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Diagnostic Value of Clinical Predictors for Tuberculosis in Pre-Screening Approach

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ABSTRACT: Tuberculosisis a serious public health problem in Iran, so it is important to use effective criteria for early diagnosis of disease. Evidence has indicated that use of the single screening criteria (chronic cough) may result in more false positive pre- screening diagnosis. The aim of this study was to evaluate the effectiveness of other clinical predictors to improve the traditional approach in Tuberculosis screening in Iran. Eighty smear positive and seventy smear negative patients were enrolled in the study. They were studied according to the specific signs and symptoms which can be presented in the course of Tuberculosis disease, such as prolonged fever, weight loss, dyspnea and chest pain. The prevalence of each item was compared between two groups. The prevalence of fever, weight loss, dyspnea, anorexia, night sweat, close contact to Tuberculosis infected patients and a family history of Tuberculosis disease in patients with positive smear results were significantly higher than the negative smear patients (P value < 0.001). Eighty-five percent of the patients had the history of these symptoms during the last four weeks. Abnormal radiologic and auscultation findings, chest pain and sputum production were common among both groups. Using other predictors such as fever, weight loss, dyspnea and night sweat in combination with persistent cough would increase the quality of diagnostic yields in suspected Tuberculosis patients. In addition, a history of close contact with Tuberculosis infected patients or family members should be considered during the medical visits.

Keywords: Diagnosis**,** Persistent cough, Screening, Tuberculosis

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INTRODUCTION

Tuberculosis (TB) is a major public health problem in the world. It's been estimated that 1.3 million afflicted patients died from TB disease in 2012 (Mjid et al., 2014). The early and correct diagnosis and treatment of the infected patients is the essential step in TB control and transmission. Many developing countries are burdened with co-infection of TB with Human Immunodeficiency Virus (HIV), limited diagnostic services, inadequate skilled technical personnel and poor health care systems, which are the main probable reasons for disease eradication (Griffiths et al., 2014). It's yet considered as an important health issue in Iran, where 10987individuals suffered from TB in 2012 (Shamaei et al., 2009). According to the report of Ministry of Health and Medical Education in 2012, TB incidence rate was 14.4 per 100000 people in Iran (Khazaei et al., 2005 and Lotfian et al., 2016). National approach to TB screening relies upon the direct sputum smear microscopy of the suspected patients, presenting with cough of ≥ 3 weeks duration. The use of other clinical predictors such as hemoptysis, dyspnea, chest pain, nausea, weight loss, fatigue, fever and night sweating, which may be also presented among TB patients (Bignall, 1968; Beser, 1993; Balcells et al., 2012), can promote the yield of diagnosis. On the other hand, presentation of chronic

cough as the only TB screening criteria includes a wide spectrum of individuals including non TB patients, such as sinusitis, Chronic Obstructive Pulmonary Disease (COPD), asthma and heart failure (Stout, 2014). This approach may lead to the unnecessary sputum testing and more negative laboratory reports. Therefore, the screening process could be made more efficient by improving the criteria for TB suspected patients. On the other hand, Triasih (2015) has suggested that sputum collecting methods should be more friendly in children. The routine respiratory specimen collection in young children is difficult. So, TB confirmation based on the smear results in children can impose a high number of false negative results. In addition, Ramos-Rincón et al. (2015) have claimed that in resource-poor tropical countries with a high prevalence of TB infection, we cannot completely rely on the microbiological tests. They suggested that physical examination and imaging modalities can considerably guide to the correct diagnosis. In a recent study, Campus et al. (2016) have reported a high prevalence of smear negative results in combination of TB and HIV. In this study, cough was less frequent than other TB features such as hemoptysis, fatigue and radiologic findings. In this study, we focused on the performance of other clinical TB predictors for screening TB patients and analyzed their diagnostic value, which could specify the case screening strategy.

