RETAIL PHARMACIES IN DEVELOPING COUNTRIES: A BEHAVIOR AND INTERVENTION FRAMEWORK*

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Abstract—Retail pharmacies in developing countries are one of the most important sources of advice on pharmaceuticals. Among the reasons the clients give are ease of access; availability of medicines; quality of service (no waiting and convenient hours of operation); and cheaper products, availability of credit, or the option to buy drugs in small amounts. However, the appropriateness of prescribing by retail pharmacy staff has been found to be far from acceptable. In childhood diarrhea, for example, oral rehydration salts (ORS), the appropriate diarrhea treatment, are recommended much less than pharmaceuticals of limited value, such as antimotility agents, adsorbents, etc. Little information is available for reasons underlying such behaviors.

In this paper, we present a conceptual framework in which to analyze factors that may affect retail pharmacy prescribing, and we suggest strategies for behavior change. We developed this framework after examining relevant literature on retail pharmacy prescribing.

We propose that pharmacy factors, client factors, physician practice and regulatory factors are the four sets of important factors for understanding pharmacy prescribing behavior. For intervention, we present four types of interventions which could be used for changing the behavior of pharmacy staff: information alone, persuasion, incentives and coercion.

The behavior and intervention frameworks presented in this paper should also help in guiding further research in this area. For example, new information on the effects of ownership type, availability vs actual role of professional staff and authority structure on pharmacy treatment behaviors would be useful areas for future research. Similarly, additional research is needed on the comparative effects of coercive, persuasive and incentive strategies on pharmacy treatment behaviors.

Key words—private sector, developing countries, pharmacies, behavior change interventions, quality of care.

INTRODUCTION

Pharmacies in developing countries are increasingly reported as an important source of health advice [1-9]. Among the reasons the clients give are ease of access [5-8], availability of medicines [8,9], quality of service (no waiting and convenient hours of operation) [2,9], cheaper products, availability of credit, or the option to buy drugs in small amounts [2,7-9].

However, the appropriateness of prescribing by retail pharmacy staff has been found to be far from acceptable. For example, a literature review of retail pharmacies’ diarrhea treatment behaviors in seven developing countries from Africa, Asia, the Middle East and North America by Ross-Degnan et al. found the reported diagnostic and treatment behaviors of retail pharmacies to be discouraging [10]: oral rehydration salts (ORS), the appropriate diarrhea treatment, were recommended in only one-third of the cases, while drugs, such as antimotility agents, adsorbents, etc., whose efficacy in the treatment of diarrhea is very limited [11], were recommended in 25–100% of cases.

What factors underlie inappropriate retail pharmacy staff behavior? We define ‘retail pharmacy behavior’ as the professional, health advice and dispensing services provided by retail pharmacists and their assistants when they, like physicians, prescribe pharmaceuticals. Thus, in these services, pharmacists and their assistants have the opportunity to directly influence the health of their clients through appropriate pharmaceutical prescribing and advising. Such services include both curative (for example, treatment of childhood diarrhea, upper respiratory infections and malaria) and preventive care (for example, advice on family planning). Research published to date has focused on characterizing consumer behavior and utilization patterns [12-14]. Useful as this information is, it reflects only the pharmacy client’s perspective, ignoring factors which might be
operating within the pharmacy itself, or in the broader environment in which pharmacies operate, and that may contribute to inappropriate pharmacy behavior.

This paper presents a conceptual framework in which to analyze factors that may affect retail pharmacy behaviors, suggests strategies which might be used for changing pharmacy behaviors, and identifies areas in which future research is needed. The generalizability of our findings, however, may be limited for two reasons. First, research published to date has been limited to retail pharmacy behavior focused on childhood diarrhea and family planning, and further has not differentially examined the behavior of pharmacy owners, pharmacists and pharmacy assistants. Second, the broad environments in which retail pharmacies function differ between developed and developing countries, and because of the paucity of research in this area, we have combined literature on retail pharmacies from developing countries with that of developed countries in developing our framework.

