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Understanding private retail drug outlet dispenser knowledge and practices in tuberculosis care in Tanzania

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SUMMARY

SETTING: Private sector accredited drug dispensing outlets in Morogoro and pharmacies in Dar es Salaam, Tanzania.

OBJECTIVE: To assess 1) the level of knowledge about tuberculosis (TB) among dispensers in Tanzania's retail pharmaceutical sector; 2) practices related to identification of patients with suspected TB; 3) the availability of educational materials and training; and 4) the availability of first- and second-line anti-tuberculosis treatment in retail drug outlets.

DESIGN: A cross-sectional descriptive study involving the administration of a structured questionnaire among drug dispensers in 122 pharmacies and 173 accredited drug dispensing outlets.

RESULTS: Private retail drug outlets are convenient; most are open at least 12 h per day, 7 days/week. Although 95% of dispensers identified persistent cough as a symptom of TB, only 1% had received TB-related training in the previous 3 years; 8% of outlets stocked first-line anti-tuberculosis medicines, which are legally prohibited from being sold at retail outlets. The majority of respondents reported seeing clients with TB-like symptoms, and of these 95% reported frequently referring clients to nearby health facilities.

CONCLUSION: Private retail pharmaceutical outlets can potentially contribute to TB case detection and treatment; however, a coordinated effort is needed to train dispensers and implement appropriate referral procedures.

KEY WORDS: pharmacy; public-private partnerships; referral and consultation; drug seller

IN THE MID-1980s, Tanzania was the first African country to introduce DOTS, the World Health Organization's (WHO) internationally recommended strategy for tuberculosis (TB) control. By 2010, Tanzania had surpassed the global treatment success (88%) and case detection (77%) targets, and had halved the 1990 TB mortality rate.[1] However, in the same year Tanzania had approximately 60 000 new TB case notifications;[1] today, it remains one of the world's 22 high TB burden countries. Continued efforts are needed to reduce the number of new TB cases in Tanzania and take it off the list of high-burden countries.

An assessment of the private health sector in Tanzania revealed that it provides a substantial contribution to health care services in the country. While the use of private health services never exceeds 34% of all services provided, patients tend to be more likely to access the private sector for problems that can be treated with medical commodities, such as fever or cough.[2] Furthermore, while patients of all wealth quintiles utilise private facilities, those from the bottom three quintiles comprise nearly 50% of all people seeking treatment for fever and/or cough.[2] Low-income households are more susceptible to TB, and for many, private retail pharmaceutical outlets are their first point of contact with the health system. If properly engaged, private pharmaceutical outlets can be involved in many aspects of TB control, including case detection, providing treatment support and limited dispensing of anti-tuberculosis drugs to those with a prescription.[3]

The contribution of public-private mix (PPM) to TB control has been well documented in the literature. A study in India demonstrated that large-scale implementation of PPM for TB care and control was not only cost-effective, it also significantly reduced patient financial burden as a result of fewer

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patients seeking care outside of the scope of the national TB control program and therefore paying a higher price for anti-tuberculosis medicines.[4] Another study in Indonesia found that collaboration between the public and private sector increased TB case detection.[5] The value of PPM has also been recognized in international guidelines, with PPM comprising one of the core components of the global Stop TB Strategy,[6] and the WHO and the International Pharmaceutical Federation (FIP; The Hague, The Netherlands) issuing a joint statement encouraging the collaboration of national TB programs and national pharmacy associations to improve TB control.[7]

The Tanzanian Ministry of Health and Social Welfare, through the National Tuberculosis and Leprosy Programme (NTLP), has committed to engaging the private sector and expanding TB and TB-HIV (human immunodeficiency virus) services in private health facilities.[8] The present study was conducted to assess TB knowledge among dispensers in the retail pharmaceutical sector, to determine practices related to the identification and management of patients with suspected TB, to assess the availability of educational materials and training, and to determine the availability of first- and second-line anti-tuberculosis treatment. We defined private retail pharmaceutical outlets as pharmacies, predominantly in urban areas, and accredited drug dispensing outlets (ADDOs), predominantly in rural and peri-urban areas. The findings from this study will help enable the NTLP and partners to develop strategic interventions for engaging the retail pharmaceutical sector in Tanzania in TB diagnosis and care in line with the WHO/FIP 2011 recommendations.[9]

STUDY POPULATION AND METHODS

This was a cross-sectional descriptive study design involving the administration of a structured questionnaire to dispensers in retail drug outlets. The questionnaire assessed TB knowledge and pharmacy practices, and inquired as to whether anti-tuberculosis drugs were stocked at the outlet. All questionnaire items were structured to categorize responses. Before full deployment, the questionnaire was pre-tested and all questions were validated through field testing in outlets in Dar es Salaam, Tanzania. Outlets included registered private retail pharmacies authorized by the Tanzania Food and Drugs Authority (TFDA) to sell and dispense all prescription medicines, and ADDOs, described elsewhere,[10,11] which are legally authorized by the TFDA to sell and dispense a limited list of essential prescription medicines.