MATERIALS AND METHODS

The present study was approved by the ethic committee of Tabriz University of medical sciences. This cross sectional comparative study was carried out between the years 2011- 2013. It was conducted on 80 patients diagnosed with tuberculosis based on positive sputum smear for *Mycobacterium tuberculosis* and 70 patients with negative smear results referred to TB laboratory, Tuberculosis and Pulmonary Disease Research Center, Tabriz University of Medical Sciences, Iran. The inclusion criteria consisted of: being suspected as a "new case" of TB, possessing smear test results for acid fast bacilli and claiming of chronic cough for more than 3 weeks. A questionnaire including the age, sex, specific symptoms, and clinical signs was prepared. The participants underwent an interview about the possible morbidity, complains and symptoms as well as a physical examination. A history of familial TB infection and close contact to TB infected patients were also taken. The included symptoms in our study were prolonged fever, weight loss, dyspnea, anorexia, night sweats, chest pain, and fatigue and sputum production. Besides, abnormal radiologic findings such as infiltrates, consolidations and cavities were also evaluated in the positive smear group. The questionnaires were filled out according to mentioned values in both groups. Prevalence of prolonged fever, as well as other symptoms was compared between these 2 groups using multivariate analytic model. Data were double-verified, entered and analyzed using SPSS version 16.0 (Statistical Package for the Social Sciences Inc, Chicago, IL, USA). Variables were expressed as proportions. Statistical differences between the negative smear and positive smear groups were determined with chi-square test. $P< 0.05$ was considered significant.

RESULTS

A total of 150 patients, suspected of TB infection, were included in this study. Among them 93 were female (62%) and 57 were male (38%). Their mean age was 46± 12.3years. Out of 80 patients in positive smear group, 73cases (91.3%) were detected with fever, 75 patients (93.8%) had a history of recent weight loss, 69 patients (86.3%) were suffering from dyspnea and 64 participants (80%) were complaining of night sweat. On the other hand, out of 70 in negative smear group only 26patients (37.1%) mentioned fever, 20 participants (28.6%) had recently lost weight, 30 patients (42.9%) mentioned dyspnea and 22 of them (31.4%) experienced night sweats. The prevalence of fever, Weight loss, dyspnea and night sweat in active TB patients was significantly higher than non-TB participants ($P < 0.001$). History-taking revealed that 19 (23.8%) active TB patients and 4 (5.7%) negative TB participants had a history of close contact to a TB infected person (P value= 0.021). Moreover, a familial history of TB infection was reported in 51 (31.3%) patients in positive and 11 (5.7%) patients in negative smear groups (P value=0.001). The prevalence of other respiratory symptoms such as sputum production and chest pain were higher in both of the study groups, which accounted for 88.8% and 65% participants of active TB group, similarly 80% and 40% of non TB cases, respectively (P value=0.212, 0.13 respectively). Moreover, 51 (63.8%) patients with positive smear result revealed abnormal chest X-ray findings. Eventually systemic complains, including anorexia, and fatigue were detected as chief complain of 64 and 11 of patients in the positive smear group, while out of 70 participants with negative smear results only 19 and 16 of them revealed the same history of symptoms (P value= 0.005 and 0.226 respectively). The prevalence of criteria is included in table 1.

