



Study of Depression, Anxiety and Stress among Tuberculosis patients and its relation with their Life Satisfaction

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Abstract

Given the ease of access to vaccines, drugs and medical treatments for Tuberculosis (TB), the disease continues to be a global health concern. Along with the high prevalence of TB, there is growing awareness of psychiatric comorbidity and its impact in the outcome of the disease. With this purpose, the present study was conducted to assess depression, anxiety, stress of TB patients and their life satisfaction in relation to these variables. Eighty eight TB patients who were undergoing treatment from last six months were given self reported measures of DASS-42 and Life Satisfaction Scale for data gathering. Required statistical techniques were used to obtain results. The results of the study showed 72% of the participants reported high level of depression while as 45.46% and 52.27% reported higher anxiety and stress respectively. 92.05% were extremely dissatisfied with their overall life. Moreover, depression, anxiety and stress were identified as the significant negative predictors of life satisfaction of these patients.

Key Words: Tuberculosis, Mental disorders, Depression, Life Satisfaction.

Introduction

Tuberculosis (TB), one among the ancient diseases of the human race is still today a biggest threat to global public health. The statistics are upsetting when it comes to impact of tuberculosis on human well being. After human immunodeficiency virus (HIV), TB ranks as the second leading cause of death globally. As per the reports of WHO, there were 9.0 million new TB cases in 2013 and 1.5 million deaths related to TB worldwide ^[1]. Even at the national level, the figures are alarming. India being the second largest populous country in the world, contributes one fourth of the total global incident TB cases annually. According to reports of the TB India 2014, in 2012, out of the estimated global annual

incidence of 8.6 million TB cases, 2.3 million were estimated to have occurred in India ^[2].

While from the medical point of view TB is a bacterial infection that can spread through the lymph nodes and bloodstream to any organ of body ^[3], there are other factors that make an independent contribution to the burden of disease worldwide ^[4]. These factors include stigmas (e.g., dirty disease, disease of poor and marginalized people) ^[5] that have not only impact on these patients, their families and upon effectiveness of Tb control programmes ^[6] but has also severely compromised their psychological health. These outside body factors are responsible for a high prevalence of common mental disorders in TB patients which the primary care physicians and

pneumologist do not screen. Common mental disorders (CMDs) comprise a range of affairs like, depression, anxiousness or somatoform symptoms, including irritability, insomnia, nervousness, fatigue and feelings of uselessness^[7]. Along with the chronic nature of these disorders, they cause intensive suffering of subjective nature among these individuals which in turn not only compromises their ability to take their own healthcare^[7,8], but are responsible for up to 10 % of the total global disease burden. At least one-third of all patients seen in primary care facilities in low- and middle-income countries (LMICs) present with CMDs^[9]. Several authors found frequent comorbidity of TB and common mental disorders^[10,11]. Few studies have investigated common mental disorders in TB patients in low and middle income countries (LMICs) and have found high rates of CMDs in Pakistan 46.3%-80%^[12-14], Nigeria 27.7%-30%^[15,16], Ethiopia 64%^[17], India 76%^[18], South Africa 46%^[19,20] and Turkey 19%-26%^[21]. Even in the developing countries, the prevalence of CMDs varies between 20%–30%^[22]. Further association has been described between TB and CMDs, where approximately 39%–70% of pulmonary TB cases have been found to have anxiety or depression^[23–25]. As the link between CMDs and tuberculosis is reasonable, and if such a link exists, there are implications for the control and treatment of both diseases^[26]. Thus the CMDs and TB are both coupled with greater social helplessness, insufficient livelihood setting and socioeconomic variation^[27, 28].

Other factors associated with CMDs in TB patients included: male gender^[29], older age groups, the young and the elderly^[29,30,31], low education^[31], instable finance and meager of income^[30,32]. This means an increase in the number of symptoms reported, further grave consequences and less control over their illness persists^[33, 30].

