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RESEARCH ARTICLE

EVALUATION OF IMPLEMENTATION OF TUBERCULOSIS CONTACT INVESTIGATION IN JAZAN 2013

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ABSTRACT

Background: TB is one of the most infectious diseases resulting in considerable mortalities especially in low income countries. World health organization estates that About one-quarter of the world's population has latent TB, which means people have been infected by TB bacteria but are not (yet) ill with the disease and cannot transmit the disease. In KSA, the National tuberculosis program was established more than 30years ago in all regions of the kingdom following World health organization guidelines for the program. **Methods:** The study is a quantitative survey research deduced for secondary data of contacts of primary cases registered by the program in Jazan region. The data included demographic characteristics, clinical and laboratory evaluations of the cases. **Findings:** The targeted population in this study are tuberculosis contacts of primary cases in the period Jan1st-Dec 31st .2013.All contacts nationals and non-nationals, males and females with median age 15-49 years old were included in the study. The study included (2308) contacts for 198 primary cases of which 98% were screened for latent TB which turned to represent 26% of the screened cases in this study. All the cases received treatment on time in accordance with World health organization guidelines. For those who were initially tuberculin skin test negative (1688), the test was repeated in 61.79% revealing 10% of them have changed to positive cases. While those with an initial positive result, 25% had chest xray done showing abnormal findings in 2.04% and for those who repeated the smear test (0.39%), 40% came out positive for tuberculosis. **Conclusion:** The key finding in this study proves that the national tuberculosis programm of Jazan region is adherent to the guidelines of the national program which goes in alliance with World health organization regulations and guidelines, nevertheless, raising awareness among the population is a must. Further studies are recommended to reveal the causes of investigation and treatment refusal.

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INTRODUCTION

Tuberculosis abbreviated as TB for tubercle bacillus, is a common and often deadly infectious disease caused by mycobacterium mainly, Mycobacterium tuberculosis. The disease usually attacks lungs and in this case it is known as pulmonary TB. On other circumstances, it might affect other sites of the body like bones, joints, central nervous system, lymphatic, circulatory, genitourinary, and gastrointestinal system and is known as extra-pulmonary TB[1]. TB is one of the most important causes of infectious diseases mortality worldwide, particularly in low income countries. The incidence of TB has declined in most of the regions defined by the World Health Organization (WHO), but the total number of new cases continues to rise slowly due to population growth.[2] Saudi health authoritiesestablished National TB Control Program (NTP) since more than 30 years,[3].The program initiated observed treatment, short course (DOTS) in all regions of the Kingdom starting in 2000. Contacts of people with tuberculosis are at high risk of also developing tuberculosis. ([4]) Contact tracing is one of the most important strategies to prevent spreading TB in KSA ([5]).

[1]East African Community health/Tuberculosis Overview/ http://www.eac.int/health/index.php?option=com_content&view=article&id=50&Itemid=34.accessed on 26/april2014

[2]WHO report 2008: Global tuberculosis control, media centre. [http://www.who.int/mediacentre/factsheets/fs104/en/index.html]

[3] Al-Kahtani NH, Al-Jeffri MH. Manual of the National TB Control Program. Ministry of Health; 2003.

[4]Fox GJ, Barry SE, Britton WJ, Marks GB. Contact investigation for tuberculosis: a systematic review and meta-analysis. EurRespir J 2013; 41: 140–56.

