Treatment referral system for tuberculosis patients in Dhaka, Bangladesh

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Objective: To evaluate the referral system in an urban DOTS-based programme in Dhaka, Bangladesh, including the peri-urban area, and to identify opportunities to strengthen the system.

Design: This was a retrospective cohort study in which diagnosed tuberculosis (TB) patients and health providers from DOTS centres were interviewed. Research tools included pre-tested structured questionnaires and the TB patients' referral records.

Results: Of 4974 TB patients who were referred to the different treatment centres, only 1756 (35%) of the counterfoils of the referral slips were returned. Of 250 patients randomly selected for interview, 165 reported to a DOTS centre, 69 did not and 16 could not be traced. Variations in educational qualification, residence and the identification of DOTS centres after counselling were statistically significant ($P < 0.05$). Lower monthly income ($RR = 7.84$, $RR = 5.03$), distance from the centre ($RR = 36.21$) and those receiving treatment from pharmacies ($RR = 3$) or non-governmental organisations ($RR = 28.48$) have more risk of irregular treatment.

Conclusion: A high proportion of referred patients were registered and initiated treatment, but many did not report to the referral treatment centre. Proper counselling and taking into account the patients' preferences during referral are essential to address access barriers to treatment adherence and improved treatment outcome.

Bangladesh is one of the 22 high tuberculosis (TB) burden countries identified by the World Health Organization (WHO), with a prevalence of 402 per 100 000 population and an incidence of 224/100 000 per year.¹ Governmental, non-governmental and private sector providers are highly committed to working together to achieve TB control.² One of the current priorities of the Bangladesh National TB Programme (NTP) is to develop an urban strategy that can effectively engage diverse health care providers in providing accessible care for the poor.³

The population density of Bangladesh's capital, Dhaka, is about 19 380 per km² (50 000/square mile),⁴ and the total population is 14.5 million.⁵ There is a basic health care delivery system in Dhaka City, with designated areas where non-governmental organisation (NGO) clinics provide primary health care. The NTP adopted the DOTS strategy for the country in 1993, and expanded DOTS services to Dhaka Metropolitan Area in 2002 through mixed public-private activities. The NTP has set up a referral system across

providers designed to enable early diagnosis and convenient treatment. A total of 17 DOTS corners have been established in different tertiary level hospitals in both the public and private sectors where a large number of TB patients are diagnosed. NGOs also manage 115 DOTS centres, providing free treatment for TB across the city.⁶ Orientation programmes are conducted to inform different professionals from these institutes about DOTS and the national guidelines. Individuals with TB symptoms and diagnosed patients are referred from in-patient and out-patient departments to the respective DOTS corner.⁷ Following diagnosis, patients who live near the DOTS corner are registered there, while others are referred to the centre nearest to their homes for registration.⁸ Seriously ill patients are admitted to hospital to receive initial treatment from attending nurses and are later referred to the nearest local centre to complete treatment.⁹

Completion of anti-tuberculosis treatment is challenging due to the long duration of treatment.¹⁰ Patient convenience and satisfaction with services are important factors in treatment success. Effective counselling increases treatment completion and reduces loss to follow-up.¹¹

Because the diagnosis and treatment sites are usually different, treatment initiation is a key challenge in urban TB control. In the current system, when a TB case is confirmed, a referral form is completed. A copy of this form is given to the patient, who is sent to the recommended treatment facility, and the original is retained by the referring facility. The receiving facility completes the bottom part of the form and returns it to the referral institution as soon as the patient reports for treatment.¹² If a patient fails to report for treatment, there is no comprehensive mechanism in place to trace them.

OBJECTIVES

General objective

The aim of the study was to assess the patient referral system in the urban DOTS programme in Dhaka, Bangladesh, with a view to identifying problems and solutions.

Specific objectives

The specific objectives were 1) to evaluate the overall progress of urban DOTS in Dhaka; 2) to identify the gaps in the referral system in Dhaka; and 3) to determine the associated factors for patients referred to the peripheral DOTS centres following diagnosis, but whose treatment information is not recorded at the diagnostic centres.