From the above literature it can be said that TB is not only a medical problem but also a psychological one. Even if bio medical factors are

responsible for the onset of disease it is the psychological health of the patients that determines the efficacy of their journey from the onset to treatment and later to readjustment in normal life. Thus encouraging back-up of psychosomatic wellbeing of these patients will heighten their immune system and will increase their hardiness ability. This necessitates the need of psycho-medical approach towards these patients. With this purpose the present study was conducted to assess the level of stress, depression and anxiety of tuberculosis patients as well as to find the relation of these variables with their overall life satisfaction.

Objectives

1. To study level of depression, anxiety, stress and life satisfaction of TB patients.
2. To study Depression, anxiety and stress as predictors of life satisfaction of TB patients.
3. To study difference of gender and marital status in depression, anxiety, stress and life satisfaction of TB patients.

Methodology

Study Area and Population

This research was conducted in the South Kashmir District (Kulgam) of Jammu & Kashmir State. The district has total population of 424,483 persons as per census of 2011. The sample for the study comprised of those patients who were enrolled and undergoing treatment in RNTCP Center of the hospital for the year 2014. As per the records of the center there were 129 TB patients under treatment during the same year. For the present study only those patients were included who were under treatment from last six months. Also the minors were excluded from the study. Hence the final sample for the study was reduced to 88 participants. Out of the total sample of 88, 46 (52.27%) were males and 42 (47.73%) were females. Majority of the participants i.e., 69 (78.40%) were married and 19 (21.59%) were unmarried. The age of the sample ranged from 18-70 years.

Data Collection Instruments

I. Depression Anxiety Stress Scale 42 (DASS 42) ^[34]. The DASS is a 42 item self-report inventory that yields 3 factors: Depression; Anxiety; and Stress. Each factor of the scale comprises of 14 items equally making a total of 42 items. The reliability coefficients of the three factors as per authors of the scale are .71 for depression, .86 for anxiety, and .88 for stress.

II. Life Satisfaction Scale ^[35]. This is a short 5-item instrument designed to measure global cognitive judgments of satisfaction with one's life. It is a 7-point Likert-type scale and usually requires only about one minute of a respondent's time. The high score would indicate a high level of life satisfaction and the low score would indicate a low level of life satisfaction. The reliability of the scale is reasonably high as reported by the authors. Besides the above tools a demographic data sheet was also used to obtain information related to socio personal aspects of the subjects.

Procedure: After explaining the purpose of the study to respondents, proper consent was sought from them for participating in the study. It was also ensured to them that the information provided by them shall be meant for research purpose only.

Data Analysis

The data was analyzed with the help of SPSS 20 version. Descriptive method, Regression Analysis and T-test were used to obtain the results.

Table 1.1 Level of Depression of TB patients

Depression		
Level	Frequency	Percentage
Low	0	0%
Average	24	27.27%
High	64	72.73%
Total	88	100

The data in the above table indicates that majority of the respondents 64 (72.73%) had higher level

of depression while as 24 (27.27%) had average or normal amount of depression.

Table 1.2 Level of Anxiety of TB patients

Anxiety		
Level	Frequency	Percentage
Low	6	6.81%
Average	42	47.73%
High	40	45.46%
Total	88	100

The above table indicates that 6 (6.81%) of respondents had low level of anxiety while as 42 (47.73%) had normal anxiety and 40 (45.46%) had high anxiety.

Table 1.3 Level of Stress of TB patients

Stress		
Level	Frequency	Percentage
Low	1	1.13%
Average	41	46.60%
High	46	52.27%
Total	88	100

With respect to stress the table shows that 46 (52.27%) of respondents had high level of stress, 41 (46.60%) had average level of stress while as 1 (1.03%) had low level of stress.

Table 1.4 Level of Life Satisfaction of TB patients

Life Satisfaction		
Level	Frequency	Percentage
Low	81	92.05%
Average	7	7.95%
High	0	0%
Total	88	100%

The above table indicates that majority of respondents 81(92.05%) had low satisfaction with their life while as 7 (7.95%) had average life satisfaction.

