Prevalence and correlates of depression and anxiety among patients with tuberculosis at WolaitaSodo University Hospital and Sodo Health Center, WolaitaSodo, South Ethiopia, Cross sectional study

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Abstract

Background: Anxiety and depression are frequently and highly occurring mental disorders in patients with tuberculosis. When depression and anxiety co-morbid with tuberculosis, it leads to poor adherence to anti TB medication, which is important barrier to global control of tuberculosis & increases the risk of morbidity and mortality due to TB. Cross sectional study was conducted to assess prevalence and correlates of depression and anxiety among patients with TB at WolaitaSodo University Hospital and Sodo Health Center, WolaitaSodo, Ethiopia.

Methods: Institution based cross-sectional study was conducted in 2014. A total of 417 TB patients, who had regular follow up at WolaitaSodo University Hospital and Sodo Health Center, WolaitaSodo, South Ethiopia, were recruited to assess depression and anxiety and its associated correlates. Depression and anxiety were assessed through face to face interviews by trained psychiatry nurses using the hospital anxiety and depression scale (HADS). Correlates for depression and anxiety were assessed using a structured questionnaire, Oslo social support scale and TB stigma Scale.

Results: The prevalence of depression and anxiety among patients with TB were 43.4 % (181) and 41.5 % (173) respectively. When we adjusted for the effect of potential confounding variables, patients who had co-morbid HIV infection [AOR = 5.90,(95 % CI: 2.34,15.93)], poor social support [AOR = 18.06, (95 % CI:11.21,25.45)] & perceived TB stigma [AOR = 10.86, (95 % CI:10.26,23.47)] were more likely to have depression as compared to individuals who had no co-morbid HIV infection, good social support and no perceived TB stigma respectively. Patients who had co-morbid HIV infection [AOR = 9.61,(95 % CI:3.56,25.96)], poor social support [AOR = 8.93,(95 % CI: 5.01,15.94)], perceived TB stigma [AOR = 3.11,(95 % CI:1.78,5.42)], being female [AOR = 1.72 (95 % CI: 1.06, 2.95)], current substance use[AOR = 4.88, (95 % CI: 1.79, 13.28)] and being on intensive phase of TB treatment [AOR = 1.91, (95 % CI: 1.08, 3.39)] were more likely to have anxiety as compared to individuals who had no co-morbid HIV infection, good social support, no perceived TB stigma, being male and being on continuous phase of TB treatment respectively.

Conclusion: Developing guidelines and training of health workers in TB clinics is useful to screen and treat depression and anxiety among TB patients.

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Background

Tuberculosis is a chronic infectious disease caused by Mycobacterium tuberculosis. It is one of the leading causes of morbidity and mortality worldwide [1, 2]. According to WHO 2012 estimate, 2 billion people have latent TB, while another 3 million people worldwide die each year due to TB [3]. It remains a major global health problem & causes ill-health among millions of people each year and ranks as the second leading cause of death from an infectious disease worldwide, after HIV/AIDS [4]. According to WHO 2013 global TB control report, Ethiopia ranks 7th among the 22 high burden countries in the world and 2nd in Africa [5].

Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, decreased energy, feelings of guilt or low self-worth, disturbed sleep or appetite, and poor concentration [6]. It is one of the leading causes of disease burden affecting 121 million people worldwide. Depression can lead to suicide. Suicide contributes for the loss of about 850,000 lives every year [7]. In general population, the life time risk of depression is 10 % to 25 % for women and 5 % to 12 % for men [8]. In Ethiopia, a study done in Addis Ababa showed that the life time prevalence is 2.7 % for depressive episodes, 0.2 % for recurrent episodes, 0.3 % for bipolar and 1.6 % for persistent mood disorder [9]. However, the prevalence of depression in those with chronic illness in the world is much higher, i.e. 25 % to 33 % [8].