METHODS

We searched medical, pharmacy, public health and social science literature printed in English since 1969 with the aid of two computer-assisted retrieval systems: Medline and International Pharmaceutical Abstracts. Additional studies were identified through published bibliographies and written communication with researchers in the field.

A FRAMEWORK FOR ANALYZING RETAIL PHARMACY BEHAVIOR

Retail pharmacies are commercial entities. Thus, after reviewing available literature, we identified four major factors that could affect prescribing behavior of pharmacy staff. These are pharmacy staffing and organizational patterns, client expectations, physician practice and local regulatory factors.

Pharmacy Staffing and Organizational Patterns

Availability and role of professional staff

In many developing countries, the numbers of trained professional staff are very low, and a pharmacist/population ratio of less than 1:100,000 is not uncommon [13]. Even in countries such as India, which has comparatively high numbers of trained pharmacists, the large number of pharmacies could lead to a situation of 'officially employed and physically absent' pharmacists, resulting in staffing by minimally trained or untrained persons. Staffing by inadequately trained pharmacy staff is more prevalent in poorly developed urban areas. In Lima, Peru, while trained pharmacists were found to be present in ten out of fourteen outlets located in areas with high socioeconomic status (SES), they were present in only seven out of fifteen pharmacies located in low community SES areas [8]. The situation in rural areas is likely to be much worse.

More important than availability is the actual role of the professional staff within a pharmacy, which is often limited to administrative/managerial functions, thus affecting a pharmacy's ability to control the quality of care received by its clients. Field experience suggests that the staff's role is more administrative or managerial than consultative. Pharmaceutical assistants quite often are the only contact between a client and a retail pharmacy.

Sources of information on pharmaceuticals

Lack of unbiased information on drugs may contribute to inappropriate prescribing among pharmacists and their assistants. In developing countries, in contrast to developed countries, the primary source of information available to prescribers appears to be drug company salesmen [14, 15]. In El Salvador, Fergusan found that sales representatives have a high-school education or less, and their training emphasizes sales and promotional techniques. Thus it is highly unlikely that they are an unbiased source of information. Additionally, their incomes are largely dependent on volume of sales, increasing by as much as 600% or 700% through sales commissions [3].

The quality of information provided by United States pharmaceutical companies about their products has recently been evaluated in four developing countries by the U.S. Office of Technology Assessment (OTA) [16]. Of the 241 drugs evaluated, only 32% contained information which did not diverge from a standard based on medical importance. More serious divergences were noted in information on indications, warnings and precautions, adverse reactions and overdosage. While this analysis limited itself to United States pharmaceutical companies, information provided by pharmaceutical companies based elsewhere may not be much different.

Economic incentives

Among pharmacy staff, profit is likely to be an important motivating factor in product recommendations. If this is the case, economic incentives could be one of the prime determinants of product selection and sales. Profit associated with socially desirable products like ORS may not compete well with less socially desirable ones like antidiarrheals, leading to increased sales of the less desirable drugs.

There are two important reasons why economic incentives may be less important factors, however. Quite often, retail pharmacies sell other products besides drugs, so a client is likely to visit a pharmacy for these other commodities as well. Thus, a client who trusts a pharmacy's staff is more likely to visit to buy other commodities. In addition, unlike other health professionals who either are not physically part of the community they serve or are psychologically distant from clients, pharmacy staff may be
more integrated into the community they serve [17, 18]. This relationship may motivate a pharmacy staff to develop an image as health provider, and not just product supplier. Although such an argument has also been made for village health workers who sell medicines for a small profit [19], absence of empirical data makes it impossible to draw definitive conclusions about profit vs other incentives for the different types of pharmacy staff.

**Staff training/education**

As mentioned earlier, there are too few trained pharmacists in many developing countries, resulting in staffing of pharmacies with minimally trained or untrained persons. In one town in El Salvador, of seven pharmacy assistants employed in a pharmacy, four had received a sixth grade education, two had reached the third grade and one had never been to school [3]. In Nepal, about 50% of retailers had fewer than ten years of education [20]. In a survey in rural Ghana, staff of all five chemist shops were found to have little or no training in pharmacy [21].

