Tuberculosis-related technical enquiries received by a national level institution in Japan, 2014–2016

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Background: Japan had a tuberculosis (TB) notification rate of 13.9 per 100 000 population in 2016.

Objectives: To characterise TB-related enquiries received by the Research Institute of Tuberculosis, Tokyo, Japan, between January 2014 and December 2016.

Design: A descriptive study of the time, place and other attributes of the enquiries.

Results: A total of 1864 enquiries were listed for analysis. On average, 51.8 enquiries (range 30–77) were received per month. The enquiry rates were highest for Yamanashi (5.87/100 000) and Kochi (5.77) Prefectures, and lowest in Miyazaki (0.45) and Saga (0.48) Prefectures. Enquirers belonged mostly to local governments ($n = 1212$, 65%) and health care facilities ($n = 386$, 21%), and included medical doctors ($n = 412$, 22%), nurses ($n = 926$, 50%) and the general public ($n = 150$, 8.0%). Most enquiries concerned TB diagnosis and treatment ($n = 475$, 25%), including diagnosis in general ($n = 38$, 2.0%), laboratory diagnosis ($n = 83$, 4.5%), anti-tuberculosis treatment in general ($n = 62$, 3.3%) and the management of comorbidities or adverse events ($n = 60$, 3.2%), followed by contact investigations ($n = 371$, 20%).

Conclusions: As most enquiries concerned the diagnosis and treatment of TB, the Ministry of Health of Japan should maintain a number of specialised TB institutions with TB clinicians to provide technical assistance.

In Japan, the tuberculosis (TB) notification rate has declined over the past six decades from 698 per 100 000 population in 1951 to 15.4/100 000 in 2014.^{1,2} Nevertheless, about 7000 smear-positive pulmonary TB cases are still reported every year,³ with >65% involving persons aged ≥ 65 years. As these infectious TB cases pose a health threat to the community, local health offices are responsible for conducting contact investigations^{4–6} under the Communicable Disease Control Law of 1998.⁷ With the steady increase in the proportion of immigrants among all TB cases, from 2.4% in 2000 to 5.6% in 2014, TB among immigrants is also a challenge to TB elimination in Japan. In 2014, immigrants accounted for 43% of TB cases among those aged 20–29 years.^{1,3} Moreover, immigrants may have drug-resistant TB,^{8,9} particularly multi- or extensively drug-resistant TB (M/XDR-TB), which are about 6–16 times more costly to treat than drug-susceptible TB.¹⁰

The Research Institute of Tuberculosis (RIT), Tokyo, Japan, receives about 700 TB-related technical enquiries every year from public health workers at local

health offices and from health care workers (HCWs) at health care facilities all over the country; these communications, including our responses, are stored electronically in a computer server. These enquiries reflect the interests and concerns of frontline HCWs. However, no detailed analysis has been conducted to determine what topic or area is more frequently enquired about than others, nor who the frequent enquirers are. The relationship between the frequency of the enquiries and the TB notification rate is also not known. As the number of TB cases declines in Japan, the number of TB experts may also be declining at a similar or faster rate. However, the national TB control programme (NTP) needs to retain clinical and epidemiological expertise in TB to respond to the enquiries.

The present study aimed to characterise TB-related enquiries received by the RIT from January 2014 to December 2016, to explore any correlations between the enquiries with time or TB notification rates of prefectures, and to share the results, particularly with intermediate TB burden countries, who may experience similar challenges in the near future.

STUDY POPULATION, DESIGN AND METHODS

This is a descriptive study of TB-related enquiries in terms of time, place and classification with analyses of correlation of the enquiries with time or TB notification rates of prefectures. The RIT has been receiving enquiries and providing technical assistance on TB, including clinical and public health matters through its website,¹¹ and by telephone and fax. Announcements are normally made during training courses stating that RIT welcomes enquiries and provides consultations. These training courses accommodate more than 2000 participants and are held annually at the RIT as well as locally by RIT staff members. When an enquiry is received by e-mail or telephone at the RIT, one of the primary responders (two physicians and three nurses) on duty replies. If more expert opinion is needed, the enquiry is forwarded to other staff members, including a consultant physician, an epidemiologist or two medical microbiologists. Summaries of the telephone communications are recorded in a logbook. At the end of each month, an administrative staff member reminds all the responders to record their telephone communications in the logbook.

