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Why do child contacts of multidrug-resistant tuberculosis not come to the assessment clinic?

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Background: Local policy advises that children exposed to multidrug-resistant tuberculosis (MDR-TB) should be assessed in a specialist clinic. Many children, however, are not brought for assessment.

Methods: Focus group discussion was used to design appropriate questionnaires. From 1 September 2011, the first 50 children referred to the specialist paediatric MDR-TB clinic, Cape Town, South Africa, and who attended their clinic appointment, were recruited. The first 50 children who were referred but who did not attend were concurrently identified, traced and recruited. Differences in group characteristics were compared.

Results: The median age of the children was 35 months: 48 (48%) were boys, 4 (4%) were human immunodeficiency virus infected and 47 (47%) were of coloured ethnicity. Factors significantly associated with non-attendance at the MDR-TB clinic were: Coloured ethnicity (OR 2.82, 95%CI 1.21–6.59, $P = 0.01$), the mother being the source case (OR 3.78, 95%CI 1.29–11.1, $P = 0.02$), having a smoker resident in the house (OR 2.37, 95%CI 1.01–5.57, $P = 0.04$), the time ($P = 0.002$) and cost ($P = 0.03$) required to get to the specialist clinic, and fear of infection whilst waiting to be seen (OR 2.45, 95%CI 1.07–5.60, $P = 0.03$).

Conclusions: Reasons for non-attendance at paediatric MDR-TB clinic appointments are complex and are influenced by demographic, social, logistical and cultural factors.

The World Health Organization (WHO) and other agencies recommend that child contacts of multidrug-resistant tuberculosis (MDR-TB) cases should be assessed for TB disease and, if well, followed up for a period of at least 2 years.[1–11] The rationale is that if child contacts are found to have MDR-TB disease, treatment can be initiated rapidly. If they do not have disease, they are followed to detect incident TB disease. Children at the highest risk of disease progression following infection are the young (aged <5 years)[12,13] and the human immunodeficiency virus (HIV) infected.[14] The policy regarding preventive treatment of child contacts of MDR-TB patients is debatable, with little evidence to inform practice.[15] A wide variety of advice is provided by different agencies, but in the Western Cape Province of South Africa the policy is to give ethambutol, ofloxacin and high-dose isoniazid (INH) daily for 6 months.

In the paediatric TB literature, few studies have quantified the proportion of eligible child contacts brought for assessment following exposure to a case of infectious, drug-susceptible TB.[16–20] Few studies have examined reasons for non-attendance. Children may not be identified, or they may be identified but then not brought to clinic appointments. In other health care contexts, the reasons for failure to attend paediatric clinic appointments are complex, but include logistic and financial aspects, parents' educational status and the attitudes of the parents towards the child, including perceptions regarding the importance of the disease.[21,22] The attrition for child TB contacts appears to occur at every step in the identification and referral cascade.[19]

According to WHO estimates, there were 650 000 prevalent cases of MDR-TB worldwide in 2010.[23] MDR-TB is defined as TB resistant at least rifampicin and INH.[3] Not all of the estimated adult cases are currently diagnosed, but with the imminent roll-out of new molecular diagnostic tests, the proportion diagnosed is likely to rise.[24] As each MDR-TB source case interacts with multiple children,[25] a large number of children are exposed each year. The management of child contacts of MDR-TB differs from that of drug-susceptible TB, as in most programmes they are managed by a clinician with specialist knowledge and experience in paediatric MDR-TB.[1,6] This can have further logistic and financial implications, as this service is frequently only available in academic centres, potentially leading to long delays in obtaining appointments, together with implications for travel and incurred cost to the family. Furthermore, MDR-TB may be perceived as more dangerous and more difficult to manage, possibly further affecting clinic attendance. We aimed to determine potential reasons for clinic non-attendance among child contacts of MDR-TB cases.

METHODS

Setting

The TB notification rate in the Western Cape Province of South Africa was 976 per 100 000 in 2009.[26] Of children with culture-confirmed TB during 2007–2009 at the Tygerberg Children's Hospital (TCH), 8.9% were diagnosed with MDR-TB.[27] Local policy is that, following the diagnosis of MDR-TB in an adult, a home visit is performed. HIV-infected children and children aged <5 years who have been in contact with the MDR-TB source case are referred to their local clinic (roughly 100 exist in the City of Cape Town Health district), where they are assessed by the local clinic team before referral to the regional paediatric MDR-TB clinic. This MDR-TB clinic takes place at TCH, a large provincial, academic hospital and, as an outreach service, is also

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conducted at another site in the city. The referral consists of a telephone call to book an appointment at the specialist clinic and a letter documenting clinical details to be brought to the appointment by the family. Cape Town is comprised mainly of Black (mainly of the Xhosa ethnic group), White (mainly of European ancestry), Indian and Coloured (a heterogeneous ethnic group of mixed ancestry) populations.