[5] Saudi Arabia TB national guidelines 2010

It could be household, work or school contacts, close contact is a person who has prolonged, frequent or intense contact with a person with TB while he/she was infectious.[6] Household contact is defined as those who share abed room, kitchen, bathroom or sitting room with the index case.[7] Contact investigation provides a better chance of cure and reduction in further transmission of the disease[8], especially in low- and middle-income countries[9]. Developed countries have routinely investigated contacts to identify and treat persons with active TB or latent TB infection (LTBI) ([1011]). In JAZAN region, the investigation of contacts of (TB) cases is an essential part of the regional TB control program, as part of the national TB control program in KSA. However, there has not yet been an analysis of contact investigation data in this region. Furthermore, little is known about the effectiveness of the actual procedures followed, or accuracy of results of these investigations. The national tuberculosis guidelines regarding contact investigation, states that when a person is identified as a contact he/she is listed and registered in the contact`s register. Demographic, environmental as well as medical history including Bacilli Calmette-Guérin1(BCG) vaccination, symptoms suggestive of tuberculosis, such as chronic cough, previous treatment for the disease or risk factors of TB are all identified and reported.[3] All contacts were screened by the Monteux Tuberculin skin Test (TST) with 0.1 ml of 5TU Purified Protein Derivative (PPD)injected intra-dermal into the inner surface of the forearm. The Tuberculin Skin Test TST is used to determine if a person is infected with M. tuberculosis. If a person is infected, a delayed-type 4 hypersensitivity reaction is detectable 2 to 8 weeks after infection. The skin test is administered intra dermallyusingthe Mantoux technique by injecting 0.1ml of 5 TU purified protein derivative (PPD) solution. The reading and interpretation of TST reactions should be conducted within 48 to 72 hours of administration.
The TST is read at 48–72 hours after being administered. Assessment of a TST is done by the sector program health worker team (usually a general practitioner and a nurse), using a cutoff point set at (5mm). A contact with a negative TST (<5 mm) receives follow-up testing 8 weeks later. Any contact with initial or repeat TST positive (≥5mm) undergoing a chest X-ray and sputum smear to exclude active TB[3]. Secondary cases of sputum smear positive should be treated as an index cases for contact tracing. Any contact with positive TST and normal chest radiograph, is considered as Latent Tuberculosis Infection (LTBI) and receives prophylaxis treatment (ISONIAZIDE)for6 months.[12] WHO recommends investigation of contacts in all households of index cases with bacteriologically confirmed pulmonary tuberculosis. Investigation should involve screening and surveillance, with the aim of promptly diagnosing tuberculosis and providing preventive therapy for contacts judged to be at the highest risk[6]. The latest Incidence rate of tuberculosis (per 100,000 people) in Saudi Arabia is 15 and 95% C.I (13-17) for 2012, compared to 16 95% C.I(14-18) in 2011, and (19) 95% C.I(17-21) in 2010.(2). With smart declining trend and clear regional differences[3]. In this study we expect that, the finding of our study could have a significance impact on the principles and practices of improving contact investigation in our region to strengthen and maintain the NTP in the KSA, provide guidance for other regions for effective and successful contact investigation, to decrease the impact of TB on individuals and communities giving a better chance of cure and reduction in rate of disease transmission

General objective: To evaluate contact investigations conducted by the regional tuberculosis program and the outcomes of these investigations in the district during the study period

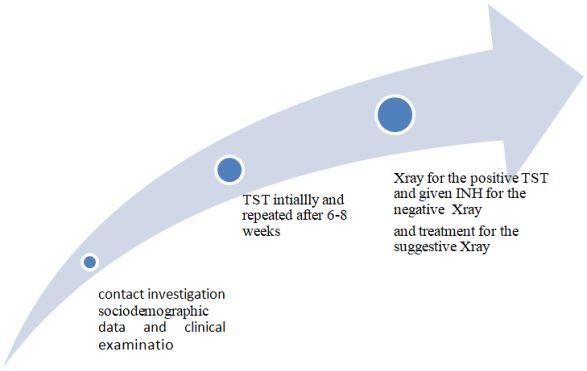
Specific objectives

- To study the socio demographic data of contact of index TB cases in Gazan 2013
- To evaluate the implementation of national guideline of contact investigation contact
- To explore the prevalence of latent and active tuberculosis infection among patients' contacts

MATERIALS AND METHODS

Study Design: This is cross sectional study facility based.

Study area: This study is conducted in Jazan Province. It is one of the smallest (11,670 km2) administrative areas of the Kingdom, located in the south-western tip of the country with a coastal boundary 260 km along the Red Sea and a 120 km border with the Republic of Yemen.



Study population: All contacts of TB index cases in Jazan area during 2013

Study tools

Study subjects and Methods: A secondary data driven from all contacts detected and registered in the period from Jan1st-Dec31st 2013 using Jazan TB control program data. In JAZAN services, households contacts of index TB cases were visited and Identification of contacts is conducted by requiring names and addresses of persons who reside with, or frequently visit the household.

