ORIGINAL ARTICLE

Diagnosis and treatment of presumed STIs at Mexican pharmacies: survey results from a random sample of Mexico City pharmacy attendants

A N Turner, C Ellertson, S Thomas, S García

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See end of article for authors' affiliations

Correspondence to: Charlotte Ellertson, Ibis Reproductive Health, 2 Brattle Square, Cambridge, MA 02138, USA; cellertson@ibisreproductivehealth.org

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Objectives: People in developing countries often seek medical advice for common ailments from pharmacies. As one example, pharmacists routinely diagnose and treat symptomatic sexually transmitted infections (STIs). We aimed to assess the quality of advice provided in Mexico City pharmacies by presenting hypothetical STI related syndromes and recording pharmacy attendants' suggested diagnoses and treatments.

Methods: We interviewed the first available attendant in each of a 5% random sample of Mexico City's pharmacies. We inquired about the training, age, and experience of the attendant and about the typical number of clients coming for treatment of suspected STIs. After considering three hypothetical case studies, attendants recommended diagnoses, treatments, and, sometimes, physician follow up.

Results: Most Mexico City "pharmacists" are actually clerks, with trained pharmacists rarely available on the premises. The average pharmacy attendant was 32 years old, with a median of 5 years' experience at that pharmacy, but very limited (if any) training. 62% reported seeing 10 or more clients with genital or vaginal infections per month. Depending on the case study, attendants provided appropriate diagnoses in 0–12% of cases, recommended appropriate treatments in 12–16% of cases, and suggested physician follow up for 26–67% of cases.

Conclusions: In general, surveyed pharmacy personnel were unable to diagnose accurately or offer appropriate treatment advice when presented with classic, common STI symptoms. Given the volume of clients seeking advice from this source, training pharmacy attendants could significantly help to reduce the burden of disease associated with STIs in Mexico City.

Retail pharmacies in Mexico City, as in many developing countries, are a widely used source of advice about health concerns and medication.[1–5] Researchers have posited many reasons for the ubiquitous role that pharmacies have in primary health care, including easy accessibility, short waiting time, convenient hours of operation, cheaper products, access to credit, and option to buy medications in small amounts.[1 3 6 7] While pharmacists are an important source of care for all social strata, they are often primary healthcare "providers" for poor and less educated clients and for those undertaking riskier health behaviours.[2 6 8 9] Pharmacists and pharmacy attendants, therefore, can have enormous influence on the public's health through their advice and treatment recommendations.

Pharmacy health care, however, is frequently inadequate, although it is difficult to choose a fair standard of comparison. Past studies have shown that the remedies suggested by retail pharmaceutical staff are often far from accurate in both developing and developed countries.[1 4 10–14]

We conducted a small survey of a random selection of Mexico City pharmacies to evaluate the appropriateness of suggested diagnoses and recommended treatments for symptomatic vaginal and genital infections. Mexico City was an appropriate location for this study for many reasons, as it is the largest city in both Latin America and the developing world; approximately 25 million people live within Mexico City's borders (representing roughly 25% of Mexico's total population).[15] In addition, previous research has shown that non-HIV STIs constitute the second major cause of disease burden (after maternal related causes) in young adult women in developing countries.[16] Finally, Mexican pharmacies rarely enforce physician prescription laws before dispensing STI (or other) drugs.[9] Since exploitation of this leniency in prescription drug laws is quite common, pharmacists have an important role in STI related diagnoses, treatment, and advice.

The proper diagnosis and treatment of STIs is critical because of the chronic sequelae of untreated infections including pelvic pain, infertility, ectopic pregnancy, cervical neoplasia, and, in the case of syphilis, blindness.[17 18] People with unresolved STIs also have higher risks of contracting HIV,[19] and pregnant women may face obstetric complications.[17]

METHODS

From a list of all (approximately 1000) registered pharmacies provided by the Mexico City Chamber of Commerce, we randomly selected 5% (n = 57) using a pseudorandom number generator (SPSS, Version 7.0, Chicago, IL, USA). Eleven of the selected pharmacies refused to participate (response rate of 81%). We randomly chose 11 additional pharmacies to replace them. After a small pilot (n = 5), we made minor changes to the questionnaire, mainly to reduce its length. Because the pilot survey did not otherwise differ from the main study questionnaire, we analysed all data together. All interviews took place in August 1999.

