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Patient perceptions of tuberculosis transmission: A qualitative study within a tuberculosis cluster

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Significant tuberculosis (TB) spatial–temporal cluster provide where vulnerable person live and indicate possibility of local transmission. Some previous studies showed that there were TB spatial – temporal cluster in some areas, but only few have studied on patient perception of the transmission. The aims of this research are to study experience and interpretation about the transmission mechanism of smear positive TB patients in spatial–temporal clusters in Bandar Lampung and identify possibility of local transmission. A phenomenology qualitative study was performed to identify the experience and interpretation Numbers of samples were 15 patients. Information collected in this research including TB transmission sources, contact duration and transmission mechanism; which obtained through in-depth interview using questionnaire. Data was analysed using qualitative approach. Results showed that informants' perception of TB transmission sources were not from other informants in the clusters, but from in-house contacts, neighbours, and work colleagues. The duration of first contact until informants diagnosed as TB patients were from three months to some years. Transmission mechanism consisted of speaking directly, treating patients with TB, drinking with the same glass and smoking on the same cigarette. Therefore, TB control programs should consider local transmission and its mechanism for a better TB intervention.

Kata kunci:

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A B S T R A K

Cluster spasial–temporal tuberkulosis (TB) yang signifikan menyediakan informasi dimana orang yang rentan berada dan menunjukkan kemungkinan penularan lokal. Beberapa penelitian sebelumnya menunjukkan adanya TB spasial–temporal cluster di beberapa daerah, tetapi hanya sedikit yang mempelajari persepsi pasien terhadap penularan. Penelitian ini bertujuan untuk mempelajari pengalaman dan interpretasi tentang mekanisme penularan pasien TB BTA positif di cluster spasial – temporal TB di Bandar Lampung dan mengidentifikasi kemungkinan penularan lokal. Penelitian kualitatif fenomenologi dilakukan untuk mengidentifikasi pengalaman dan interpretasi tersebut dengan jumlah sampel 15 pasien. Informasi yang dikumpulkan meliputi sumber penularan TB, lama kontak dan mekanisme penularan; yang diperoleh melalui wawancara mendalam dengan menggunakan kuesioner. Analisis data menggunakan pendekatan kualitatif. Hasil penelitian menunjukkan bahwa persepsi informan tentang sumber penularan TB bukan dari informan lain di cluster, melainkan dari kontak rumah, tetangga, dan rekan kerja. Lama kontak pertama sampai informan terdiagnosis sebagai pasien TB berkisar antara tiga bulan hingga beberapa tahun. Mekanisme penularannya berupa berbicara langsung, mengobati penderita TBC, minum dengan gelas yang

sama dan merokok dengan rokok yang sama. Oleh karena itu, program pengendalian TB harus mempertimbangkan penularan lokal dan mekanismenya untuk intervensi TB yang lebih baik.

INTRODUCTION

A spatial–temporal cluster is a group of patient geographical coordinates clustering based on particular variables of both time and space domains. The variable could be based on similarity of patients' diagnosis date or similarity of patients' residence or work location (Kulldorff, 2010). This phenomenon is also related to tuberculosis (TB) cases. A TB spatial–temporal cluster can be defined as a cluster of TB patients due to the similarity of date of TB diagnosis as well as the similarity of the patients' housing location (Liu et al., 2012; Maciel et al., 2010). Numerous researchers have verified that TB spatial–temporal clusters are present in a number of countries. Research in Spain showed that during period of 1 January 2008–31 December 2010, there were 20 TB spatial–temporal clusters, mostly found in Barcelona (Gomez-Barosso et al., 2013). Research in Bandar Lampung, Indonesia, also showed that there were two TB spatial–temporal clusters during January–July 2012 (Wardani et al., 2014). Furthermore, research in Bandar Lampung also showed that during 2012–2015 there were cluster dynamics, that is, movement of TB spatial–temporal clusters, in some areas of Bandar Lampung (Wardani & Wahono, 2020).

Information on the location of TB spatial–temporal clusters is valuable in order to support TB control programs since the cluster provides the location at which most TB patients live. TB control programs could thus be more focused on high risk areas and highlight the conditions of these areas (Alvarez-Hernández et al., 2010; Li et al., 2016). Research has shown that TB clusters mostly occur in areas with low social determinants. This corresponds with reviews which determined that social determinants, directly or through TB risk factors (poor housing conditions, poor food security, and poor health access), influence TB incidence (Lönnroth et al., 2009; Rasanathan et al., 2011; Wardani & Wahono, 2019; Wardani & Wahono, 2019b, 2019a). Some researchers have shown that spatial–temporal TB clusters occur in areas with high population density, high deprivation index, or high TB incidence rates. Researchers have also recommended their findings in supporting TB control programs (Alvarez-Hernández et al., 2010; Li et al., 2016; Wardani et al., 2014; Wardani & Wahono, 2020).

