

Prescribing Habits of Peruvian Physicians and Factors Influencing Them¹

EDUARDO ZÁRATE CÁRDENAS² & LUCÍA LLOSA ISENRIK³



A survey conducted between September 1991 and August 1992 approached 800 physicians in two marginal areas of the cities of Lima and Chimbote, Peru. Among other things, the survey sought data about information sources influencing the drug prescription practices of Peruvian physicians, about how these practices were modified by experience, and about the rationality of drug treatments prescribed for dealing with selected common ailments. Of the 800 physicians, 184 had already established themselves in private practice, 309 were recent medical school graduates, and 307 did not complete the survey questionnaire.

The responses provided suggested that knowledge acquired in medical school had little influence on the prescribing habits of either the established physicians or the recent graduates. Over two-thirds of both groups (69.6% of the physicians in private practice and 79.9% of the recent medical school graduates) indicated that their primary source of drug information was medical literature. Overall, however, data from this and related studies suggest that while the medical school influence was limited, the role of medical literature was less powerful than the survey participants claimed—because advertising materials distributed by pharmaceutical companies appeared to constitute a key source of information, one that tended to promote irrational drug use.

Several studies conducted in developed (1) and developing (2–7) countries indicate that use of medications is not consistent with rational academic criteria, but instead is shaped by the marketing activities of the pharmaceutical industry (6, 8). In recent years, Peruvian health professionals have shown increased interest in medication-related research, the purpose of which is to promote rational drug use and support the design of a drug policy that reflects the health problems prevailing in the country (2, 9). However, there is little data available on the various sources of pharma-

cologic information that influence the prescribing habits of Peruvian physicians. This situation led to the decision to conduct the research study reported here, the aims of which were as follows: (1) to assess which sources of drug information were influencing physicians' prescribing practices; (2) to determine the extent such practices are modified by professional experience; and (3) to evaluate the rationality of drug use in treating two common ailments.

MATERIALS AND METHODS

The sample consisted of two groups of Peruvian physicians in marginal urban areas located in two departmental political units with large populations of Andean immigrants: Eastern Lima and Chimbote. These immigrants are typically indigent people with little knowledge of health concerns and high prevalences of infectious disease morbidity. One survey group consisted of physi-

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²Universidad Nacional Mayor de San Marcos, Lima, Peru.

³Universidad Peruana Cayetano Heredia, Lima, Peru.

cians recently graduated from medical school who were preparing to perform their Rural and Marginal Urban Medical Service (*Servicio Rural y Urbano Medical—SERUM*), an exercise of initiation into clinical practice. The other survey group consisted of physicians who had already established professional practices. In the case of the first group, a printed copy of the survey questionnaire was distributed to all those preparing to participate in the forthcoming biannual drawing to determine SERUM assignments. With regard to the second group, the physicians involved were all those working in the two areas covered by the Project for the Revitalization of Health Services with Community Participation (*Proyecto de Revitalización de los Servicios de Salud con Participación Comunitaria—PRORESEP*), an initiative supported by the United Nations Children's Fund (UNICEF) and the Peruvian Ministry of Health that promotes community pharmacies and rational drug use. In this case the survey questionnaire was administered during the preliminary phase of the project, the names of the physicians involved being obtained from records kept by the Ministry of Health and pharmaceutical companies.

The survey instrument (Annex 1) prepared for this study followed the design of similar surveys conducted in other countries (1). The instrument, which contained 10 questions, was field-tested on a group of approximately 30 physicians and interns attending a seminar on rational drug use.

The instrument's third question dealt with active drug ingredients, drugs that should not be prescribed in daily practice, and nonessential drugs. Among other things, in section 3.1 it presented a list of brand name drugs selected from among the 100 top-selling drugs in Peru. Here the physicians were asked to choose those that were not indispensable for outpatient practice. The list included one an-

tibiotic (Amoxyl), one nonsteroidal anti-inflammatory drug (Voltarén), one anxiolytic (Urbadán), one anorexigenic (Lipenan), one cerebral tonic (Gamalate B6), and one cerebral vasodilator (Hydergina)—the correct physician response being to mark Lipenan, Gamalate B6, and Hydergina as not indispensable for outpatient practice.

The instrument's seventh question contained a list of various pharmacologic groups, some with drugs whose therapeutic efficacy had yet to be demonstrated. The participating physicians were asked to select those they did not consider indispensable for use in outpatient medical practice. The groups on the list were as follows: analgesics and antipyretics, antibiotics, anorexigenics, antidiarrheals, anxiolytics and antidepressants, hepatoprotectors, hypotensives, and cerebral vasodilators.