Study design

We aimed to determine whether there were differences between the children brought for assessment to MDR-TB specialist clinics and those who were not. While we postulated that factors such as distance and cost may be important, we thought that an initial focus group discussion would be useful to identify potential key variables which could then be examined in a quantitative case-control study.

Focus group discussion

Parents/care givers were purposively sampled to create a focus group of 10 people,[28] to include a mix of sexes, ages, residential locations, ethnicity and whether they had brought their children to appointments. The discussion took place on 5 August 2011 and lasted 90 min. The semi-structured session was facilitated by KZ to cover a series of broad topics but with open-ended discussion encouraged between participants. The session was recorded, transcribed and translated where needed. The transcript was analysed by KZ and JAS using standard ethnographic techniques, to determine themes and concepts that led to the design of questionnaires.[29,30]

Study population and inclusion

From 1 September 2011, a register was created of all children (age <5 years or <13 years if HIV-infected) referred to the MDR-TB clinic at TCH or the outreach clinic, who had been referred as a well child in significant contact with an infectious case of pulmonary MDR-TB (sputum smear- or culture-positive) in the previous 6 months. This register was compiled from telephone referrals. The first 50 children who had been referred and who subsequently attended their clinic appointments were recruited following written informed consent from their parent/care giver (assent in children aged >7 years). Only the first child referred from a household was eligible for inclusion. The first 50 children who had been referred but who failed to attend their clinic appointment were identified, traced and also recruited following consent/assent. Once the child had been recruited, a structured interview was conducted with the parents/care givers. All interviews were conducted by a study nurse (KZ, English and Afrikaans speaking) and research counsellor (English and Xhosa speaking) who asked questions in a standardised manner following training. If the participant did not understand the question, it was repeated, where necessary with explanation from the interviewer. Questionnaire fields included demographics of the household and source case, and the logistic and financial implications of attending clinic appointments, together with perceptions of MDR-TB.

Living standards measure

Parents/care givers were asked a series of questions to determine their assets and disposable income. A well-established market segmentation tool, the Living Standards Measure, devised and subsequently revised by the South African Advertising Research Foundation, has been used widely in South Africa since 1989.[31] The results from 27 variables are used to create a 'score' from 1 to 14, which reflects the standard of living in a household.

Data classification and analysis

Data were analysed using STATA, version 11 (Stata Corp, College Station, TX, USA); missing data were excluded from the analysis. Associations were assessed using the χ^2 (or Fisher's exact) test, with the effect estimated (odds ratios [OR]) and 95% confidence intervals [CI]) calculated. The Mann-Whitney test was used to assess associations between non-parametric data, with median and interquartile ranges (IQRs) calculated.

The study was approved by the Stellenbosch University and London School of Hygiene & Tropical Medicine Ethical Committees.

RESULTS

Focus group discussion

From the focus group discussion, a number of themes emerged. Some were associated with the physical challenges of getting a child to an appointment:

> The local clinic is easier to go to, but to go to Tygerberg Hospital is sometimes difficult to get there because of money we don't have.
>
> The weather plays a role if you have to go to the MDR-TB clinic because you must wait at the taxi rank or bus stop and sometimes it takes two to three rides to get there.

Other themes that emerged included the attitude of clinic staff:

> The sisters at the clinic sometimes take very long to give the letter.
>
> I just feel some of the staff at the clinic is inexperienced.

Other concerns were about the appointment itself:

> I feel uncomfortable because my child is very small and some adults—I could hear how they say that some of them don't take their medication.
>
> I had sleepless nights when I first heard I must take my child to the clinic, I even thought my child was going to die; I didn't know what the doctor was going to say.

Finally, some parents/care givers felt that personal elements affected whether children were brought to appointments:

> I feel some parents just don't take their children to the clinic because they just don't care. They don't take their children's health seriously.
>
> The other reason is also that some parents found it very difficult to get time off from work.

Quantitative study

Of the first 56 children referred who attended, 50 were included. Of the 6 not included, 3 were too old (>5 years, but HIV-negative), 1 child presented with TB disease and 2 families left the clinic before the study team could approach them. Of the first 58 children who were referred but who did not attend, 50 were included. Of the 8 not included, 5 were too old, 1 had moved to a different province and 2 could not be traced. Significant risk factors for non-attendance included ethnicity (Coloured vs. Xhosa, OR 2.82, 95%CI 1.21–6.59, $P = 0.01$), the mother being the TB source case (OR 3.78, 95%CI 1.29–11.1, $P = 0.02$), and cigarettes smoked in the house (OR 2.37, 95%CI 1.01–5.57, $P = 0.04$; Table 1).