Because market life for most pharmaceuticals is short (about five years in the United States) [21], many products currently on the market were not present when most pharmacy staff were in training. Periodic education about new drugs is therefore critical. Few studies have examined the impact of education/training on pharmacy behavior. In a survey of 361 retailers in Nepal, those who had completed more than ten grades and received additional training locally had more knowledge of the contraindications of oral contraceptive use than those who did not [20].

**Workload**

Workload in a pharmacy may vary as a result of geography and time of day. For example, pharmacies located in urban central business districts may have greater workloads than those in rural areas. Urban pharmacies may have monthly (for example, after pay days), weekly (for example, on Fridays) or even daily (for example, early afternoons) peak periods. In busier pharmacies during these periods of higher workload, pharmacy staff may have less time for adequately communicating with their clients, as do physicians under similar circumstances [23].

**Expected efficacy of a pharmaceutical product**

The behavior of pharmacy staff may be influenced by the expected efficacy of a product, as has been reported for physicians [24–26]. This is an area not yet explored in the literature.

**Pharmacy ownership**

In some countries, investor-owned pharmacies exist side by side with those owned by professionally trained persons. One retail pharmacy study from Los Angeles attempted to test the hypothesis that pharmacy owners were more likely to make a product recommendation than salaried pharmacists when surrogate patients presented the scenarios of nervousness and some rectal bleeding, but this study did not reach any definitive conclusions [27]. Thus, new research is needed on the impact of professional ownership on professional freedom and on the quality of care received by pharmacy clients in developing countries.

**Authority structure**

As has been reported for a health center [28], a retail pharmacy could be considered a social organization with established authority and communication structures. For example, pharmaceutical assistants with their minimal pharmacy education may not have much authority to question store policy established by better-trained pharmacists. If the assistants are the ones actually advising pharmacy clients, and their knowledge of the proper treatment of an illness is poor, store policies may lead to an unchallenged acceptance of treatment norms and the perpetuation of clinically inappropriate treatment behaviors.

**Location**

A pharmacy’s location with respect to community SES and the type of town (urban/rural), may also affect pharmacy behavior through (1) staffing patterns, (for example, pharmacy staff with less training available in poorer areas) [8]; or (2) the clients themselves, who in poorer areas may have less education and may demand certain types of treatments. Similarly, pharmacy staff working in rural areas may have fewer opportunities for upgrading their professional skills.

**Competition**

Behaviors of retail pharmacies may be affected by competition, especially where they are densely situated, as for example in certain large towns. There is little or no research on the effect of competition on pharmacy behavior, although a study of professional colleagueship and cooperation among neighboring pharmacies in Minnesota did not find any effect of competition on these variables [29].

**Client Characteristics**

Client demand for particular pharmaceutical products may be affected by knowledge about their illness or the expected efficacy of the product. In developing countries, however, only a few studies have differentiated between pharmaceuticals requested by clients vs those dispensed on a pharmacy staff’s recommendation. A study from Sao Paulo showed that products were bought at the customer’s own initiative in 34% of the encounters, and products were prescribed at the attendant’s initiative in 22%, while in the remaining 44% of the encounters products were prescribed by a physician [30]. In another study of 226 encounters in two rural areas in Brazil, 42% of the products were reported to be self-prescribed [31].
Although not yet explored in the retail pharmacy literature, client SES and gender could also affect pharmacy behavior. This has been reported in the literature on physician behavior from developed countries which document information given to patients of different SES and gender [32-35]. Local cultural norms may also influence the pharmacy staff's behavior. For instance, studies from Egypt and Paraguay suggest that a male pharmacy staff person may not be able to advise effectively on gynecological problems and family planning [36, 37].