In our study, an enquiry was defined as an event whereby the RIT received a telephone call or an e-mail containing an enquiry on TB-related subjects, such as

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KEY WORDS

consultations; epidemiology;
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FIGURE 1 Number of TB-related enquiries received by month at the Research Institute of Tuberculosis, Tokyo, Japan, 2014–2016. TB = tuberculosis.

diagnosis and treatment and TB control, between January 2014 and December 2016.

The date, the name of the organisation to which the enquirer belonged, the profession of the enquirer, the initial classification of the enquiry and a summary of the enquiry were extracted by a researcher from the logbook recording the telephone communications and the e-mails; these data were then entered into a Microsoft Excel 2010 (Microsoft, Seattle, WA, USA) spreadsheet. The names of the enquirers were not entered in the database to protect their confidentiality. We classified one enquiry into two categories only if the enquiry explicitly included two independent questions and only if the questions were not related. After completion of data entry, two other researchers independently reviewed the database, particularly the classifications, and reclassified them if necessary. Any disagreement in the decisions of the latter two researchers was resolved by a fourth researcher. If one or multiple follow-up communications were recorded, only the initial communication was counted if the follow-up communication(s) arrived within 1 month. Administrative, rather than technical, communications, including requests to send a lecturer for training sessions, were excluded from the analysis.

To classify the enquiries, nine categories were created: 1) TB diagnosis and treatment, including laboratory diagnosis; 2) contact investigation; 3) TB in foreigners, and TB control and policies overseas; 4) regulatory or legal framework related to TB control; 5) bacille Calmette-Guérin vaccination; 6) latent tuberculous infection and its treatment; 7) prevention of nosocomial infection; 8) general or basic enquiries related to TB; and 9) others. 'TB diagnosis and treatment, including laboratory diagnosis' was further classified into 11 subcategories: 1) diagnosis in general, 2) laboratory diagnosis, 3) anti-tuberculosis treatment in general, 4) management of comorbidity or adverse events, 5) selection of drugs when the standard four-drug regimen was not applicable, 6) treatment duration, 7) treatment of extra-pulmonary TB other than TB in lymph node or TB pleuritis, 8) retreatment or resistant TB, 9) dealing with TB patients, including DOTS, 10) non-adherent TB patients and 11) other.

Pearson's correlation analysis was conducted to determine the relationship between the number of enquiries and time by month and between enquiry rates and TB notification rates/100 000 in the prefectures using R software (R Foundation, Vienna, Austria) to explore any associations. In calculating enquiry rates and TB notification rates by prefecture, the 2015 estimated population by prefecture (downloaded from the National Statistics Bureau, To-

kyo, Japan) was used.¹² The number of TB cases by prefecture was obtained from routine surveillance data.¹³

The requirement for ethical approval for the study was waived by the Institutional Review Board of RIT (RIT/IRB 29-11) as this was a retrospective study and involved the use of secondary data that had been already collected during routine activities.

RESULTS

A total of 2135 communications (2.87 per working day) were initially entered into the spreadsheet, 174 of which were later determined to be administrative and 95 to be follow-up communications, thus leaving 1864 enquiries for analysis. Communications were received by e-mail ($n = 1265$, 68%) and telephone ($n = 599$, 32%).

Figure 1 shows the numbers of enquiries per month. An average of 51.8 enquiries (range 30–77) were received per month from January 2014 to December 2016, with no statistically significant increasing or decreasing trend ($R = 0.24$, 95% confidence interval [CI] -0.10 to 0.52). The geographic distribution of the enquiry rates is shown in Figure 2. The enquiry rate was highest (5.99/100 000) for Yamanashi Prefecture, followed by Kochi (5.77) and Ishikawa (3.90), and was lowest in Miyazaki (0.45), followed by the Saga (0.48) and Okayama (0.52) Prefectures. There was no correlation between the enquiry rates of the prefectures and their TB notification rates ($R = 0.085$, 95%CI -0.21 to 0.36).

The affiliations of the enquirers were local governments ($n = 1212$, 65%), health care facilities ($n = 386$, 21%) or were unknown/others ($n = 266$, 14%). A total of 633 different organisations were represented. Enquirers included medical doctors ($n = 412$, 22%), public health and clinical nurses ($n = 926$, 50%), other health care professionals, including veterinarians ($n = 44$, 2.4%), the general public ($n = 150$, 8.0%) and others ($n = 334$, 18%). Enquiries were related to TB diagnosis and treatment, including lab-

FIGURE 2 Geographic distribution of TB-related enquiry rates per 100 000 population received by the Research Institute of Tuberculosis, Tokyo, Japan, 2014–2016. TB = tuberculosis.