In Question 8 the physicians were asked to give their opinions of the information disseminated by pharmaceutical companies, while Question 9 tried to determine the rationality of drug use in treating of two frequent clinical problems, iron deficiency anemia and lower urinary tract infections among women. For iron deficiency anemia, the list of candidate medications included ferrous gluconate combined with vitamin C (Ferricum C); ferrous fumarate combined with vitamin B₁₂, vitamin C, and folic acid (Autrín); ferrous sulfate (sold under its generic name); and ferrous sulfate combined with calcium, vitamins B₁, B₂, B₆, and B₁₂, and niacinamide (Iberol 500). The list of drugs for treating lower urinary tract infections included the combination of trimethoprim with sulfamethoxazole known as cotrimoxazole (Bactrim), norfloxacin with phenozopyridine (Urocyclar R), and nalidixic acid with phenozopyridine (Urodixyl N 500).

One aim of Question 9 was to give insight into whether the drugs recommended for iron deficiency anemia and

urinary tract infections in women reflected the survey participants' stated sources of information (see Annex, Question 6). For instance, while 76% of the participating physicians stated that medical literature (books and journals) was their main source of information, only 60.8% chose the correct drug for treating iron deficiency anemia. Since no serious medical book or journal would recommend including vitamins in treatment for this problem (as was recommended in the three incorrect answers) the result suggests that in this case pharmaceutical company information could have had marked influence on prescription practices.

The questionnaire was administered to a total of 800 physicians in two groups, the first completing it in September 1991 and the second in August 1992. For reasons of geographic access, it was mailed to the physicians in private practice in September 1991, accompanied by a postage prepaid envelope for returning the response and an explanatory covering letter requesting that the physician forward the completed questionnaire to the area health center. If the physician did not answer within 30 days, a courier was dispatched to retrieve the questionnaire. In contrast, the questionnaire was administered to recent medical school graduates during the third week of August 1992, at the start of an administrative

training course offered by the Ministry of Health in Lima. For this reason, these latter physicians did not have an opportunity to consult sources of information. The responses given by both groups were kept confidential. In order to provide an incentive, participating physicians were informed that the PRORESEP project would send them books, reprints, magazines, and other educational materials about drugs.

The results were subjected to tests of statistical significance, the level of significance employed being $P < 0.01$.

RESULTS

Out of a total of 800 physicians, complete responses were received from 493—184 already established in private professional practice and 309 recent medical school graduates. Of the rest, 284 did not respond and 23 provided only general data or a few isolated answers, reflecting either lack of interest or reluctance to participate in the project.

Overall, only 9.9% of the 493 participating physicians said their prime source of information about new medications and medications they used daily was medical school (see Annex, Question 6). As Table 1 indicates, 79.9% of the graduates and 69.6% of the established physicians indicated that medical literature (books and journals) was the prime source of this

Table 1. Principal source of information on therapeutics cited by the 493 physicians surveyed. Peru, 1991 and 1992.

	Established physicians		Recently graduated physicians		Total	
	No.	%	No.	%	No.	%
Medical literature	128	69.6	247	79.9	375	76.1
University courses	14	7.6	35	11.3	49	9.9
Pharmaceutical companies	25	13.6	12	3.9	37	7.5
Medical conferences	17	9.2	15	4.9	32	6.5
Total	184	100.0	309	100.0	493	100.0

information. Statistically, the difference between the two groups of physicians was highly significant ($P < 0.01$). In addition, 3.9% of the recent graduates, 13.6% of the established physicians, and 7.5% of the total stated that pharmaceutical company literature was their prime source of drug information. Here again, the difference between the two groups was highly significant ($P < 0.01$). (An additional 6.5% of the physicians surveyed cited medical conferences as their prime source of information.)

Only 28.8% of the physicians provided the correct response to Question 7 (see Annex) regarding drugs that are indispensable for outpatient clinical practice by indicating that they did not consider anorexigenics, anti-diarrheals, hepatoprotectors, or cerebral vasodilators indispensable to their daily practice. No significant difference was observed between the two participating groups (physicians with an established private practice, 21% correct; recently graduated physicians, 34% correct).

Regarding another question (3.3) which dealt with drugs that should not be prescribed in daily practice, 28.9% of all the participating physicians (26.1% of the established physicians, 30.8% of the recent graduates) gave the correct response by marking the drugs Lipenan, Donafan F, Hepabionta, and Hydergina. Again, the difference between the two groups was not significant.

