

Barriers and Opportunities to Effectively Engage Private Sector Retail Pharmacies as DOTS Centers in Pakistan

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Key Words

TB DOTS, retail pharmacy, barriers, opportunities, Pakistan, TB detection, case management, community level

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ACRONYMS

AFB	acid-fast bacilli
CENAT	National Center for Tuberculosis and Leprosy Control [Cambodia]
CI	confidence interval
DHQ	District Headquarters
E	ethambutol
H	isoniazid
HBC	high-burden country
HCMC	Ho Chi Minh City
HCP	health care provider
Hx	history
IMS	International Marketing Survey
MDR-TB	multidrug-resistant tuberculosis
MOU	memorandum of understanding
NAP	National Association of Pharmacists
NEDL	National Essential Drug List
NTP	national TB program
OTC	over-the-counter
PCP	Pharmacy Council of Pakistan
PHC	primary health care
PPM	public-private mix
R	rifampicin
S	streptomycin
SAPP II	Second Social Action Program Project
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
STG	standard treatment guidelines
T	thiacetasone
TB	tuberculosis
USAID	US Agency for International Development
WHO	World Health Organization
Z	pyrazinamide

EXECUTIVE SUMMARY

As part of an ongoing pilot project to engage about 500 private retail pharmacies in six cities of Pakistan (Islamabad, Rawalpindi, Lahore, Peshawar, Karachi, and Sukkur) in the early detection and referral of tuberculosis (TB) cases, stakeholders in the National TB Program (NTP) have discussed the potential of pharmacies providing DOTS to clients. The present study was designed to evaluate the knowledge, perceptions, dispensing practices, case management, and adherence to standard NTP guidelines by dispensers, and the pattern of TB medicine sales by volume, brand, and price at community pharmacies.

The study used a comparative cross-sectional study design to evaluate the barriers and opportunities for retail pharmacies to be effectively engaged as DOTS centers in Pakistan. The sample was drawn from a list of retail pharmacies obtained from the District Health Offices in Islamabad and Rawalpindi and the NTP using a simple random technique. A total of 170 pharmacies were included in the study: 96 pharmacies in Rawalpindi from each group (i.e., trained under the pilot project and not trained), and 28 pharmacies in Islamabad from each group (i.e., trained under the pilot and not trained). Semi-structured questionnaires were used to evaluate knowledge, perceptions, dispensing practices, and adherence by dispensers to standard NTP guidelines. To evaluate case management of TB patients, simulated patient visits were used at the pharmacies: scenario I (proper and complete prescription); scenario II (improper and incomplete prescription); and scenario III (missed dose prescription). International Marketing Survey (IMS) data were examined to analyze patterns in TB medicine sales by volume, brand, and price at the community pharmacies. Following data collection, the data were cleaned, coded, and entered into SPSS version 16. The data were screened to ensure correct data entry by running frequencies. Descriptive statistics were generated to ascertain distribution patterns. The data were analyzed using SPSS.

The overall knowledge of dispensers working at trained and untrained pharmacies in Islamabad and Rawalpindi about TB management was adequate. Most of them were aware of TB symptoms, anti-TB medicines, and the duration of the intensive and continuous phases for newly diagnosed and retreatment TB cases. Results showed that the client sometimes brings a prescription to the pharmacy, in the case of trained (69.3%, n=86) and untrained (65.3%, n=81) pharmacies. The most common reason for a patient to interrupt treatment was the cost of medication at trained (62 %, n=77) and untrained (52.4 %, n=65) pharmacies. Most patients were counseled about their treatment regimen at trained (89.3%, n=25) and untrained (68%, n=19) pharmacies. Most of the dispensers were satisfied with the currently available anti-TB medicines at trained (89.2%, n=25) and untrained (92.9%, n=26) pharmacies. In the view of most of the dispensers working at trained (56.2%, n=16) and untrained (78.6%, n=22) pharmacies, anti-TB medicines should not be sold as over-the-counter (OTC) medications. The trained pharmacies located in Islamabad (71.4%, n=20) and Rawalpindi (78.1%, n=75) agreed on the effective role of the NTP in TB control.

In scenario I (proper and complete prescription), the scores on the history taking observation checklist for dispensing showed that most patients (except for a few in Rawalpindi) were not asked about their demographic data (age, weight), their past and present medical history (history [Hx] of illness, medical history), and compliance with current medications (current symptoms and side effects with the regimen) at either the trained or untrained pharmacies. During the visits to trained and untrained pharmacies in Islamabad, the treatment was recognized as correct in all cases, while at the pharmacies in Rawalpindi, the treatment was

recognized as correct in 57.3 % (n=55) of the visits to trained pharmacies and in 86.5 % (n=83) of the visits to untrained pharmacies. Patients were not referred to a doctor and the same remedy was dispensed by all trained and untrained pharmacies in Islamabad and Rawalpindi. The scores on the medication information checklist showed that the appropriate dose, frequency, and duration of the medicines for TB treatment were communicated to the customer in all the cases that presented at trained and untrained pharmacies in both Islamabad and Rawalpindi. However, the use and side effects of medicines were not communicated in any of the cases that presented at trained and untrained pharmacies in Islamabad and Rawalpindi.

In scenario II (improper and incomplete prescription), the prescription was not recognized as incorrect in all the cases at trained and untrained pharmacies in Islamabad and Rawalpindi. History regarding the patient's weight, illness, medications, current symptoms, improvement in symptoms, duration of treatment, and side effects was not inquired about in all the trained and untrained pharmacies in Islamabad and Rawalpindi. The patient was not referred to a doctor in all cases at the trained and untrained pharmacies in Islamabad and Rawalpindi, and the same improper and incomplete prescription was dispensed in all cases that presented at trained and untrained pharmacies in Islamabad and Rawalpindi. The dosage regimen was not told to the patient by the dispenser in all cases at trained and untrained pharmacies in Islamabad and Rawalpindi.

In scenario III (missed dose prescription), the scores on the history taking observation checklist showed that the patient's age, weight, Hx of illness, medications, medical history, current symptoms, and improvement in symptoms were not inquired about in any of the cases that presented at trained and untrained pharmacies in Islamabad. Medication history was asked about in 97.9% (n=94) of the cases at trained and untrained pharmacies in Rawalpindi. History regarding side effects with the regimen was not asked about in any of the cases at trained and untrained pharmacies in Islamabad. Different patterns of referral were observed at trained pharmacies in Islamabad and Rawalpindi, including: referred to a doctor but dispensed the same prescription (3.2 %, n=4); did not refer to a doctor but dispensed a new prescription (29.8 %, n=37); and did not refer to a doctor but dispensed the same prescription (55.6 %, n=69). It was observed that anti-TB medicines with the correct dose, frequency, and duration were dispensed to patients in 85.7% (n=24) of the cases at trained and 92.8% (n=26) of the cases at untrained pharmacies in Islamabad, but in 85.4 % (n=82) of the cases at trained and 89.6% (n=86) of the cases at untrained pharmacies in Rawalpindi. The use and side effects of the medicines were not communicated to patients in any of the cases that presented at trained and untrained pharmacies in Islamabad and Rawalpindi.

The total number of anti-TB medicines brands sold in the market were; 54, 50, and 52 in 2012, 2013, and 2014, respectively. An overall decrease in the sale of anti-TB medicines was observed at all levels (national, retail and wholesale market) between 2012 and 2014. This may indicate better coverage by the NTP in supplying medicines.

The results of the present study are quite encouraging despite the overall unsatisfactory condition of dispensing practices for TB management at community pharmacies in the country. This study highlighted inadequate knowledge, poor case management, and poor dispensing practices for TB treatment at community pharmacies in Pakistan. The dispensers who had received training referred patients to a doctor in few cases. Most of the dispensers were not very good at taking history and providing appropriate advice to their customers.

This may be due to the fact that the dispensers who were trained by the NTP were usually not present at the time of the visit and they had not trained other staff members after receiving training. This result indicates that the training may be effective for individuals but not for the system. In a few cases, medicines were not dispensed due to unavailability. In the view of many of the dispensers, anti-TB medicines should not be sold like OTC medications. Regulators should take the opinion of these stakeholders into account and identify the issues related to this matter before implementing the sale of anti-TB medicines OTC. Results from the pilot conducted in six districts and the research study are strongly suggestive that pharmacies can play a very effective role in early TB case detection. Selected pharmacies that meet the requirements can be trained to act as DOTS centers; however, strong monitoring and follow-up are required to ensure the pharmacies meet the set standards and follow the guidelines.

INTRODUCTION AND BACKGROUND

Tuberculosis (TB) has been a major global health problem for centuries. One-third of the world's total population is infected with *Mycobacterium tuberculosis*, the bacteria that cause TB [1]. The incidence of mycobacterial infection worldwide is alarming, mainly due to its increase in developing countries, the number of co-infections with HIV, the number of infections within the elderly population, and the emergence of multidrug-resistant TB (MDR-TB). The number of TB deaths is unacceptably high, given that most of the deaths are preventable [2]. The World Health Organization (WHO) recommends the Stop TB Strategy based on DOTS to control TB. The strategy aims to ensure that patients take a standard short-course of chemotherapy under guided supervision to cure the disease and to prevent transmission. Patients are assisted through their treatment regimen and are encouraged to complete their treatment to prevent resistance to available anti-TB medicines. DOTS may be delivered by health workers, community volunteers, lay health workers, and even family members [3].

Situation Analysis

Twenty-two countries have 80% of the global incident cases of TB. These countries were designated as high-burden countries (HBC) by the WHO in 1998. They have received accelerated assistance to increase case detection rates and improve treatment outcomes. All of the HBCs had adopted WHO's DOTS strategy by 2000 [4]. By 2007, national TB programs (NTP) in all HBCs had achieved 100% DOTS coverage nationwide, providing access to standardized TB care through public sector health facilities. However, less attention has been paid to private sector TB care in the HBCs. The growth of private sector health care in many HBCs has seen the proliferation of TB services outside the control of NTPs [5]. Between 60% and 80% of TB patients choose to seek and obtain treatment from private providers, at significant out-of-pocket expense, and with unknown treatment outcomes. The Stop TB Partnership Strategy 2006–2015 aims to engage directly with private sector providers to ensure that patients have access to high-quality DOTS services from all TB care providers [3]. Collaborative public-private sector interventions to implement the DOTS strategy, known as PPM (public-private mix) DOTS, and dissemination of the evidence-based International Standards of Tuberculosis Care are being used to link private providers to NTPs. These strategies are being scaled up in most HBCs. However, progress is slow, with limited and varying success [6].

LITERATURE REVIEW

Community pharmacies have quite a distinct and unique position in the health care delivery system as they are the first and/or final point of contact between a patient and his/her medicines in the majority of cases [7]. Their importance is enhanced by their large coverage and magnitude of operations, serving millions of patients every day. However, an important fact to consider is that these outlets are working mainly as business entities and not as health care providers. All over the world, community pharmacies function according to a business model, yet they are regulated by health laws. In Pakistan, however, the problem does not lie in pharmacies being run as businesses, it is in the lack of implementation of regulations [8]. Inherent to their unique characteristics, many irrational medicine use problems have cropped up at these outlets, including self-medication, antibiotic prescribing, inappropriate use of anti-diarrheals and steroids, sale of less than prescribed quantities of medicines, especially of antibiotics, and poor medicine storage practices. Other common problems include limited counselling, and attempts to diagnose and treat almost all conditions despite staff having no expertise. This latter problem is compounded by the confidence with which staff execute their services for the multitude of patients [9]. Personnel who are dealing with patients are normally pharmacy assistants, dispensers, and those with lower secondary school qualifications and no formal training [7, 9-11]. However, they feel confident when dealing with patients, and patients also trust their suggestions and seek medical advice directly from community pharmacies because they are faster and less expensive than a physician's practice [10].

It is possible to improve dispensing practices at community pharmacies through a combination of focused interventions. Three types of interventions are being used by researchers across the world, which include educational, managerial, and regulatory interventions. The interventions are being applied after considering the availability of expertise and capacity of pharmacies to dispense safe and appropriate medicines in their communities. Although changing knowledge, behavior, and practices is a slow and difficult process, it is possible to achieve improvements in public, private, and even in resource-deprived settings. The literature suggests that the majority of dispensers are willing to learn and contribute to rational dispensing and have expressed the need for training [12, 13]. The incentives reported for the dispensers to participate in interventions were: increased knowledge, increased ability to help their own families, improved social status, and improved profits [14]. Methods to evaluate the impact of interventions include community baseline and follow-up surveys, pre- and post-training knowledge and practices (simulated visits), and consumer satisfaction.