Table 1.5–A Presenting the Multiple Regression Analysis (ANOVA Summary)

	Sum of Squares	df	Mean of Squares	F
Regression	61.682	3	20.561	12.863*
Residual	134.272	84	1.598	
Total	195.955	87		

a. Predictors: (constant), Depression, Anxiety and Stress

b. Dependent Variable: *Life Satisfaction*

R Square = .315

Table 1.5-B Presenting the Multiple Regression Analysis (Summary of predictor variables).

Model	Unstandardized Coefficients	Standardized Coefficients		(t)
	B	Std. Error	Beta	
Constant	14.828	1.219		12.167
Depression	-.029	.023	-.116	-1.249^{NS}
Anxiety	-.074	.017	-.396	-4.276*
Stress	-.109	.024	-.406	-4.451*

(^{NS} $p > .05$) & (*sig. $p \leq .05$) Dependent Variable: *Life Satisfaction*

Table 1.5-A. & 1.5-B present the regression analysis of *life satisfaction* and predictor variables (*depression, anxiety and stress*) of TB patients. The ANOVA table shows F-value (**12.863***) which is significant. This indicates that the combination of the predictors significantly predict *life satisfaction*. The Model Summary table shows that the **adjusted R²**, using all the predictors simultaneously, is ($R^2 = .315$), meaning that 31% of the variance in *life satisfaction* can be predicted from *depression, anxiety and stress* combined.

Further analysis (Table 1.5-B) shows the significance of predictors of *life satisfaction*. As is

evident from the table that only the t-values of Anxiety (**t=-4.276***) and Stress (**4.451***) are significant which means that these two variables have emerged as the significant predictors of *life satisfaction* while the t-value of depression (**-1.249^{NS}**) is insignificant at ($p \leq 0.05$) level.

Moreover the negative beta value of independent variables namely, depression (-.116), anxiety (-.396) and stress (-.406) indicate that lower presence of these variables will result in higher *life satisfaction* among TB patients.

Table 1.6: Comparison of Mean scores of Depression, Anxiety and Stress of TB patients on the basis of their Gender.

Variables	Groups	N	M	SD	df	(t)
Depression	Male	46	32.56	5.90	86	.35^{NS}
	Female	42	32.09	6.36		
Anxiety	Male	46	22.54	7.66	86	2.50*
	Female	42	26.71	7.96		
Stress	Male	46	29.93	4.88	86	3.26*
	Female	42	26.23	5.73		
Life Satisfaction	Male	46	9.08	1.26	86	.41^{NS}
	Female	42	8.95	1.73		

*significant at $p < .05$; NS Insignificant at $p < .05$

The above table shows the comparison of mean scores of Depression, Anxiety and Stress of TB patients on the basis of their Gender. The data in the table shows that there is a significant difference in anxiety and stress scores of males and females as both the t-values (2.50 and 3.26) of

both the variables are significant at .05 level of significance. However the t-values of Depression and Life Satisfaction are insignificant at .05 level which indicates that males and females does not differ in the scores of depression and life satisfaction.

Table 1.7: Comparison of Mean scores of Depression, Anxiety and Stress of TB patients on the basis of their Marital Status.

<i>Variables</i>	<i>Groups</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>(t)</i>
Depression	Unmarried	19	30.57	5.04	86	1.431^{NS}
	Married	69	32.82	6.30		
Anxiety	Unmarried	19	26.42	7.30	86	1.157^{NS}
	Married	69	24.01	8.20		
Stress	Unmarried	19	25.63	4.80	86	2.288*
	Married	69	28.86	5.62		
Life Satisfaction	Unmarried	19	9.10	1.62	86	.269^{NS}
	Married	69	9.00	1.47		

*significant at $p < .05$; NS Insignificant at $p < .05$

The above table shows the comparison of mean scores of Depression, Anxiety and Stress of TB patients on the basis of their Marital Status. From the table it is evident that there is no significant difference in depression, Anxiety and Life Satisfaction of TB patients as the t-values are insignificant at .05 level. However, with respect to stress among TB patients, there is a significant difference as the t-value ($t=2.288$) is significant at .05 level of significance. This means that a married and unmarried TB patient does not differ in scores of depression, anxiety and life satisfaction.