**Physician Practice**

Retail pharmacies exist and function in a medical milieu dominated by physicians, practicing both in hospitals and in private clinics. If these physicians are perceived to be professionally competent, pharmacy staff may model their behavior on physician prescribing patterns. Presence of some medical malpractice could also influence the pharmacy staff's behavior. For example, in the private sector of Bombay it was found that the general practitioner, consultant physician, nursing home (private hospital) owner, and investigation centers 'collude' with one another to gain financially [38]. Whether or not such collusion involves pharmacy staff has yet to be explored.

**Regulatory Factors**

Six regulatory factors could influence retail pharmacy behavior. These are number and types of products available in the private sector, staff education requirements, scheduling of pharmaceuticals over-the-counter (OTC/non-OTC, etc.), freedom to substitute, requirements for providing information and control of profit margins which specify how much profit pharmacies can add to their procurement cost. Our literature review found this area strikingly neglected by researchers: we identified only one pharmacy study which examined the relationship between regulatory factors and pharmacy behavior [16]. In that study, Tomson and Sterky found that in Sri Lanka, which has a national drug policy, pharmacy behavior in the treatment of childhood diarrhea was more rational than in Yemen, where no such policy existed at the time of their study [16]. What influence other regulatory factors have on behavior clearly needs to be examined, using stronger research designs. Interrelationships between these factors could also be important determinants of retail pharmacy behavior. For example, staff training/education staff may be affected by physician practice and influence of regulatory factors may vary by location.

### Table 1. Four types of policy interventions for retail pharmacy

<table>
<thead>
<tr>
<th>Illustrative example</th>
<th>Information</th>
<th>Persuasion</th>
<th>Incentives</th>
<th>Coercion</th>
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<tr>
<td>2. Monitoring and feedback of behaviors.</td>
<td>2. Participatory development of treatment norms.</td>
<td>2. Employer-paid attendance at continuing education seminars.</td>
<td>2. Import controls via foreign exchange manipulation.</td>
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<tr>
<th>Characteristics of key inputs</th>
<th>Characteristics of factors affecting success in behavior change</th>
<th>Role of implementor</th>
<th>Role of pharmacist/other pharmacy staff</th>
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<tr>
<td>Same as Information plus sponsor(s) credible in professional community and effective trainers.</td>
<td>Design of effective communication, extent of contextual barriers.</td>
<td>Providing reasons for desired behaviors, answering concerns and responding to criticisms in a meaningful way.</td>
<td>Providing unbiased information.</td>
</tr>
<tr>
<td>Financial subsidies.</td>
<td>Strength of economic motivation</td>
<td>Ensuring that incentives are adequate for desired behavior change.</td>
<td>Ensuring compliance to stated regulations.</td>
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<td>Political commitment for getting legislative approval.</td>
<td>Administrative mechanisms to ensure compliance.</td>
<td>Compliance and enforcement.</td>
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### Characteristics

- **Table 1. Four types of policy interventions for retail pharmacy**

- **Illustrative example**
  - 1. Distributing WHO's publication *Rational Use of Drugs in Children*.
  - 3. Lowering import duty on ORS.

- **Information**
  - 1. Area-wide discussions with counter assistants on treatment of childhood diarrhea.
  - 2. Participatory development of treatment norms.
  - 3. Lowering import duty on ORS.

- **Persuasion**
  - 1. Supplying ORS sachets to pharmacies at a subsidized price.
  - 2. Employer-paid attendance at continuing education seminars.

- **Incentives**
  - 1. Banning stocking and sale of antidiarrheals at the pharmacies.
  - 2. Import controls via foreign exchange manipulation.

- **Coercion**
  - 1. Financial subsidies.
  - 2. Administrative mechanisms to ensure compliance.
  - 3. Compliance and enforcement.

**Role of implementor**

- Providing unbiased information.

**Role of pharmacist/other pharmacy staff**

- Passive recipient of information.

**Characteristics of key inputs**

- Unbiased, appropriate information and effective communication channels.

**Characteristics of factors affecting success in behavior change**

- Cognitive: belief, relevance.