There were significant logistic and financial differences between those who attended their appointment and those who did not, including time taken to get to the MDR-TB clinic (45 vs. 60 min, $P = 0.002$) and cost of transport (18.5 vs. 40 SA Rand, $P = 0.03$). Of those not attending specialist clinic appointments, more had to use multiple minibuses (OR 3.08, 95%CI 1.28–7.41, $P = 0.008$; Table 2).

TABLE 1 Characteristics of children, households, main carers and source cases of children referred as contacts of multidrug-resistant tuberculosis

	Did not attend appointment median [IQR] or *n* (%)	Attended appointment median [IQR] or *n* (%)	OR (95%CI)	*P* value
Age, child, months	35 [25–51]	36 [23–53]	—	0.35
Male child	26 (52)	22 (44)	1.38 (0.62–3.05)	0.43
Coloured ethnicity	30 (60)	17 (34)	2.82 (1.21–6.59)	0.01
Child HIV-infected (*n* = 88)	3/40 (7.5)	1/48 (2.1)	3.81 (0.37–39.4)	0.33
Mother main carer for child	44 (88)	41 (82)	1.61 (0.52–4.97)	0.58
Years of education of main carer	10 [8–11]	10 [8–11]	—	0.35
Main carer without any paid work	34 (68)	35 (70)	0.91 (0.39–2.14)	0.83
Main carer looks after other children	20 (40)	29 (58)	0.48 (0.21–1.09)	0.07
Male main carer	2 (4)	6 (12)	0.31 (0.06–1.64)	0.27
Male source case	19 (38)	25 (50)	0.61 (0.27–1.37)	0.23
Mother source case	17 (34)	6 (12)	3.78 (1.29–11.1)	0.02
Household LSM score	6 [6–8]	7 [6–8]	—	0.29
Cigarettes smoked in house	36 (72)	26 (52)	2.37 (1.01–5.57)	0.04
Alcohol drunk in house	27 (54)	27 (54)	1.00 (0.45–2.20)	0.80
Illegal drug use in house	10 (20)	9 (18)	1.14 (0.42–3.11)	1.00

IQR = interquartile range; OR = odds ratio; CI = confidence interval; HIV = human immunodeficiency virus; LSM = living standard measure.

TABLE 2 Financial and travel implications of accessing care for child contacts of multidrug-resistant tuberculosis

	Did not attend appointment median [IQR]	Attended appointment median [IQR]	OR (95%CI)	*P* value
Distance to MDR-TB clinic, km (*n* = 82)	5 [4–8]	6 [2–14]	—	0.77
Time taken to travel to MDR-TB clinic, min (*n* = 93)	60 [45–90]	45 [25–60]	—	0.002
Cost of travel to MDR-TB clinic, SAR	40 [20–60]	18.5 [4–50]	—	0.03
More than one minibus taxi required to get to MDR-TB clinic, *n* (%)	26 (52)	13 (26)	3.08 (1.28–7.41)	0.008

IQR = interquartile range; OR = odds ratio; CI = confidence interval; MDR-TB = multidrug-resistant tuberculosis; SAR = South African Rand.

TABLE 3 Perceptions of disease among parents/care givers of children referred as contacts of MDR-TB

