PrevalenceAnd Socio-Demographic Factors Associated With Depression Among Patients With Tuberculosis Attending TB Clinic of Butabika National Referral Mental Hospital.

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Abstract

Background:
Depression is a major cause of the global disease burden, affecting an estimated 350-400 million people worldwide. This makes it the largest contributor to Years Lived with Disability (YLDs) globally

Methodology:
It was a descriptive cross-sectional study with an analytic component in which 82 patients already diagnosed with TB were recruited for the study using stratified sampling technique and convenient sampling technique. PHQ-9 was used to assess for presence and severity of depression, a score above 9 was considered to be depressed. Socio-demographic questionnaire was used to obtain the socio-demographic characteristics. Data entry and analysis was done using SPSS 23rd version, Chi-square test and T-test were used to find associations of socio-demographic factors to depression.

Results:
The prevalence of depression was 54.9%, out of whom 22.2%, 66.7% and 11.1% had mild, moderate and severe depression respectively. Depression was more prevalent in patients from a nuclear family (34.1%), in age group of 31 to 60 years (32.9%), treatment duration of 1 month (31.7%), among the females (29.3%), and patients who were unemployed 28%.

Conclusion:
In conclusion, the prevalence of depression (54.9%) in TB patients is high, with most patients moderately depressed and this could be associated with multiple socio-demographic factors like being female, age of 30-60 years, unemployment, low education level, being in the intensive phase of TB treatment, HIV and TB co-morbidity.

Recommendations : [a]
There is need for integration of mental health services into TB treatment to ensure routine screening, early diagnosis and treatment of mental disorders like depression to prevent their co-morbidity with TB, which often has negative treatment outcomes. There is need to carry out more research on depression in patients with TB to widen knowledge about this problem.

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1 Background

Depression disturbed sleep and/or appetite, and poor concentration (APA, Depression is a mood

disorder that presents with depressed mood, loss of interest, feelings of guilt, or low self-worth 2013).

Depression is a major cause of the global disease burden, affecting an estimated 350-400 million people worldwide. This makes it the largest contributor to Years Lived with Disability (YLDs) globally (Marcus *et al.,* 2012). A study carried out by WHO in 2012 in 17 countries revealed that 1 in 20 people reported having depression (Marcus *et al.,* 2012). Among patients with chronic physical illnesses like cancer, hypertension, TB, the prevalence is between 10-20% (Katon, *et al.*, 2007).

Mycobacterium tuberculosis is the bacteria that causes the infection called tuberculosis. It's considered to be one of the most globally deadliest and transmissible diseases (WHO, 2016). TB is a major global public health problem, mostly in developing and underdeveloped countries and globally it's responsible for more than 3 million deaths each year and is one of the evading causes of mortality worldwide (Sulehri *et al.,* 2010). WHO reported that a third of the world population (approximately 2 billion people) is infected with TB and that there are about 8-10 million new active cases every year. There are 8.8 million new cases of TB in 2005, the highest being in Africa (28% of all TB cases) and half of all the new cases in 6 Asian countries namely Bangladesh, China, Indian, Indonesia, Pakistan, and Philippines (Husian, 2008).

TB is a chronic disease and there are high chances of the existence of various psychological problems in TB patients. Individuals with TB often have co-morbid depression that often requires frequent hospitalizations thus posing great challenges to the care of such patients (Ige *et al.,* 2011).

Depression and TB are important public health concerns that contributed 2.5 and 2% respectively of Disability Adjusted Life Years (DALYs) worldwide in 2010 (Murray *et al.,* 2013). Depression is 3 to 6 times more common in patients with TB compared to patients without TB (Sweetland *et al.,* 2014).

Globally in 2014, 9.6 million people developed TB and 3.3% were multi-drug-resistant tuberculosis (MDR-TB) cases with more than 1.5 million cases occurring in sub-Saharan Africa each year(Zumla, *et al.,* 2015).

Evidence from cross-sectional studies done in African hospitals indicates a very high prevalence of co-morbid depression among patients with TB ranging between 10-52%, with the one study in Nigeria reporting it at 27.7% (Deribew *et al.,* 2010).

A study done in Uganda at Mulago hospital on the prevalence of depressive symptoms among medically ill patients found that 25% of the patients had chest infections including TB and 35% of the medically ill patients had a depressive illness (Katorogo, 2006)

2 METHODOLOGY

The study was a descriptive cross-sectional study and employed both quantitative and qualitative research methods. A Cross-sectional study is an observational study that collects data from the whole study population at a single point in time to examine the relationship between variables. It is a combination of both qualitative and quantitative approaches.

A qualitative approach was used to get underlying opinions, feelings, and thoughts from respondents. This approach was essential where the purpose was to discover underlying patterns of responses as a depth interview technique was used to collect data.

A quantitative research design was used in this study. This design was used to collect numerical data. This method was useful in establishing relationships and differences between variables within the sample. This approach also helped us analyze qualitative data acquired.