**Strength of economic motivation**

- Ensuring that incentives are adequate for desired behavior change.
In the next part of this paper, we describe four broad types of intervention strategies which could be used for improving retail pharmacy behaviors (see Table 1). As these strategies have so far been used for behavior change, it will be interesting to observe what effects they have in the retail pharmacy setting.

### STRATEGIES FOR IMPROVING RETAIL PHARMACY BEHAVIOR

Strategies for improving retail pharmacy behaviors include: information alone, persuasion, incentives and coercion. The four types of strategies differ conceptually as well as operationally. On a conceptual level, the information alone strategy provides a necessary input into the decisionmaking process, while persuasive interventions seek to change underlying beliefs and values in such a way that the decisionmaker is motivated to select a therapeutically appropriate treatment option. In operational terms, the information alone strategy intrudes least in the decisionmaker’s freedom to select a treatment option, while coercion is the most intrusive strategy.

The information alone strategy appears attractive due to its ease of implementation and, possibly, low costs. In a study done in a developing country this strategy changed some physician behaviors [39]. However, in a major review of studies done in primary care on changing physician behavior in developed countries, this strategy was found to be weak [40].

Persuasion has been successfully used in developed countries for changing physician prescribing practices [41–45]. Persuasion is defined as a successful, intentional effort to influence another’s mental state through communication in a setting in which the target audience has a measure of freedom [46]. This strategy has been successfully used by the pharmaceutical industry for a century, often in combination with financial incentives (for example, free vacation trips) [47]. However, successful persuasion is relatively complicated as it requires a thorough assessment of current behaviors and the factors underlying those behaviors, and the development of messages, printed materials, and a training program to address those factors. This strategy, therefore, could require moderate involvement from government staff, unless locally available, non-government expertise is involved in the process. Persuasion also has the potential for developing conflicts with the pharmaceutical industry, particularly when it appears to demote a product line (for example, cough and cold remedies often used for children).

An incentive strategy—increasing the profitability of socially desirable products—requires inputs which may be difficult to obtain in developing countries. For example, financial inputs may not be available due to diminishing government health budgets, or, if available, their allocation to the retail private sector to subsidize the cost of certain products may not be politically acceptable.

However, if profit maximization is identified as important in determining retail pharmacies’ sales behavior, or if the economic loss associated with changing behavior is significant, two broad types of incentive strategies could be considered: (1) encouraging sales staff to discriminate among their clients, that is, take less than maximum return from certain types of consumers and/or illness types (for example, a poor mother consulting for her child’s cold) and competitive return from others and (2) reducing the acquisition cost of socially desirable products while maintaining profit-margin. One way to achieve reduced cost to the retail pharmacies could be to reduce or eliminate taxes on such products, as has been successfully done for pharmacies located in rural areas of Norway [48].

A coercive strategy that bans the stocking and sale of certain drugs may be feasible, but it may create unnecessary use of other drugs (substitution effects). For example, banning antidiarrheals may lead to an increased use of drugs such as metronidazole in simple childhood diarrhea, where their use is inappropriate. This is not to say that regulatory interventions should not be used. Reducing the number of drugs available to health providers is the centerpiece of WHO’s globally accepted Essential Drugs Policy. However, a priori attention should be paid to the possibility of substitution effects. This could mean combining a coercive strategy with either a strategy of information alone or persuasion.

Notwithstanding the strategy selected for changing behavior, from the discussion on factors affecting practice it follows that in some environments, targeting physician practice and/or client demand along with retail pharmacy practice could be more effective than targeting pharmacies alone.

Because persuasion has been effective in improving physician behavior in developed countries, but is relatively unknown in developing countries, the next section discusses the key issues related to its design.

### PERSUASION AS A PHARMACY BEHAVIOR CHANGE STRATEGY

The fundamental design issues in a persuasion strategy have been described by Soumerai and Avorn, among others, and are summarized below [46, 49]. They focus on the sponsor of the persuasive message, the actual message itself, and finally, the target audience.