It is well known that private pharmacies also play a substantial role in the diagnosis and treatment of TB. However, the link between private pharmacies and the public sector in TB control is still underdeveloped [15]. The process can be strengthened by engaging community pharmacies, which are often the first point of contact by a person with a cough, mild fever, and associated symptoms. Productive cough of more than three weeks can be used as a cut-off value by pharmacists and alternative practitioners for referring the suspects to a DOTS center. Such measures can considerably improve the yield of contact tracing and may consequently result in the gradual decrease in the incidence of TB [16]. A study conducted in Malaysia reported that cough and cold preparations are the most common self-medicated medicines, followed by analgesics and gastrointestinal preparations. Most of the participants in this study purchased medicines from pharmacies, indicating that the high cost of doctors'

visits, long wait times at hospitals, and the availability of affordable medicines led them to alternative ways to access medications for their minor illnesses [17]. In view of the current practices of Malaysians and the strong relationship between cough and TB, the study's authors were of the opinion that pharmacists should be actively involved in active case finding for TB. Staff at pharmacies should be trained to identify TB suspects complaining of cough and mild fever, which are indeed the leading causes of self-medication in the community [16]. These suggestions are consistent with recommendations of the WHO paper on the role of the pharmacist as a health promoter, in terms of his/her participation in health screening programs to identify those at risk in the community [18].

On the other hand, studies conducted in Vietnam have shown that private pharmacies were the most important cause of delays in diagnosing TB and initiating TB treatment [19-23]. One of the reasons suggested was the prescription by private pharmacies for suspected TB patients instead of a referral to the designated health facilities for diagnosis. However, it is not clear whether private pharmacies are unable to identify TB suspects or unwilling to refer them. Furthermore, factors that affect the performance of health care providers (HCP) in private pharmacies are unknown [24].

The results of another study conducted in Ho Chi Minh City (HCMC), Vietnam, reported that, on average, 1,100 to 3,400 people buy anti-TB medicines each month from the 1,814 registered private pharmacies in HCMC. About one-quarter of them do so without a prescription. At least 40% of all anti-TB medicine dispensing in HCMC occurs in the private sector. The study also highlighted the need for implementation of regulations and strengthening collaboration between the NTP and the disorganized private sector to improve current practices [24].

Overcoming long-held perceptions and improving communication between the public and private sectors will be crucial to expanding access to quality care [25]. Many studies have concluded that NTPs should take the initiative in opening discussion pathways with all providers, and that adequate resources should be devoted to this task [20, 26-28]. Dissemination of treatment guidelines to all health care providers may help initiate this process. Intersectoral collaboration has been a tested strategy in many HBCs between 1998 and 2009 through PPM-DOTS and community-based DOTS interventions [29]. However, progress has been slow and with variable success. A study reported that the dissemination of consumer educational materials through primary health care providers may serve to raise patient awareness of TB standards of care [24]. The study findings indicated the positive impact of messages through mass media, but it also suggested that the NTP can improve targeted information and establish closer linkages with private pharmacies, to strengthen them as a link in the referral chain. However, a potential obstacle highlighted in such efforts may be that pharmacists and private physicians may perceive the NTP as a competitor, threatening to take over their share of the TB patient market by providing free medicines [29]. Studies also surveyed provider attitudes about NTP guidelines and the adoption of DOTS protocols by clinics, pharmacies, and practices. A study in India reported that community pharmacists were willing to collaborate without financial incentive, believing it was their public health duty to contribute to TB control. Access to training and education were considered valuable incentives, and collaboration with a public health program was perceived to add significantly to professional status and reputation [29]. Another study from India showed that training community pharmacists through collaborative NTP/professional association workshops can provide convenient access to TB education for primary health care providers [30].

Linking trained private providers to NTPs through context-specific collaborative models can be effective in delivering standard quality care, particularly in case detection, referral, and treatment monitoring [31]. The National Health Strategic Plan for Tuberculosis Control in the Kingdom of Cambodia, 2006–2010, prioritized strategies for intensified case detection and provision of universal access to public sector health care. Having collaborated with registered private sector pharmacies on other public health projects, the Ministry of Health was proactive in engaging with private sector pharmacies to decentralize TB services to the primary health care level. The program promoted pharmacy-initiated assessment and referral of people with TB symptoms to public sector DOTS centers providing free diagnosis and treatment. Pharmacies registered with the Government’s health department elected to join the referral program. These pharmacies provided patients with information, counselling, and referral documentation. The policy of the National Center for Tuberculosis and Leprosy Control (CENAT) prohibited the pharmacies from selling anti-TB medicines to patients. About 1,200 pharmacies nationwide provide the service, including almost 500 pharmacies in the capital city, Phnom Penh. Pharmacies pay no fee to join the program nor do they receive any fee-for-service from either the government or patients. This collaborative model was considered a success because about 9% of TB cases are identified through pharmacy-initiated referral in Cambodia [32]. Similarly, the integration of TB programs into the primary health care network had very positive effects in China [33]. Research related to pharmacy-initiated referral services is limited. But the collaborative NTP and community pharmacy models in Cambodia and China provide substantial evidence for using pharmacies, which are described as a neglected link and underused resource in TB control.

STRUCTURE AND HEALTH ADMINISTRATION OF HEALTH SERVICES IN PAKISTAN

Country Background

Demographics

Pakistan is the sixth most populous country in the world, with a population currently estimated at approximately 158 million people, 66% of who live in rural areas. Pakistan is administratively divided into five provinces, namely, Punjab, Sindh, Khyber Pakhtunkhwa, Gilgit, and Balochistan. The population of Pakistan is unevenly distributed, with 78.6% clustered in the eastern provinces of Punjab and Sindh. Although it is the largest province, with about 44% of the total land area, Balochistan has only 5% of the population [34].

Economic, Social, and Health Indicators

The gross national income (gross domestic product plus net income received from overseas) per capita in Pakistan is greater than that of other low-income countries (USD 1,360 in 2013). Nevertheless, about one-third (29.2%) of the population, about 45 million people, live below the official national poverty line. According to the 2012 Pakistan Demographic and Health Survey, 50% of urban residents are in the highest wealth quintile, as compared to only 5% of rural residents. Residents of the Islamabad Capital Territory are more likely to fall in the highest wealth quintile (69%) compared to people living in other regions. By contrast, Gilgit Baltistan, Balochistan, and Sindh have the highest proportions of residents in the lowest wealth quintile (50%, 44%, and 32%, respectively). Pakistan has very low levels of literacy; the national adult literacy rate in 2005 was only 54.9%. The literacy rate is lower in females living in rural areas. The majority of the population (61%) has no access to good quality drinking water. This problem is more severe in rural areas, where only 23% of people have access to tap water. Approximately 19% of the population and 30% of children under the age of five are malnourished. Communicable diseases are the most prevalent and principal causes of sickness and death in Pakistan, and comprise gastroenteritis, respiratory infections, congenital abnormalities, TB, malaria, and typhoid fever [35].

Structure of the Health Sector

The health care system is very well structured in Pakistan; however, one cannot overlook some inherent issues typical of many other developing countries. The public sector, which is responsible for providing health services to the masses, is assisted by the government. The private sector functions in parallel, with a more commercial approach. Health care expenditure by the government is low, at about 3.2% of GDP, which is less than other countries that have the same socioeconomic conditions, such as Bangladesh and Sri Lanka. For health expenditure in Pakistan, 78% is out of pocket. Health care provision is decentralized in the public sector and is predominantly the responsibility of governments at the provincial level. The central Ministry of Health looks after national policy, planning, coordination, and enactment of the six national health programs on immunization, family planning, TB, HIV and AIDS, malaria, and nutrition. There is a shortage of qualified and trained staff, essential medicines, and medical and other supplies in most public health facilities. Therefore, patients periodically seek medical care in the private sector. This in itself is a reflection that 86.8% of the health care cost is out-of-pocket expenditure in Pakistan [42]. The health care system is largely urban oriented, with private sector health facilities mainly

concentrated in urban areas, making it difficult for the rural poor to access and afford. Patients have to seek health care in the private sector or alternative sources (herbalists, *hakeems*), as observed in the latest Pakistan Social and Living Standards Measurement Survey [36].

Pharmaceutical Sector

The National Drug Policy of 1997 promotes the essential medicine concept and the use of the National Essential Drug List (NEDL) 2003, for example, by mandating that all government and semi-government health institutions conduct bulk procurement in accordance with the NEDL. However, there is poor adherence to this list in the actual provincial or district procurement practice. Pakistan has a rapidly growing pharmaceutical industry with a market value of approximately USD 1.72 billion. It consists of nearly 400 local manufacturing companies, including 30 multinationals, which are meeting around 95% of the country's pharmaceutical requirements. Pakistan also exports pharmaceuticals regionally and worldwide. The number of currently registered pharmaceutical formulations exceeds 45,000. The price of medicines plays an important role in improving access to medicines. Unfortunately, pricing had been a problematic issue for quite some time in the country. A recent pricing analysis on the Health Action International's website confirmed this viewpoint. The analysis shows that the prices of some of the branded medicines, such as ciprofloxacin, atenolol, and acyclovir, are very high when compared to the international reference prices. Even the generic price for ciprofloxacin, which is a commonly used antibiotic, was also found to be high. This finding is especially important when 77% of the pharmaceutical expenditures are out of pocket [37].

Statistics on Human Capital/Workforce

The key health care players are physicians, nurses, dentists, pharmacists, and pharmacy assistants. Their numbers are as follows:

- Physicians: 149,201
- Nurses: 76,244
- Dentists: 10,958
- Pharmacists: 8,102
- Pharmacy assistants: 31,000

The number of health care providers is quite low vis-a-vis Pakistan's population. There is one doctor for every 1,206 people; one dentist for every 16,426 people; one nurse for every 2,360 people; and one pharmacist for every 22,216 people. Medical doctors are dominant in the system, holding major administrative and decision making positions in the health sector [9]. There are 8,102 pharmacists who are categorized as A category (license of premises granted to a qualified person having a degree of B-Pharm/Pharm-D, i.e., a pharmacist), and 31,000 pharmacy technicians categorized in the B (license of premises granted to a qualified person having a diploma in pharmacy, i.e., pharmacy assistant) and C (license of premises granted to a person having a certificate of course completion in medicine dispensing, i.e., diploma holder) categories. There are over 65,000 community pharmacies in the country. Assuming that all of the available pharmacists and pharmacy technicians were employed by the community pharmacies, there would be a very significant number of pharmacies without a qualified person on staff throughout the county. In reality and according to the Pharmacy Council of Pakistan (PCP), 70% of pharmacists are employed in the pharmaceutical industry, while only 10% work at community pharmacies. There are over 30 pharmacy institutions in

the country, which graduate 2,587 pharmacists annually [12]. The current number of pharmacists does not meet current demand or the growing need for optimal health care delivery to the population.

The Pakistan Pharmacists Association is responsible for the growth of the pharmacy profession, and the National Association of Pharmacists (NAP) endorses the role of the pharmacist in public health and patient care. In most countries, patients can seek health care in either the public or private sector. There is a clear dichotomy of the health care system in Pakistan, with the public sector financed by the state and the private sector working independently for profit. As noted above, the Government of Pakistan spends less than 1% on health care, even lower than in Bangladesh and Sri Lanka. Despite this, some health indicators have been improving, such as immunization coverage and knowledge of family planning. Factors that have slowed progress in health indicators include the large segment of the population that lives in rural areas (66%), high poverty and illiteracy, the low status of women, and inadequate water and sanitation facilities [17].

In South Asia, the size of household out-of-pocket expenditure on health is at times 80% of the total amount spent on health care per annum. The economic ability of the population in Pakistan to use health services is not very different. As noted above, in Pakistan, 86.8 % of total health expenditures are out of pocket [42]. This fact determines the ability of an individual or a family to satisfy their need(s) for health care. Out-of-pocket costs have undoubtedly been a major barrier to people seeking appropriate health care in Pakistan. This complexity is reflected in current health-seeking behavior, including the use of home prescriptions and self-medicating with medicine borrowed from a neighbor or purchased from a chemist shop.