Anxiety is a vague, subjective, non-specific feeling of uneasiness, apprehension, tension, (excessive nervousness) fears, and a sense of impending doom, irrational avoidance of objects or situation and anxiety attack [6]. The anxiety disorders make up one of the most common groups of psychiatric disorders and the National co-morbidity study reported that one of four persons met the diagnostic criteria for at least one anxiety disorder and that there is a 12-month prevalence rate of 17.7 percent [10].

Anxiety and depression are the most frequently occurring mental disorders in the general population [11]. Studies conducted in different countries on prevalence of depression and anxiety among TB patients shows that 46.3 % (anxiety), 47.2 % (depression) in Pakistan [11], 72.88 % (anxiety), 38.98 % (depression) in Romania [12], 40.67 % (anxiety), 9.93 % (depression) in Greece [13], 45 % (depression) in Nigeria [14], 61 % (depression in Kenya [15]. The studies indicate that there is high prevalence of depression and anxiety among TB patients compared to general population which is about 3–17 % [16], and 7 % to 82.3 % [17], respectively.

Moreover, depression often comes with symptoms of anxiety. These problems can become chronic or recurrent and lead to substantial impairments in an individual’s ability to take care of his or her everyday responsibilities [5]. The presence of depression and anxiety has a negative influence on quality of life, health care cost and self-care. This leads to decreased resistance to infections, so it adversely affects the patient’s compliance to TB treatment that can increase mortality from the disease [18]. Despite their known effect on the population, there is very little data available in the study area. Therefore, this study was planned to determine the prevalence and correlates of depression and anxiety among patients with TB at Wolaita Sodo University Hospital and Sodo health center, Wolaita Sodo, Ethiopia.

Methods

Study Setting and population

The study was a cross sectional design, conducted from April to May, 2014 in Wolaita Sodo University Hospital and Sodo Health Center, South Nation Nationalities regional state of Ethiopia. All adult patients (age ≥ 18) with tuberculosis who had regular follow were included in the sample. Critically ill patients were excluded from the study.

Among 948 TB patients who had regular follow up at TB clinics, 424 TB patients were recruited for the study. Study participants were included using systematic random sampling technique. Seven patients refused to participate in the study.

Data collection

Data were collected by trained psychiatry nurses using pretested interviewer administered questionnaire. The data collection instrument had different components. The first part includes socio-demographic characteristics (age, education, occupation, marital status and others). Social support characteristics were collected by Oslo 3-item social support scale. Oslo 3-item social support scale is 3-item questionnaire commonly used to assess social support. It has the sum score scale ranging from 3 to 14 with three broad categories: “poor support” 3–8, “moderate support” 9–11 and “strong support” 12–14 [19]. It was reliable in the study (Cronbach’s α = 0.91).

Stigma felt by TB patients was collected by 12-item perceived TB stigma scale. It consisted of four-point Likert scale (strongly disagree, disagree, agree, strongly agree) questions concerning perceived isolation, shame, guilt and disclosure of the TB status. Item scores of the stigma questions were summed to construct a single stigma variable. Participants were classified as having or not having perceived stigma using the mean of the stigma variable as cut-off point [20]. The instrument was adopted and translated to Amharic language and back to English and highly reliable in the study (Cronbach’s α = 0.89). An outcome variable (presence of anxiety and depression) was collected by Hospital Anxiety & Depression scale (HADS). HADS is a 14-item questionnaire, commonly used to screen for
symptoms of anxiety and depression. The 14-item can be separated into two 7-item sub-scales for anxiety and depression. It was validated in Ethiopia and its internal consistency was 0.78 for anxiety, 0.76 for depression subscales and 0.87 for full scale. The scales use a cut off score for anxiety and depression of greater than or equal to 8 [21].

Data Processing and Analyses
Data were analyzed using SPSS version 20. Bivariate analysis was done to see the association of each independent variable with the outcome variable. Potential confounders (important) variables were entered into binary logistic regression model to identify the effect of each independent variable with the outcome variables. A p-value of less than 0.05 was considered statistically significant, and adjusted odds ratio with 95 % CI was calculated to determine association.