The study locations were Dar es Salaam City and the Morogoro region. Dar es Salaam has nearly 60% of all registered retail pharmacies in the country,[12] contributes 22% of all notified TB cases nationwide, and represents an urban population. The Morogoro region ranks seventh in national TB case notifications, has had ADDOs operating for several years, and represents peri-urban and rural populations. We estimated the sample size to include approximately 30% of all eligible registered pharmacies and ADDOs. We determined the sampling interval based on the total number of outlets in each region and randomly selected pharmacies and ADDOs by selecting the first on the list, then counting every second outlet from the list until the final sample included respondents from 122 private pharmacies and 173 ADDOs.

Interviews were conducted in person with dispensers, and the data were analyzed using SPSS statistical software version 16 (Statistical Product and Service Solutions, Chicago, IL, USA). Data collectors included representatives from the NTLP, Pharmacy Council and TFDA, along with community pharmacists, district pharmacists and district NTLP coordinators. To assure data quality, all data collectors were trained before being assigned to one of four teams, with each team led by a supervisor who ensured the completeness and accuracy of data during interviews. Two data entry clerks double-checked each entry to ensure accuracy.

Before data collection, approval was sought from the TFDA, the Pharmacy Council, and the NTLP. After being briefed on the purpose of the study, pharmacy and ADDO dispensers were asked to participate and were interviewed after providing informed consent. Data collectors verbally assured participants of the confidentiality of the information collected, their anonymity and the freedom to withdraw consent at any time during the process. Meetings were also held with district officials where the study was proposed before data collection.

RESULTS

Characteristics of the study population

The vast majority (83%) of dispensers interviewed in this study were female; 61% dispensers in pharmacies had secondary education compared to only 41% of those working in ADDOs, and 39% of all dispensers had primary education. Dispensers working in pharmacies had a statistically significantly higher level of education than those working in ADDOs ($P = 0.000$). Of those interviewed at pharmacies, 10% identified themselves as pharmacists; however, there were no pharmacists identified at the ADDOs. Of all dispensers in the pharmacies and ADDOs, 15% did not have any health training background.

Accessibility and referral linkages

Service accessibility was measured by the number of days and hours outlets were open for operation. Most ADDOs and pharmacies were open for at least 12 h

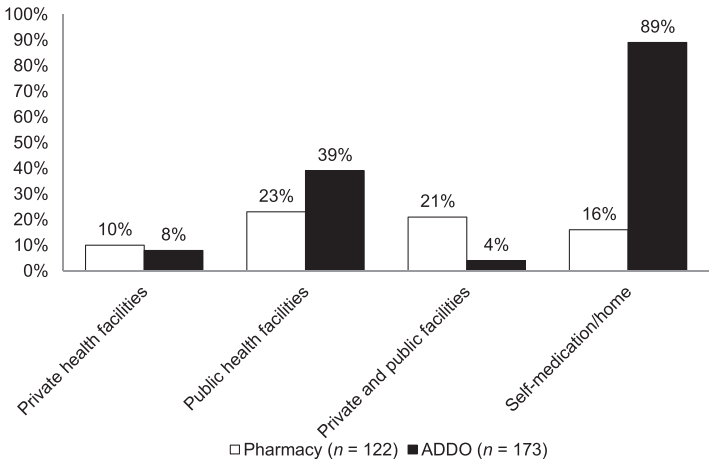

Figure Retail outlets' sources of clients (multiple responses allowed).

per day (85% and 67%, respectively), with approximately 70% of pharmacies and 60% of ADDOs operating 7 days per week. To assess referral linkages between ADDOs and pharmacies with other health services, we measured the walking time to the nearest public or private health facility and asked about the sources of clients at outlets. Approximately 88% of retail outlets were near a health facility, and dispensers reported that it took less than 30 min to walk to the closest facility. While most pharmacies reported that health facilities were their primary source of clients, the majority of ADDO clients came directly from home to seek care (Figure).