Despite the network of health services in Pakistan's public sector and a plethora of private sector initiatives, 45% of the population still lacks access to health services. The physician to population ratio is 57 per 100,000 people, as compared to 85 in Iran or 311 in developed countries, like Sweden. As noted above, to meet health needs and reduce personal costs, people rely on alternative health care systems, such as chemists, traditional medicine practitioners, faith healers, and homeopaths. Large gaps in the formal health sector encourage self-medication. Hence, the knowledge and practices of medicine sellers are critically important in Pakistan. There are estimated over 65,000 retail and wholesale medicine outlets in Pakistan (for a population of 145 million). However, only about 1,000 individuals per annum graduate with a Bachelors of Pharmacy, of which only 10% are working at community pharmacies. This translates to very few qualified personnel available to staff these outlets. The majority of medicine stores, therefore, have persons with little or no professional training. If one truly wants to make a large-scale impact on rational medicine use in Pakistan, dispensing practices in the private sector must be addressed [9, 19].

TB Epidemiology in Pakistan

Pakistan ranks fifth among the HBCs in the world [20]. The prevalence of bacteriologically (sputum-smear and culture) confirmed pulmonary TB was estimated at 361 per 100,000 persons (with a 95% confidence interval [CI] of 308-414/100,000), while the prevalence of smear positive TB was estimated at 341 per 100,000 (95% CI, 285-402) in 2015 repor. These figures are in the range of the rate previously estimated by WHO in 2011 (350/100,000, 95% CI 158-618), but with a much narrower CI. Of the 315 TB culture-positive persons, 7.6%

were on treatment for TB at the time of enrollment in the survey. Based on the number of notifications reported by the NTP, the estimated case detection rate was 62%. This means that only 62% of the patients with pulmonary TB were notified to the NTP within a period of one year.

TB Control Program in Pakistan

The first survey was carried out in 1962. The results triggered a collaborative effort among the Ministry of Health, WHO, and UNICEF for a twenty-year TB control program that focused on establishing specialized TB centers and special TB wards at the District Headquarters (DHQ) Hospitals. In 1985, UNICEF withdrew its financial support. WHO declared TB a global emergency in 1993 and the Government of Pakistan endorsed the DOTS strategy. In 1994, the Ministry of Health, in collaboration with WHO revised the TB control policy. National policy and technical guidelines were drafted. In 1995, the Ministry of Health decided on the location of five DOTS pilot sites, but only one site became operational. A highly centralized and vertical five-year development plan was prepared by the Federal NTP. Since the provinces expressed certain reservations about the plan, it was not approved. In 1996, the Directorate for TB Control of Pakistan was abolished and the Medical Superintendent of the TB Centre in Rawalpindi was made responsible for the NTP, without any additional support. In 1998, Pakistan was declared one of the 16 countries without an appropriate NTP. Recently, it was decided that each province would be responsible for planning and managing its own NTP under Federal NTP guidelines. Funding for the plans will be provided through the Second Social Action Program Project (SAPP II) comprehensive district health care system [38].

Programmatic reforms in Pakistan's health sector over the years have improved public health services through better targeting of populations, funds, and services. The TB Control Program is one example. Recently, there has been an effort on the part of provincial health departments to introduce structural and management reforms in the health sector to improve the efficiency of service delivery and resource development. Interest in the control of TB has been further renewed through a recent policy initiative to strengthen primary health care (PHC) services through an integrated approach. With its multi-donor support, the SAPP II has also pushed TB high on the agenda, and the program priorities of Provincial Health Departments have been redefined [39].

By 2005, Pakistan had achieved near universal DOTS coverage in the public sector, and in 2006, a five-year federal work plan was approved that included support for the expansion of PPM activities for TB control. By 2010, the NTP had engaged four non-profit organizations to implement PPM DOTS pilot projects in 30 districts. Additionally, the NTP initiated the "hospital DOTS linkage" as a PPM strategy to enhance laboratory services, introduce standardized treatment, and develop a referral system between hospitals and DOTS treatment centers. This program has been implemented in approximately 40% of public and private tertiary care hospitals. By 2009, data showed a 50% increase in case notifications in districts in which the DOTS linkages had been introduced [3].

TB Control Policy

The major objectives of the national TB control policy are:

- To increase the number of notified TB cases from 298,981 in 2013 to at least 420,000 by 2020 while maintaining the treatment success rate at 91%.
- To reduce, by at least 5% per year by 2020, the prevalence of MDR-TB among TB patients who have never received any TB treatment.
- To strengthen programmatic and operational management capacity of the TB Control Program while enhancing public sector support for TB control by 2020.

Federal Role in the NTP

The role of the federal level in the NTP is to provide the policy framework, technical assistance, supervision, surveillance, coordination, research and development, and advocacy.

Provincial Role in the NTP

The role of the provincial level is to plan, access funds, manage the NTP, and implement DOTS through integration of these activities within the PC-1 (planning commission tool for the development projects).

Standard Treatment Guidelines for TB in Pakistan

The standard treatment guidelines (STGs) propose short-course chemotherapy for all sputum-positive cases for a duration of eight months. The guidelines distinguish three main categories of patients:

- Category I patients are new acid-fast bacilli (AFB) smear positive cases.
- Category II refers to smear positive retreatment cases and failures after a full short chemotherapy course.
- Category III refers to sputum smear negative and extra-pulmonary cases and to children who are unable to produce sputum.

The recommended treatment strategies for these three categories are described in table 1.

Table 1. National TB Treatment Strategy

Category of patients	Treatment	
	Intensive phase	Continuous phase
I	2 HRZE (or 2 HRZS)	6 HT (or 6HE)
II	2 HRZES	1 HRZE + 5 HRT
III	2 HRZ	6 HT (or 6HE)

H: isoniazid; R: rifampicin; E: ethambutol; S: streptomycin; Z: pyrazinamide; T: thiacetasone

Note: Figure in front of the treatment schedule refers to the number of months the medicine is given.

Problem Statement

It is universally accepted that a partially treated TB patient is worse than an untreated one because the chronic cases are the ones who excrete multidrug-resistant organisms and increase the community burden of TB. Partial treatment with inappropriate regimens, in terms of dosage and duration, is probably the most important factor leading to the rise in MDR-TB

in Pakistan. TB detection and diagnosis are generally based on X-ray, clinical impression, and blood examination rather than on sputum examination. Some clinicians rely on Mantoux results, although the tuberculin skin test is rarely available [40]. Active case detection suffers from a chronic lack of resources, especially those of widely available trained laboratory technicians and X-ray facilities. The treatment of cases is often inadequate and inappropriate owing to the lack of training of health care workers, scarcity of medicines in health care facilities, absence of control of medicine sales, and hence, over-the-counter sales and self-medication by patients and widespread lack of patient compliance with therapy [41].

The NTP commissioned a study within the broader context of the public-private mix (PPM) engagement for retail pharmacies in areas where there are ongoing activities under the pilot project in six major cities. The goal is to increase early case detection and referral by pharmacies to TB treatment centers. As the project took off, the NTP has been planning to introduce a bill/statute that would require mandatory TB reporting (which will significantly affect retail pharmacies). Another objective is to make TB medicine sales prescription-only. It is far from clear how and when these two major policy changes will be implemented. The NTP has also begun to discuss the idea of pharmacies being DOTS centers (pending results from the pilot project), given that pharmacies in Pakistan legally stock and sell all TB medicines. This situation calls for in-depth research on effective NTP and community pharmacy collaborative models to promote active case detection and appropriate treatment, which can lead to improved patient compliance and control of TB in Pakistan.

Rationale of the Study

As part of the ongoing pilot project that has engaged about 500 retail pharmacies in six cities (Islamabad, Rawalpindi, Lahore, Peshawar, Karachi, and Sukkur) in early TB case detection and referral, NTP stakeholders have discussed the possibility of pharmacies providing DOTS for clients who come to purchase TB medicines. This presents both a huge opportunity and many challenges. Pharmacies already stock and sell TB medicines, however, little is known about TB prescriptions received at the pharmacies and whether they follow the recommended NTP treatment regimen. Which TB medicines are sold when a TB patient comes without a prescription? These are some of the issues and questions that need to be studied to understand how pharmacies could be effective DOTS providers. Pharmacy DOTS could offer an opportunity to appropriately dispense TB medicines for confirmed TB cases who present at their counters with a prescription by following the NTP treatment guidelines. The pharmacy would provide counselling, education, and awareness-raising to patients and their families, including counselling them to adhere to DOTS. As the NTP expands TB prevention and care in the retail pharmacies, the use of routinely collected TB medicine sales and price data from the private sector may be of use for programmatic decision making. This study will explore thematic areas that will be useful for NTP decision making.

Study Objectives

- To evaluate knowledge, perceptions, dispensing practices, and adherence of dispensers to standard NTP guidelines.
- To evaluate case management of TB patients at community pharmacies.
- To analyze patterns of TB medicine sales by volume, brand, and price at community pharmacies.

Study Questions

Dispensing and Counselling Practices/TB Medicine Sales

1. What is the pattern and profile of prescriptions for TB medicines presented at the pharmacies?
2. Have clients coming to the pharmacies been on regular medicines or do they interrupt their treatment?
3. What are the commonly prescribed anti-TB medicines (generics/brands)?
4. Do dispensers know the correct dosages of anti-TB medicines?
5. How much does it cost for a full course of TB treatment in the private sector?
6. Do pharmacy staff counsel on the importance of other close family members being tested/evaluated for TB?
7. Do pharmacy staff take medical history from the client?
8. Do pharmacy staff counsel clients on the correct use/adherence to the prescription?
9. What does the sale of TB medicines in pharmacies tells us about the profit margin?

Clients Seeking TB Medicines- Behavior

10. Do clients bring a prescription every time or just the first time?
11. What happens at the follow-up purchase? Is it based on an empty medicine pack or do patients recall the medicine name?
12. When and how often do patients switch to seek treatment elsewhere?
13. What is the pattern and profile of prescriptions for TB medicines presented at the pharmacies?

METHODOLOGY

Study Design

A comparative cross-sectional study design was used to evaluate the barriers and opportunities for retail pharmacies to be effectively engaged as DOTS centers in Pakistan by using a structured questionnaire, mystery clients/ simulated patients, and a review of retrospective sales data as data collection methods.

Study Setting

The study included retail pharmacies in Rawalpindi and Islamabad:

(A) Part of the pilot project:

- Completed classroom training
- On-the-job training
- Signed memorandum of understanding (MOU) under the pilot

(B) Not part of the pilot project (and have neither been trained nor signed an MOU) but are operating in the study area.

Study Respondents and Data Sources

The study population included retail pharmacy outlets located in Islamabad and Rawalpindi that were selling anti-TB medicines, including those that were part of the pilot project and those that were not part of the pilot project. Any shop meeting this definition constituted the sampling unit. The sampling element included medicine sellers and simulated patients/customers visiting these pharmacies.

Sampling

Due to the availability of a probability framework, a simple random technique was used to draw the sample from the list of retail pharmacies obtained from the respective District Health Offices and the NTP. A total of 170 pharmacies were included in the study; 96 pharmacies in Rawalpindi were included in each group (i.e., trained under the pilot and not trained), and 28 pharmacies in Islamabad were included in each group (i.e., trained under the pilot and not trained) (table 2).

Table 2. Sample Distribution of Respondents in Selected Cities of Pakistan

Respondents	Settings				Total
	Islamabad		Rawalpindi		
	Trained	Not Trained	Trained	Not Trained	
Pharmacies	28	28	96	96	248
Pharmacists/ Dispensers	28	28	96	96	248
Simulated Patients/Customers (3 scenarios/pharmacy; the scenarios are described below)	84	84	288	288	744

Data Collection Tools

A semi-structured questionnaire and simulated patient visit form were used to collect data (table 3), as follows:

- A semi-structured questionnaire was used to get information on research questions 1-9.
- Simulated patient visit forms were used to get information on research questions 10 and 11 at the pharmacies.
- International Marketing Survey (IMS) data were used to get information on research questions 12 and 13 at the pharmacies.

Table 3. Data Collection Tools

Tools	Respondents	Sample	Objectives
Semi-structured questionnaire	Dispenser	248	To evaluate knowledge, perceptions, and adherence of dispensers to standard NTP guidelines.
			To evaluate dispensing practices for TB medicines at community pharmacies.
Simulated patient visits (3 scenarios/ pharmacy)	Dispenser	744	To evaluate TB case management. Patients at retail pharmacies.
IMS data	-----	-----	To analyze patterns of TB medicine sales by volume, brand, and price at retail pharmacies.