Ethical Consideration
Ethical clearance was obtained from the Research and Ethics Review Committee of the Institute of Public Health (University of Gondar) and Amanuel Mental Specialized Hospital. Permission letter was obtained from Wolaita zone Health Department and submitted to Sodo Health Center. Written informed consent was obtained from each study participant and they were informed about their rights to interrupt the interview at any time. Confidentiality was maintained at all levels of the study. Tuberculosis patients who were found to have moderate to severe depression and anxiety were referred to psychiatry clinics for further investigations.

Results
Socio-economic and demographic characteristics
A total of 417 participants were recruited for the study which makes the response rate 98.6 %. The mean (± SD) age of the respondents was 34.52 (±11.01) years. Among the respondents, 291(69.8 %) were in age range of 25 – 49 years, 241(57.8 %) were male, 266 (63.8 %) were Wolaita ethnic background, 199 (47.7 %) were never married (single), 129 (30.9 %) were attended primary education, and 189 (45.3 %) were protestant religion followers. The median monthly income of the participants was 700 (Table 1).

Clinical and psychosocial characteristics of the respondents
Two hundred eighty seven (68.8 %) patients were with diagnosis of pulmonary TB, 341 (81.8 %) were in new TB treatment category, 245 (59.2 %) had 6–12 months duration of illness, 270 (64.9 %) were in intensive phase of TB treatment, 229 (54.9 %) had good social support, 177 (42.4 %) had perceived TB stigma. From all study participants 49 (11.8 %) had co-morbid HIV illness, 30 (7.2 %) were currently substance (khat, cigarette and alcohol) users (Table 2).

Prevalence of depression and anxiety among TB patients
The prevalence of depression, anxiety and co-morbid depression and anxiety among TB patients were 43.4 %, 41.5 %, and 40.6 % respectively.

Factors associated with depression & anxiety among patients with TB
Binary logistic regression analysis revealed that co-morbid chronic illness, good social support and perceived TB

| Age       | 18–24 years | 88 | 21.1  |
|-----------|-------------|----|-------|
|           | 25–49 years | 291| 69.8  |
|           | ≥ 50 years  | 38 | 9.1   |
| Sex       | Male        | 241| 57.8  |
|           | Female      | 176| 42.2  |
| Marital status | Married     | 182| 43.6  |
|           | Unmarried   | 199| 47.7  |
|           | Divorced    | 15 | 3.6   |
|           | Widowed     | 21 | 5.0   |
| Education status | No formal education | 78 | 18.7  |
|           | Primary education | 129| 30.9  |
|           | Secondary education | 117| 28.1  |
|           | Higher education | 93 | 22.3  |
| Religion  | Protestant  | 189| 45.3  |
|           | Orthodox    | 146| 35.0  |
|           | Muslim      | 52 | 12.5  |
|           | Catholic    | 30 | 7.2   |
| Ethnicity | Wolaita     | 266| 63.8  |
|           | Amhara      | 62 | 14.9  |
|           | Gurage      | 69 | 16.5  |
|           | Others      | 20 | 4.8   |
| Occupation status | Government employee | 76 | 18.2  |
|           | Private employee | 85 | 20.4  |
|           | Merchant    | 51 | 12.2  |
|           | Farmer      | 15 | 3.6   |
|           | House wives | 52 | 12.5  |
|           | Jobless     | 49 | 11.8  |
|           | Students    | 89 | 21.3  |
| Monthly income | <735 ETB  | 212| 50.8  |
|           | 735–1176 ETB| 86 | 20.6  |
|           | ≥ 1176 ETB  | 119| 28.6  |
Discussion

Prevalence and factors associated with depression among patients with Tuberculosis

This study revealed that the prevalence of depression was 43.4 %. The finding was similar with other studies carried out in Nigeria 41.9 % [22], in Ibadan Nigeria 45.5 % [14] and in Pakistan 46.3 % [11]. On the other hand, the current study finding was higher than the study done in Nigeria 27 % [23] and Greece 9.93 % [13] and lower than the study was done in Kenya 61 % [15], in India 62 % [24] and 82 % [25]. The variation might be due to the difference in study design, data collection tool, sample size and difference in study participants.