**Factors related to sponsors**

The credibility of the sponsors is very important in designing a persuasion intervention. This credibility depends on the target audience’s perceptions of the sponsor’s competence (operationalized by education, training and experience) and trustworthiness (sometimes called ‘character’ or ‘personal integrity’). The sponsor must anticipate two kinds of bias: ‘knowledge bias’ (the target audience’s belief that the
and thus have an opportunity to directly influence the decisions—especially selection of pharmaceuticals—involved in helping their clients in making health care decisions. Pharmacists and their assistants, similar to physicians, are responsible for providing professional, health advisory behavior of retail pharmacies.

We defined retail pharmacy behavior as the professional, health advisory behavior of retail pharmacies and their assistants, similar to physicians, being involved in helping their clients in making health care decisions—especially selection of pharmaceuticals—and thus have an opportunity to directly influence the health of their clients. We have proposed that pharmacy factors, client factors, physician practice and regulatory factors are the four sets of important factors for understanding pharmacy behavior. The purpose of our framework is to alert both researchers and policymakers to the various influences which might be operating in a particular situation so that appropriate interventions can be designed.

We have also presented four types of interventions which could be used for changing the behavior of pharmacy staff: information alone, persuasion, incentives and coercion. Further, we have given an example of how the data collected on some of the key factors of the framework could be used to select an appropriate intervention. We have further summarized key features of a persuasion approach to facilitate its use elsewhere.

We wish to point out here that implementation issues should also be carefully considered before designing a specific intervention. These issues fall into two broad categories: feasibility, and the durability and side effects of behavior change. The feasibility of mounting an intervention should be considered in three dimensions: logistical issues, including the type and frequency of technical expertise needed for intervention, and the degree and timing of supervision needed; financial issues including the fixed and operating costs; and political issues, including the identification of actors and groups in favor and against an intervention, and their relative powers.

In summary, an effective persuasion strategy should have the following four components: (1) credible and unbiased organizations as sponsors, (2) messages that present both sides of an issue, refute possible objections up front, and cite relevant evidence from highly credible sources, (3) information that inoculates against attempts at counter-persuasion and (4) the involvement of opinion leaders in the training.

Factors related to the message

Messages that present both sides of a controversial issue are more persuasive than one-sided ones. Refuting possible objections only enhances persuasion when refuted objections are relevant ones for the decisionmaker.

Presenting both sides of an issue is important when significant disagreements on a message exist. For example, while currently there is no disagreement among experts on the role of antidiarrheals in the management of childhood diarrhea, such a consensus would be more difficult to achieve about the use of antibiotics in treating upper acute childhood respiratory infections. In such a scenario, it would be important to present both points of view as well as guidance for making a rational decision. There should be a few highly focused messages, communicated through simple graphic/print materials and face-to-face training in an environment that involves the learner.

Factors related to target audience

As future counter-persuasion is expected the sponsors should 'inoculate' the target audience against counter-persuasion by (1) demonstrating how to refute such counter-persuasion, or (2) providing supportive arguments in favor of the desired behavior change. The opinion leaders, that is, those individuals considered to be important and respected in influencing target behaviors in local settings, should be involved in training to minimize counter-persuasion.

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SUMMARY AND CONCLUSIONS

In this paper, we have presented a conceptual framework for analyzing retail pharmacy behavior. We defined retail pharmacy behavior as the professional, health advisory behavior of retail pharmacists and their assistants; thus focusing on those services provided by a retail pharmacy in which pharmacists and their assistants, similar to physicians, are involved in helping their clients in making health care decisions—especially selection of pharmaceuticals—and thus have an opportunity to directly influence the health of their clients. We have proposed that pharmacy factors, client factors, physician practice and regulatory factors are the four sets of important factors for understanding pharmacy behavior. The purpose of our framework is to alert both researchers and policymakers to the various influences which might be operating in a particular situation so that appropriate interventions can be designed.

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