[6] Centre of Disease Control and Prevention; Self Study Module on Tuberculosis;Module6:Contact Investigations for Tuberculosis.

[7] Tamara T.Tayeb, Mohammed S.Abouzeid; The National Tuberculosis Control Program Mini Guide:2013.

[8] World Health organization. Global tuberculosis report 2016. Geneva: World Health Organization; 2016.

[9]World Health Organization. Recommendations for investigating contacts of persons with infectious tuberculosis in low- and middle-income countries. Geneva: World Health Organization; 2012.

[10]Erkens CG, Kamphorst M, Abubakar I, et al. Tuberculosis contact investigation in low prevalence countries: a European consensus. EurResp J 2010;36(4):925–49. http://dx.doi.org/10.1183/09031936.00201609.

[11]Cavany SM, Sumner T, Vynnycky E, et al. An evaluation of tuberculosis contact investigations against national standards. Thorax 2017. http://dx.doi.org/10.1136/ thoraxjnl-2016-209677.

[12] WHO. Recommendations for investigating contacts of persons with infectious tuberculosis in low- and middle-income countries. Geneva: World Health Organization, 2012

These contacts are then registered, interviewed and screened for TB. Unlike many TB control programs, in the KSA, JAZAN TB program completes a contact investigation on all pulmonary and extra-pulmonary TB cases, although Priority is given to investigation of a pulmonary smear-positive case over a pulmonary smear-negative or extra pulmonary case with no pulmonary symptoms. Study included all contact of index TB cases registered at the study period, irrespective of the site of infection while the study excluded any Contacts to incarcerated population TB index case (prisoners). Data was collected through questionnaire like form, consisting of basic contacts' information as well as investigations conducted and corresponding results for each contact**,** as well as the outcome of treatment of each contact investigation. Data was then twice entered into Epi-data program, by two different trained data entry clerks, under careful supervision at the start and during working. Data entry started as soon as data was collected. A consistency checks system is built to help avoiding entry errors. There were also some pre-programmed jumps in the entry form to avoid entering irrelevant data. The file was then transferred to STATA program version 10.

The main outcome measured was the number of contacts identified and the proportion of those fully screened, and diagnosed as TB disease. On the other hand, secondary outcomes were the number of contacts with TB infection (LTBI), proportion started preventive therapy, and the proportion completed a regimen of treatment given.

RESULT AND DISCUSSION

Contact investigation involves the systematic evaluation of contacts of known TB patients to identify active disease or latent TB infection (LTBI). It is one of active case-finding strategies that have been proposed to increase case detection[13]. The study aimed to evaluate the contact investigation in Jazan province versus the national guidelines and revealed that, the regional program has identified (2308) contacts for (189) index TB cases (126) were pulmonary positive and (52) pulmonary negative and (11) (extra-pulmonary), with mean of (12) contacts per case. The majority of contacts age between 15-49 years old, 52% of them were female, 71% were Saudi and 83% of them were household contact.

Table 1. Baseline characteristics of TB contacts (N=2308), identified and registered by the regional TB program during the Year 2013

Contact`s age in last birth (years)	*n	%	(95% CI)
-15	797	34.53%	(32.59%-36.47%)
15-29	857	37.13%	(35.16%-39.10%)
30-49	450	19.50%	(17.88%-21.11%)
50-	202	08.75%	(07.60%-09.91%)
Missing/don't know	02	0.09%	(-0.03%-0.21%)
Total number (%)	2308	100%	
Sex			
Men	10104	47.83%	(45.79% - 49.87%)
Women	10201	52.04%	(50.00% -54.08%)
Missing/don't know	03	0.13%	(-0.0001%-0.003%)
Total number	2308		100%
Nationality			
Saudi	1660	71.92%	(70.09%-73.76%)
Non-Saudi	0646	27.99%	(26.16%-29.82%)
Missing/don't know	02	0.001%	(-0.000%-0.002%)
Contact type			
Household	1919	83.15%	(81.62%-84.67%)
Work	165	07.15%	(06.10%-08.20%)
Others†	222	09.62%	(08.41%-10.82%)
Missing/don't know	02	0.09%	(-0.03%-0.21%)
Total number (%)	2308	100%	