Data Collection Method and Procedure

As noted above, to select the sample unit—a pharmacy—a simple random sampling method was used. In recognition of the socio-cultural diversity of the region, local data collectors were used. The data collectors were students in their final year of the Doctor of Pharmacy program. They visited the pharmacies during off-peak hours. The data collectors asked for the superintendent, or in the case of trained pharmacies, the salespersons/dispensers who had attended training. If both were not available, then a convenient sampling method was used to identify dispensers who were willing to respond to the questionnaire. The structured questionnaires were completed at the respective pharmacies (Annex A). For the selection of the patient-dispenser interaction, a convenience sampling technique was used and the simulated patient visit forms were completed after the visits to the pharmacies (Annexes B, C and D). The three scenarios described below were used for the mystery clients.

Scenario I. Proper and Complete Prescription

A male or female TB patient presents with a proper and complete prescription for a two-month intensive course of TB treatment according to the NTP guidelines. Issues examined under this scenario included: Did the dispensers recognize the prescription as correct and proper? Did they dispense it as is or did they try to change it? Did they counsel on the importance of contact tracing? Did they counsel/emphasize on not interrupting the treatment?

Scenario II. Incomplete and Improper Prescription

A male or female TB patient presents with a prescription that is not complete and the treatment regimen is not according to the NTP guidelines. Issues examined under this scenario included: Did the dispensers recognize the prescription as not proper and incomplete? Did they change it or ask the patient to go back to the prescribing doctor? Or did they go ahead and dispense anyway?

Scenario III. Missed Dose Prescription/Scenario

A male or female patient who was on treatment in the intensive phase presents at the pharmacy and states that he/she has missed his or her treatment for a whole month and now requests to purchase medicines and resume treatment. Issues examined under this scenario included: Did the pharmacy advise him/her to go back to the prescriber for proper advice or did the dispenser go ahead and sell the medicines that were discontinued a month ago?

Data Analysis

To ensure quality control, completed questionnaires were screened daily. Following this, the data were cleaned, coded, and entered into SPSS version 16. Screening of the data was carried out to ensure correct entry by running frequencies. Descriptive statistics were generated to determine the distribution patterns. Skewness tests were performed and histograms with normal curves were made to check the normal distribution of data. Data were analyzed using SPSS.

RESULTS

Knowledge and Perceptions of Dispensers Regarding Adherence to Standard Treatment Guidelines for TB

Knowledge of Dispensers Regarding Management of TB

The knowledge of dispensers working at trained and untrained pharmacies in Islamabad and Rawalpindi regarding management of TB was adequate. Most of them were aware of the symptoms of TB, anti-TB medicines, and the duration of the intensive and continuous phases for new and retreatment cases. A detailed description of the knowledge of dispensers regarding management of TB, including the standard treatment regimens, is given in table 4.

Table 4. Knowledge of Dispensers Regarding Management of TB in the Twin Cities

	Islamabad		Rawalpindi		Composite	
	Trained Pharmacies	Untrained Pharmacies	Trained Pharmacies	Untrained Pharmacies	Trained Pharmacies	Untrained Pharmacies
	Yes n (%)	Yes n (%)	Yes n (%)	Yes n (%)	Yes n (%)	Yes n (%)
Coughing, weight loss, and blood in sputum are the typical symptoms of a TB patient.	28 (100)	28 (100)	92(95.8)	81 (84.4)	120 (96.7)	109 (87.9)
2-month intensive phase + 4-month continuous phase are the correct course durations of anti-mycobacterial agents for the treatment of a newly diagnosed case of TB.	28 (100)	21 (75)	81 (84.4)	70 (72.9)	109 (87.9)	91 (73.3)
3-month intensive phase + 5-month continuous phase are the correct course durations of anti-mycobacterial agents for are treatment case of TB.	16 (57.1)	12 (42.9)	61(63.5)	32(33.3)	77 (62.1)	44 (35.5)
2 months of HRZE+ 4 months of HR are the best anti-mycobacterial options in the intensive and continuous phases for the treatment of a newly diagnosed case of TB.	24 (85.7)	21 (75)	84(87.5)	53(55.2)	108 (87.1)	74 (59.7)
2 months of HRZES +1 month of HRZE + 5months of HRE are the best anti-mycobacterial options in the intensive and continuous phases for are treatment case of TB.	16 (57.1)	12 (42.9)	63(65.6)	27(28.1)	79 (63.7)	39 (31.5)

Dispensing Practices for Management of TB at Community Pharmacies

The most commonly prescribed anti-TB medicine combinations dispensed were: Myrin (ethambutol HCl 300 mg, INH 75 mg, rifampicin 150 mg); Myrin-P (ethambutol 225 mg, rifampicin 120 mg, isoniazid 60 mg, pyrazinamide 300 mg); Myrin-P Forte (ethambutol 275 mg, rifampicin 150 mg, isoniazid 75 mg, pyrazinamide 400 mg); and Vita-6 (pyridoxine) at trained (21.4%, n=6) and untrained (28.6%, n=8) pharmacies in Islamabad (table 5). The same medicine combinations of Myrin, Myrin-P, Myrin-P Forte, and Vita-6 were dispensed at trained (24%, n=23) and untrained (43.8% %, n=42) pharmacies in Rawalpindi. The client sometimes brings the prescription at trained (65.6%, n=63) and untrained (62.5%, n=60) pharmacies in Rawalpindi (table 5). The most common reason for a patient interrupting treatment was the cost of the medication at trained (71.4%, n=20) and untrained (89.3%, n=25) pharmacies in Islamabad. The cost of the medication was also the most common reason for an interruption in treatment among patients who presented at trained (59.4%, n=57) and untrained (41.7%, n=40) pharmacies in Rawalpindi. The patients were counselled regarding their treatment regimen at trained (89.3%, n=25) and untrained (67.9%, n=19) pharmacies in Islamabad, while counselling of patients regarding their treatment regimen was reported in trained (78.1%, n=75) and untrained (64.6%, n=62) retail pharmacies in Rawalpindi (table 5). Additional details regarding dispensing practices for the management of TB at retail pharmacies are given in table 5.

Table 5. Dispensing Practices and Patient Counselling for Management of TB at Community Pharmacies in the Twin Cities

Indicator		Islamabad		Rawalpindi	
		Trained Pharmacies n (%)	Untrained Pharmacies n (%)	Trained Pharmacies n (%)	Untrained Pharmacies n (%)
Anti-TB medicine combinations	Myrin, Myrin-P, Myrin-P Forte	9 (32.1)	10 (35.7)	14 (14.6)	19 (19.8)
	Myrin, Myrin-P, Myrin-P Forte, Vita6	6 (21.4)	8 (28.6)	23 (24)	42 (43.8)
	Myrin, Myrin-P, Myrin-P Forte, Rimectal	5 (17.9)	3 (10.7)	21 (21.9)	7 (7.3)
	Rimstar, Rim3, Rimectal, Vita 6, Myrin-P Forte	0	3 (10.7)	5 (5.2)	10 (10.4)
	Myrin-P, Rimectal, Vita 6	0	1 (3.6)	12 (12.5)	4 4.2)
	Vita 6, Cibagay, Myrin-P Forte, Rimectal	5 (17.9)	1 (3.6)	6 (6.3)	6 (6.3)
	Rimectal, Myrin, Rimstar	3 (10.71)	2 (7.1)	15 (15.6)	8 (8.3)
In your experience, do the clients bring prescriptions?	Always	5 (17.9)	7 (25)	27(28.1)	29(30.2)
	Sometimes	23 (82.1)	21 (75)	63 (65.6)	60 (62.5)
	First time only	0	0	6 (6.3)	7 (7.3)
In your experience, what is the most common practice among TB patients/clients coming to your pharmacy?	Buy/purchase all the medicine in the prescription for the duration of the treatment	5 (17.9)	2(7.1)	7 (7.3)	19 (20)
	Break the prescription into more than one purchase	7 (25)	17 (60.7)	17 (17.7)	8 (8.3)
	I see both patterns	16 (57.1)	6 (21.4)	72 (75)	69 (71.9)

Indicator		Islamabad		Rawalpindi	
		Trained Pharmacies n (%)	Untrained Pharmacies n (%)	Trained Pharmacies n (%)	Untrained Pharmacies n (%)
If they do break the treatment, do you know what the usual break time is?	One week	21 (75)	24 (85.7)	63 (65.6)	60 (62.5)
	Two weeks	4 (14.2)	3 (10.7)	27 (28.1)	29 (30.2)
	One month	3 (10.7)	1 (3.6)	6 (6.3)	7 (7.3)
If they do break the treatment, do you know why?	Due to symptomatic relief	0	1 (3.6)	13 (13.5)	13 (13.5)
	Due to cost of medications	20 (71.4)	25 (89.3)	57 (59.4)	40 (41.7)
	Due to side effects	0	0	11 (11.5)	10 (10.4)
	No comment	8 (28.6)	2 (7.1)	15 (15.6)	33 (34.4)
In your experience, why and how often do patients switch to seek treatment from one facility/doctor/clinic to another?	Ineffective treatment	4(14.3)	3(10.7)	7(7.3)	14(14.6)
	Patient not satisfied with doctor	9 (32.1)	17 (60.7)	20 (20.8)	19 (19.8)
	Physician did not change the treatment	3 (10.7)	2 (7.1)	50 (52.1)	34 (35.4)
	No comment	12 (42.9)	6 (21.4)	19 (19.8)	29 (30.2)
Do you counsel patients regarding their treatment regimen?	Yes	25 (89.3)	19 (67.9)	75 (78.1)	62 (64.6)
	No	3 (10.7)	9 (32.1)	21 (21.9)	34 (35.4)
Do you counsel patients on the importance of other close family members being tested/evaluated for TB?	Yes	24 (85.7)	8 (28.6)	65 (67.7)	40 (41.7)
	No	4(14.3)	20(71.4)	31(32.3)	56(58.3)
What usually happens at the follow-up purchase?	1. Patient presents with a prescription	6 (21.4)	4 (14.3)	21 (21.9)	20 (20.8)
	2. Patient presents with an empty medicine pack	0	2 (7.1)	38 (39.6)	16 (16.7)
	3. Patient recalls the name of the medicine and the amount purchased previously	1 (3.6)	0	9 (9.4)	24 (25)
	Both 1 & 2	5 (17.6)	6 (21.4)	2 (2.1)	1 (1.0)
	Both 2 & 3	0	1 (3.6)	2 (2.1)	0
	Both 1 & 3	8 (28.6)	9 (32.1)	0	0
	All three	8 (28.6)	6 (21.4)	23 (24)	35 (36.5)

Perceptions of Dispensers Regarding Management of TB at Community Pharmacies

Most of the dispensers were satisfied with currently available anti-TB medicines at trained (89.2%, n=25) and untrained (92.9%, n=26) pharmacies in Islamabad (data not shown). Most of the dispensers working at trained (57.1%, n=16) and untrained (78.6%, n=22) pharmacies in Islamabad stated that anti-TB medicines should not be sold as over-the-counter (OTC) medicines (table 6). In the view of most dispensers working at trained (34.3%, n=33) and untrained (32.4%, n=31) pharmacies in Rawalpindi, anti-TB medicines should not be sold as OTC medicines. Additional details concerning the perceptions of dispensers regarding the management of TB at community pharmacies are given in table 6.

Table 6. Perceptions of Dispensers Regarding Management of TB at Community Pharmacies in the Twin Cities

Indicator	Trained Pharmacies			Untrained Pharmacies		
	Strongly disagree + disagree n (%)	Neutral n (%)	Agree n (%) + strongly agree	Strongly disagree + disagree n (%)	Neutral n (%)	Agree n (%) + strongly agree
Islamabad						
In your opinion, should mandatory TB notification from pharmacies become a law?	0	3 (10.7)	25 (89.2)	0	2 (7.1)	26 (92.9)
In your opinion, if mandatory TB notification from pharmacies becomes a law, will it be beneficial?	0	1 (3.6)	27 (96.4)	1 (3.6)	0	27 (96.4)
Do you think it should be mandatory to keep records of all TB prescriptions?	5 (17.9)	14 (50)	9 (32.1)	11 (39.2)	7 (25)	10 (35.8)
Do you think TB medicines should not be sold as OTC medicines?	6 (21.4)	6 (21.4)	16 (57.1)	3 (10.7)	3 (10.7)	22 (78.6)
Rawalpindi						
In your opinion, should mandatory TB notification from pharmacies become a law?	23 (23.9)	11(11.5)	62 (64.6)	29 (30.2)	27(28.1)	40 (41.7)
In your opinion, if mandatory TB notification from pharmacies becomes a law, will it be beneficial?	20 (20.8)	10(10.4)	66 (68.8)	16 (16.7)	35(36.4)	45 (46.9)
Do you think it should be mandatory to keep records of all TB prescriptions?	42 (43.7)	16(16.7)	38 (39.6)	44 (45.8)	22(22.9)	30 (31.2)
Do you think TB medicines should not be sold as OTC medicines?	54 (56.2)	9(9.4)	33 (34.3)	47 (48.9)	18(18.8)	31 (32.3)

Perceptions of Retail Pharmacy Respondents on the Role of the NTP in TB Management at Community Pharmacies

The trained pharmacies in Islamabad (71.4%, n=20) and Rawalpindi (78.1%, n=75) agreed that the involvement of pharmacies contributes to increasing case detection and that this is an effective step by the NTP, while untrained pharmacies located in Islamabad (7.1%, n=2) and Rawalpindi (41.7%, n=40) did not agree with this statement (table 7). Additional detailed information on the role of the NTP in TB management at community pharmacies is given in table 7.