In answering Question 8 about the purpose of drug company literature, 69.6% of the participating physicians said this information was intended to persuade the medical community that the product involved was the best available and should therefore be prescribed. Another 14.7% said the intent was to motivate the health professional to seek information on the drug being recommended; 6.4% said it was to interest physicians in pharmacologic research; and 1.7% said it was to educate physicians.

Regarding questions 9.1 and 9.2, 60.8% of the participating physicians (57.3% of the established physicians, 62.7% of the recent graduates) indicated correctly that ferrous sulfate was the best treatment for iron deficiency anemia. Similarly, 52.4% of the participating physicians indicated correctly that Bactrim (co-trimoxazole) was the drug of choice for treating lower urinary tract infections in women. No significant difference was observed between the two groups in either case.

DISCUSSION

Factors that appear to have a bearing on the poor degree of response to the survey by established physicians (only 184 of 491 returned the questionnaire) include slight interest in this subject and its socioeconomic consequences, deficient academic training in this regard, and limited Ministry of Health leadership being provided in this area around the time the survey was conducted.

Results regarding the physicians' sources of information about new drugs and drugs used in daily practice supported the finding of other studies that knowledge acquired in medical school is not the principal source used by either established or recently graduated physicians. The problem is an old one that has not yet been properly addressed (3, 4).

Most Peruvian medical schools include pharmacology courses in basic study programs during the initial years of medical school, these courses normally focusing mainly on drug description and taxonomy. A medical student who has not yet come into contact with clinical theory and practice is unable to appreciate either the importance of pharmacologic knowledge or the potential for applying such knowledge. The training provided during the years of clinical study revolves primarily around disease descriptions and diagnoses, placing little emphasis on in-depth knowledge of pharmacokinetics, phar-

macodynamics, therapeutic principles, or the rational use of drugs. As a result, when it comes time to prescribe a drug, the student will typically consider only the effectiveness of a particular drug, without stopping to consider its adverse effects, interactions with other drugs, and cost. Keeping such matters in mind is vitally important in Peru, where the pharmaceuticals market is inaccessible to vast population sectors, where the tendency is for consumption to be irrational and production inadequate in terms of actual health needs, and where the situation is often characterized by overdependence on technology (5), extreme poverty affecting a large share of the general population, and frequent failure of "social programs."

Studies of how medical education affects prescribing practices have pointed up its low level of influence. In one of these studies, a group of infectious disease experts studying antibiotic use in developing countries found that deficiencies in medical teaching were to a large degree responsible for poor prescribing habits (10).

In Peru, acute respiratory infections are the leading cause of death. However, the School of Medicine at the Universidad Nacional Mayor de San Marcos (the medical school producing the most physicians) dedicates only three to five curriculum hours to such ailments, all during the final year of the three years of clinical studies (medicine and pediatrics), and places little emphasis on their treatment (11). To help make up for this sort of deficiency, in its program for controlling respiratory diseases the Peruvian Ministry of Health stresses therapeutic management, with an eye to reducing the frequency of both the problem and its complications.

The pharmaceutical industry, aware of these academic deficiencies, adopts a number of different marketing strategies aimed at increasing sales. Among other

things, it tends to exaggerate the therapeutic virtues of drugs and minimize their side-effects—in an attempt to create and perpetuate prescribing habits aimed at satisfying the interests of the producers at the expense of the consumers (6, 12, 13).

It is logical for recently graduated medical students to rely more on medical literature than on the pharmaceutical industry's promotional literature when faced with a need to prescribe drugs, for their recent university experience and internship involved constant review of therapeutic concerns involving patient management. However, our survey indicated that their use of pharmaceutical industry information, though less extensive than that of the established physicians, was still noteworthy.

The fact that nearly a quarter (23.9%) of the participating physicians did not cite medical literature as their principal source of drug information could relate to difficulty obtaining access to such literature, for financial reasons or lack of conveniently located medical libraries or both. Another contributing factor in the case of physicians in private practice could be some lack of interest in keeping abreast of therapeutic management techniques when the practice does not involve teaching or a milieu conducive to reading. This is one of the reasons why medical schools should provide continuing education programs that encourage physicians to update their knowledge using recognized sources of information. At the present time Peru's medical schools lack continuing education programs in clinical therapeutics. Instead, scientific associations sponsor symposia and other activities in collaboration with pharmaceutical companies.