We designed the survey to simulate the experience of individuals with STI symptoms seeking assistance from pharmacies. Working in Spanish, an investigator interviewed the first available attendant at each pharmacy. Each individual provided oral informed consent before participating. We notified attendants that we were investigating the diagnosis and treatment of sexually transmitted vaginal and genital infections, and we offered 20 pesos (~US$2) as compensation. Approximately 50% of individuals accepted this compensation.

Table 1 Case studies presented to participants

Case study	Pathogen/syndrome	Hypothetical client	Reported symptoms
1	Gonorrhoea/chlamydia	Male	• Painful and frequent urination • Yellow pus coming from penis • Blood in urine
2	Herpes simplex virus (HSV)	Male	• Ulcers around mouth and genitals • Ulcers feel itchy and inflamed • Third appearance of these ulcers
3	Trichomoniasis/bacterial vaginosis (BV)	Female	• Yellow and foamy vaginal discharge • Fishy smell • Itchy and uncomfortable vagina • Painful urination

The survey (available upon request) consisted of three parts. The first section collected information about the pharmacy's clientele, including typical monthly client number and breakdown by sex, type of health seeking behaviours (self medication versus requests for pharmacist diagnosis and treatment recommendation) and typical client descriptions of sexually transmitted vaginal or genital infection symptoms.

The second section investigated pharmacy attendants' diagnosis and/or treatment recommendations, based on hypothetical case studies, for three sets of infection symptoms (table 1). Case study 1 described symptoms suggesting gonorrhoeal and/or chlamydial infection; case study 2 depicted herpes simplex virus (HSV) infection; and case study 3 described symptoms of trichomoniasis and/or bacterial vaginosis (BV) infection. We organised infection information on flashcards and presented them in random order for each case study. We then asked participants to explain how they might proceed with hypothetical clients in each case. Attendants occasionally sought advice from colleagues, which was permitted under the protocol.

The final section collected background information about the pharmacy and the participating attendant.

Analysis

We analysed participants' responses to the case studies to determine which individuals properly diagnosed and/or treated the specific infections we described, *or*, those who properly diagnosed and/or treated the STI syndrome. We considered participants to have answered correctly if they suggested at least one appropriate diagnosis or treatment. We did not penalise participants who gave multiple suggestions, even if some of the treatment recommendations were ineffective or irrelevant.

Our analysis scheme reflects current STI diagnosis and treatment recommendations, as well as the debate between conflicting models. Syndromic STI management, which has proved to be valid, feasible, and cost effective for certain syndromes, is based on the identification of consistent groups of symptoms and easily recognised signs (syndromes), and the provision of treatment that targets the majority or most serious organisms responsible for producing that syndrome.[20] Syndromic treatment has many advantages. Since an individual who is positive for one STI is often also harbouring another infection, treating his/her symptoms as though they are caused by numerous potential pathogens may be a more efficient therapeutic option than treating just the "best guess" pathogen. Clinicians in many parts of the world (including the pharmacy attendants surveyed here) may not have access to microbiological laboratory assays that confirm the presence or absence of a specific pathogen. Syndromic treatment is also useful when certain drugs are effective against more than one infection (for example, antibiotic azithromycin, which effectively treats both gonorrhoea and chlamydia).

Syndromic STI treatment, however, also has several drawbacks. One study assessing the effectiveness of syndromic STI management found substantial overtreatment,[21] and another project reported that self and health worker recognised STI symptoms exhibited low sensitivities, specificities, and positive predictive values in STI diagnoses.[22] Though the World Health Organization (WHO) recommends syndromic management, it also cautions that certain treatment algorithms are limited, particularly those reporting on the management of vaginal discharge and cervical infections in women.[20]

We checked participants' treatment recommendations against those recommended by WHO,[20] a leading reproductive health textbook, *Contraceptive Technology*,[23] the 1998 edition of the *Physicians' Desk Reference*[24] and its 2002 Mexican equivalent, *PLM-Diccionario de Especialidades Farmacéutica*,[25] as well as Mexican doctors who treat STI patients through their medical practices.