Table 7. Role of the NTP in TB Management at Community Pharmacies in the Twin Cities

Indicator		Islamabad		Rawalpindi	
		Trained Pharmacies n (%)	Untrained Pharmacies n (%)	Trained Pharmacies n (%)	Untrained Pharmacies n (%)
Major problems faced in treatment of TB in Pakistan	Cost of treatment & duration of treatment	1 (3.6)	5 (17.9)	5 (5.2)	6 (6.3)
	Lack of awareness regarding TB & TB centers	14 (50)	9 (32.1)	19 (19.8)	8 (8.3)
	Availability of medicine	0	1 (3.6)	10 (10.4)	10 (10.4)
	Financial constraints	5 (17.9)	5 (17.9)	25 (26.0)	19 (19.8)
	Influence of environmental conditions and diet	0	1 (3.6)	12 (12.5)	24 (25)
	Patient compliance/ side effects of medicine	3 (10.7)	1 (3.6)	6 (6.3)	4 (4.2)
	Smoking/ literacy rate	4 (14.3)	3 (10.7)	6 (6.3)	17 (17.7)
	No comment	1 (3.6)	3 (10.7)	13 (13.5)	8 (8.3)
Do you think the involvement of pharmacies contributes to increasing case detection and that this is an effective step by the NTP?	Yes	20 (71.4)	2 (7.1)	75 (78.1)	40 (41.7)
	No	8 (28.6)	26 (92.9)	21 (21.9)	56 (58.3)
Have you received training from the NTP?	Yes, but no comment on the effectiveness of training	12 (42.9)	2 (7.1)	29 (30.2)	25 (26.0)
	Yes, and it has improved knowledge	3 (10.7)	0	9 (9.4)	3 (3.1)
	Yes, we feel confident in referring cases, but it would also be good to have free medicines made available at retail pharmacies	3 (10.7)	0	11 (11.5)	3 (3.1)
	Yes, and pharmacy referral form is a good initiative	2 (7.1)	0	20 (20.8)	5 (5.2)
	Yes, and it has increased public & patient awareness	0	0	6 (6.3)	4 (4.2)
	No comment	8 (28.6)	26 (92.9)	21 (21.9)	56 (58.3)

Scenario I: Proper and Complete Prescription

Background Characteristics of Pharmacies

Of the 248 retail pharmacies visited, 22.5 % (n=56) were located in Islamabad and 5.4 % (n=3) were part of chain pharmacies (not individually owned), while 77.4 % (n=192) of the retail pharmacies were located in Rawalpindi and 2.6 % (n=5) were part of chain pharmacies. The simulated patients were dealt with by a pharmacy salesperson in 75.8 % (n=188) of the visits, by a pharmacist in 5.2 % (n=13) of the visits, and by diploma holders in 19 % (n=47) of the visits. The mean dispensing time was 171.6 seconds (\pm 132.9, median=120 seconds), ranging from 1 to 15 minutes (10 to 900 seconds).

Management of and History Taking about TB by Dispensers Working at Community Pharmacies in the Twin Cities

The results from the history taking observation checklist showed that patients were not asked about their demographic data (age, weight), their past and present medical history (history [Hx] of illness, medical history), and compliance with their current medication regimen (current symptoms and side effects with the regimen) at trained and untrained pharmacies in Islamabad (table 8). On the other hand, patients in Rawalpindi were asked to provide information on age and weight in about 4.2% (n=4) and 3.1 % (n=3) of the visits to trained pharmacies, and in 1% (n=1) and 1% (n=1) of the visits to untrained pharmacies. In the visits to trained and untrained pharmacies in Islamabad, the treatment was recognized as correct in all the cases, while at the pharmacies located in Rawalpindi, the treatment was recognized as correct in 57.3 % (n=55) of the visits to trained pharmacies and in 86.5 % (n=83) of the visits to untrained pharmacies. The patient was not referred to a doctor and the same remedy was dispensed by all the trained and untrained pharmacies located in both Islamabad and Rawalpindi (table 8).

Table 8. Management of and History Taking about TB by Dispensers Working at Community Pharmacies in the Twin Cities

Indicator	Islamabad		Rawalpindi	
	Trained Pharmacies	Untrained Pharmacies	Trained Pharmacies	Untrained Pharmacies
	Yes n (%)	Yes n (%)	Yes n (%)	Yes n (%)
Inquired about the patient's age	0	0	4 (4.2)	1 (1.0)
Inquired about the patient's weight	0	0	3 (3.1)	1 (1.0)
Inquired about Hx* of illness	0	0	0	1 (1.0)
Inquired about Hx of medication	0	0	0	0
Inquired about medical history	0	0	0	0
Inquired about current symptoms	0	0	0	0
Inquired about improvement in symptoms	0	0	0	0
Inquired about duration of treatment	1 (3.6)	3 (10.7)	0	0
Inquired about side effects with regimen	0	0	0	0
Recognized the treatment as correct	28 (100)	28 (100)	55 (57.3)	83 (86.5)
Referred to doctor and did not dispense any remedy	0	0	0	0
Referred to doctor but dispensed same prescription	0	0	0	0

Indicator	Islamabad		Rawalpindi	
	Trained Pharmacies	Untrained Pharmacies	Trained Pharmacies	Untrained Pharmacies
	Yes n (%)	Yes n (%)	Yes n (%)	Yes n (%)
Referred to doctor but dispensed correct TB remedy	0	0	0	0
Didn't refer to doctor but dispensed new TB remedy not previously prescribed	0	0	0	0
Didn't refer to doctor and dispensed same remedy	28 (100)	28 (100)	96 (100)	96 (100)

*Hx = History

Provision of Advice and Type of Medicines Dispensed for Treatment of TB at Community Pharmacies in the Twin Cities

Medication was dispensed in 96.4 % (n=27) of the cases by the untrained pharmacies and in all (100%) of the cases by the trained pharmacies located in Islamabad (table 9). On the other hand, medication was dispensed in 45.8 % (n=44) of the visits to trained pharmacies and in 53.1% (n=51) of the visits to untrained pharmacies in Rawalpindi. The scores on the medication information checklist showed that the appropriate dose, frequency, and duration of medicine for the treatment of TB were communicated to customers in all cases at trained and untrained pharmacies in Islamabad and Rawalpindi. However, the correct use of the medicine and side effects were not communicated in any case, either at trained or untrained pharmacies located in Islamabad and Rawalpindi (table 9).

Table 9. Provision of Advice and Type of Medicines Dispensed for Treatment of TB at Community Pharmacies in the Twin Cities

Indicator	Islamabad		Rawalpindi	
	Trained Pharmacies	Untrained Pharmacies	Trained Pharmacies	Untrained Pharmacies
	Yes n (%)	Yes n (%)	Yes n (%)	Yes n (%)
Medicines dispensed due to availability	28 (100)	27 (96.4)	44 (45.8)	51 (53.1)
Dosage regimen was told by dispenser	8 (28.6)	3 (10.7)	13 (13.5)	11 (11.5)
Dosage regimen was communicated when asked	20 (71.4)	0	63 (65.6)	41 (42.7)
Advice given when prescription was dispensed as prescribed				
Correct name of medicine told	28 (100)	28 (100)	96 (100)	96 (100)
Correct dose of medicine told	28 (100)	28 (100)	96 (100)	96 (100)
Correct frequency of medicine told	28 (100)	28 (100)	96 (100)	96 (100)
Correct duration of medicine told	28 (100)	28 (100)	96 (100)	96 (100)
Correct use of medicine told	0	0	0	0
Correct side effects of medicine told	0	0	0	0

Scenario II: Improper and Incomplete Prescription

Management of and History Taking about TB by Dispensers Working at Community Pharmacies in the Twin Cities

The prescription was not recognized as incorrect in all the cases at the trained and untrained pharmacies located in Islamabad and Rawalpindi (data not shown). History regarding patient weight, illness, medication, current symptoms, improvement in symptoms, duration of treatment, and side effects were not inquired about in all the trained and untrained pharmacies in Islamabad and Rawalpindi. The patient was not referred to a doctor in all the cases at the trained and untrained pharmacies in Islamabad and Rawalpindi, and the same improper and incomplete prescription was dispensed in all cases presented at trained and untrained pharmacies in Islamabad and Rawalpindi.

Table 10. Provision of Advice and Type of Medicines Dispensed for Treatment of TB at Community Pharmacies in the Twin Cities

Indicator	Islamabad				Rawalpindi				
	Trained Pharmacies		Untrained Pharmacies		Trained Pharmacies		Untrained Pharmacies		
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	
Medicines dispensed due to availability	25 (89.3)	3 (10.7)	22 (78.6)	6 (21.4)	24 (25)	72 (75)	23 (24)	73 (76)	
Dosage regimen was told by dispenser?	0	28 (100)	0	28 (100)	0	96 (100)	0	96 (100)	
Dosage regimen was communicated when asked?	16 (57.1)	12 (42.9)	18 (64.3)	10 (35.7)	70 (72.9)	26 (27.1)	59 (61.5)	37 (38.5)	
Advice given when prescription was dispensed as prescribed									
Name of correct medicine told	Myrin-P	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
	Vitae-6	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
Name of incorrect medicine told	Moxiget	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
Correct dose of medicine told	Myrin-P	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
	Vitae-6	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
Dose of incorrect medicine told	Moxiget	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
Correct frequency of medicine told	Myrin-P	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
	Vitae-6	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
Frequency of incorrect medicine told	Moxiget	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)

Indicator		Islamabad				Rawalpindi			
		Trained Pharmacies		Untrained Pharmacies		Trained Pharmacies		Untrained Pharmacies	
		Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Correct duration of medicine told	Myrin-P	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
	Vitae-6	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
Duration of incorrect medicine told	Moxiget	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
Correct use of medicine told	Myrin-P	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
	Vitae-6	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
Use of incorrect medicine told	Moxiget	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
Correct side effects of medicine told	Myrin-P	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
	Vitae-6	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
Side effects of incorrect medicine told	Moxiget	25 (89)	3 (11)	25 (89)	3 (11)	24 (25)	72 (75)	23 (23.9)	73 (76.1)
Advice given when prescription was not dispensed as prescribed									
Correct name of medicine told		N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
Correct dose of medicine told		N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
Correct frequency of medicine told		N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
Correct duration of medicine told		N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
Correct use of medicine told		N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
Correct side effects of medicine told		N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D

Provision of Advice and Type of Medicines Dispensed for Treatment of TB at Community Pharmacies in the Twin Cities

Medications were not dispensed due to unavailability in 10.7 % (n=3) of the cases by trained pharmacies and in 21.4 % (n=6) of the cases by the untrained pharmacies located in Islamabad (table 11). On the other hand, medications were not dispensed due to unavailability in 75% (n=72) of the visits to trained pharmacies and 76% (n=73) of the visits to untrained pharmacies located in Rawalpindi. The dosage regimen was not communicated to the patient by the dispenser in all cases in both trained and untrained pharmacies located in

Islamabad and Rawalpindi. It was observed that the correct anti-TB medicines (Myrin-P and Vita-6) with the appropriate dose, frequency, and duration were dispensed to patients in 89.3% (n=25) of the cases at trained and untrained pharmacies in Islamabad, and the same was practiced in 26% (n=25) of all cases in trained and untrained pharmacies of Rawalpindi (data not shown). However, incorrect medicines, along with their dose, frequency, and duration were dispensed in 100% (n=28) of the cases at trained and untrained pharmacies in Islamabad and the same was reported in 100% (n=96) of the cases at trained and untrained pharmacies in Rawalpindi (data not shown). The use and side effects of both correct and incorrect medicines were not communicated to patients in 100% (n=28) of the cases in trained and untrained pharmacies in Islamabad, and the same was reported in 100% (n=96) of the cases in trained and untrained pharmacies in Rawalpindi (data not shown).