Regarding corroboration of most participating physicians' assertion that their leading source of drug knowledge was the medical literature, outside data suggest this may not have been entirely certain. Specifically, no sound medical text-

book or journal dealing with therapeutics recommends the use of anorexigenics, hepatoprotective drugs, or cerebral vasodilators. In 1990, a total of 24 hepatoprotective drugs were registered for sale in the Peruvian pharmaceuticals market, with a total of 31 different presentations (14). In addition, one cerebral tonic (brand name "Gamalate B6") was the 18th leading pharmaceutical product in terms of total 1989 sales value (7). The inconsistency between these circumstances and the participating physicians' responses suggests that within at least part of the medical community pharmaceutical firms in effect conduct teaching activities by moving in skillfully to occupy the opening left by the universities. This hypothesis is supported by the work of Avorn et al. (1), who found differences between the sources of information cited by a group of physicians in Boston, Massachusetts, and their prescribing habits.

Overall, then, it appears that although Peruvian physicians typically assert that the medical literature is their prime source of information in treating patients, considerable inconsistency with that literature occurs when actual prescriptions are written, an inconsistency resulting in irrational drug use. This is consistent with results obtained in other studies. For example, a study of two teaching hospitals in Bangladesh (15) revealed that in 90% of all cases where antibiotic treatment was initiated before bacteriologic test results became available, the results of those tests were negative. In a similar vein, another study of 14 hospitals in southeastern Brazil found that each patient was prescribed an average of 8.6 drugs (16).

Peru's prevailing socioeconomic picture and lack of pharmaceutical regulation makes this problem more an economic and social one than a pharmacologic problem *per se*. Specifically, Peru's current pharmaceuticals policy places no restrictions on drug company advertising, which is disseminated primarily during

symposia sponsored by medical associations and through direct contact with physicians in hospitals and private clinics. In other developing countries where authorities do not limit the activities of the pharmaceutical industry, that industry is most aggressive in promoting drug sales. In the case of the drug norfloxacin, for example, it was found that the same manufacturer provided different therapeutic indications, depending on whether the product was being promoted in a developing or developed country (8).

Even though 69.6% of the physicians surveyed felt the purpose of the information published by pharmaceutical companies was to persuade clinical practitioners that their product was the best available and therefore the most appropriate to use, the marketing mechanisms employed by the companies still appeared to generate specific prescribing behaviors which were intended to increase their drug sales. This suggests that any program directed at providing training in rational drug use should alert participants to the subtle and effective marketing methods employed by the pharmaceutical industry.

Within this context, it is worth noting that two medical problems frequently faced by physicians in outpatient clinical practice are iron deficiency anemia and lower urinary tract infections. The former is experienced by 50% of the pregnant women and 30% of the women of reproductive age in Lima, while the latter is the fourth most common cause of medical consultations in marginal parts of the city (17). It is thus disconcerting to find that 4 out of 10 physicians do not appear to practice rational therapeutic management with regard to these problems, preferring to use combinations of two or more drugs rather than a single medication, and that of the drugs available in the Peruvian pharmaceuticals market, 42% are packaged in what appear to be therapeutic

tically irrational combinations (18). In examining factors that influence such prescribing habits, Stephen and Soumerai (19) note such things as a lack of educational programs, difficulties experienced by general practitioners in keeping their therapeutic knowledge current, and patient pressure.

In brief, there is good reason to suppose that a number of different factors conspire to make the prescribing practices of Peruvian physicians inadequate. Among these are a lack of good training in pharmacology at both the undergraduate and graduate levels; intensive, unregulated promotion by pharmaceutical companies; and a drug policy that fails to consider physician conduct at the time a prescription is written.

In other words, the irrational prescription of drugs in Peru is closely associated with poor professional training, absence of continuing education, and the commercial literature put out by drug companies. To combat these critically important factors it will be necessary to reformulate the role played by medical schools; design new, intensive, long-term programs dealing with pharmaceutical use; and regulate promotion by the drug industry. The aim of such actions would be to promote improved education in the area of drug prescribing, better information and an improved ability to analyze actual drug needs in the face of drug company advertising, greater interest in conducting research on drug use and conditioning factors, and implementation of norms for regulating drug promotion activities.

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Annex 1. Survey on the Use of Drugs by Physicians

Dear Physician:

The purpose of this survey is to gather information on the degree of pharmacologic information, its sources, and medical practices with regard to the use of medications. This information will be of value for the purposes of training carried out by the institution.

The survey is confidential. Below you will find a series of questions designed to achieve the objective, and we request that you respond to them.