RESULTS

Pharmacy personnel characteristics

Pharmacy attendants varied widely in age and experience. Mean age was 32 years (range 18–60) and median time working at that pharmacy was 5 years (range 0.3–48.0 years). Half the participants were men, half women; 11% had some type of pharmacy certification. Fully licensed pharmacists were ever available in only 54% of pharmacies. The interviews lasted approximately 12 minutes.

Typical pharmacy clients' complaints

Attendants saw an average of 28 clients per month with symptoms of vaginal or genital infections. Nearly two fifths (39%) of participants reported seeing fewer than 10 clients per month, while half (51%), saw between 10 and 50. The remaining 11% reported seeing over 50 clients per month (percentages do not add up to 100% because of rounding). Attendants estimated that over 80% of STI consultations were with women.

Although more than half the attendants (58%) reported that some clients were embarrassed to describe symptoms of vaginal or genital infections, only two pharmacies had designated places where clients and attendants could speak privately.

According to attendant reports, 64% of presumptive STI clients already knew what medication they wanted to buy; these self directed clients were usually filling doctors' prescriptions or incorporating information from television commercials or other media. The remaining 36% of clients typically requested treatment recommendations based on their symptoms.

We asked survey respondents to describe clients' "typical" symptoms. Participants most frequently cited itching, vaginal discharge, and burning sensations as complaints from

Table 2 Recommended diagnoses and treatments

N=57	Case 1: Gonorrhoea/chlamydia		Case 2: HSV		Case 3: Trichomoniasis/BV	
WHO guidelines for treatment of STI associated syndromes[20]	" . . .[T]he major pathogens causing urethral discharge are *N gonorrhoeae* and *C trachomatis*. . . . [T]reatment of a patient with urethral discharge should adequately cover these two organisms." Flow chart for urethral disease leads to gonorrhoea and chlamydia.		"Treatment [for genital ulceration] appropriate to local aetiologies . . . should be given . . . In many parts of the world, genital herpes is the most frequent cause of genital ulcer disease." Flow chart for genital ulcers leads to HSV.		"A spontaneous complaint of "abnormal" vaginal discharge (referring to quantity, colour or odour) is most commonly due to a vaginal infection . . . Thus, all women presenting with vaginal discharge should receive treatment for trichomoniasis and BV." Flow chart for vaginal discharge leads to bacterial vaginosis and trichomoniasis (coupled with other risk factors, chlamydia and gonorrhoea are possible diagnoses).	
Diagnosis (any)	16	(28%)	12	(21%)	23	(40%)
General diagnosis*	9		2		23	
Specific diagnosis	7		10		0	
Correct diagnoses	5; all for gonorrhoea	(9%)	7; all for HSV	(12%)	0	(0%)
Treatments (any)	24	(42%)	19	(33%)	47	(83%)
Appropriate treatment	9; all effective against gonorrhoea only	(16%)	7; all effective against HSV	(12%)	9; all effective against both trichomoniasis and BV	(16%)
Physician follow up recommended	38	(67%)	37	(65%)	15	(26%)

*eg "genital infection" or "vaginal infection."

women, with only one participant not suggesting any female symptom. Nearly half the respondents (47%), however, could not describe any "typical" STI symptoms reported by male clients. Of those who answered, itching, irritation, and penile lumps or bumps were the most commonly reported complaints.

Hypothetical case study results

We presented flashcards displaying three sets of typical STI symptoms (table 1). Case study 1, describing symptoms of gonorrhoea and/or chlamydia, and case study 2, describing HSV, referred to hypothetical male clients. Case study 3, depicting symptoms of trichomoniasis and/or BV, described a female client. Table 2 summarises participants' responses.

Sixteen participants (28%) gave one or more diagnoses (not necessarily correct) for the gonorrhoea/chlamydia case, 12 gave diagnoses in the HSV case (23%), and 23 attendants (40%) attempted to diagnose the trichomoniasis/BV case. Accurate diagnoses, however, were rare. Participants suggested gonorrhoea or chlamydia in less than one third of attempts (n = 5; all suggested gonorrhoea). Attendants correctly diagnosed HSV in slightly more than half of their attempts (n = 7). No participants recognised the trichomoniasis/BV syndrome beyond the general diagnosis of "vaginal infection."