Positive responses to the following questions	Not attending *n* (%)	Attending *n* (%)	OR (95%CI)	*P* value
Do you have confidence in the medical staff at your local clinic?	33 (66)	41 (82)	0.43 (0.16–1.10)	0.07
Do you have confidence in the medical staff at the MDR-TB clinic?	48 (96)	49 (98)	0.49 (0.04–5.67)	1.00
Does the weather affect your decision on whether to attend appointments at the MDR-TB clinic?	16 (32)	13 (26)	1.34 (0.56–3.21)	0.51
Do you consider MDR-TB is a disease that can kill you?	43 (86)	38 (76)	1.94 (0.68–5.50)	0.31
Do you consider MDR-TB a disease that can be treated successfully?	46 (92)	50 (100)	—	0.12
Do you think that people in your community with MDR-TB are discriminated against?	24 (48)	25 (50)	0.92 (0.42–2.03)	0.84
Do you feel that employers in your community discriminate against people with MDR-TB?	37 (74)	28 (56)	2.24 (0.94–5.30)	0.06
Are you concerned about the risk of being infected with MDR-TB while waiting at the MDR-TB clinic?	30 (60)	19 (38)	2.45 (1.07–5.60)	0.03
Do you think that your child would take anti-tuberculosis medicines every day without a problem?	27 (54)	34 (68)	0.55 (0.24–1.26)	0.15
Are you concerned about the side effects of the anti-tuberculosis medicines for the child?	30 (60)	24 (48)	1.63 (0.73–3.62)	0.23
Do you feel that you have to wait a long time to be seen at your local clinic?	28 (56)	17 (34)	2.47 (1.07–5.69)	0.03
Do you feel that you have to wait a long time at the MDR-TB clinic?	11 (22)	10 (20)	1.13 (0.43–2.97)	0.81
Do you think that parents should be responsible for preventing children from getting MDR-TB?	46 (92)	45 (90)	1.28 (0.32–5.11)	1.00
Out of ten, for you how important a priority is it to have your child assessed in the MDR-TB clinic? Median [IQR]	10 [10–10]	10 [10–10]	—	0.37

MDR-TB = multidrug-resistant tuberculosis; OR = odds ratio; CI = confidence interval; IQR = interquartile range.

Families who did not bring their children to their appointments were more concerned about the risk of infection while waiting to be seen (OR 2.45, 95%CI 1.07–5.60, $P = 0.03$; Table 3). Families failing to attend MDR-TB appointments were more likely to feel that they had to wait a long time to be seen at the local clinic (OR 2.47, 95%CI 1.07–5.69, $P = 0.03$).

DISCUSSION

As far as we can determine, this is the first study to examine reasons for non-attendance of child contacts of MDR-TB cases. We conducted a focus group discussion to determine appropriate questions that we could examine quantitatively in a systematic sample of children. Children not brought to appointments were more frequently of Coloured ethnicity and lived in families containing smokers. If the mother was the person with TB, the child was less likely to be brought. For those attending MDR-TB clinic appointments, travel times were shorter, cheaper and required fewer transport changes. Those attending were less concerned about infection risk while waiting to be seen at the MDR-TB clinic, and were made to wait less at their local clinic.

The reasons for the association between ethnicity and attendance are complicated, and may be a surrogate for other socio-economic and cultural characteristics. While we captured details regarding employment, education and living standards, the complex social and cultural implications of ethnicity and lifestyle were not fully investigated. The reason for children being brought less frequently if the mother was the source case may be more easily explained. The mother was the main carer for the child in the majority of instances, and if the mother was unwell or hospitalised, access to evaluation for the child was impaired. Smoking may also be a surrogate for other socio-economic or cultural factors, or it may be that smokers have less money available for transport or feel stigmatised interacting with health care services.

Although it is not surprising that fewer children were brought to clinic appointments if the journey was long, expensive or complicated, it is interesting that the Living Standard Measure or education of the parent did not differ between the two groups. Also of note, attendance appeared to be more influenced by the attitudes of staff at local clinics than staff at the MDR-TB clinic. This reinforces the significance of quality local care to inform and explain the importance of attending appointments as well as to educate children and their families about the disease.

It is also important to note parental perceptions of MDR-TB. Concerns that either they or their child may be exposed to MDR-TB while waiting to be evaluated at either the local or the MDR-TB clinic may be appropriate; significant rates of hospital-acquired infections have been suggested in previous high-profile outbreaks.[32] Even if they are not justified, such perceptions are important determinants of non-attendance. Consideration should be given to infection control practices and in having children attend local clinic appointments at a separate time or in a separate space from adults. Parents/care givers should also be screened for symptoms when they bring children to appointments to avoid the risk, or the perception of risk, of exposure. Perceptions regarding the danger of MDR-TB disease and its treatment also need to be explored and addressed, as do attitudes to MDR-TB and discrimination against those with MDR-TB. This would include education for both health care workers as well as the community.

This observational study employs a combination of qualitative and quantitative research techniques to examine a complex social issue regarding the determinants of human behaviour influencing access to health care. Our study examines an important topic affecting a vulnerable and marginalised group. Limitations of the study include the relatively small sample, which may have obscured true associations. The retrospective nature of the study may have allowed recall bias to influence responses from the non-attendees who may have wanted to justify their decisions not to attend. Furthermore, we only examined families in which the child had been identified and referred to the MDR-TB clinic. We have demonstrated in a previous study that only a small proportion of child contacts of MDR-TB accessed specialist assessment;[33] we did not explore the reasons for non-identification of child contacts. Finally, we have not compared children exposed to MDR-TB with children exposed to drug-susceptible TB. Some of the issues identified in this study may be specific to MDR-TB, but some may be common to all children exposed to TB. Further comparative studies are needed.