Discussion

The present study was conducted to assess the different psychological aspects of tuberculosis patients. The results of the study showed high prevalence of depression, anxiety and stress in these patients. 72.73% of the patients had higher depression, 45.46% had higher anxiety, 52.27% had higher stress and 92.05% had lower in life satisfaction. In line with the above mentioned results it can be said the link between tuberculosis and mental health is complex. These results are in

line with the meta-analytic survey conducted by Amy Hyman and Guruge^[36] who reviewed 31 prevalence articles related to mental disorders in TB patients and concluded 46-72% of TB patients also experience depression and anxiety which have a direct effect on their quality of life. Neli, Macharashvilli and Maia^[37] in their study titled Tuberculosis and Depression found that all forms of depression (extreme, severe, moderate) were diagnosed among these patients. Higher rates of depression and anxiety were also reported in the study of Adina and others^[38]. The regression analysis of the variables in our study showed that higher presence of mental health complications (depression, stress and anxiety) among the TB patients has compromised their overall life satisfaction. The result is in line with a number of previous studies showing that psychiatric complications have a severe negative impact on the quality of life of the tuberculosis patients^[39, 40, 41, 42, 43, 44, 45, and 46]. The other studies that have confirmed our results include Eram^[47] that the patient's initial reactions even to diagnosis were anxiety, depression, denial etc., Rajeswari^[48] worry (50%) and suicidal thoughts (9%). Deribew

^[49] found a low self-image and social isolation among these patients which in turn predisposes them to common mental disorders. Jaggarajamma ^[50] found fear of discrimination or acceptability higher than enacted stigma among these patients. Courtwright ^[51] surfaced impact of stigma more on women and on less educated community members, and it is perceived to increase TB diagnostic delay and treatment non adherence ^[52,53]. Naidoo ^[54] found limited social, psychological, and economic resources available to these people which make it extremely difficult for them to maintain a reasonable quality of life. Marra ^[55] found prolonged therapy with multiple potentially toxic drugs as a factor for low quality of life among the active TB patients.

Conclusion

From the overarching results of the study, it can be safely said that there is a well-knit relationship between tuberculosis and mental health issues. This complex association, if left unobserved could result in poorer prognoses of TB cases. Mental health programs should be integrated within TB control programs, and efforts should be made to increase awareness about the common mental disorders in TB patients and the implications for TB treatment outcomes. Primary care doctors and pneumologist need to develop systematic strategies to screen the mental disorders symptoms in tuberculosis patients and must take help from mental health professionals for the betterment of these patients.

References

1. World Health Organization. Global tuberculosis report 2012. Geneva: World Health Organization. Available: www.who.int/iris/bitstream/10665/91355/1/9789241564656_eng.pdf. Accessed 15 January, 2015.
2. TB INDIA . Annual Status Report 2014. India: Central TB Division Directorate General of Health Services, Ministry of Health and Family Welfare, Nirman Bhavan, New Delhi. www.tbcindia.nic.in
3. Lisa B. Bernstein, L, B. Understanding Tuberculosis -- the Basics. Montefiore Medical Center, New York, NY. Centers for Disease Control. World Health Organization. National Library of Medicine. 2015. <http://www.webmd.com/a-to-z-guides/understanding-tuberculosis-basics>.
4. Packer S, Husted J, Cohen S, Tomlinson G. Psychopathology and quality of life in schizophrenia. *J Psychiatr Neurosci*. 1997;2 2:231–4.
5. Baxter A. J, Charlson F. J, Somerville A. J, Whiteford H. A. Mental disorders as risk factors: assessing the evidence for the Global Burden of Disease Study. *BMC medicine*. 2001: 9: 134.
6. Macq J, Solis A, Martinez G. Assessing the stigma of tuberculosis. *Psychol Health Med*. 2006; 11:346-52.
7. Van Brakel WH. Measuring health-related stigma – a literature review. *Psychol Health Med* 2006; 11:307-34.
8. Fonseca MLG, Guimaraes MBL, Vasconcelos EM. Sofrimento difuso e transtornos mentais comuns: *uma revisa~o bibliografica*. *Rev. APS* 11. 2008: 285–294.
9. Veggi AB, Lopes CS, Faerstein E, Sichieri R. Body mass index, body weight perception and common mental disorders among university employees in Rio de Janeiro. *Rev Bras Psiquiatr* 2004: 26: 242–247.
10. Siddiqi K, Siddiqi N: Treatment of common mental disorders in primary care in low- and middle-income countries. *Trans R Soc Trop Med Hyg* 2007, 101(10):957–958.
11. Trenton AJ, Currier GW: Prim Care Companion. *J Clin Psychiatry* 2001, 3(6):236–243.