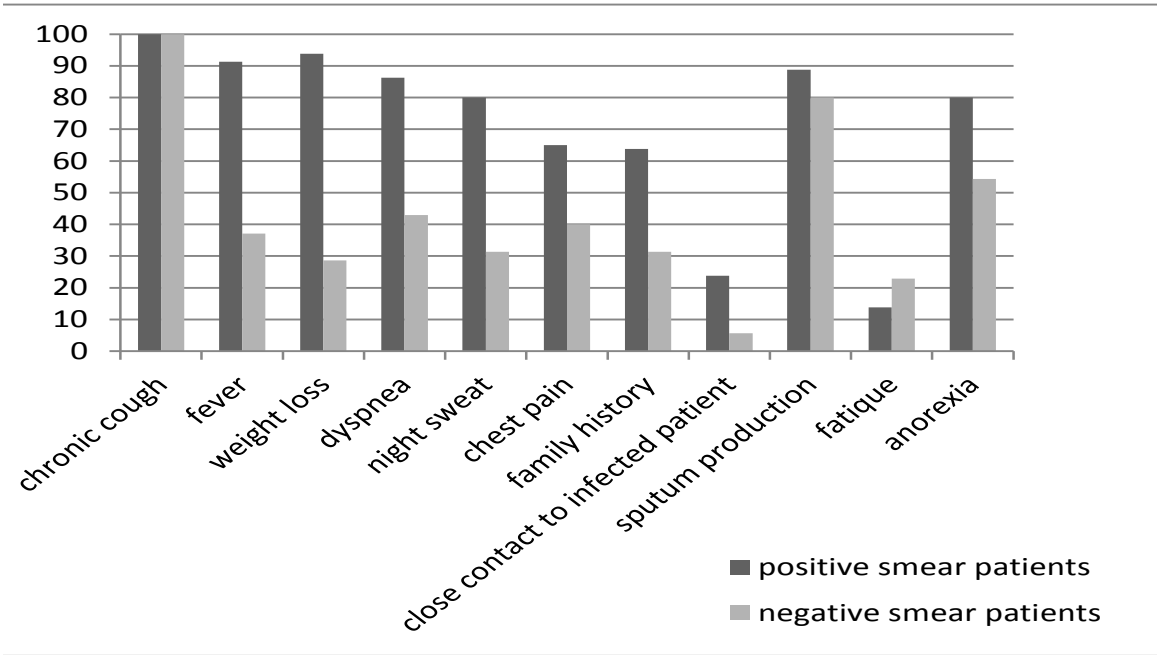

Figure 1. Prevalence of specific signs and symptoms among 150 patients from Tuberculosis and Pulmonary Disease Research Center, Tabriz, Iran (2011-2013)

DISCUSSION

WHO recommended the use of sputum smear microscopy as an initial diagnostic tool for pulmonary TB (Dye, 2000). Since TB symptoms, especially chronic cough, are so prevalent among all types of patients, the pre- screening method could be made narrower and specific. Other clinical predictors, as well as the value of such predictors have yet to be evaluated for early diagnosis of TB. Failure to early detection and treatment of the infectious cases of pulmonary tuberculosis has led to continued *Mycobacterium tuberculosis* spread within communities (Koenig and Furin, 2016). Chronic cough (> 3 weeks) was the fundamental predictor in all suspected patients in our study, which was confirmed by the results of two other studies. In the study of Maciel et al. (2010), one of the most important factors for delay in TB diagnosis was the history of chronic cough which accounted for 80% of TB patients; in this study sputum production and chest pain were other prevalent symptoms among TB patients. This may be related to a wide variety of other disease with the same symptoms, which may lead to missed diagnosis. These results have been replicated throughout Andersen et al. (2011) study in which the most frequent symptom was persistent cough, followed by weight loss, fever and fatigue. Our study results demonstrated a high prevalence of fever, weight loss, night sweats, dyspnea, recent close contact to an infected patient and positive familial history of TB infection in active TB patients compared with non-TB individuals. Although sputum production and abnormal radiologic findings were also frequent among the patients with active TB diagnosis, they couldn't be regarded as specific predictors for TB disease in our study. Consequently, our results confirm that the detection of smear positive TB cases can be improved if the screening criterion combined persistent cough with mentioned symptoms (Masuyama and Igari, 2013). In one study which was done in Peru, diagnostic accuracy of smear tests was low in respiratory symptomatic patients. Which can be related to limited laboratory facilities (Roque-Henriquez et al., 2015). In another study, among smear negative TB patients, persistent cough was not as frequent as the other respiratory symptoms. They proposed that clinical findings and physical examination can place a significant importance in TB diagnosis (Campos et al., 2016). This is the first report assessing other clinical predictors as diagnostic criteria for early diagnosis of TB in Iran. This approach will promote the yield of TB diagnosis, resulting in less laboratory costs and more accurate diagnosis of TB patients, and increasing the specificity of laboratory results. Our findings need to be corroborated by a greater population based study as this study investigated only a small sample of TB patients.

CONCLUSION

This study suggested that national tuberculosis screening approach for TB diagnosis can be significantly improved by adding other TB parameters. Persistent cough (which is the important symptom) in combination with fever, night sweats and weight loss and a family history of TB infection would enhance the quality of diagnostic yields in early TB diagnosis, therefore it is recommended for all the physicians and health care staff to consider these symptoms beside the persistent cough to increase the specificity of TB screening findings.

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Competing interests

The authors declare that there is no conflict of interest.

Authors' contribution

MEH designed the study. FS and RG collected the data. FS and YH analyzed the data which was interpreted by MEH and FS. The first draft of manuscript was prepared by FS and reviewed by the rest of authors. The final version of the manuscript was read and accepted by all the authors.