Table 2 also describes recommended treatments. Participants suggested treatment in the gonorrhoea/chlamydia case on 24 occasions (42% of the time), and nine antibiotic prescriptions were appropriate for gonorrhoea: spectinomycin (recommended four times), ceftriaxone (twice), rosoxacin (once), ciprofloxacin (once), and pefloxacin (once). No participant suggested azithromycin (effective against both gonorrhoea and chlamydia), WHO's suggested treatment based on the described syndrome. In 11 of the incorrect prescriptions, participants suggested antibacterials (such as chloramphenicol) intended for treatment of urinary tract infections (UTIs) or antimicrobials (such as phenazopyridine) for treatment of pain, burning, and discomfort caused by infection or irritation of the urinary tract (though not effective against the infection itself). The remaining inappropriate recommendations included drugs intended for other reproductive tract infections, including the antifungal clotrimazole (effective against candidiasis) and the antiprotozoal tinidazole (effective against trichomoniasis).

Participants prescribed medication for the HSV case study 19 times (33% of all attendants). Attendants suggested appropriate antiviral treatments on seven occasions: aciclovir (five times), ribavirin (once), and tromantadine (once). (Ribavirin is a broad spectrum, ribonucleuic acid (RNA) virus mutagen. Though used most commonly for treatment of respiratory syncytial virus (RSV), ribavirin is also effective against HSV, hepatitis C virus, measles, mumps, Lassa fever, and other viral pathogens.) Incorrect treatment recommendations covered a broad range, including medications more appropriate for gonorrhoea (antibiotics spectinomycin, rosoxacin, and ceftriaxone), either gonorrhoea or chlamydia (antibiotic azithromycin), UTIs (antibiotic ampicillin), and candidiasis (antifungal clotrimazole).

Attendants were much more confident when suggesting treatment for the trichomoniasis/BV case, as 83% of all respondents made treatment recommendations (n = 47). However, participants suggested appropriate treatments only nine times (16% of all attendants). All nine mentioned antiparasitics metronidazole or secnidazole, effective against both trichomoniasis and BV. On 34 occasions, participants suggested treatment effective against candidiasis (antifungals clotrimazole or miconazole, or both together). The remaining ineffective products were more appropriate for urinary tract infections (UTIs) (antibiotic ampicillin) or UTI symptoms (antimicrobial phenazopyridine).

Participants suggested physician follow up 38 times (67% of all participants) following the gonorrhoea/chlamydia case study. Most (n = 30) had not recommended treatment, though on three occasions, neither treatment nor physician follow up was recommended. Similarly, participants recommended physician follow up on 37 occasions (65% of all participants) for the HSV case study, and all but one of these had not suggested treatment. Three attendants (the same three participants as in the gonorrhoea/chlamydia case) recommended neither treatment nor physician follow up. Attendants recommended physician follow up for the trichomoniasis/BV case 15 times (26%), with 13 of these suggesting follow up in the first two case studies as well. On two occasions, participants recommended neither treatment nor physician follow up.

DISCUSSION

Our results suggest that Mexico City pharmacy attendants possess inadequate knowledge to provide accurate STI diagnoses and treatment. These self reported data indicate poor training and high failure rates in identifying and recommending appropriate treatments for three sets of common STI symptoms.

Aside from inadequate training, the potential reasons for low recognition and mistreatment of STIs are many. One interpretation is that even when participants did not have useful treatment recommendations, they suggested costly but ineffectual (for STI treatment) medications in order to make a sale. Alternatively, others may have recognised general symptoms of reproductive tract infections and recommended what came to mind first, possibly influenced by advertising campaigns. Some respondents may have simply listed possible treatments because they did not know what else to recommend.

As might be expected, diagnoses did not always precede treatment recommendations, nor did treatment recommendations always follow diagnoses. That is, some attendants made diagnoses without prescribing medication, and others prescribed medications when they were unwilling to specify a diagnosis.