One of the factors significantly associated with depression was HIV and TB co-infection. The finding is similar with the study conducted in Jimma, Ethiopia [26]. Being diagnosed with HIV, which is a terminal life-long disease associated with high levels of stigma may also lead to high rates of mental disorders [27]. Hence, TB/HIV co-infected patients can be at higher risk of common mental disorders as a result of stigma and discrimination by the society [28].

Patients who had perceived TB stigma were about 11 times more likely to have depression than their counterparts. This is similar with a study conducted in Pakistan [29]. Previous study has proven that presence of perceived stigma is highly associated with depression. People with perceived stigma may have a low self image and be socially isolated which may predispose them depression [30].

Furthermore, the study indicated that poor social support was significantly associated with depression. The finding is similar with other studies in Nigeria [23]. Lack of (poor) social support and somatic illness may lead to increased psychological distress. On the other hand, good social support is vital for those with good health in prevention of depression [31].

Prevalence and factors associated with anxiety among patients with Tuberculosis

The study showed that the prevalence of anxiety among TB patients was 41.5 %. The finding is similar with the study conducted in Pakistan 46.2 % [11] and in Greece 40.67 % [13] but lower than the study conducted in Romania 72.88 % [12]. The variation might be due to the difference in data collection tool which was STAI scale, might over estimate anxiety symptoms among TB patients in Romania.

With respect to gender, being female was significantly associated with anxiety. Different studies showed that anxiety disorders are more common in females than males. Biological factors might contribute for the differences.

Similar to depression, HIV and TB co-infection was significantly associated with anxiety. A similar finding was observed in a study conducted in Jimma, Ethiopia [26]. TB/HIV co-infected patients can be at higher risk of common mental disorders because of stigma and discrimination by the society [28].

Anxiety was also significantly higher among patients who had perceived TB stigma. A similar finding was seen in a study conducted in Pakistan [29]. Previous study has proven that presence of perceived stigma is highly associated with anxiety. People with perceived stigma may have a low self image and be socially isolated which may predispose them anxiety [30].

Anxiety was significantly higher among patients who were in intensive phase of TB treatment than those of patients in continuation phase of treatment. This is due to the fact that the symptoms of tuberculosis tend to be prominent in the intensive phase where patients get relieved as they progress to the continuation phase of TB treatment. This may indicate Patients in the continuation phase...
phase of anti-TB treatment, the physical and functional status of the patients could improve significantly which in turn brings improved mental health status of individuals. Regarding to social support, anxiety was significantly higher among patients who had poor social support than patients who had good social support. Lack of (poor) social support and somatic illness (TB) may lead to increased psychological distress (mental disorders); on the other hand, good social support is vital for those with good health in prevention of anxiety [31].

The study also revealed that use of substance (khat, cigarette & alcohol) was significantly associated with anxiety. This could be due to the fact that anxious patients are more prone to use substances to relief themselves from the stress or anxiety symptoms. Many studies established that 25-50 % of people with substance (khat, cigarette & alcohol) use related problem meet diagnostic criteria of anxiety disorder some time in their life [32]. For instance, one study conducted on smoking in relation to anxiety and depression showed, anxiety had strong association with cigarette smoking [33, 34].

**Conclusion**

The prevalence of depression, anxiety and co-morbid depression and anxiety (40.6 %) among TB patients were high. Both depression and anxiety had statistically significant association with co-morbid HIV infection, perceived TB stigma and poor social support. Being female sex, current substance (khat, alcohol and cigarette) use and being on intensive phase of TB treatment had statistically significant association with anxiety only. TB clinics should develop guidelines to screen and treat depression and anxiety should be conducted to strengthen and broaden the current findings.