12. Yang L, Wu DL, Guo HG, Liu JW: A study of the psychological and social factors in patients with pulmonary tuberculosis. *Zhonghua Jie He He Hu Xi Za Zhi* 2003, 26(11):704–707.
13. Hussain MO, Dearman SP, Chaudhry IB, Rizvi N, Waheed W: The relationship between anxiety, depression and illness perception in tuberculosis patients in Pakistan. *Clin Pract Epidemiol Ment Health* 2008, 26:4. 4.
14. Sulehri M. A, Dogar I. A, Sohail H, Mehdi Z, Azam M, Niaz O, Javed M. S, Sajjad I. A, Iqbal Z: Prevalence of Depression Among Tuberculosis Patients. *A.P.M. C* 2010, 4(2):133–137.
15. Aamir SA. Co-morbid anxiety and depression among pulmonary tuberculosis patients. *J Coll Physicians Surg Pak* 2010, 20(10):703–704.
16. Issa BA, Yussuf AD, Kuranga SI: Depression comorbidity among patients with tuberculosis in a university teaching hospital outpatient clinic in Nigeria. *Mental Health Family Med* 2009, 6:133–138.
17. Aghanwa HS, Erhabor GE: Demographic/socioeconomic factors in mental disorders associated with tuberculosis in southwest Nigeria. *J Psychosom Res* 1998, 45(4):353–360.
18. Deribew A, Tesfaye M, Hailmichael Y, Apers L, Abebe G, Duchateau L, Colebunders R: Common mental disorders in TB/HIV co-infected patients in Ethiopia. *BMC Infect Dis* 2010, 10:201.
19. Prakash C, Sangita S: Study of Psychiatric co - morbidity in cases of tuberculosis patients undergoing treatment. *Indian J Public Health Res Development* 2011, 2(2):111–113.
20. Westaway MS, Wolmarans L: Depression and self-esteem: rapid screening for depression in black, low literacy, hospitalized tuberculosis patients. *Soc Sci Med* 1992, 35(10):1311–1315.
21. Naidoo P, Mwaba K: Helplessness, depression and social support among TB patients at a public health site: a prevalence study. *J Soc Beh Pers* 2010, 38(10):1323–1334.
22. Aydin IO, Uluşahin A: Depression, anxiety comorbidity, and disability in tuberculosis and chronic obstructive pulmonary disease patients: applicability of GHQ-12. *Gen Hosp Psychiatry* 2001, 23(2):77–83.
23. Patel V, Kleinman A. Poverty and common mental disorders in developing countries. *Bull World Health Organ*: 2003, 81: 609–615.
24. Ahola K, Virtanen M, Honkonen T, Isometsä E, Aromaa A. Common mental disorders and subsequent work disability: a population-based Health 2000 Study. *J Affect Disord*, 2001; 134: 365–372. doi:10.1016/j.jad.2011.05.028.
25. Deribew A, Tesfaye M, Hailmichael Y, Apers L, Abebe G. Common mental disorders in TB/HIV co-infected patients in Ethiopia. *BMC Infect Dis*: 2010, 10: 201 doi:10.1186/1471-2334-10-201.
26. Balaji AL, Abhishekh HA, Kumar NC, Mehta RM. Depression in patients with pulmonary tuberculosis in a tertiary care general hospital. *Asian J Psychiatry*: 2013, 6: 251–252. doi:10.1016/j.ajp.2012.12.017.
27. Doherty AM, Kelly J, McDonald C, O'Dwyer AM, Keane J, et al. A review of the interplay between tuberculosis and mental health. *Gen Hosp Psychiatry*: 2013, 35: 398–406. doi:10.1016/j.genhosppsy.2013.03.018.
28. Patel V, Kleinman A. Poverty and common mental disorders in developing countries. *Bull World Health Organ*: 2003, 81: 609–615.