FIGURE 3 Classification of TB-related enquiries received by the Research Institute of Tuberculosis, Tokyo, Japan, 2014–2016. TB = tuberculosis; BCG = bacille Calmette-Guérin; LTBI = latent tuberculous infection.

oratory diagnosis ($n = 475$, 25%), contact investigation ($n = 371$, 20%), TB in foreigners, and TB control and policies overseas ($n = 193$, 10%) (Figure 3). The information gathered on the 11 subcategories of TB diagnosis and treatment, including laboratory diagnosis, was as follows: diagnosis in general ($n = 38$, 2.0%), laboratory diagnosis ($n = 83$, 4.5%), anti-tuberculosis treatment in general ($n = 62$, 3.3%), the management of comorbidity or adverse events ($n = 60$, 3.2%), selection of drugs when the standard four-drug regimen was not applicable ($n = 48$, 2.6%), treatment duration ($n = 41$, 2.2%), treatment of extra-pulmonary TB other than lymph node TB or TB pleuritis ($n = 30$, 1.6%), retreatment or resistant TB ($n = 27$, 1.4%), TB patient management, including DOTS ($n = 31$, 1.7%), non-adherent TB patients ($n = 16$, 0.86%) and other ($n = 39$, 2.1%).

DISCUSSION

We conducted a review of enquiries about TB received from all over Japan from 2014 to 2016. Most enquiries concerned the diagnosis and treatment of TB, including laboratory diagnosis, and contact investigations, followed by foreign-born TB patients and TB control in foreign countries. Two thirds of the enquiries were from local governments, and only one fifth were from health care facilities. There were substantial differences in the geographical distribution of the enquiry rates, ranging from $<1/100\,000$ to almost $6/100\,000$.

One possible reason for the high frequency of enquiries about TB diagnosis and treatment could be that physicians now have less expertise about TB than in the past, as the number of TB patients has decreased in Japan; furthermore, the frontline HCWs may not have received regular refresher training, a situation similar to that observed in the United States.¹⁴ Another reason may be that because most TB patients in Japan are elderly, some of whom have difficulties swallowing, and are more likely to have underlying diseases that make treatment difficult due to various possible side effects, underlying diseases and drug-drug interactions, physicians may need to deal with complicated situations that require the advice of expert TB clinicians.

Enquiries related to contact investigations accounted for the second largest number because it is sometimes difficult for local health offices to decide the scope of a contact investigation and they might require guidance by experts. As the issue of TB in foreign-born patients has become a bigger challenge in Japan in the

past decade,¹⁵ enquiries related to foreign-born TB patients and TB control in high TB burden countries were the third major topic of enquiry. Local health offices were likely to have played a coordinating role between health care facilities and the institution specialising in TB, as about a quarter of the enquiries were related to very clinical matters, while only about a fifth of the enquiries were directly from health care facilities. The substantial differences in the geographical distribution of enquiry rates in the prefectures might reflect the ease of access to local TB experts, rather than the actual TB notification rates in the prefectures.

There seem to be no previous studies on TB-related enquiries to country NTPs at any level or their classification, although similar activities must have been conducted as one of the roles of any NTP.^{16,17} Of note, several models for providing expert advice to local physicians in the management of M/XDR-TB have been proposed in the United States,¹⁴ the United Kingdom¹⁸ and in a resource-limited setting in Africa.¹⁹ At the local government level, Saito reported 402 TB-related enquiries made in Wakayama Prefecture in 2015–2016, of which 32% were related to treatment, 27% to laboratory tests and radiological examinations, and 19% to diagnosis; enquiries were more focused on clinical aspects, rather than public health issues, probably because the author belonged to a local government.²⁰ In a review of another prefecture in Japan, Nishio et al. reported that enquiries received from HCWs and the general public were related only to tuberculin skin testing.²¹

Our study has both strengths and limitations. One of the strengths is that we reviewed enquiries received over a period of three consecutive years, and they thus seem to represent enquiries on TB asked at the national level in Japan. However, as some basic enquiries should have been settled at the local level,²⁰ they have not been included in our study. The system of classifying enquiries might appear arbitrary, particularly the multiple categories of TB diagnosis and treatment, and of TB control; however, we have tried our best to accurately classify these enquiries and we believe the classification reflects the reality of TB-related questions at national level.