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KEY WORDS

referral linkage; diagnostic centre; DOTS centre; counselling

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FIGURE Flow chart of referral system for TB patients. TB = tuberculosis; DMHC = Dhaka Medical College and Hospital.

Rationale

Since the introduction of DOTS in urban areas, various attempts have been made to establish a suitable system for TB care, and especially for patient referral. Despite many efforts to improve coordination, no comprehensive analysis of patient outcomes and the referral system has been conducted. This study aimed to evaluate the situation of the patient referral system and to develop recommendations.

METHODS

Study design

In this retrospective cohort study, the referral registers of three large TB diagnostic centres in the city were used for sampling. The Chankharpool and Shamoly Chest Disease Clinics, the Dhaka Medical College and Hospital (DMCH) and 30 treatment (DOTS) centres in the Dhaka urban and peri-urban areas were involved in the study.

Data sources, sampling and tools

The details of TB patients referred in 2013 were obtained by reviewing the referral registers of three diagnostic centres. Based on the maximum patient load, a total of 30 urban DOTS centres were purposefully selected for the study area. All 30 DOTS providers and 250 TB patients from among 4974 referred cases were randomly selected for interview. Pre-tested structured questionnaires were used. Cases involving children (age 0–14 years) were excluded from the study.

Data variables collected

Data variables were collected from March to September 2014 in relation to the objectives of the study. To address the first objective, the referral registers of the three TB diagnostic centres were

reviewed for information as to whether the referred TB patients had reported to the treatment centres (Table 1). To explore the second and third objectives, a total of 234 TB patients and 30 providers were interviewed using a pre-tested structured questionnaire.

Data entry, analysis and statistics

Data entry was performed with the original study ID from the structured proforma, and data analysis was conducted using SPSS software version 20 (Statistical Package for Social Sciences, IBM, Montauk, NY, USA). Statistical analysis was performed using the χ^2 test and by calculating relative risk (RR).

Ethics approval

Ethical approval for the study was obtained from the ethics committee of the Research Institute of Tuberculosis, Tokyo, Japan and from the Bangladesh Medical Research Council. Subjects were informed about the purpose of the study and written consent was obtained, with the freedom to decline and other rights in a non-coercive environment. Regarding the data set that contains individual names, addresses and other results, strict confidentiality was kept through encoding.

RESULTS

Treatment information on cases referred from three tuberculosis diagnostic centres

Of 5229 TB patients diagnosed at the three diagnostic centres in 2013, 4974 (95%) were referred to the different treatment centres. The 2013 TB treatment registers of the 30 DOTS centres were cross-checked with the TB patients diagnosed at the three diagnostic centres in 2013. Initiation of treatment was confirmed for 3698 (74% of total referred) TB patients registered in the different treatment centres by mobile; however, only 1756 (35%) referral slips were returned to the diagnostic centres. The remaining 1276 (26%) patients did not attend the treatment centres to which they had been referred.

Tuberculosis patients who followed the referral vs. those who did not

Of the 250 TB patients selected for interview, it was not possible to trace 16 during the visits. Of the 234 patients who were interviewed, most of those who had not followed the referral system were illiterate and had not received a formal education (60.9%) in comparison to those (44.8%) who followed the system (Table 2). Most of these patients (62.3%) resided in urban slums and had an irregular monthly income (50.7%), and the majority (55.1%) could not follow the instructions during counselling regarding the location of the treatment centre. On the other hand, 98.2% of patients who reported to the treatment centres were able to follow the instructions provided during counselling. The above variations were statistically significant ($P < 0.05$, Table 3).