Some participants (12%) reported that they only attended individuals with doctors' prescriptions. These pharmacies may not therefore constitute a source of primary health care for their clients (beyond filling clients' prescriptions). For the remainder of pharmacies, it is possible that some clients have prescriptions some of the time. However, we estimate that perhaps 50% of individuals are seeking medical treatment for vaginal or genital infections from pharmacies without a medical doctor's advice. This supports the major role of pharmacies in the provision of primary health care for STIs.

Our study has several limitations. Our results attempt to characterise the competence of pharmacy practice based on only three STI case scenarios and only within Mexico City. Since we interviewed the first available pharmacy attendant, we approximated the experience of individuals who do not specifically ask to consult trained pharmacists, so our survey cannot appraise the performance of certified pharmacists. This study also did not address the conflicting roles of the pharmacy as merchant and medical provider, nor the impact of commercial drug company publicity on employees. Finally, our results reveal that many more women than men approach pharmacies for STI diagnosis and treatment; unfortunately, two of the three hypothetical case studies referred to men. Attendants' greater experience "treating" women may have resulted in more successful responses to our case studies if more of the descriptions had referred to women.

These data suggest an obvious policy recommendation: implementation of aggressive and sustained training for pharmacy personnel. Other studies have shown that improvements in appropriate diagnosing and treatment are possible following such training efforts, but these same reports caution that the improvements are difficult to maintain.[9 26 27] In addition, intensified training entails thorny legal and logistical decisions. For example, programmes that educate pharmacy personnel about appropriate syndromic STI management must carefully address prescribing regulations, since such "prescribing" is technically illegal. This type of training programme may also meet with opposition from physicians, who want to minimise competition from outside medical alternatives. In contrast, training efforts that encourage pharmacy attendants to refer all potential STI clients to a physician are also limited, since individuals who seek pharmacy treatment are often those who cannot afford physicians and since the efforts would ask pharmacists to act against their financial incentives. Such a programme might have the undesired consequence of reducing the total number of people who obtain appropriate STI treatment.

Any training effort must carefully balance these challenges, though clearly, dissemination of accurate STI information to the Mexican population as a whole, as well as a broad provision of educational materials to pharmacists specifically, is essential. Such information can enable people to avoid initial infection, as well as allow both individuals and pharmacy attendants to assess better the severity of disease condition and possible courses of action. These strategies could help prevent misdiagnoses, mistreatments, and potential sequelae due to pharmacies' ineffective STI treatment.

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CONTRIBUTORS

ANT conducted the analysis and wrote the final manuscript; CE conceived and designed the study, and provided support and guidance throughout the survey's implementation, analysis and write up; ST collected the data and initiated the analysis and writing processes; SG assisted with the questionnaire design and provided feedback on early drafts of the manuscript.

Authors' affiliations

A N Turner, C Ellertson, S Thomas, S García, Population Council, Mexico City, Mexico (at the time of fieldwork and analysis)