Table 11. Provision of Advice and Type of Medicines Dispensed for Treatment of TB at Community Pharmacies in the Twin Cities

Indicator	Islamabad				Rawalpindi			
	Trained Pharmacies		Untrained Pharmacies		Trained Pharmacies		Untrained Pharmacies	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Medicines dispensed due to availability	25 (89.3)	3 (10.7)	22 (78.6)	6 (21.4)	24 (25)	72 (75)	23 (24)	73 (76)
Dosage regimen was told by dispenser	0	28 (100)	0	28 (100)	0	96 (100)	0	96 (100)
Dosage regimen was communicated when asked	16 (57.1)	12 (42.9)	18 (64.3)	10 (35.7)	70 (72.9)	26 (27.1)	59 (61.5)	37 (38.5)

Scenario III: Missed Dose Prescription

Management of and History taking about TB by Dispensers Working at Community Pharmacies in the Twin Cities

The scores on the history taking observation checklist showed that the patient's age, weight, Hx of illness, medications, medical history, current symptoms, and any improvement in symptoms were not inquired about in any of the cases presented at trained and untrained pharmacies in Islamabad (table 12). On the other hand, medication history was inquired about in 97.9% (n=94) of the cases at trained and untrained pharmacies in Rawalpindi. Any experiences with side effects from the regimen were not inquired about at either trained or untrained pharmacies in Islamabad, and were only inquired about at 4.2% (n=4) and 2.1% (n=2) of the trained and untrained pharmacies, respectively, in Rawalpindi (table 12). Different patterns of referral were observed at trained pharmacies located in Islamabad, including: referred to a doctor but dispensed the same prescription (10.7%, n=3); did not refer to a doctor but dispensed the new prescription (14.3%, n=4); and did not refer to a doctor but dispensed the same prescription (75%, n=21). Patterns of referral observed at untrained pharmacies located in Islamabad included: referred to a doctor but dispensed the same prescription (10.7%, n=3); did not refer to a doctor but dispensed the new prescription (7.1%, n=2); and did not refer to a doctor but dispensed the same prescription (78.6%, n=22). On the other hand, referral patterns observed at trained pharmacies located in Rawalpindi included: referred to a doctor but dispensed the same prescription (1.0%, n=1); did not refer to a doctor

but dispensed the new prescription (34.4%, n=33); and did not refer to a doctor but dispensed the same prescription (50%, n=48). Referral patterns observed at untrained pharmacies in Rawalpindi included: referred to a doctor but dispensed the same prescription (6.2%, n=6); did not refer to a doctor but dispensed the new prescription (1.0%, n=1); and did not refer to a doctor but dispensed the same prescription (82.3%, n=79) (table 12).

Table 12. Management of and History Taking about TB by Dispensers Working at Community Pharmacies in the Twin Cities

Indicator	Islamabad				Rawalpindi			
	Trained Pharmacies		Untrained Pharmacies		Trained Pharmacies		Untrained Pharmacies	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Inquired about the patient's age	0	28 (100)	0	28 (100)	0	96 (100)	0	96 (100)
Inquired about the patient's weight	0	28 (100)	0	28 (100)	0	96 (100)	0	96 (100)
Inquired about Hx* of illness	0	28 (100)	0	28 (100)	0	96 (100)	0	96 (100)
Inquired about Hx of medication	0	28 (100)	0	28 (100)	94 (97.9)	2 (2.1)	94 (97.9)	2 (2.1)
Inquired about medical history	0	28 (100)	0	28 (100)	0	96 (100)	4 (4.2)	92 (95.8)
Inquired about current symptoms	0	28 (100)	0	28 (100)	0	96 (100)	0	96 (100)
Inquired about improvement in symptoms	0	28 (100)	0	28 (100)	7 (7.3)	89 (92.7)	6 (6.2)	90 (93.7)
Inquired about duration of treatment	9 (32.1)	19 (67.9)	9 (32.1)	19 (67.9)	6 (6.2)	90 (93.8)	14 (14.6)	82 (85.4)
Inquired about duration of discontinuation of treatment	17 (60.7)	11 (39.3)	18 (64.3)	10 (35.7)	43 (44.8)	53 (55.2)	65 (67.7)	31 (32.3)
Inquired about side effects with regimen	0	28 (100)	0	28 (100)	4 (4.2)	92 (95.8)	2 (2.1)	94 (97.9)
Referred to doctor and did not dispense any remedy	N.A	N.A	N.A	N.A	14 (14.6)	82 (85.4)	10 (10.4)	86 (89.6)
Referred to doctor but dispensed same prescription	3 (10.7)	25 (89.3)	3 (10.7)	25 (89.3)	1 (1)	95 (99)	6 (6.2)	90 (93.7)
Didn't refer to doctor but dispensed new remedy	4 (14.3)	24 (85.7)	2 (7.1)	26 (92.8)	33 (34.4)	63 (65.6)	1 (1)	95 (99)
Didn't refer to doctor and dispensed same remedy	21 (75)	7 (25)	22 (78.6)	6 (21.4)	48 (50)	48 (50)	79 (82.3)	17 (17.7)
Didn't refer to doctor and didn't dispensed any remedy	N.A	N.A	1 (3.5)	27 (96.4)	N.A	N.A	N.A	N.A

*Hx = History

Provision of Advice and Type of Medicines Dispensed for Treatment of TB at Community Pharmacies in the Twin Cities

Medication was dispensed in 100% (n=28) of the cases by trained pharmacies and in 96.4% (n=27) of the cases by the untrained pharmacies located in Islamabad (table 13). On the other hand, medication was dispensed in 85.4% (n=82) of the visits to trained pharmacies and in 89.6% (n=86) of the visits to untrained pharmacies in Rawalpindi. It was observed that the correct name of the anti-TB medicine, with the correct dose, frequency, and duration were told to patients in 85.7% (n=24) of the cases at trained and 92.8% (n=26) of the untrained pharmacies in Islamabad. On the other hand, the correct anti-TB medicine with the correct dose, frequency, and duration were told to patients in 85.4% (n=82) of the cases at trained and 89.6% (n=86) of the cases at untrained pharmacies in Rawalpindi. The use and side effects of medicines were not communicated to patients in any of the cases at either trained or untrained pharmacies located in Islamabad and Rawalpindi (table 13).

Table 13. Provision of Advice and Type of Medicines Dispensed for Treatment of TB at Community Pharmacies in the Twin Cities

Indicator	Islamabad				Rawalpindi			
	Trained Pharmacies		Untrained Pharmacies		Trained Pharmacies		Untrained Pharmacies	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Medicines dispensed due to availability	28 (100)	0	27 (96.4)	1 (3.6)	82 (85.4)	14 (14.6)	86 (89.6)	10 (10.4)
Dosage regimen was told by dispenser	0	28 (100)	4 (14.3)	24 (85.7)	14 (14.6)	82 (85.4)	24 (25)	72 (75)
Dosage regimen was communicated when asked	28 (100)	0	24 (85.7)	4 (14.3)	36 (37.5)	60 (62.5)	68 (70.8)	28 (29.2)
Advice given when prescription was dispensed as prescribed								
Correct name of medicine told	24 (85.7)	4 (14.3)	26 (92.8)	2 (7.2)	82 (85.4)	14 (14.6)	86 (89.6)	10 (10.4)
Correct dose of medicine told	24 (85.7)	4 (14.3)	26 (92.8)	2 (7.2)	82 (85.4)	14 (14.6)	86 (89.6)	10 (10.4)
Correct frequency of medicine told	24 (85.7)	4 (14.3)	26 (92.8)	2 (7.2)	82 (85.4)	14 (14.6)	86 (89.6)	10 (10.4)
Correct duration of medicine told	24 (85.7)	4 (14.3)	26 (92.8)	2 (7.2)	82 (85.4)	14 (14.6)	86 (89.6)	10 (10.4)
Correct use of medicine told	0	28 (100)	0	28 (100)	0	96 (100)	0	96 (100)
Correct side effect of medicine told	0	28 (100)	0	28 (100)	0	96 (100)	0	96 (100)
Advice given when prescription was not dispensed as prescribed								
Correct name of medicine told	4 (14.3)	24 (85.7)	2 (7.2)	26 (92.8)	33 (34.4)	63 (65.6)	1 (1)	95 (99)
Correct dose of medicine told	4 (14.3)	24 (85.7)	2 (7.2)	26 (92.8)	33 (34.4)	63 (65.6)	1 (1)	95 (99)
Correct frequency of medicine told	4 (14.3)	24 (85.7)	2 (7.2)	26 (92.8)	33 (34.4)	63 (65.6)	1 (1)	95 (99)
Correct duration of medicine told	4 (14.3)	24 (85.7)	2 (7.2)	26 (92.8)	33 (34.4)	63 (65.6)	1 (1)	95 (99)
Correct use of medicine told	0	28 (100)	0	28 (100)	0	96 (100)	0	96 (100)
Correct side effect of medicine told	0	28 (100)	0	28 (100)	0	96 (100)	0	96 (100)

Sale of Anti-TB Medicines by Cost and Volume in Twin Cities of Pakistan

Overview of Trends in the Sale and Cost of Anti-TB Medicines between 2012 and 2014

The total number of anti-TB medicine brands was 54, 50, and 52 in 2012, 2013, and 2014, respectively (table 14). An overall decrease in the volume of sales of anti-TB medicines was observed between 2012 and 2014 at national, retail, and wholesale market levels. This indicates better coverage by the NTP in supplying medicines. The sales trends in Rawalpindi and Islamabad saw a similar decrease as that in the national market.

Table 14. Overview of Trends in the Sale and Cost of Anti-TB Medicines between 2012 and 2014

Product J04A Market	2012		2013		2014	
	Unit	Value (PKR)	Unit	Value (PKR)	Unit	Value (PKR)
National	6,785,748	1,048,771,132	6,702,068	1,049,809,603	5,364,754	990,512,615
Retail	4,559,897	755,819,658	4,633,864	792,068,375	3,661,689	738,462,928
Wholesale	2,225,851	292,951,474	2,068,204	257,741,228	1,703,065	252,049,687
Islamabad	19,753	7,327,317	19,293	7,927,051	19,769	8,293,658
Rawalpindi	55,226	20,495,592	52,798	20,892,382	52,678	20,314,733
Total Brands		54		50		52

Overview of Trends in the Sale and Cost of the Most Commonly Prescribed/Sold Anti-TB Medicines between 2012 and 2014

As stated above, an overall decrease in the sale of anti-TB medicines is seen between 2012 and 2014 at national, retail, and wholesale market levels. The most commonly prescribed/sold anti-TB brands are Myrin, Myrin P, Rimactal, Rimactal INH, and Rimstar. A detailed description of the most commonly prescribed/sold anti-TB brands at various markets levels from 2012 to 2014 is given in table 15.