1. Name: _____

University from which graduated: _____

Year of graduation: _____

Specialty: _____

Place of work (primary): Ministry of Health () Peruvian Social Security Institute ()

Private practice ()

Number of patients seen each day: _____

Telephone (home): _____

Telephone (work): _____

2. Match the therapeutic drug groups with the brand name medications:

Teldane	()	1. Antibiotic/chemotherapeutic
Voltarén	()	2. Nonsteroidal anti-inflammatory
Posipén	()	3. Vitamins/minerals/nutrients
Mucovit	()	4. Psychopharmacologic
Urbadán	()	5. Hepatoprotector
Quadrierm	()	6. Topical dermal
Tegretol	()	
Ventolin	()	
Iberol 500	()	

3. Nonessential drugs, active drug ingredients, and drugs that should not be prescribed in daily practice:

3.1. Mark with an X the drugs that you do not consider indispensable for your daily professional practice:

Amoxyl	()
Voltarén	()
Urbadán	()
Lipenan	()
Gamlate B6	()
Hydergina	()

3.2. From the following list of brand name drugs, indicate the active ingredient(s) contained in each:

	Brand name	Active ingredient(s)
Example:	<u>Penbritin</u>	<u>Ampicillin</u>
	Magnapén:	_____
	Dolo-cordralán:	_____

Annex 1. (Continued)

Apronax: _____
Septrín: _____
Novalgina: _____
Lexotán: _____
Ventolin: _____
Mylanta II: _____
Urbadán: _____
Ferro-fólic: _____

3.3 Mark with an X the drugs that should not be prescribed in your daily professional practice:

Amoxyl ()
Lipenan ()
Donafan F ()
Urbadán ()
Hepabionta ()
Aldomet ()
Hydergina ()

4. Underline the pharmaceutical presentation that you would prescribe in the following cases:

4.1 A nine-year-old child living in a marginal urban area of Lima presents infectious otitis. A decision is made to provide outpatient antibiotic treatment. What form of medication should be prescribed?

Ampule () Syrup () Capsule () Suspension ()

4.2 An adult male has a febrile lower respiratory process. A decision is made to provide outpatient therapy with ampicillin. What pharmaceutical presentation would you prescribe?

Ampule () Syrup () Capsule () Sachet ()

5. When you prescribe a medication, the most important criterion to bear in mind is:

- (a) the efficacy of the medication against the ailment to be treated;
- (b) the price of the medication;
- (c) the safety provided (few adverse effects);
- (d) all of the above.

6. Information on new medications and the medications that you use in your daily practice is obtained from (indicate one):

- (a) medical literature (books, journals);
- (b) the medical literature provided by medical visitors from the pharmaceutical companies;
- (c) university courses;
- (d) medical conferences.

7. Mark with an X the pharmacologic groups that you do not consider indispensable for your daily professional practice:

- () Analgesics/antipyretics
- () Antibiotics
- () Anorexigenics
- () Antidiarrheals
- () Anxiolytics/antidepressants

Annex 1. (Continued)

- Hepatoprotectors
 - Hypotensives
 - Cerebral vasodilators
8. With regard to the medical information provided by pharmaceutical companies, it is your opinion that the purpose of such information is to:
- educate the health professional;
 - persuade the health professional that this product is the best product and should be prescribed;
 - interest the health professional in drug research;
 - motivate the health professional to seek information on the drug being recommended;
 - all of the above.
9. Mark with an X the drug that you feel is most appropriate for managing the following problems:
- 9.1 Iron deficiency anemia:
- Ferricum C (ferrous gluconate + vitamin C)
 - Autrín (ferrous fumarate + vitamin C + vitamin B₁₂ + folic acid)
 - Ferrous sulfate
 - Iberol 500 (ferrous sulfate + calcium + vitamins B₁, B₂, B₆, & B₁₂ + niacinamide)
- 9.2 Lower urinary tract infection in women:
- Bactrim (co-trimoxazole)
 - Urocyclar R (norfloxacin + phenazopyridine)
 - Urodixyl N 500 (nalidixic acid + phenazopyridine)
10. Indicate the course that should be taken:
- A patient seeks medical consultation for arthralgia. In examining the patient, the physician detects Heberden's nodes and prescribes acetylsalicylic acid (aspirin). The patient smiles on seeing the prescription and then, somewhat upset, tells the physician that he himself could have prescribed aspirin. What should the physician do in this situation?
- (a) switch to another nonsteroidal anti-inflammatory drug;
 - (b) add an additional nonsteroidal anti-inflammatory drug;
 - (c) explain to the patient why aspirin is being prescribed;
 - (d) add an additional drug, even though you consider it useless, to satisfy the patient.