TABLE 1 Treatment information for cases referred from three TB diagnostic centres, 2013

Diagnostic centre	Total cases diagnosed <i>n</i>	Total referred cases <i>n</i> (%)	Referral slips returned to diagnostic centre <i>n</i> (%)	Cases registered at treatment centre <i>n</i> (%)	Cases not registered at treatment centre <i>n</i> (%)
Chankharpool	1227	1137	288 (25)	883 (78)	254 (22)
Shamoly	2255	2255	591 (26)	1835 (81)	420 (19)
DMCH	1747	1582	877 (55)	980 (62)	602 (38)
Total	5229	4974 (95)	1756 (35)	3698 (74)	1276 (26)

TB = tuberculosis; DMCH = Dhaka Medical College and Hospital.

TABLE 2 TB patients who followed the referral system vs. those who did not

Variables	Patients following referral system (<i>n</i> = 165) <i>n</i> (%)	Patients not following referral system (<i>n</i> = 69) <i>n</i> (%)	<i>P</i> value (χ^2)
Education			
Illiterate	38 (23.0)	14 (20.3)	0.013
Non formal	36 (21.8)	28 (40.6)	
Formal	90 (54.5)	27 (39.1)	
Data missing	1 (0.6)	0	
Monthly income			
Regular	87 (52.7)	34 (49.3)	0.648
Irregular	74 (44.8)	35 (50.7)	
Data missing	4 (2.4)	0	
Sex			
Female	87 (52.7)	37 (53.6)	0.808
Male	77 (46.7)	32 (46.4)	
Data missing	1 (0.6)	0	
Residence			
Urban	94 (57.0)	26 (37.7)	0.006
Urban slum	67 (40.6)	43 (62.3)	
Other	4 (2.4)	0	
Identification of DOTS centres (after counselling)			
Could follow instructions	162 (98.2)	30 (43.5)	0.000
Could not follow instructions	3 (1.8)	38 (55.1)	
Data missing	0	1 (1.4)	

TB = tuberculosis

Tuberculosis patients who did not follow the referral system

Of the 69 TB patients who did not report to the treatment centre specified, 32 were male. Those in the economically productive age group (15–64 years) had a greater risk of not following up on the referral compared with patients aged ≥ 65 years. Patients with a monthly family income of Bangladeshi taka (BDT) $\leq 10\,000$ or BDT 11 000–20 000, were more likely not to follow the referral (RR = 7.84 and RR = 5.03, respectively), than those who had an income of $\geq$ BDT 21 000 (US\$ 1.00 = BDT 79.3, November 2015). Moreover, distance was found to be a highly attributable risk factor (RR = 36.21) for not beginning treatment in the DOTS centres. TB patients who obtained treatment from the pharmacy and reported to other treatment centres were at particularly higher risk for irregular treatment (RR = 3 and RR = 28.48, respectively) compared to the DOTS centre patients.

Providers' perspective

A total of 30 health care providers were interviewed regarding their knowledge about counselling and the process of referral (Table 4). Only 40% of them had the experience of referring TB patients to the DOTS centres through proper counselling, indicating that the counselling of TB patients was inadequate. Although there were different opinions among the health providers, most of them reported sending the feedback form back on the same day that they received the patients. In most cases, the method for sending the feedback was via mobile telephone in addition to returning the lower portion of the referral slip to the diagnostic centre. The diagnostic centres received the treatment registration number from the treatment centres through mobile telephone or text message.

Patient outcomes

The treatment outcomes of 234 TB patients were reviewed in the treatment registers (Table 5). The outcome of those patients who

TABLE 3 Characteristics of TB patients who did not report to DOTS centres after diagnosis and referral

	<i>n</i> (%)	RR
Sex		
Female	37 (53.6)	1.15
Male	32 (46.4)	Reference
Age group, years		
<15	3 (4.3)	3.07
15–44	54 (78.3)	55.92
45–64	11 (15.9)	11.35
≥ 65	1 (1.4)	Reference
Income, BDT		
$\leq 10\,000$	39 (56.5)	7.84
11 000–20 000	25 (36.2)	5.03
$\geq 21\,000$	5 (7.2)	Reference
Reasons for not accessing referred centres		
Distance to centre	35 (50.7)	36.21
Physical health status	1 (1.4)	Reference
Unknown	31 (44.9)	32.07
Mental health condition	1 (1.4)	1
Other	1 (1.4)	1
Received treatment from		
Other government centre	4 (5.8)	2
Pharmacy	6 (8.7)	3
Other NGO centres	57 (82.6)	28.48
Others	2 (2.9)	Reference
Total	69 (100)	

TB = tuberculosis; RR = relative risk; BDT = Bangladeshi taki; NGO = non-governmental organisation.