TB knowledge and practices among respondents

The vast majority of dispensers (91%) knew that TB is contracted by breathing air containing TB-causing micro-organisms. Many respondents, however, did not report knowing the factors that contribute to the spread of TB; 33% correctly identified poor ventilation in the house, approximately one half correctly noted overcrowding and one third correctly identified the presence of TB patients in the house or community. Dispensers working in retail pharmacies were significantly more likely to identify overcrowding ($P = 0.019$) or poverty ($P = 0.035$) as a factor contributing to TB transmission.

Patients with TB can present with a variety of symptoms, such as persistent cough lasting $\geqslant 2$ weeks, low grade fever, coughing blood and loss of weight. Among interviewed dispensers, 95% correctly identified persistent cough as a symptom, but the next most commonly recognized symptom—weight loss—was identified by only 49% of respondents (Table 1). ADDO dispensers were significantly more likely to name this symptom than those working in retail pharmacies (55% vs. 41%, respectively; $P = 0.018$).

While nearly all respondents recognized that there were negative consequences of not completing anti-tuberculosis treatment, including TB recurrence and death, only 30% were aware of the risk of developing drug-resistant TB (Table 1). ADDO dispensers were significantly more likely to recognize this risk, with 39% aware of resistance vs. 17% of pharmacy dispensers ($P = 0.000$). Two thirds of respondents had learned about TB symptoms during their formal education; the second most frequent source of knowledge cited was family members, relatives and friends. Other sources, such as community sensitization meetings, television, radio and billboards, contributed less than 5% each. Only 1% of respondents reported receiving any TB-related training in the previous 3 years.

Practice in TB case detection

Many respondents in both retail pharmacies and ADDOs (63% and 61%, respectively) reported seeing clients with TB-like symptoms in the 2 weeks before the interview. Of these, 95% reported referring the client to a nearby health facility, 8% dispensed broad-spectrum antibiotics and 14% dispensed cough syrup. Importantly, only 4% of both retail pharmacies and ADDOs referred patients with TB-like symptoms with a written note to a nearby health facility. Dispensers working in pharmacies were significantly more likely to report doing nothing when they saw clients come in with TB symptoms as compared to those working in ADDOs ($P = 0.025$).

Demand for and availability of anti-tuberculosis medicines

Despite the fact that first-line anti-tuberculosis medicines are prohibited from sale at retail outlets, 18% of surveyed pharmacies stocked at least one first-line anti-tuberculosis medicine, compared with 2% of ADDOs; however, none stocked fixed-dose combinations. For second-line anti-tuberculosis med-

Table 1 Knowledge about TB symptoms and the consequences of not completing anti-tuberculosis treatment among respondents

	Type of outlet		
	Pharmacy ($n = 122$) *n* (%)	ADDO ($n = 173$) *n* (%)	Total ($n = 295$) *n* (%)
TB symptoms*			
Persistent cough (⩾2 weeks)	115 (94)	166 (96)	281 (95)
Coughing blood	23 (19)	45 (26)	68 (23)
Fever for ⩾2 weeks	47 (39)	67 (39)	114 (39)
Loss of weight†	50 (41)	95 (55)	145 (49)
Excessive night sweats	47 (39)	48 (28)	95 (32)
Chest pains	25 (20)	30 (17)	55 (19)
Shortness of breath	12 (10)	18 (10)	30 (10)
Fatigue, malaise	32 (26)	48 (28)	80 (27)
Don't know	3 (2)	4 (2)	7 (2)
Consequences of not completing anti-tuberculosis treatment*			
Patient dies‡	63 (52)	118 (68)	181 (61)
Patient deteriorates	26 (21)	30 (17)	56 (19)
Recurrence of TB‡	67 (55)	120 (69)	187 (63)
Patient continues to infect others	15 (12)	27 (16)	42 (14)
Patient develops drug-resistant TB‡	21 (17)	67 (39)	88 (30)
Don't know	3 (2)	4 (2)	7 (2)

* Multiple responses allowed.
† ADDO dispensers were significantly more likely to name this symptom than those working in retail pharmacies (55% vs. 41%, respectively; $P = 0.018$).
‡ ADDO dispensers were significantly more likely to name patient death ($P = 0.009$), recurrence of TB ($P = 0.023$) and development of drug-resistant TB ($P = 0.000$) than pharmacy dispensers.
TB = tuberculosis; ADDO = accredited drug dispensing outlet.

icines, 68% of pharmacies and 50% of ADDOs stocked at least one second-line anti-tuberculosis medicine. In Tanzania, second-line regimens are authorized to be stocked at retail pharmacies because they are used for other diseases; however, ADDOs are not allowed to stock them (Table 2). A higher proportion of ADDO dispensers (43%) saw clients who specifically asked for anti-tuberculosis medicines as compared with pharmacy dispensers (35%).