Results

Table 15. Overview of Trends in the Sale and Cost of Most Commonly Prescribed/Sold Anti-TB Medicines between 2012 and 2014

Anti-TB Medicines	2012 Unit (Value PKR)			2013 Unit (Value PKR)			2014 Unit (Value PKR)		
	National	Retail	Wholesale	National	Retail	Wholesale	National	Retail	Wholesale
Myrin	274,562 (128730903)	200,576 (94270036)	73,986 (34460867)	232,161 (124126090)	179,236 (95829670)	52,925 (28296420)	210,847 (112730492)	164,742 (88080388)	46,105 (24650104)
Myrin Tabs 80	274,562 (128730903)	200,576 (94270036)	73,986 (34460867)	232,161 (124126090)	179,236 (95829670)	52,925 (28296420)	210,847 (112730492)	164,742 (88080388)	46,105 (24650104)
Myrin P	503,781 (338827922)	366,395 (247869291)	137,386 (90958631)	382,775 (295104293)	304,687 234873853	78,088 60230440	394,999 (305115638)	305,464 (235575493)	89,535 (69540145)
Myrin P Tabs 100	146,478 (107003034)	105,200 (77524495)	41,278 (29478539)	105,029 (88293925)	83,311 (70036614)	21,718 (18257311)	114,496 (96252355)	84,592 (71113486)	29,904 (25138869)
Myrin P Tabs Fort 80	357,303 (231824888)	261,195 (170344796)	96,108 (61480092)	277,746 (206810368)	221,376 (164837239)	56,370 (41973129)	280,503 (208863283)	220,872 (164462007)	59,631 (44401276)
Rimactal	2,713,430 (127389278)	1,814,743 (85984287)	898,687 (41404991)	2,764,785 (140879105)	1,896,195 (97313174)	868,590 (43565931)	1,809,995 (140461310)	1,296,994 (101070162)	513,001 (39391148)
Rimactal Tabs C. 300 mg 40	21,320 (5021589)	14,025 (3302922)	7,295 (1718667)	16,289 (4375793)	12,039 (3234219)	4,250 (1141574)	15,048 (4092766)	11,744 (3194188)	3,304 (898578)
Rimactal Tabs 450 mg 30	39,947 (9945684)	28,707 (7139801)	11,240 (2805883)	26,707 (6945882)	20,675 (5376983)	6,032 (1568899)	27,589 (7265171)	21,887 (5763510)	5,702 (1501661)
Rimactal INH	244,722 (55323675)	164,963 (37539825)	79,759 (17783850)	234,035 (58094641)	170,590 (42377649)	63,445 (15716992)	222,867 (55720775)	169,622 (42536218)	53,245 (13184557)
Rimactal INH Tabs C. 300mg 30	138,515 (25810024)	905,16 (16768069)	47,999 (9041955)	137,376 (28024704)	99,834 (20366136)	37,542 (7658568)	133,549 (27585890)	100,469 (20753163)	33,080 (6832727)
Rimactal INH Tabs C. 450mg 30	106,207 (29513651)	74,447 (20771756)	31,760 (8741895)	96,659 (30069937)	70,756 (22011513)	25,903 (8058424)	89,318 (28134885)	69,153 (21783055)	20,165 (6351830)
Rimstar Tabs F.C. 100	63,462 (52631338)	50,980 (42309990)	12,482 (10321348)	64,128 (59688990)	53,414 (49716812)	10,714 (9972178)	63,004 (59373632)	53,487 (50404922)	9,517 (8968710)

Overview of Trends in the Sale and Cost of the Most Commonly Prescribed/Sold Anti-TB Medicines in Islamabad and Rawalpindi Between 2012 and 2014

An overall decrease in the sale of anti-TB medicines was observed between 2012 and 2014 in Islamabad and Rawalpindi. A detailed description of the most commonly prescribed/sold anti-TB medicines in Islamabad and Rawalpindi between 2012 and 2014 is given in table 16.

Table 16. Overview of Trends in the Sale and Cost of Most Commonly Prescribed/Sold Anti-TB Medicines in Islamabad and Rawalpindi between 2012 and 2014

Anti-TB Medicines	2012 Unit (Value PKR)		2013 Unit (Value PKR)		2014 Unit (Value PKR)	
	Islamabad	Rawalpindi	Islamabad	Rawalpindi	Islamabad	Rawalpindi
Myrin	3,457 (1631646)	7,373 (3478910)	3,245 (1734959)	6,877 (3676810)	3,457 (1631646)	7,373 (3478910)
Myrin Tabs 80	3,457 (1631646)	7,373 (3478910)	3,245 (1734959)	6,877 (3676810)	3,457 (1631646)	7,373 (3478910)
Myrin P	4,245 (2872175)	10,713 (7221233)	4,326 (3355627)	9,795 (7543030)	4,245 (2872175)	10,713 (7221233)
Myrin P Tabs 100	1,312 (969977)	2,962 (2172751)	1,400 (1176925)	2,599 (2184873)	1,312 (969977)	2,962 (2172751)
Myrin P Tabs Fort 80	2,933 (1902198)	7,751 (5048482)	2,926 (2178702)	7,196 (5358157)	2,933 (1902198)	7,751 (5048482)
Rimactal	2,775 (246559)	6,172 (554666)	2,896 (291951)	6,492 (568550)	2,775 (246559)	6,172 (554666)
Rimactal Tabs C. 300 mg 30	403 (96470)	810 (192835)	479 (128671)	708 (190185)	403 (96470)	810 (192835)
Rimactal Tabs 450 mg 30	224 (56032)	617 (154103)	227 (59031)	485 (126130)	224 (56032)	617 (154103)
Rimactal INH	2,705 (576741)	6,758 (1474001)	2,977 (685907)	7,448 (1751454)	2,705 (576741)	6,758 (1474001)
Rimactal Caps 300 mg 40	1,899 (351079)	4,466 (830596)	2,243 (457572)	5,281 (1077324)	1,899 (351079)	4,466 (830596)
Rimactal INH Tabs C. 450mg 30	806 (225662)	2,292 (643405)	734 (228335)	2,167 (674130)	806 (225662)	2,292 (643405)
Rimstar Tabs F.C. 100	470 (396528)	2,099 (1768650)	541 (503575)	2,358 (2194763)	470 (396528)	2,099 (1768650)

DISCUSSION

The results of this study show an overall improvement in the knowledge of dispensers about the full treatment regimen for TB at community pharmacies trained by the NTP. A similar positive impact from educational/training interventions on dispensers' knowledge has been reported in the literature [1-5]. However, this study also highlights that the overall qualifications and training of dispensers working at community pharmacies in Pakistan are inadequate and that pharmacies are largely operated by non-qualified and untrained dispensers. Low levels of technical knowledge of dispensers and the absence of qualified personnel have been similarly reported in several studies from developing countries [6-9].

The study results revealed that Myrin-P and Vita-6 were the most commonly dispensed anti-TB medicine combinations by the community pharmacies. The dispensers reported that patrons sometimes bring prescriptions with them. They also reported that TB patrons most commonly either purchase all the prescribed medicine at one time or break the prescription into more than one purchase. The usual break time for treatment was one week. The main reason highlighted for interrupting treatment was the high cost of the medications. Most of the dispensers were satisfied with the currently available anti-TB medicines. In their opinion, anti-TB medicines should not be sold as OTC medicines. The dispensers indicated that although they were involved in counselling their patients regarding the treatment regimen, they do not counsel them regarding their close family members. Little or no verbal advice was given to patients regarding treatment for TB and no formal arrangements to facilitate referral were reported.

The collaborative NTP and community pharmacy models in Cambodia and China provide substantial evidence for using pharmacies, which are described as a neglected link and underused resource for TB control. The results of this study show that the major problems highlighted by dispensers in TB treatment in Pakistan are cost and the duration of treatment. The dispensers trained by the NTP agreed that pharmacies were contributing to increased case detection and that their involvement in the program was an effective step by the NTP. Untrained dispensers did not share this view, although they were willing to be trained. Similar results highlighting access to training and education as valuable incentives and collaboration with a public health program were reported in the literature [29].

Community pharmacies are looked upon for their potential in disease management in the existing health care setting. To achieve this potential, better knowledge and skills of the dispensers and their understanding of patient referral are required. The available literature indicates that the standards of practice are quite low at community pharmacies in Pakistan [6, 8, 11, 12]. Knowledge of dispensers is an important prerequisite for the provision of quality services at community pharmacies but may not always reflect in their real practices [13, 14]. The results of this study reveal that the overall process of disease management of TB at community pharmacies in Pakistan is not up to the mark. Three different scenarios were presented to the pharmacies, namely: complete TB prescription, incomplete TB prescription, and missed dose. History taking was a missing component in all three scenarios at the community pharmacies. At the same time, when a patient's history was taken, pharmacists were more frequently involved in history taking. But it should be noted that their availability at community pharmacies is low. Studies have reported inappropriate diagnosis and treatment by unqualified and untrained pharmacy attendants; pharmacists appear to perform better than other staff [15-17]. It was interesting to observe different patterns in the three scenarios.

Dispensers had fragmentary knowledge of TB case management, but when probed, most of them replied that they are willing to provide information if they are offered an opportunity with guidelines from the national program. All dispensers knew the correct prescription and the same remedy were dispensed by all trained and untrained dispensers working at the pharmacies in Islamabad and Rawalpindi. At the same time, the incorrect prescription was not identified by any of the trained or untrained dispensers, and the same improper and incomplete prescription was dispensed in all cases presented. On the other hand, different patterns of dispensing were observed in the missed dose scenario, including referral to a doctor but dispensing the same prescription, not referring to a doctor but dispensing a new prescription, and not referring to a doctor but dispensing the same prescription. Referral of TB cases was not common. This might be due to poor understanding, the unavailability of the personnel trained by the NTP, and their lack of interest in training other staff members regarding management of TB at community pharmacies. These results are similar to other studies conducted in various countries, including Pakistan [18-21].

Counselling is an important determinant in ascertaining the method of medicine use by the patient. The information communicated should include advice on appropriate use, when to expect symptoms of relief, potential side effects, dose, and frequency of the medicine [22]. The results of the study highlighted that the overall process of counselling at trained and untrained community pharmacies, irrespective of the provider type in the three scenarios, was fairly adequate. In most cases, when TB medicine was not dispensed, the reason was unavailability at the pharmacy at the time of the patient's visit. The results of the study highlighted that most of the remedies suggested by dispensers were brand names. This fact is similar to the prescription writing habits of prescribers in developing countries, where they prefer to use brand names for prescribing [23]. The most frequently prescribed medicines were Myrin-P, Myrin-P forte, and Vita-6. Provision of advice on use and side effects were negligible, which is due to the absence of qualified and trained personnel at these community pharmacies. The situation is not exceptional to Pakistan as similar patterns of lack of counselling have been observed in other countries [13, 15, 24, 25]. The low quality of professional services from pharmacies and the inadequate provision of advice for common symptoms have been reported in middle-income countries [26].

The cost analysis (IMS data) on the sale of anti-TB medicines from 2012 to 2014 showed an overall decrease in number of units, which might be due to better medicine supply coverage by the NTP. The study results highlight that the average median cost of treatment for the whole regimen was Rs 7000 (USD 70), while the average median cost of treatment offered by the community pharmacies was Rs 1263 (USD 12.63). (The conversion rate as of June 22, 2015 was USD 1= PKR 100.) The cost of treatment offered by community pharmacies is low because treatment is usually offered for a day or two in most instances, the whole regimen is not provided, which makes community pharmacies a quick and cheaper source of medicines for the public [27].

CONCLUSIONS AND RECOMMENDATIONS

Interventions can improve the knowledge and practices of dispensers working at community pharmacies. The results of this study are quite encouraging, despite the overall unsatisfactory condition of dispensing practices for TB management at community pharmacies in the country. This study highlights adequate knowledge about TB, in general, but poor case management and dispensing practices at the participating community pharmacies. The dispensers who had received training referred patients to doctors in few cases. The results show that most of the dispensers were not very good at history taking or the provision of appropriate advice to their customers. This may be due to the fact that the dispensers, who were trained by the NTP, were usually not present at the time of the visit, nor had they trained other staff members after receiving training from the NTP. This result indicates that training is effective for individuals but not for the community pharmacy system as a whole. In many cases, when medicines were not dispensed, the reason was unavailability of the medicines at the pharmacy. In the view of most of the dispensers, anti-TB medicines should not be sold as OTC medications. Regulators should take into consideration the opinion of these stakeholders and identify the issues related to this matter before implementing the sale of anti-TB medicines OTC.

Ongoing monitoring programs and regular audits should be designed to determine the long-term impact of interventions and the sustainability of the dispensers' practices. Training programs for dispensers should be a regular feature of the District Health Office. Attendance by dispensers can be ensured by linking the training with the renewal of their pharmacy licenses. Training of dispensers on referral, history taking, and the importance of giving verbal advice and strong monitoring systems are compulsory for effective TB treatment and control in Pakistan. It is recommended that national STGs for TB be updated, promoted, and implemented to improve the knowledge and adherence of dispensers, which will result in better dispensing practices and control of TB in Pakistan. Many TB cases go unreported due to under-diagnosis. There is an urgent need to update and integrate a national database for registering the actual number of TB cases on a regular basis in the different provinces of Pakistan. Regular updating of lists of community pharmacies trained by the NTP should also be done. In addition, the training program should be evaluated and training modules should be updated on a regular basis. Pharmacists should be encouraged to join the community pharmacy business with the introduction of incentives by the Government. Dispensers currently working at the pharmacies should be trained to improve their dispensing practices. Long-term changes in the public health domain can be brought about through education and the enforcement of legislation.