TABLE 4 Provider information

Information	<i>n</i> (%)
Refer to other centres through proper counselling	
No	18 (60)
Yes	12 (40)
Pattern of referral by providers	
Transfer to another treatment centre after registration	8 (26.7)
Refuse to register and transfer back to referral centre	4 (13.3)
Do not refer to other centres	18 (60)
Time to inform about referred patients	
Same day	27 (90)
Weekly	1 (3.3)
Within a few days	1 (3.3)
Missing information	1 (3.3)
Referral method	
Mobile telephone	5 (16.7)
Mobile telephone and referral slip	17 (56.7)
Referral slip only	8 (26.7)
Total	30 (100)

received treatment at places other than the DOTS centres was below the national average (<92%), and unfavourable in comparison with those who were successfully referred to NTP treatment centres.

DISCUSSION

The TB referral system in Dhaka is well-established, and overall communication and collaboration has improved among service providers, which ensured that approximately 74% of TB patients are registered in the referral centres. Patient awareness regarding the health system remains a challenge to accessing quality services.¹³ Front-line health service providers should play a pivotal role in health service delivery.¹⁴ In TB control, patient behaviour is an important factor in facilitating the treatment process. Economic and geographical factors can create barriers to accessing health care services.¹⁵

This study shows that for poor patients, distance and transportation costs are a significant barrier to seeking care for TB. A lack of understanding about the clinic location was another challenge for clients with low literacy or who did not understand the information given. Approximately 26% of all cases diagnosed will need more supportive referral mechanisms from providers, potentially leveraging the infrastructure of community health workers, and providers should consider providing transportation stipends. A referral feedback system, perhaps using mobile technology, could also help providers identify those patients who do not present for treatment.

Many patients are diagnosed by private providers who fail to provide effective counselling and referrals. Regular refresher training for the service providers of diagnostic and DOTS centres is also needed. Specific counselling for patients on the need for early and proper treatment is essential¹⁶ for curing the disease, and prevents transmission in the family and community. The patient's registration information in the treatment centre is thus crucial to ensure the right treatment and protect the community. In addition, access barriers—time, distance and transportation costs for patients to treatment services—will be reduced further if the treatment centres are close to patients' home or work place according to their convenience. A limitation of the study was the purposive

TABLE 5 Patient outcomes

Outcome	Patients following referral system (<i>n</i> = 165) <i>n</i> (%)	Patients not following referral system (<i>n</i> = 69) <i>n</i> (%)
Successfully treated	158 (93.5)	56 (81.2)
Lost to follow-up	3 (1.8)	11 (15.9)
Failure	1 (0.6)	2 (2.9)
Not evaluated	3 (1.8)	0

selection of the urban treatment (DOTS) centres, and there may have been recall bias by study participants in this retrospective cohort study.

CONCLUSION

This study shows that health care providers do not fully respect the existing referral system established by the NTP. Health service providers who are closely involved in patient referral should recognise the importance of referral and address the treatment access barriers of their patients. The NTP should organise specific orientation/training and refresher courses, addressing the importance of the referral system taking into account the convenience and choice of patients. Proper counselling during the referral of TB patients from the diagnostic centre is essential, as it will guide TB patients to register and initiate early anti-tuberculosis treatment under the NTP. Thus, capacity building on effective counselling of the health workforce is essential for the smooth functioning of the referral system to ensure the early treatment initiation and to minimise unfavourable treatment outcomes. The return of the referral slips from the peripheral DOTS centres and the regular update of the referral registers are necessary to maintain a good referral network.