Spatial–temporal TB clusters also indicate the possibility of local transmission from TB patients to other community members. Some researchers have identified the possibility of local transmission based on identifying genotype similarity of TB patients either within a particular cluster or through combining cluster and molecular epidemiological surveillance in order to identify the occurrence of local transmission (Lindquist et al., 2013; Moonan et al., 2004). On the other hand, local transmission paths based on TB patient perceptions have not been identified and studied. Moreover, the patient perceptions were used to explain the actual TB transmission process according to the patients perceived. Therefore, this research aimed to identify the possibility of local transmission based on patient perceptions, including transmission source, contact duration, and transmission mechanism, in TB spatial–temporal clusters in Bandar Lampung.

METHODS

This was a phenomenological, qualitative study to identify smear-positive TB patients' experience and interpretation of their TB transmission source, contact duration, and transmission mechanism. The study was conducted during June–November 2017 following a TB spatial–temporal cluster period of January–December 2016 in Bandar Lampung, Indonesia. The cluster consisted of 15 smear-positive TB patients who had similarity of TB diagnosed time within three months as well as housing location. The radius of the cluster was 1.98 kilometres. The research population was comprised of TB patients in a TB spatial–temporal cluster period of January–July 2016 with 15 smear-positive TB patients. The eligibility criterion was availability to participate in the study. Sample of this research was all population who was 15 smear-positive TB patients, since all of population voluntary agree to participate in this study. Research variables consisted of transmission source, contact duration, and transmission mechanism. Data collected in the research included secondary and primary data collection. Secondary data were collected from CHCs where TB spatial–temporal clusters were located and consisted of smear-positive TB patients' identities. Primary data included transmission source, contact duration, and transmission mechanism, which were obtained through in-depth interviews using a questionnaire and continued through triangulation with the closest family member of respondents who knew of respondents' daily activities. Questionnaire guidelines used for in-depth interviews include questions about possible sources of transmission by exploring the history of possible interactions with TB patients and mentioning the detail of related information; respondents were also asked about the status of the concerned source transmission, whether as a family member, neighbour, co-worker, or other possible status; interview was also performed to explore further information about the duration of contact with source of transmission; as well as what kind of activities that have been carried out together with the possible source of transmission. Data obtained from in-depth interview were then analysed using qualitative analysis, which consisted of the following steps: 1) transcription: transcribing the in-depth interviews; 2) coding: labelling meaningful units of transcripts; 3) categorization: re-evaluation and re-coding with labels for more specific categories or subcategories; and 4) theming: pattern identification between and within categories.

RESULTS AND DISCUSSION

The informants consisted of 10 men and 5 women. Most were aged 31–50 years (80.0%); were less educated/had less

than 9 years' education (66.7%); were employed part-time (73.3%) as for example factory workers, construction workers, or drivers or had no occupation (26.7%); had a monthly family income of less than US$167; and had no productive assets such as a rental house or a shop.

Six of the fifteen informants perceived the TB transmission source as from their neighbours. "Neighbour" referred to immediate neighbours who met with the informants on a daily basis. Two informants said that their source of TB transmission was a family member who lived next to the informant. In addition, two informants stated that their transmission source was close relatives who often visited the house, and two informants stated the source of TB transmission was a member of their extended family who lived in the same house or was an in-house contact. The three other informants stated that the source of TB transmission was work colleagues. Most of the informants did not know that their neighbour or work colleague was suffering from TB. Although informants' perception of their TB transmission source was the sources mentioned above, no one perceived that their TB transmission source was another informant.

Results also showed that informant perceptions of the period from first contact with a TB patient to diagnosis as having TB varied from 3 months to some years. Referring to the results, the duration depended on the closeness of the relationship of informants with TB patients. Informants with in-house contact as the perceived TB transmission source stated that the period from contact to diagnosis was 3 months. Moreover, informants with neighbours or work colleagues as the perceived source of TB transmission indicated longer durations–6 months or 1 year until TB diagnosis.