Only half of the retail outlets (49%) surveyed reported keeping any kind of records for their clients, with ADDOs being significantly more likely to do so than pharmacies (39% and 10%, respectively, $P = 0.000$). Only 1% of all dispensers had any educational materials on TB available for their customers.

DISCUSSION

While similar studies have been conducted in Tanzania to assess knowledge and practices about malaria among drug sellers, and map care-seeking behavior for childhood illnesses and other health conditions,[13–15] this is the first study to assess TB awareness and practices among dispensers at Tanzania's private retail drug outlets. Our study found that many clients expect retail pharmaceutical outlets to supply and dispense anti-tuberculosis medicines, which is perhaps not surprising given that a previous study reported that 62% of retail pharmacy consultations were for cough.[16] While only 8% of dispensers in this study stocked first-line anti-tuberculosis medicines, approximately 4 in 10 saw clients who requested these medicines. Until the NTLP engages retail dispensers fully and ensures regulatory monitoring for anti-tuberculosis medicines, retail pharmaceutical outlets will continue to be under pressure to stock first-line medicines illegally and dispense them outside the DOTS strategy. These actions have the

Table 2 Availability of anti-tuberculosis medicines at retail outlets

	Type of outlet		
Anti-tuberculosis drugs stocked	Pharmacy ($n = 122$) *n* (%)	ADDO ($n = 173$) *n* (%)	Total ($n = 295$) *n* (%)
First-line drugs*	22 (18)	3 (2)	25 (8)
Second-line drugs†	83 (68)	86 (50)	169 (57)‡

* Sale prohibited by law at retail outlets.
† May be legally stocked in retail pharmacies because they are used to treat a variety of other conditions.
‡ Over 95% of pharmacies and ADDOs stocked fluoroquinolones (ciprofloxacin, levofloxacin and ofloxacin); the remaining pharmacies only stocked kanamycin and amikacin.
ADDO = accredited drug dispensing outlet.

potential to increase inappropriate use of anti-tuberculosis medicines and contribute to a rise in drug-resistant TB cases.

Studies carried out in other high TB burden countries have found similar misconceptions and knowledge gaps among retail pharmaceutical sellers regarding TB transmission, case detection and treatment; however, significantly higher rates of improper dispensing of TB medicines, mismanagement of TB cases, and development and spread of drug-resistant strains of TB were observed in countries that allow the sale of first-line anti-tuberculosis medicines in the private sector.[17–19] While Tanzania has largely managed to control the supply and sale of anti-tuberculosis medicines in its private retail pharmaceutical outlets (Sheikh K, Uplekar M. Regulating tuberculosis medicines: a policy analysis in six countries, unpublished), failure to involve the retail pharmaceutical sector in TB control efforts—including in the dispensing of anti-tuberculosis medicines—could lead to an increase in the unregulated distribution of these medicines as a result of client demand.

Although the dispensers' level of education was significantly lower in ADDO than pharmacies, their knowledge about TB was higher than in pharmacies. This is a result of years of investment to improve ADDO standards through training about all common illnesses including TB, regulatory monitoring, incentives and record keeping.[10,11,20] No similar efforts have been directed at retail pharmacies.

There are a variety of lessons to be learned from a similar effort to engage private pharmacists in Mumbai, India.[21] A total of 194 retail pharmacists were trained in case detection, a referral mechanism and DOTS protocols, and were provided with DOTS posters to display. In 2012, government TB clinic records showed a cumulative referral of 430 cases of persons suspected of having TB, of whom 17% had confirmed TB.[17] Training for pharmacists was scaled up and a significant number of pharmacists have since participated in the training and are administering DOTS. The system has proved beneficial for the pharmacists, who report that they enjoy offering a social service, as well as for the clients, who note that it is more convenient, more economical and less stigmatizing than receiving treatment at a TB clinic. A key component of the Indian effort to engage private pharmacists included listing those who completed the program in the DOTS directory of the local TB offices. The Indian Pharmaceutical Association then followed up with the pharmacists by telephone to inquire about their DOTS-related work.[21] This simple monitoring mechanism creates a sense of accountability and should be a part of any TB public-private intervention.

As retail pharmaceutical dispensers in this study rarely gave written referrals to health facilities for clients presenting with TB-like symptoms, any future dispenser training should include not only TB education, but also support for dispenser screening and referral. For example, a system could be established with a screening checklist for retail pharmacists and ADDO dispensers, standardized referral forms, a directory of facilities that provide NTLP TB diagnosis and treatment, and a register of pharmacy-referred TB patients. In addition, opportunities for health education could be enhanced by creating TB communication materials for pharmacies and ADDOs to display and distribute to clients.