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ANNEX A: DATA COLLECTION TOOL 1

Questionnaire for the Assessment of Knowledge & Perceptions of Dispensers Regarding Adherence to Standard Treatment Guidelines for Mycobacterium Tuberculosis

I. Demographic Data

Name of staff interviewed		Name of Pharmacy	
Trained/Untrained under pilot		City	
Area		Status in pharmacy	
Age of interviewee		Gender of interviewee	
Qualification of interviewee		Experience of interviewee	

II. Knowledge of dispensers regarding management of TB

i. In your opinion, which of the following treatment criteria is considered while managing tuberculosis? Tick (✓) the appropriate column

Question	Yes	No
Cough more than 2 weeks, fever, weight loss and /or blood in sputum is the typical symptoms of TB patient.		
2-month intensive phase + 4-month continuous phase is the correct course duration of anti-mycobacterial agents for the treatment of newly diagnosed case of tuberculosis.		
3-month intensive phase + 5-month continuous phase is the correct course duration of anti-mycobacterial agents for the retreatment case of tuberculosis.		
2 months HRZE+ 4 months HR is the best anti-mycobacterial option in intensive and continuous phase for the treatment of newly diagnosed case of tuberculosis.		
2 months HRZES +1 month HRZE + 5months HRE is the best anti-mycobacterial option included in intensive and continuous phase in the retreatment case of tuberculosis.		

In your opinion, which of the following dosages regimens of anti-mycobacterial drugs are effective in treating tuberculosis? Tick (✓) on the appropriate column.

Isoniazid 4-6mg/kg daily maximum 300mg daily		
Rifampicin 8-12mg/kg daily maximum 600mg daily		
Ethambutol 15-25mg/kg daily		
Pyrazinamide 20-30 mg/kg daily		
Streptomycin 12-18mg/kg daily		

H=Isoniazid R=Rifampicin Z=Pyrazinamide E=Ethambutol S=Streptomycin

III. Dispensing practices for management of TB at community pharmacies

- i. In your experience do the clients bring prescription;
- Always
 - Sometimes
 - Only the first time
 - Never

ii. What are the commonly prescribed anti TB drugs at your pharmacy (Generics/brands)?

- _____

- _____

iii. In your experience what is the common trend of the TB patients/clients coming to your pharmacy;

- Buy/purchase all the medicine in the prescription for the duration
of the treatment
- Break the prescription into more than one purchase
- I see both

iv. If they do break the treatment do you know why and what is the usual break time?

v. In your experience when and how often do patients switch to seek treatment from one facility/Doctor/clinic to another?

- vi. Do you counsel the patients regarding their treatment regimen?
- vii. Do you counsel the patients on importance of other close family members to be tested/evaluated for TB?
- viii. What usually happens at follow up purchase?
 - o Patient presents with prescription
 - o Patients presents with empty medicine pack
 - o Patients recall name of medicine and amount purchase previously
- ix. How much does it cost for a full course of TB treatment in the private sector?

IV. Perceptions of dispensers regarding management of TB in Pakistan

i. Tick (✓) on the scale of 1 to 5 where (1) being Strongly Disagree and (5) Strongly Agree.

Perceptions	(1) Strongly Disagree	2 Disagree	3 Neutral	4 Agree	(5) Strongly Agree
Tuberculosis in patients is well controlled with currently available anti mycobacterial tuberculosis agents in Pakistan health care system.					
In your opinion mandatory TB notification from pharmacies should become a law?					
Do you think it will be beneficial?					
Do you think it should be mandatory to keep records of all TB prescriptions?					
Do you think TB medicines must not be sold as OTC medicines?					
Guidelines on tuberculosis treatment are available in the community pharmacies					
In your opinion, do you think empirical prescribing of anti-mycobacterial before performing diagnostic test is beneficial in the					

management of tuberculosis?					
In your opinion, there is a need for more educational programs to increase knowledge & awareness on the available guidelines?					
In your opinion, there is a need for more educational programs to increase knowledge & awareness of general public regarding TB?					

ii. In your opinion, what are the major problems faced in treatment of TB in Pakistan?

.....
iii. Do you think NTP is playing effective role in control of TB in Pk?if, yes, how?
.....
.....

iv. Have you received training from NTP? if yes, are you satisfied with the training?
What was the most important information at the training session?

Thank you for your cooperation

.....

ANNEX B: DATA COLLECTION TOOL 2

Scenario 1: Proper & Complete Prescription for the Intensive Phase

Data collection from Community Pharmacies: Simulated Patient's Visit Disease Management Form

Demographic information & time can be filled before entering to the pharmacy.

Keep a watch with you, and note the time when the conversation starts and note it down in the entrance time, note the time when conversation ends, you take drugs and leave the counter note this time in the exit time.

Date of visit		City Province	
Name of Pharmacy		Area	
Data collected by		Urban/rural	

Time of entry _____ Exit time _____

Dispensing time _____ *(subtract the above two and convert in seconds till the next patient comes or after leaving the pharmacy)*

Request was handled by _____ *(you can ask after ending the encounter)*

1. After presenting the prescription to the dispenser. How he responded to the following questions. Put '1' for 'Yes' and '2' for 'No' in front of each question.

- Obtained history regarding patient's demographics
 - Age
 - Weight
 - History of illness *(Hx regarding appearance of symptoms/disease)*
 - History of medication *(Which medicines you are currently using)*
 - Medical history *(Hx of other diseases/conditions)*
 - Current symptoms
 - Improvement in symptoms
 - Duration of treatment *(Intensive or continuous phase)*
 - Any side effect with current regimen *(Side effect appeared with the current regimen)*
 - Recognized the Treatment Correct
 - Dispensed the regimen as prescribed
 - Refer to the doctor and suggest remedy
 - Changed the prescription
 - Refer to doctor

2. Any other questions asked *(Write in dispenser's words)*

3. Advice given by the dispenser on drug use *(Write in dispenser's words)*

4. Does the pharmacy staff counsel on importance of other close family members to be tested/evaluated for TB?

5. Dosage regimen was told by dispenser?

6. Dosage regimen was communicated when asked?

7. Describe below the advice given to you on how to take drugs if prescription was dispensed as prescribed. *(Fill in the dose, frequency of drug use and number of days drugs to be used. If any of the following is not told state "not told". Do not fill in the comment box)*

Sr #	Name of drug	DOSE Teaspoonful/ tab/capsule	FREQUENCY Times per day	DURATION Number of days	Use	Cautions/ Side effects	Comment 1 = Correct 2 = Incorrect
1							
2							
3							
4							
5							

8. Describe below the advice given to you on how to take drugs if prescription was not dispensed as prescribed. *(Fill in the dose, frequency of drug use and number of days drugs to be used. If any of the following is not told state "not told". Do not fill in the comment box)*

Sr #	Name of drug	DOSE Teaspoonful/ tab/capsule	FREQUENCY Times per day	DURATION Number of days	Use	Cautions/ Side effects	Comment 1 = Correct 2 = Incorrect
1							
2							
3							
4							
5							

Cost of medicines _____

Response: 1=Yes, 2= No

ANNEX C: DATA COLLECTION TOOL 3

Scenario 2: Improper & Incomplete Prescription for Intensive Phase

Data collection from Community Pharmacies: Simulated Patient's Visit Disease Management Form

Demographic information & time can be filled before entering to pharmacy.

Keep a watch with you, and note the time when the conversation starts and note it down in the entrance time, note the time when conversation ends, you take drugs and leave the counter note this time in the exit time.

Date of visit		City Province	
Name of Pharmacy		Area	
Data collected by		Urban/rural	

Time of entry _____ Exit time _____

Dispensing time _____ *(subtract the above two and convert in seconds till the next patient comes or after leaving the pharmacy)*

Request was handled by _____ *(you can ask after ending the encounter)*

After presenting the prescription to the dispenser. How he responded to the following questions. Put '1' for 'Yes' and '2' for 'No' in front of each question.

1. Did the dispenser recognize the treatment prescription as incorrect?

If YES, what action did the dispenser do

- Dispensed the regimen as prescribed anyway
- Refer to the prescribing doctor and suggest remedy
- Refer to one of the PPM providers / BMU from the directory
- Changed the prescription himself

2. **If NO, then after presenting the prescription to the dispenser. How he responded to the following questions. Put '1' for 'Yes' and '2' for 'No' in front of each question.**

- Obtained history regarding patient's demographics
 - Age
 - Weight
 - History of illness *(Hx regarding appearance of symptoms/disease)*
 - History of medication *(Which medicines you are currently using)*
 - Medical history *(Hx of other diseases/conditions)*
 - Current symptoms
 - Improvement in symptoms
 - Duration of treatment *(Intensive or continuous phase)*
 - Any side effect with current regimen *(Side effect appeared with the current regimen)*

3. Any other questions asked *(Write in dispenser's words)*

4. Advice given by the dispenser on drug use *(Write in dispenser's words)*

5. Dosage regimen was told by dispenser?

6. Dosage regimen was communicated when asked?

7. Describe below the advice given to you on how to take drugs if prescription was dispensed as prescribed. *(Fill in the dose, frequency of drug use and number of days drugs to be used. If any of the following is not told state “not told”. Do not fill in the comment box)*

Sr #	Name of drug	DOSE Teaspoonful/ tab/capsule	FREQUENCY Times per day	DURATION Number of days	Use	Cautions/ Side effects	Comment 1 = Correct 2 = Incorrect
1							
2							
3							
4							
5							

8. Describe below the advice given to you on how to take drugs if prescription was not dispensed as prescribed. *(Fill in the dose, frequency of drug use and number of days drugs to be used. If any of the following is not told state “not told”. Do not fill in the comment box)*

Sr #	Name of drug	DOSE Teaspoonful/ tab/capsule	FREQUENCY Times per day	DURATION Number of days	Use	Cautions/ Side effects	Comment 1 = Correct 2 = Incorrect
1							
2							
3							
4							
5							

Cost of medicines _____

Response: 1=Yes, 2= No

ANNEX D: DATA COLLECTION TOOL 4

Scenario 3: Missed Dose Prescription for Intensive Phase

Data collection from Community Pharmacies: Simulated Patient's Visit Disease Management Form

Demographic information & time can be filled before entering to the pharmacy.

Keep a watch with you, and note the time when the conversation starts and note it down in the entrance time, note the time when conversation ends, you take drugs and leave the counter note this time in the exit time.

Date of visit		City Province	
Name of Pharmacy		Area	
Data collected by		Urban/rural	

Time of entry _____ Exit time _____

Dispensing time _____ *(subtract the above two and convert in seconds till the next patient comes or after leaving the pharmacy)*

Request was handled by _____ *(you can ask after ending the encounter)*

1. **After presenting the prescription to the dispenser. How he responded to the following questions. Put '1' for 'Yes' and '2' for 'No' in front of each question.**

- Obtained history regarding patient's:
 - Age
 - Weight
 - History of illness *(Hx regarding appearance of symptoms/disease)*
 - History of medication *(Which medicines you are currently using)*
 - Medical history *(Hx of other diseases/conditions)*
 - Current symptoms
 - Improvement in symptoms
 - Duration of treatment *(Intensive or continuous phase)*
 - Any side effect with current regimen *(Side effect appeared with the current regimen)*
- Ask duration of discontinuation
- Dispensed the previous regimen as prescribed
- Dispensed new remedy
- Refer to doctor (patient initially was seeking treatment from/fill out referral form using the directory

2. **Any other questions asked *(Write in dispenser's words)***

3. **Advice given by the dispenser on drug use *(Write in dispenser's words)***

4. **Dosage regimen was told by dispenser?**

5. **Dosage regimen was communicated when asked?**

6. **Describe below the advice given to you on how to take drugs if previous prescription was continued. *(Fill in the dose, frequency of drug use and number of days drugs to be used. If any of the following is not told state "not told". Do not fill in the comment box)***

Sr #	Name of drug	DOSE Teaspoonful / tab/capsule	FREQUENCY Times per day	DURATION Number of days	Use	Cautions/ Side effects	Comment 1 = Correct 2 = Incorrect
1							
2							
3							
4							
5							

7. Describe below the advice given to you on how to take drugs if prescription was not dispensed as prescribed. *(Fill in the dose, frequency of drug use and number of days drugs to be used. If any of the following is not told state "not told". Do not fill in the comment box)*

Sr #	Name of drug	DOSE Teaspoonful / tab/capsule	FREQUENCY Times per day	DURATION Number of days	Use	Cautions/ Side effects	Comment 1 = Correct 2 = Incorrect
1							
2							
3							
4							
5							

Cost of medicines _____
 Response: 1=Yes, 2= No