negligible number of sales of misoprostol are without a prescription.

It should be noted as well that health care providers come to the pharmacy not only to get information, but also to buy misoprostol, especially those who work in reproductive health such as midwives and gynaecologists. Indeed, at the moment, misoprostol cannot be purchased in the public sector. Therefore, health providers from all sectors must purchase it or prescribe for purchase at a pharmacy level. When the product becomes available in the public sector, there will still be a demand for the product from private sector facilities that cannot access public products.

Some pharmacists argue that demand for misoprostol is low and this explains why they do not stock it or sell large quantities. However, low sales are clearly a direct result of low levels of use or prescription for the product by health providers. Nevertheless, it is encouraging that almost half of pharmacies who are not stocking and selling misoprostol at the time of the study expressed a desire to do so. As the product therapeutic indications and LEM status become better known by health providers, prescriptions will increase. It will be important that the supply chain and the pharmacies ensure product availability consistently and in sufficient quantity.

Limitations

This is the first study in Senegal to focus on the knowledge and practices of misoprostol provision in pharmacies. There were some methodological limitations. Since misoprostol can be used as an abortifacient product and because of the restrictive context in the country around abortion, there may have been some denial on the part of pharmacists and biases in their responses. Responses to questions about the availability of misoprostol for gynaecological uses (for example, managing references to health facilities) were not presented because the number of such responses was very low. Moreover, limiting the study to Dakar prevents information on knowledge and practices of misoprostol provision in other areas of the country.

Conclusions

The study results indicate that knowledge of pharmacy personnel around misoprostol needs to be strengthened to enable them to play a more effective role in providing the product for gynaecological uses and in minimizing misperceptions. The Senegalese government has made significant efforts in the fight against maternal mortality. Misoprostol is now on the LEM, but this list remains to be widely disseminated, which undervalues the importance of, and the government's recognition of, this essential product. However, in view of the role and place of pharmacies in the provision of health care services, it is still necessary to ensure good availability of misoprostol in pharmacies to help Senegal tackle the burdens of PPH and the disastrous consequences of unsafe and incomplete abortions. This will also be in line with the fact that the Senegalese government adopted recommendations at the dissemination meeting in January 2014 of studies conducted by ChildFund and Gynuity that advocated for the scaling up of misoprostol availability to prevent PPH at a community-level. This study did not address availability in pharmacies but in order to scale up product availability, the pharmacies play a critical role whilst the product remains unavailable in the public health sector.

At the time of writing, misoprostol was not available in the public health system. With the on-going need for the product for public providers, and long-term need for all private sector providers, pharmacies play an essential role today for enabling access to misoprostol in the country and at health facilities at all levels of the health pyramid. As demand for the product will increase, the supply chain must be strengthened to respond effectively and avoid shortages.

The Ministry of Health has committed to working with the Order and Syndicate of Pharmacies to ensure the availability of essential medicines, including misoprostol, and that pharmacists are trained in all aspects that allow them to safely sell misoprostol for gynaecological purposes. This commitment must be upheld to contribute to reducing the MMR and reaching national goals. Misoprostol has a significant role to play, but it must be made more available where people actually will get it from i.e. the pharmacies.

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