CONCLUSION

The potential for retail pharmaceutical outlets to play a larger role in TB case detection is demonstrated by the fact that they are widely used, operate longer hours than health facilities, and most already see clients presenting with TB-like symptoms. However, the limited TB knowledge among staff, the lack of training and low rates of written referral indicate the need for a coordinated effort to engage this sector in TB case finding and to strengthen their linkage to TB diagnostic centers.

The NTLP, in collaboration with partners, used these study findings to develop an intervention to engage the retail pharmaceutical sector in TB control. The intervention includes a comprehensive training program covering proper identification and referral of TB patients, standard procedures for DOTS, and best practices for keeping client and drug registers. On completion of the training, private pharmacies and ADDOs will be certified by the NTLP to identify persons with TB symptoms and formally refer them to a nearby health facility (private or public) with diagnostic capacity. The outcomes of this intervention are currently being assessed and will be reported in a future publication.

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RESUME

CONTEXTE : Officines privées accréditées de délivrance de médicaments à Morogoro et pharmacies à Dar es Salaam, Tanzanie.

OBJECTIF : Evaluer 1) le niveau de connaissances en matière de tuberculose (TB) parmi les revendeurs dans le secteur de la pharmacie de détail en Tanzanie ; 2) les pratiques relatives à l'identification des patients suspects de TB ; 3) la disponibilité de matériel éducatif et de formation ; et 4) la disponibilité du traitement de première et de deuxième intention dans les officines de revente de médicaments.

SCHÉMA : Une étude descriptive transversale impliquant l'administration d'un questionnaire structuré à des vendeurs de médicaments dans 122 pharmacies et 173 officines de revente accréditées.

RÉSULTATS : Les officines privées de revente accréditées sont commodes car la majorité sont ouvertes au moins 12 h par jour, sept jours par semaine. Bien que 95% des revendeurs aient identifié une toux persistante comme un symptôme de TB, seulement 1% avaient bénéficié d'une formation relative à la TB pendant les 3 dernières années ; 8% des officines de revente disposaient d'un stock de médicaments anti-tuberculeux de première intention, dont la vente est interdite par la loi dans les officines. La majorité des répondants a affirmé avoir vu des clients présentant des symptômes évocateurs de TB et parmi eux, 95% ont déclaré référer fréquemment leurs clients à des centres de santé proches.

CONCLUSION : Les officines privées de revente pharmaceutiques peuvent contribuer à la détection des cas de TB et à leur traitement, cependant un effort coordonné est nécessaire pour former les revendeurs et mettre en place des procédures de référence appropriées.

RESUMEN

MARCO DE REFERENCIA: Los puntos autorizados de venta de medicamentos en el sector privado de Morogoro y las farmacias en Dar es Salaam, en Tanzania.

OBJETIVOS: Evaluar: 1) el grado de conocimientos sobre la tuberculosis (TB) de los proveedores del sistema de venta de medicamentos al público en Tanzania; 2) las prácticas en materia de detección de los pacientes con presunción de TB; 3) la existencia de materiales pedagógicos y de capacitación; y 4) la existencia de medicamentos antituberculosos de primera y segunda línea en los puntos de venta al público.

MÉTODO: Se llevó a cabo un estudio transversal descriptivo, mediante la administración de un cuestionario estructurado a los proveedores de medicamentos en 122 farmacias y 173 puntos autorizados de venta de medicamentos.

RESULTADOS: Los puntos de venta del sector privado son prácticos, pues en su mayoría atienden como mínimo 12 h al día y 7 días a la semana. Aunque el 95% de los proveedores reconoció la tos persistente como un síntoma indicativo de TB, solo 1% de ellos había recibido una capacitación en materia de TB en los últimos 3 años. El 8% de los puntos de distribución contaba con existencias de medicamentos antituberculosos de primera línea, cuyo comercio está prohibido en estos puntos de venta. La mayoría de los proveedores que respondieron al cuestionario manifestó haber atendido clientes con síntomas indicativos de TB y el 95% declaró que solía remitirlos a los establecimientos de salud cercanos.

CONCLUSIÓN: Los puntos de venta de medicamentos del sector privado podrían contribuir a la detección de casos de TB y a su tratamiento, siempre y cuando se emprenda un esfuerzo coordinado de capacitación de los proveedores y se pongan en práctica procedimientos de remisión apropiados.