* number of contact school†including

Table 2. Screening Status of TB contacts (N=2308), identified and registered by the regional TB program during the year 2013

TST† initial	Number*n	**%**	C.I
Done	2263	98.05%	(97.49%-98.61%)
Not done	43	01.86%	(01.31%-02.42%)
Don't know/missing	02	0.09%	(-0.03%-0.21%)
Total number (%)	2308	100	
TST (repeated*)			
Done	1426	61.79%	(59.80%-63.77%)
Not done	877	38.0%	(36.02%-39.98%)
Don't know/missing	05	0.22%	(0.03%-0.41%)
Total number (%)	2308	100%	
X-rays chest			
Done	589	25.52%	(23.74%-27.30%)
Not done	1717	74.39%	(72.61%-76.18%)
Don't know/missing	02	0.09%	(0.03%-0.21%)
Total number (%)	2308	100%	
Sputum smear			
Done	09	0.39%	(0.14%-0.64%)
Not done	2295	99.44	(99.13%-99.74%)
Don't know/missing	04	0.17%	(0.003%-0.34%)
Total number (%)	2308		

* repeated after 8 weeks test for contacts shown negative result by initial test

[13]Riechler HL. Contacts of tuberculosis patients in high-incidence countries. Int J Tuberc Lung Dis 2003;

Table 3.Results of screening of TB Contacts (N=2308), identified and registered by the regional TB program during the Year 2013

TST† initial	Number	(%)	(95% CI)
Positive	575	24.91%	(23.15%%-26.68%)
Negative	1688	73.14%	(71.33%-74.95%)
Don't know/missing	45	01.95%	(01.39%-02.51%)
Total number	2308	100%	
TST (repeated*	Number	(%)	(95% CI)
Positive	144	10.08%	(08.54%-11.64%)
Negative	1285	89.92%	(88.36%-91.49%)
Total number	1429	100%	
X-rays chest	Number	(%)	(95% CI)
Normal	574	97.62%	(96.38%-98.85%)
Abnormal	12	2.04%	(00.89%-03.19%)
Don't know/missing	02	0.34%	(-0.13%-0.81%)
Total number	588	100%	
Sputum smear			
Positive	04	40.00%	(03-05%-76.94%)
Negative	06	60.00%	(23.06%-96.94%)
Total number (%)	10	100%	

† tuberculin skin test
* repeated after 8 weeks test for contacts shown negative result by initial test

Table 4. Diagnosis and therapeutic status of TB contacts (N=2308), identified and registered by the regional TB program during the Year 2013

Diagnosis status			
TB disease	10	0.43%	(0.17%-0.70%)
TB infection (LTBI	610	26.46%	(24.66%-28.27%)
No one	1684	73.06%	(71.25%-74.87)
Don't know/missing	04	0.17%	0.00%-0.34%)
Total number (%)	2308	100%	
Treatment			
Preventable INH*	602	95.71%	(94.12%-97.30%)
Other†	27	4.29%	(2.70%-05.88%)
Total number (%)	629	100%	
Preventive Regimen Status			
Completed INH	424	72.89%	(69.36%-76.6%)
Transfer to full DOTs	5	0%0.86	(0.11%-01.61%)
Refuse treatment	145	24.96%	(21.43%-28.49%)
Move to other setting	07	1.2%	(0.32%-02.09%)
Total number (%)	581	100%	

*Isoniazide given for 6 months.
†including full dose of dots and other antibiotics

Of these (2308) identified contacts, the program succeeded to investigate and screen 2263 by TST (98% of contacts), and only 43 (2%) were not screened/with missed information, this because Jazan region is a border area with the republic of Yemen, It also receives many illegal immigrants from this country, about 575 (25%) contacts screened were positive (TST =>5MM) initially. Based on NTP guideline against which we evaluate and compare the success of implementation, all contacts with initial negative TST should be re-screened after 8 weeks, and all positive TST contacts should consecutively be screened by chest radiograph/sputum smear microscopy to exclude active disease, while the rest are treated as LTBI. However the program in the Jazan region succeeded to repeat the test for (85%) of this group, 2013 out of 1688 contacts, with (15%) of contacts refusing the repetition of the TST. Another 144 (10%) of contacts who were initially negative result (TST<5) converted to positive results after repetition of the test 8 weeks later, ending up with a total of 719. The study found 26% (one third) of contacts (all form of TB) with TST =>5MM, suggestive of LTBI based on KSA-NTP, coinciding with the World Health Organization stating that about one third of the mankind is infected with latent TB[14]. However, only about one third of the contact (25.5%) (589) are moving to the next step for screening by chest radiograph. The other challenges facing the program meaning that, about (8%) of positive TST were inadequately screened.