The reasons why children are not brought to specialist clinic appointments following exposure to MDR-TB are complex. Care that is more patient-centred would address some of the problems. This means that patients need to be seen near their homes, and should not have to wait for long periods of time to be seen. They should be treated with courtesy and respect, and time should be taken during the consultation to inform and explain the risks and benefits of referral. Home visits by social care teams, community supporters and clinic staff would allow greater interaction and support as well as education about the disease and implementation of infection control. Public health messaging and community education would help to allay fears of infection risk. Finally, further social science research is required to address the implications of ethnicity and how it relates to TB control in Cape Town.

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Contexte : Selon les politiques locales, les enfants exposés aux cas de tuberculose à germes multirésistants (TB-MDR) devraient faire l'objet d'une évaluation dans une polyclinique spécialisée. Toutefois, beaucoup d'enfants ne sont pas amenés à cette évaluation.
Méthodes : On a recouru à des discussions de groupes focalisées pour élaborer des questionnaires appropriés. A partir du 1er septembre 2011, on a recruté les 50 premiers enfants référés à la polyclinique pédiatrique spécialisée en TB-MDR, Cape Town, Afrique du Sud, et qui s'étaient présentés à leur rendez-vous à la polyclinique. Les 50 premiers enfants référés qui ne se sont pas présentés ont été identifiés simultanément, recherchés et recrutés. On a comparé les différences de caractéristiques entre les deux groupes
Résultats : L'âge médian des enfants était de 35 mois, 48 (48%) étaient des garçons, 4 (4%) étaient infectés par le virus de l'immunodéficience humaine et 47 (47%) étaient de race de couleur. Les facteurs en association significative avec la non-présentation à la polyclinique TB-MDR ont été : la race de couleur (OR 2,82 ; IC95% 1,21–6,59 ; $P = 0,01$), le fait que la mère soit le cas-source (OR 3,78 ; IC95% 1,29–11,1 ; $P = 0,02$), le fait qu'il y ait un fumeur à la maison (OR 2,37 ; IC95% 1,01–5,57 ; $P = 0,04$), la durée ($P = 0,002$) et le coût ($P = 0,03$) nécessaires pour arriver à la polyclinique spécialisée ainsi que la crainte d'infection au cours de la période d'attente avant l'examen (OR 2,45 ; IC95% 1,07–5,60 ; $P = 0,03$).
Conclusions : Les raisons de non-présentation au rendez-vous de la polyclinique pédiatrique TB-MDR sont complexes et influencées par des facteurs démographiques, sociaux, logistiques et culturels.

Marco de referencia: Las directrices locales recomiendan la evaluación en un consultorio especializado de los niños expuestos a la tuberculosis multidrogorresistente (TB-MDR). Sin embargo, muchos niños expuestos no acuden a la consulta para investigación.
Métodos: Mediante debates en grupos de opinión se elaboraron los cuestionarios apropiados. A partir del 1° de septiembre del 2011 se incluyeron en el estudio los primeros 50 niños que habían sido remitidos al consultorio pediátrico especializado en TB-MDR y que acudieron a su cita, en la Ciudad del Cabo en Suráfrica. De manera simultánea, se detectaron y se investigaron los primeros 50 niños remitidos que no habían acudido a la consulta especializada y se incluyeron también en el estudio. Se compararon las diferencias en las características de los niños de ambos grupos.
Resultados: La mediana de la edad de los niños fue 35 meses, 48 eran de sexo masculino (48%), 4 presentaban infección por el virus de la inmunodeficiencia humana (4%) y 47 niños eran de etnia de color (47%). Los factores que se asociaron de manera significativa con la inasistencia a la consulta de TB-MDR fueron: la etnia de color (OR 2,82; IC95% de 1,21 a 6,59; $P = 0,01$), el hecho de que la madre fuese el caso original (OR 3,78; IC95% de 1,29 a 11,1; $P = 0,02$), ser contacto domiciliario de un fumador (OR 2,37; IC95% de 1,01 a 5,57; $P = 0,04$), el tiempo ($P = 0,002$) y el costo ($P = 0,03$) necesarios para llegar hasta el consultorio especializado y el temor a la infección durante la espera (OR 2,45; IC95% de 1,07 a 5,60; $P = 0,03$).
Conclusión: Los motivos de la inasistencia al consultorio pediátrico especializado en TB-MDR son complejos y tienen como origen factores demográficos, sociales, logísticos y culturales.

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