REFERENCES

1 **Paswa B**, Barnett L. Care or cash: assessing quality of care provided by drug retailers in Nepal. *International Quarterly of Community Health Education* 1993;**13**:317–28.
2 **De Valverde C**. [The pharmacy: A health resource.] *Arch Latinoam Nutr* 1989;**39**:365–81.
3 **Goel P**, Ross-Degnan D, Berman P, *et al*. Retail pharmacies in developing countries: A behavior and intervention framework. *Soc Sci Med* 1996;**42**:1155–61.
4 **Goel PK**, Ross-Degnan D, McLaughlin TJ, *et al*. Influence of location and staff knowledge on quality of retail pharmacy prescribing for childhood diarrhea in Kenya. *Int J Qual Health Care* 1996;**8**:519–26.
5 **Kloos H**, Chama T, Abemo D, *et al*. Utilization of pharmacies and pharmaceutical drugs in Addis Ababa, Ethiopia. *Soc Sci Med* 1986;**22**:653–72.
6 **Benjarattanaporn P**, Lindan CP, Mills S, *et al*. Men with sexually transmitted diseases in Bangkok: where do they go for treatment and why? *AIDS* 1997;**11(Suppl 1)**:S87–95.
7 **Crabbe F**, Carsauw H, Buve A, *et al*. Why do men with urethritis in Cameroon prefer to seek care in the informal health sector? *Genitourin Med* 1996;**72**:220–2.
8 **Ferguson A**. Commercial pharmaceutical medicine and medicalization: a case study from El Salvador. In: van der Geestand S, Whyte SR, eds. *The context of medicines in developing countries*. Dordrecht, Netherlands: Kluwer Academic Publishers, 1988:19–46.
9 **Pick S**, Reyes J, Alvarez M, *et al*. AIDS prevention training for pharmacy workers in Mexico City. *AIDS Care* 1996;**8**:55–69.
10 **Shaw JP**, Trevean MA. The advisory role of the community pharmacist in self-medication. *N Z Med J* 1983;**96**:171–3.
11 **Igun UA**. The knowledge-practice gap: an empirical example from prescription for diarrhoea in Nigeria. *J Diarrhoeal Dis Res* 1994;**12**:65–9.
12 **Kafle KK**, Madden JM, Shrestha AD, *et al*. Can licensed drug sellers contribute to safe motherhood? A survey of the treatment of pregnancy-related anaemia in Nepal. *Soc Sci Med* 1996;**42**:1577–88.
13 **Ralph SG**, Preston A, Clarke J. Over-the-counter advice for genital problems: The role of the community pharmacist. *Int J STD AIDS* 2001;**12**:513–5.
14 **Lamsam GD**, Kropff MA. Community pharmacists' assessments and recommendations for treatment in four case scenarios. *Ann Pharmacother* 1998;**32**:409–16.
15 **Central Intelligence Agency**. The World Factbook: Mexico (Web Page). Available at URL: http://www.odci.gov/cia/publications/factbook/geos/mx.html#Geo. (Accessed 6 January 2003).
16 **World Bank**. *World development report 1993: Investing in health*. New York: Oxford University Press, 1993.
17 **Faundes A**. Reproductive tract infections. *Int J Gynaecol Obstet* 1994;**46**:181–7.
18 **Meheus A**. Women's health: Importance of reproductive tract infections, pelvic inflammatory disease and cervical cancer. In: Germain A, Holmes KK, Piot P, Wasserheit JN, eds. *Reproductive tract infections: global impact and priorities for women's reproductive health*. New York: Plenum Press, 1992:61–91.

19 **Fleming DT**, Wasserheit JN. From epidemiological synergy to public health policy and practice: The contribution of other sexually transmitted diseases to sexual transmission of HIV infection. *Sex Transm Infect* 1999;**75**:3–17.
20 **World Health Organization**. *Guidelines for the management of sexually transmitted infections*. Geneva, Switzerland: WHO, 2001.
21 **Hawkes S**, Morison L, Foster S, *et al*. Reproductive-tract infections in women in low-income, low-prevalence situations: assessment of syndromic management in Matlab, Bangladesh. *Lancet* 1999;**354**:1776–81.
22 **Blankhart D**, Muller O, Gresenguet G, *et al*. Sexually transmitted infections in young pregnant women in Bangui, Central African Republic. *Int J STD AIDS* 1999;**10**:609–14.
23 **Cates W**. Reproductive tract infections. In: Hatcher RA, Trussell J, Stewart F, Cates W, Stewart GK, Guest F, Kowal D, eds. *Contraceptive technology*. 17th ed. New York: Ardent Media, 1998:179–210.
24 *Physicians' Desk Reference*. 52nd ed. Montvale, NJ: Medical Economics Company, Inc, 1998.
25 **Thomson**. *PLM-Diccionario de Especialidades Farmacéuticas*. Edición 48 (web page). Available at URL: http://www.facmed.unam.mx/bmnd/. (Accessed 6 January 2003).
26 **Somse P**, Mberyo-Yaah F, Morency P, *et al*. Quality of sexually transmitted disease treatments in the formal and informal sectors of Bangui, Central African Republic. *Sex Transm Dis* 2000;**27**:458–64.
27 **Garcia PJ**, Gotuzzo E, Hughes JP, *et al*. Syndromic management of STDs in pharmacies: Evaluation and randomised intervention trial. *Sex Transm Infect* 1998;**74(Suppl 1)**:S153–8.

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