Participants described the most frequent activity carried out with neighbours as TB transmission source as speaking directly with the neighbours, such as when they visited their neighbours or vice versa. Activities conducted by informants who identified family as the TB transmission source were speaking directly as well as helping and taking care of the family member such as by buying something for them, bathing, feeding, or giving them something to drink. Meanwhile, for informants with work colleagues as the TB transmission source, the most frequent activities were sharing a cigarette and drinking from the same glass. Moreover, all the informants stated that their activity with their neighbours, families, and colleagues were conducted without any personal protective equipment such as a mask.

The results showed that informants' perception of their TB transmission source was not from other informants in the TB spatial–temporal cluster. This does not indicate that there was no local transmission in the cluster, since the informants' perceptions regarding the transmission source involved people closest to them, that is, in-house contacts, family, neighbours, or work colleagues. In addition, the transmission source with the shortest period until diagnosis was in-house contact. This result concurs with research in Bandar Lampung which found that the strongest transmission source was internal house transmission, followed by working transmission and transmission from surrounding houses (Wardani & Wahono, 2018). This result is also supported by research in Lima, Peru, which showed that families with multiple drug–resistant TB have the opportunity to transmit TB in the first 3 years, with an incidence density of 2,360 per 100,000 people to other family members (Grandjean et al., 2011). Research in Pakistan also showed that the highest index cases of smear-positive TB were found in household contacts (Khan et al., 2014). Most of the informants in this study who stated that their source transmission were family members and in-house contacts had lower educational attainment; 66.7% of informants had low educational attainment, which is related to low knowledge of TB transmission and has an impact on increased transmission probability through in-house contacts or family. This result is also concurrent with research in Zambia, which found that low educational attainment drives low knowledge of TB transmission routes (Boccia et al., 2011). The frequency of direct engagement without any protective equipment as well as low knowledge of TB are most likely to be relevant risk factors for transmission.

Besides in-house contact, the results also showed that neighbours and work colleagues were also potential transmission sources. This finding supports research conducted in Cape Town, South Africa and Thailand, which found that neighbours and work colleagues were source of TB transmission. Moreover, reinfection frequently occurs outside of the household, that is, from surrounding houses and working environments (den Boon et al., 2007; Ngamvithayapong-Yanai et al., 2019). In the present study, most informants with neighbours and colleagues perceived as transmission sources stated that they did not know and had not received any information that their neighbours or work colleagues had severe TB. This situation is related to community stigma that individuals with TB will be ostracized. Therefore, family members of TB patients tend not to reveal the condition of TB patients to neighbours, work colleagues, or the community. Research in Blantyre, Malawi also showed that family members of TB patients did not want the status of family members with TB revealed to neighbours or the community. This is related to stigma in the community that TB is related to HIV/AIDS (Monk et al., 2018). Research in Thailand also showed that regular annual check-ups for teachers at work can allow earlier detection of TB. This indicates that TB infection was transmitted at work because the TB patient did not convey that he had TB to his colleagues (Ngamvithayapong-Yanai et al., 2019)).

The status of TB patients was not revealed so activities were shared between healthy people and TB patients. In this study, activities varied from direct conversation to drinking from the same glass and sharing cigarettes, all of which were related to social interaction. Research in Cape Town also showed that places with high social interaction such as bars (*shebeen*| local bars in Cape Town) had high potential for TB transmission((Murray et al., 2009). Activities occurring between family members and in-house contacts in this study consisted of speaking directly and caring for (bathing, feeding, and providing drinks) in-house contacts, which was not accompanied by personal protective equipment such as masks, thus increasing the risk of transmission to healthy family members. This situation is related to low educational attainment of family members and lack of knowledge regarding TB transmission (Braveman et al., 2011).

CONCLUSIONS AND SUGGESTION

Based on the results presented above, patients' perception of TB transmission in spatial-temporal TB cluster is not from other TB patients within the cluster, in the same spatial and time domain. However, there is still potential local TB transmission in TB spatial–temporal cluster. This transmission is due to activities of TB patients and healthy people tend not to reveal the condition because of negative

stigma in the community regarding TB and lack of knowledge with regard to TB transmission. Therefore, TB control programs, especially in countries with large burdens of TB spatial–temporal clusters, must include increasing the TB transmission knowledge of communities to reduce negative stigma surrounding TB as well as target close contacts of TB patients to reduce in-house TB transmission.

ETHICAL CONSIDERATION

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Conflict of Interest Statement

We certify that there is no actual or potential conflict of interest in relation to this article.

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