29. Harling G, Castro MC. A spatial analysis of social and economic determinants of tuberculosis in Brazil. *Health Place*: 2013, 25: 56–67. doi:10.1016/j.healthplace.2013.10.008.
30. Sulehri MA, Dogar IA, Sohail H, Mehdi Z, Azam M, Niaz O, Javed MS, Sajjad IA, Iqbal Z: Prevalence of Depression Among Tuberculosis Patients. *A.P.M. C*: 2010, 4(2):133–137.
31. Issa BA, Yussuf AD, Kuranga SI: Depression comorbidity among patients with tuberculosis in a university teaching hospital outpatient clinic in Nigeria. *Mental Health Family Med*: 2009, 6:133–138.
32. Aghanwa HS, Erhabor GE: Demographic/socioeconomic factors in mental disorders associated with tuberculosis in southwest Nigeria. *J Psychosom Res*: 1998, 45(4):353–360.
33. Deribew A, Tesfaye M, Hailmichael Y, Apers L, Abebe G, Duchateau L, Colebunders R: Common mental disorders in TB/HIV co-infected patients in Ethiopia. *BMC Infect Dis* 2010, 10:201.
34. Hussain MO, Dearman SP, Chaudhry IB, Rizvi N, Waheed W: The relationship between anxiety, depression and illness perception in tuberculosis patients in Pakistan. *Clin Pract Epidemiol Ment Health* 2008, 26:4. 4.
35. Lovibond, S.H. & Lovibond, P.F. Manual for the Depression Anxiety Stress Scales (2nd. Ed.). Sydney: Psychology Foundation, 1995.
36. Diener, E, Emmons, RA, Larson, RJ. & Griffin, S. The satisfaction with life scale. *Journal of Personality Assessment*, 1985. Vol. 49, pp. 71-75.
37. Bender, A., Hyman, I & Guruge, S. Exploring Tuberculosis, Mental Health, and Immigrant Health through a Syndemic Approach. CERIS –The Ontario Metropolis Centre, 2012. amy.bender@utoronto.ca.
38. Neli, Macharashvilli and Maia, A. Tuberculosis and Depression. National Centre for TB and Lung Diseases, Tbilisi, Georgia. European Respiratory Society, Annual Congress 2013.
39. Adina., M.M., Necrelescu., O.L., Bondor., C., Trofor, A., Alexanderescue, D, and Dantes, E. Depressive syndrome, anxiety and illness perception in Tuberculosis patients. *Recent Researches in Modern Medicine*, 2011. Vol. 24, pp. 243-248.
40. Vega P, Sweetland A, Acha J, Castillo H: Psychiatric issues in the management of patients with multidrugresistant tuberculosis. *Int. J. Tuberc. Lung Dis.* 2004 jun. 8 (6):749-759.
41. Westaway, M. S., & Wolmarans, L.: Depression and self-esteem: Rapid screening for depression in black, low literacy, hospitalized tuberculosis patients. *Soc Sci Med* 1992;35:1311-1315.
42. Thomas H. Holmes, Norman G. Hawkins, Charles E. Bowerman, Edmund R. Clarke , Joy R. Joffe : Psychosocial and Psychophysiologic Studies of Tuberculosis. *Psychosomatic Medicine* 19:134-143 (1957)
43. Aghanwa, H.S., Erhabor, G.E: Demographic/socioeconomic factors in mental disorders associated with tuberculosis in southwest Nigeria; *Journal of Psychosomatic Research* October 1998, october, 45, 353-360.
44. Baba, A Issa, Abdullah D Yussuf, Suleiman I Kuranga: Depression comorbidity among patients with tuberculosis in a university teaching hospital outpatient clinic in Nigeria. *Mental Health Family Medicine*, 2009 September; 6(3): 133–138.
45. Aydin IO, Ulusahin A Depression, anxiety comorbidity, and disability in tuberculosis and chronic obstructive pulmonary disease