### Table 3 Factors associated with depression among patients with TB at Wolaita Sodo University Hospital and Sodo Health Center, SNNPRS, Ethiopia, 2014

| Explanatory Variables                  | Depression | COR, 95 % (CI) | AOR, 95 % (CI) |
|----------------------------------------|------------|---------------|---------------|
|                                        | Yes        | No            |               |
| Age n = 417                             |            |               |               |
| 18–24 years                            | 27         | 61            | 1             | 1             |
| 25–49 years                            | 129        | 162           | 1.79, (1.08, 2.99) | 0.78(0.30, 2.03) |
| ≥ 50 years                             | 25         | 13            | 4.34, (1.94, 9.76) | 1.09 (0.20, 5.92) |
| Educational status n = 417             |            |               |               |
| No formal education                    | 48         | 30            | 3.20, (1.71, 5.99) | 2.92 (0.91, 9.35) |
| Primary education                      | 59         | 70            | 1.68, (0.97, 2.93) | 2.58 (0.95, 6.96) |
| Secondary education                    | 43         | 74            | 1.16, (0.66, 2.06) | 1.50 (0.57, 3.94) |
| Higher education                       | 31         | 62            | 1             | 1             |
| Classification n = 417                 |            |               |               |
| Pulmonary TB                           | 150        | 137           | 3.49, (2.19, 5.57) | 1.68(0.97, 4.17) |
| Extra-pulmonary TB                     | 31         | 99            | 1             | 1             |
| Phase of treatment                     |            |               |               |
| Intensive phase                        | 127        | 143           | 1.53, (1.01, 2.31) | 0.59 (0.29,1.23) |
| Continuous phase                       | 54         | 93            | 1             | 1             |
| Co-morbid chronic illness              |            |               |               |
| HIV/AIDS                               | 34         | 15            | 3.83, (2.01, 7.29) | 5.90(2.34, 15.93)** |
| Other chronic illness                  | 19         | 5             | 6.41, (2.34, 17.59) | 1.07 (0.37, 3.07) |
| No chronic illness                     | 128        | 216           | 1             | 1             |
| Good social support                    |            |               |               |
| Yes                                    | 29         | 200           | 1             | 1             |
| No                                     | 152        | 36            | 29.12, (17.10, 49.59) | 18.06(11.21, 25.45)** |
| Perceived TB Stigma                    |            |               |               |
| Yes                                    | 148        | 29            | 32.01, (18.62, 55.02) | 10.86(10.26, 23.47)** |
| No                                     | 33         | 207           | 1             | 1             |

*significant association (p-value < 0.05) **significant association (p-value < 0.01) Substance use = khat, cigarette and/or alcohol use .Other chronic illness = hypertension, renal diseases, cardiovascular diseases and diabetes
Limitation of the study
This study was cross-sectional study design, it did not allow establishing a temporal relationship between depression and anxiety and significant associated factors like substance (khat, cigarette and alcohol) use. Additionally, no detailed validation study was done for the

Table 4 Factors associated with anxiety among patients with TB at Wolaita Sodo University Hospital and Sodo Health Center, SNNPRS, Ethiopia, 2014