Also there were 12 contacts with abnormal chest radiograph, as one of the indictors of TB disease but only 10 of them were screened by sputum smear. Another finding was that, there were (10) contacts with 95% CI 0.43% (0.17-0.70) contacts diagnosed as TB disease, although only (4) contacts were found to be positive sputum smear. Another finding was that, there were (10) contacts with 95% CI 0.43% (0.17-0.70) contacts diagnosed as TB disease, although only (4) contacts were found to be positive sputum smear. In 95 studies from low- and middle-income settings, the prevalence of active TB in all contacts was 3.1% (95% CI 2.2–4.4%), microbiologically proven TB was 1.2% (95% CI 0.9–1.8%), and latent TB infection was 51.5% (95% CI 47.1–55.8%)[15]. The regional services also finally diagnosed 610 contacts as LTBI, although there were 709 positive TST contacts, after exclusion of 10 TB disease. The prophylaxis measurement is to give the INH isoniazid treatment for six month with high refusal proportion about (25%) among contacts in spite of this the mobile team of the program succeeded to follow up about 602 (95%) contacts and insure their intake of received prophylaxis INH, about 42 (72.89%) contacts completed the treatment. In summary there was high completion of evaluation among contacts for active TB and LTBI (98%), by the regional TB control program, with

[14] Kochi A. The global tuberculosis situation and the new control strategy of the World Health Organization. Tubercle 1991;72:1-6.

[15]Gregory J. Fox, Simone E. Barry,Warwick J. Britton,and Guy B. Marks ; Contact Investigation For Tuberculosis :a systematic review and meta-analysis; EurRespir J. Jan 2013; 41(1): 140–156. Published online Aug 30, 2012. doi: 10.1183/09031936.00070812 PMCID: PMC3533588.

more effort needed to reduce the refusal rate of the TST repetition and receiving the INH prophylaxis. The high refusal rate among contacts detected by the study (25%) might be used to implement new attractive strategy to improve their response rate. Contact investigation is succeed to discover secondary tuberculosis patient (.43%) among contact. The study found 26% of contacts (all form of TB) with TST =>5MM, suggestive of LTBI according to NTP in KSA. This indicates that TB control program in JAZAN is not far, from the standard and could be improve if more efforts focused on close monitoring of the staff working in the field, maintaining training, and enhancing population base surveillance that could understand the socio-demographic determinants of cooperation of TB contacts with the program.

Conclusion and recommendations

The national tuberculosis program succeeded to investigate 98% from patients contact regards to sociodemographic data, initial tuberculin test and environmental assessment. The findings of this analysis demonstrated about 26.5% of TB contacts in JAZAN region is infected with latent TB , and treated accordingly, this fact increase the importance of strengthen and improve the quality of DOTS implementation by follow up and supervision.

There was refusal rate of repetition of tuberculin test, take the prophylaxis treatment and for the negative tuberculin test and doing X-ray of positive tuberculin test which emphasis the need for awareness raising activities and improve the health attitude and health seeking behaviors. More study is recommended in elaborating the root causes for refusal of TST repetition and receiving the INH for 6 month. Raising awareness of community and reducing the stigma is right of way.

List of abbreviations

BCG	Bacillus Calmette–Guérin
DOTS	Directly Observed Treatment Short course
INH	isonicotinylhydrazide
KSA	Kingdom of Saudi Arabia
LTBI	Latent tuberculosis infection
NTP	National tuberculosis programm
PPD	isonicotinylhydrazide
TB	Tuberculosis
TST	Tuberculin skin test
TU	tuberculin units
WHO	World health organization

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