- patients: applicability of GHQ-12. *Gen Hosp Psychiatry*. 2001 Mar- Apr;23(2):77-83.
46. Amare Deribew , Markos Tesfaye , Yohannes Hailmichael, Ludwig Apers, Gemeda Abebe, Luc Duchateau , Robert Colebunders : Common mental disorders in TB/HIV co-infected patients in Ethiopia. *BMC Infectious Diseases* 2010, 10-21.
47. Mark E. Kunik, MD, MPH, Kent Roundy, MD, Connie Veazey, PhD: Surprisingly High Prevalence of Anxiety and Depression in Chronic Breathing Disorders*. *Chest* 2005, April; 127; 1205-1211.
48. Eram., U., Khan., I.A., Tamanna., Z., Khan., Z., Khaliq., N. and Abidi., A.J. "Patient perception of illness and initial reaction to the diagnosis of tuberculosis," *Indian Journal of Community Medicine*, vol. 31, no. 3, pp. 2006-07–2006-09, 2006.
49. Rajeswari., R., Muniyandi., M., Balasubramanian., P. and Narayanan., P.R. "Perceptions of tuberculosis patients about their physical, mental and social well-being: a field report from south India," *Social Science and Medicine*, vol. 60, no. 8, pp. 1845–1853, 2005.
50. Deribew., A., Tesfaye., M., Hailmichael., Y. "Common mental disorders in TB/HIV co- infected patients in Ethiopia," *BMC Infectious Diseases*, vol. 10, article 201, 2010.
51. Jaggarajamma., A., Ramachandran., K., Charles., N., Chandrasekaran., V., Muniyandi., M. and Ganapathy., S. "Psycho-social dysfunction: perceived and enacted stigma among tuberculosis patients registered under revised national tuberculosis control programme," *The Indian Journal of Tuberculosis*, vol. 55, no. 4, pp. 179–187, 2008.
52. Courtwright., A, and Turner., A.N. "Tuberculosis and stigmatization: pathways and interventions," *Public Health Reports*, vol. 125, supplement 4, pp. 34–42, 2010.
53. S. A. Munro., S.A, Lewin., S.A, Smith., S.J., Engel., M.E., Fretheim., A. and Volmink., J. "Patient adherence to tuberculosis treatment: a systematic review of qualitative research," *PLoS Medicine*, vol. 4, no. 7, pp. 1230–1245, 2007.
54. Gibson., N., Cave., D. Doering., A., Ortiz., A. and Harms., P. "Socio-cultural factors influencing prevention and treatment of tuberculosis in immigrant and Aboriginal communities in Canada," *Social Science and Medicine*, vol. 61, no. 5, pp. 931–942, 2005.
55. Naidoo., P, and Mwaba., K. "Helplessness, depression, and social support among people being treated for tuberculosis in South Africa," *Social Behavior and Personality*, vol. 38, no. 10, pp. 1323–1334, 2010.
56. Marra, C. A., Marra, F., Cox, V.C., Palepu., A and Fitzgerald., J.M. "Factors influencing quality of life in patients with active tuberculosis," *Health and Quality of Life Outcomes*, vol. 2, article 58, 2004.