As most enquiries were related to TB diagnosis and treatment, the Ministry of Health, Labour, and Welfare (MHLW) of Japan should maintain one or perhaps two specialised TB institutions with expert TB clinicians and microbiologists available at national or subnational level to provide technical assistance, including training, education and medical consultation,^{17,22} to local governments and clinicians at the grassroots level. Japan is a long coun-

try and there are multiple large metropolitan areas in western and eastern Japan. The NTP should also continue to provide technical assistance, including epidemiological assistance, as is done in the United States,²³ for TB contact and outbreak investigations to those who need it. As TB in the foreign-born is currently becoming a greater challenge for local governments, the MHLW should initiate pre-entry screening and strengthen post-entry screening in persons from high TB burden countries^{24,25} to ensure early detection of TB.

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Contexte : Le Japon avait un taux de notification de la tuberculose (TB) de 13,9 par 100 000 habitants en 2016.

Objectif : Caractériser les demandes liées à la TB reçues par le Research Institute of Tuberculosis, Tokyo, Japon, de janvier 2014 à décembre 2016.

Schéma : Une étude descriptive en termes de date, lieu et autres caractéristiques des demandes.

Résultats : Un total de 1864 demandes ont été listées pour l'analyse. En moyenne, 51,8 demandes (fourchette 30–77) par mois ont été reçues. Les taux de demande ont été les plus élevés pour les préfectures de Yamanashi (5,87/100 000 habitants) et de Kochi (5,77) et les plus bas dans les préfectures de Miyazaki (0,45) et de Saga (0,48). Les organisations principales auxquelles appartenaient les

demandeurs ont été les gouvernements locaux ($n = 1212$; 65%) et les structures de soins de santé ($n = 386$; 21%). Les demandeurs ont été des médecins ($n = 412$ 22%), des infirmiers ($n = 926$; 50%) et le public général ($n = 150$; 8,0%). Les demandes les plus fréquentes ont été liées au diagnostic et au traitement de la TB ($n = 475$; 25%), incluant le diagnostic en général ($n = 38$; 2,0%), le diagnostic de laboratoire ($n = 83$; 4,5%), le traitement de la TB en général ($n = 62$; 3,3%) et la prise en charge des comorbidités ou des effets secondaires ($n = 60$; 3,2%), suivies par la recherche des contacts ($n = 371$; 20%).

Conclusion : Comme les demandes les plus fréquentes ont été relatives au diagnostic et au traitement de la TB, le Ministère de la santé du Japon devrait maintenir quelques institutions spécialisées dans la TB avec des cliniciens qui pourraient fournir une assistance technique.

Marco de referencia: En el Japón, la tasa de notificación de tuberculosis (TB) fue 13,9 por 100 000 habitantes en el 2016.

Objetivos: Caracterizar las consultas relacionadas con la TB que se recibieron en el Instituto de Investigación en Tuberculosis, Tokyo, Japón, de enero del 2014 a finales de diciembre del 2016.

Método: Se llevó a cabo un estudio descriptivo de las consultas con respecto al tiempo, el lugar y otros atributos de las mismas.

Resultados: Se registraron 1864 consultas para análisis. En promedio, se recibieron 51,8 consultas por mes (entre 30 y 77). La tasa de consultas más alta correspondió a las prefecturas de Yamanashi (5,87/100 000 habitantes) y Kochi (5,77) y la más baja a las prefecturas de Miyazaki (0,45) y Saga (0,48). Las principales organizaciones de los solicitantes pertenecían a los gobiernos locales

($n = 1212$; 65%) y a los establecimientos de salud ($n = 386$; 21%). Los solicitantes fueron médicos ($n = 412$; 22%), enfermeros ($n = 926$; 50%) y el público en general ($n = 150$; 8,0%). Las consultas más frecuentes se relacionaban con el diagnóstico y el tratamiento de la TB ($n = 475$; 25%), entre otros, el diagnóstico en general ($n = 38$; 2,0%), el diagnóstico en el laboratorio ($n = 83$; 4,5%), el tratamiento antituberculoso en general ($n = 62$; 3,3%) y el manejo de las enfermedades intercurrentes o las reacciones adversas ($n = 60$; 3,2%), seguidos de la investigación de contactos ($n = 371$; 20%).

Conclusiones: Dado que las consultas más frecuentes se referían al diagnóstico y el tratamiento de la TB, el Ministerio de Salud del Japón debe conservar algunas instituciones especializadas en TB con médicos experimentados que presten asistencia técnica en esta esfera.