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Objectif : Evaluer le système de référence dans les programmes de DOTS urbains dans la ville de Dhaka, Bangladesh, et sa banlieue et à identifier les opportunités de renforcer ce système.

Schéma : Une étude rétrospective de cohorte a interviewé les patients ayant eu un diagnostic de TB et les prestataires de soins des centres de diagnostic et de traitement (DOTS). Les outils de recherche ont inclus des questionnaires structurés pré testés et de registres de référence de patients TB.

Résultats : Un total de 4974 patients TB a été référé aux différents centres de traitement. Seulement 1756 (35%) des fiches de référence des homologues ont été retournées. Parmi eux, 250 patients ont été sélectionnés au hasard pour un entretien. Parmi eux, 165 patients sont allés dans les centres DOTS, 69 n'y sont pas allés et 16 n'ont pas pu être retrouvés. On a découvert des

variations statistiquement significatives en matière de niveau d'instruction, de lieu de résidence et d'identification du centre DOTS après conseil ($P < 0,05$). Les personnes ayant un revenu mensuel plus faible ($RR = 7,84$; $RR = 5,03$), la distance par rapport au centre ($RR = 36,21$) et prenant leur traitement dans une pharmacie et divers autres lieux ont eu un risque plus élevé ($RR = 3$; $RR = 28,48$) de prendre un traitement irrégulier.

Conclusion : Un bon nombre de patients référés ont été enregistrés et ont mis en route le traitement mais ne sont pas retournés au centre de traitement indiqué. Un conseil adapté et le fait de tenir compte des préférences du patient pendant la référence sont essentiels pour répondre aux contraintes d'accès, pour l'adhésion au traitement et pour un meilleur résultat du traitement.

Objetivo: Evaluar el sistema de remisiones en el marco de la estrategia DOTS y reconocer las oportunidades que existen de fortalecer el sistema y se llevó a cabo en la ciudad de Dhaka, Bangladesh, incluida su zona periurbana.

Método: Fue este un estudio retrospectivo de cohortes, en el cual se administraron entrevistas a los pacientes con diagnóstico de tuberculosis (TB) y a los trabajadores de salud de los centros DOTS de diagnóstico y tratamiento. Los instrumentos de la investigación consistieron en cuestionarios estructurados y registros de las remisiones de los pacientes con TB.

Resultados: Se remitieron 4974 pacientes con diagnóstico de TB a los diferentes centros de tratamiento. Solo se recibieron 1756 notificaciones de contrarreferencia en los centros de origen (35%). De estos pacientes se escogieron de manera aleatoria 250 para las entrevistas. De los pacientes escogidos, 165 se habían registrado en el centro DOTS, 69 no se presentaron y fue imposible localizar a 16

de los pacientes. Los factores significativos que determinaron estas diferencias fueron el grado de instrucción, el lugar de residencia y la capacidad de seguir las instrucciones para localizar el centro DOTS ($P < 0,05$). Se observó que el riesgo de irregularidad en cumplimiento terapéutico se asoció con un ingreso mensual más bajo (hasta 10 000 takas, riesgo relativo $[RR] = 7,84$; de 10 000 takas a 20 000 takas, $RR = 5,03$), el hecho de vivir a una distancia mayor del centro DOTS ($RR = 36,21$) y de haber recibido el tratamiento en una farmacia ($RR = 3$) o en centros diferentes a los designados ($RR = 28,48$).

Conclusión: Un buen número de pacientes remitidos se registró e inició el tratamiento antituberculoso, pero muchos no acudieron al centro específico DOTS. Es primordial ofrecer una orientación adecuada y tener en cuenta las preferencias del paciente durante la remisión, a fin de superar los obstáculos que existen al cumplimiento del tratamiento y obtener mejores resultados terapéuticos.