| Explanatory Variables                  | Anxiety | COR, 95% (CI) | AOR, 95% (CI) |
|---------------------------------------|---------|---------------|---------------|
|                                       | Yes     | No            |               |
|                                       |         |               |               |
| Sex n = 417                           |         |               |               |
| Male                                  | 89      | 152           | 1             | 1             |
| Female                                | 84      | 92            | 1.56, (1.05, 2.31) | 1.72, (1.06, 2.95)** |
| Educational status n = 417            |         |               |               |
| No formal education                   | 45      | 33            | 3.01, (1.61, 5.64) | 0.70, (0.23, 2.11) |
| Primary education                     | 54      | 75            | 1.59, (0.91, 2.79) | 0.80, (0.32, 1.99) |
| Secondary education                   | 45      | 72            | 1.38, (0.78, 2.45) | 1.31, (0.54, 3.20) |
| Higher education                      | 29      | 64            | 1             | 1             |
| Job n = 417                           |         |               |               |
| Government employed                   | 28      | 48            | 1             | 1             |
| Private employed                      | 29      | 56            | 0.89, (0.47, 1.69) | 0.79, (0.33, 1.93) |
| Merchant                              | 20      | 31            | 1.11, (0.53, 2.29) | 0.65, (0.23, 1.88) |
| Farmer                                | 6       | 9             | 1.14, (0.37, 3.55) | 0.70, (0.14, 3.56) |
| House wives                           | 29      | 23            | 2.16, (1.05, 4.44) | 1.24, (0.88, 6.23) |
| Jobless                               | 26      | 23            | 1.94, (1.03, 4.02) | 2.40, (0.62, 5.12) |
| Students                              | 35      | 54            | 1.11, (0.59, 2.09) | 2.34, (0.43, 3.32) |
| Category of treatment                 |         |               |               |
| New                                   | 134     | 207           | 1             | 1             |
| Return after default                  | 16      | 21            | 1.18, (0.59, 2.34) | 1.86, (0.71, 4.87) |
| Relapse                               | 23      | 16            | 2.22, (1.13, 4.36) | 1.01, (0.39, 2.65) |
| Phase of treatment                    |         |               |               |
| Intensive phase                       | 130     | 140           | 2.25, (1.46, 3.45) | 1.91, (1.08, 3.39)** |
| Continuous phase                      | 43      | 104           | 1             | 1             |
| Co-morbid chronic illness             |         |               |               |
| HIV/AIDS                              | 42      | 7             | 11.95, (5.21, 27.43) | 9.61, (3.56, 25.96)* |
| Other chronic illness                 | 16      | 8             | 3.98, (1.66, 9.58) | 2.62, (0.91, 7.58) |
| No chronic illness                    | 115     | 229           | 1             | 1             |
| Good social support                   |         |               |               |
| Yes                                   | 36      | 193           | 1             | 1             |
| No                                    | 137     | 51            | 14.40, (8.92, 23.26) | 8.93, (5.01, 15.94)* |
| TB Stigma                             |         |               |               |
| Yes                                   | 123     | 54            | 8.66, (5.54, 13.53) | 3.12, (1.78, 5.42)** |
| No                                    | 50      | 190           | 1             | 1             |
| Substance use                         |         |               |               |
| Yes                                   | 21      | 9             | 3.607, (1.61, 8.09) | 4.88, (1.79,13.28)* |
| No                                    | 152     | 235           | 1             | 1             |

* Significant association (I-value < 0.05) **- significant association (p-value < 0.01)
Substance use = khat, cigarette and/or alcohol use other chronic illness = hypertension, renal diseases, cardiovascular diseases and diabetes
perceived TB-stigma scale and Oslo 3-item social support scale. Also, substance use related factor was not assessed by standard tool.

Competing interests
The authors declare that they have no competing interests.

Authors’ contributions
BD conceived the study and was involved in the study design, reviewed the article, analysis, report writing and drafted the manuscript. AG & GA were involved in the study design, analysis and drafted the manuscript. All authors read and approved the final manuscript.

Acknowledgements
The authors acknowledge Amanuel Mental Specialized Hospital, Addis Ababa, Ethiopia for funding the study. The authors appreciate the respective study institutions, Mr. Mihretu Alemayehu, Mr.Telake Azale & the study participants for their cooperation in providing all necessary information.

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Received: 5 December 2014 Accepted: 7 September 2015

Published online: 14 September 2015

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