REFERENCES

Andersen R, Bjorn-Praest S, Gradel K, Nielsen C and Nielsen H (2011). Epidemiology, diagnostic delay and outcome of tuberculosis in North Jutland, Denmark. Danish Medical Bulletin, 58(3):4256. PMID:21371406, http://www.danmedj.dk/portal/page/portal/danmedj.dk/dmj_forside/PAST_ISSUE/2011/DMB_2011_03/A4256

Balcells M, Garcia P, Chanqueo L, Bahamondes L, Lasso M, Gallardo AM, et al. (2012). Rapid molecular detection of pulmonary tuberculosis in HIV-infected patients in Santiago, Chile. The International Journal of Tuberculosis and Lung Disease, 16(10):1349–1353.https://doi.org/10.5588/ijtld.12.0156

Beser E (1993). The prevalence of pulmonary tuberculosis using different methods in group screenings. East African Medical Journal, 70(12):768–71. PMID: 8026349, http://www.europepmc.org/

Bignall J (1968). International co-operation in tuberculosis research.Scandinavian Journal of Respiratory Diseases, 65:69–71. PMID: 5193854, http://www.europepmc.org/

Campos L, Rocha M, Willers D and Silva D (2016). Characteristics of Patients with Smear-Negative Pulmonary Tuberculosis (TB) in a Region with High TB and HIV Prevalence. PLoS One. United States, 11(1):0147933. https://doi.org/10.1371/journal.pone.0147933

Dye C (2000). Tuberculosis 2000-2010: control, but not elimination. The International Journal of Tuberculosis and Lung Disease, 4: 146-152. PMID: 11144545, http://www.ingentaconnect.com/content/iuatld/ijtld/2000/00000004/A00212s2/art00010

Griffiths C, Barne M, Saxena P and Yaphe J (2014). Challenges of tuberculosis management in high and low prevalence countries in a mobile world. Primary Care Respiratory Journal, 23(1):106–11. DOI: 10.4104/pcrj.2014.00019

Khazaei H, Rezaei N, Bagheri G, Dankoub M, Shahryari K, Tahai A, et al. (2005). Epidemiology of tuberculosis in the Southeastern Iran. European Journal of Epidemiology, 20(10):879–483. DOI:10.1007/s10654-005-2152-y

Koenig S and Furin J (2016). Update in Tuberculosis/Pulmonary Infections (2015). American Journal of Respiratory and Critical Care Medicine, 194(2):142–146. DOI:10.1164/rccm.201601-0129UP

Lotfian F, Bolursaz M, Khalilzadeh S, Baghaie N, Hassanzad M and Velayati A (2016). Features of adolescents tuberculosis at a referral TB's hospital in Tehran, Iran. Mediterranean Journal of Hematology and Infectious Diseases, 8(1):1–7. DOI:10.4084/mjhid.2016.005

Maciel E, Golub J, Peres R, Hadad D, Favero J, Molino L, et al. (2010). Delay in diagnosis of pulmonary tuberculosis at a primary health clinic in Vitoria, Brazil. The International Journal of Tuberculosis and Lung Disease, 14(11):1403–1410. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3697918/

Masuyama H and Igari H (2013). Reconsideration of the admission and discharge criteria of tuberculosis patients in Japan. Kekkaku : [Tuberculosis], 88(3):373–385. PMID: 23672177, https://www.ncbi.nlm.nih.gov/pubmed/23672177

Mjid M, Cherif J, Ben Salah N, Toujani S, Ouahchi Y, Zakhama H, et al. (2014). Tuberculosis epidemiology. Revue de pneumologie clinique, 67-

72DOI:10.1016/j.pneumo.2014.04.002

Ramos-Rincon J, Cuadros-Gonzalez J, Malmierca-Corral E and de Gorgolas-Hernandez M (2015). Medical diagnosis in resource-poor tropical countries.Revista Clinica Espanola, 215(1):43–49. DOI:10.1016/j.rce.2014.05.002

Roque-Henriquez J, Catacora-Lopez F, Hilasaca-Yungas G and Romani-Romani F (2015). Evaluation of tuberculosis detection indicators in a region with high risk of transmission in Peru. Revista peruana de medicina experimental y salud publica, 32(3):504–508. http://www.scielosp.org/scielo.php?pid=S1726-46342015000300014&script=sci_arttext&tlng=pt

Shamaei M, Marjani M, Chitsaz E, Kazempour M, Esmaeili M, Farnia P, et al. (2009). First-line anti-tuberculosis drug resistance patterns and trends at the national TB referral center in Iran--eight years of surveillance. International Journal of Infectious Diseases,13(5):e236-240. DOI:10.1016/j.ijid.2008.11.027

Stout J (2014). Understanding the costs of better tuberculosis diagnostics. The international journal of tuberculosis and lung disease : the official journal of the International Union against Tuberculosis and Lung Disease, 18: 508. DOI:10.5588/ijtld.14.0211

Triasih R (2015). Newer Diagnostic Tests for Pulmonary Tuberculosis in Children. Indian Journal of Pediatrics, 82: 827–832. DOI:10.1007/s12098-015-1848-6