Study setting and rationale

The study was carried out at TB clinic in Butabika National Referral Mental Hospital (BNRMH), a governmental hospital located in Butabika, the southeastern part of the city, in Nakawa division, adjacent to the northern shores of Lake Victoria, Kampala district, Buganda region. The location is approximately 12 kilometers by road, east of Kampala's central business center. It is located on plot 2 Kirombe-Butabika road. The coordinates of Butabika Hospital are 0018'57.0" N, 32039'33.0" E. (Latitude: 0.315845; Longitude: 32.659160) (Globefeed.com, 2014). Butabika hospital is a public psychiatric hospital with a capacity of 550 patients though it houses about 700-800 patients at any one time. It provides expert management for patients with mental, neurological, and substance use problems as inpatients inwards. It also provides outpatient department services where it sees about 350 clients per day in both general and mental health clinics. The hospital also has different departments such as Psychology, Occupational ther-

apy, Community health, Finance, and administrative departments, Alcohol and Drugs Unit, Private Unit, Children's department, and Outpatient department comprises of different clinics such as Mental health clinic, Orthopedic clinic, Eye clinic, ART and TB clinic, Maternal and Child health care among others. (MOH-Uganda, 2015) BNMRH is headed by the Executive director, deputized by a Senior Consultant Psychiatrist who is the Clinical head; Nursing departments are headed by Assistant Commissioner Nursing, followed by Senior Principal Nursing officer, Principal Nursing Officer, and Senior Nursing Officers who are the wards in-charges and deputized by nursing officers. BNMRH is also a Research and Training institute for different Institutions such as Makerere University, Butabika School of Psychiatric Clinical Officers, and Butabika School of Psychiatric Nursing among others. The study intends to be carried out at the Infectious Disease Clinic (IDC) of Butabika Hospital. Butabika hospital was chosen for the convenience of the researcher and IDC has patients with TB enough for the sample space.

Study population

The study included male and female patients with TB under the care and considered those who were under care for 1 month, 3 months, and 6months. According to the TB clinic register of 2018, the clinic had 107 patients among which 28 were at 1 month, 57 at 3 months, and 22 at 6 months.

Sample size determination

The sample size was determined using Kish-Leslie's formula for survey samples (Glenn, 1992) where;

n0 = sample size required

p= estimated prevalence of depression among TB patients in Uganda is 35% (Katorogo, 2006).

q= (**1-p)** and is the probability of not having depression

z= normal standard deviation at 95% confidence interval corresponding to 1.96

e= absolute error between the estimated and true population prevalence is 5%

The calculated sample size =

n0= **350.0**

To get the appropriate sample size for a study on 107 TB patients approximated to be in care at TB clinic in Butabika National referral hospital in 2018, a finite population correction for proportions formula was used as below to calculate the sample size (Glenn, 1992) Where **n** =proportionate sample size required, **N** = Population of patients with TB which is approximately 107.

(Rounded off to the nearest tens)

Convenient sample size of 82respondents was interviewed.

Sampling procedure

The study used a stratified sampling technique. In selecting proportional stratified samples, the population size of each stratum was multiplied by the required (total) sample size and divided by the total population i.e. Where the strata were divided as follows: At one month, = 21, Three months = 44, and Six months = 17 respondents.

This reduced the sampling errors because variation between the strata was not incorporated in the calculation of the sampling errors. After acquiring the required sample size in each stratum, the researcher used a non-random sampling technique specifically the convenient sampling method since the respondents could not be put in a cluster at a single time.

Inclusion criteria:

The study included Patients on treatment for TB who were in care for 1 month, 3 months, and 6 months both male and female in the TB clinic of Butabika National Referral Mental Hospital.

Definition of variables

The **Independent variables** included the socio-demographic variables of patients with TB associated with depression for example; age, sex, duration of stay in care, financial status, and co-morbid chronic illness, among others. The **dependent variable of the study was** the prevalence of depression among patients with TB.

Research instruments

The interview-guided questionnaire was used to collect data. The questionnaire method was used because it would generate information within a short time. The open-ended questions helped to generate the wide views of the respondents and closed-ended questions gave precise answers. A socio-demographic questionnaire was used to obtain data on the socio-demographic characteristics. Depression was assessed using the Patients' Health Questionnaire ninth item (PHQ-9) and it was also used to rate the severity of depression. The PHQ-9 has 9 items used to identify depression with acceptable levels of sensitivity and specificity. A validation study in Uganda showed that the PHQ-9 has reasonable sensitivity (91.6%) and specificity(81.2%), accuracy in classifying classes of depression, is eas-

ily implemented by health workers and is a useful screening tool in a primary care setting (Akena, et al., 2013). The questionnaire has a maximum score of 27 and a minimum score of 0 [10-15=mild, 16-20=moderate, >20=severe depression), individuals who score**>** 9 are considered to have depression. In this study, the researcher used the English version of the questionnaire.

Data collection procedure

After receiving the approval letter from Butabika School of Psychiatric Clinical Officers, the letter was forwarded to Butabika Hospital Research Ethics Committee seeking permission to collect data. After approval by the REC of Butabika Hospital, the researcher approached patients after being introduced by the health worker on duty to request them to participate in the study. After obtaining consent, respondents were interviewed by the researcher immediately. The researcher then checked the questionnaires well if all questions were answered before leaving the respondents. The questionnaires were then kept safely until all the 82 respondents were achieved.

Data management

The filled questionnaires were kept safely in the lockable cupboard and the key was kept by the researcher. Data were coded, entered into SPSS, and kept on flash disks in soft copy to allow revisiting in case of any reference. After analysis and dissemination of results, the researcher cleaned data and consent forms immediately to keep the respondents anonymous.

Data analysis

Data entered in SPSS was analyzed using the Statistical Package of Social Sciences and presented in form of tables, graphs, and pie charts using frequencies and numbers. The study also determined the associated factors using Chi-square and t-test. Qualitative data was analyzed using content analysis and responses were categorized according to a common meaning, after responses were also coded, and also analyzed quantitatively with the numerical presentation.

Ethical consideration

The researcher presented an introductory letter from Butabika School of Psychiatric Clinical Officers introducing the researcher to the administration of Butabika National Referral Mental Hospital seeking permission to carry out the study. The administration of the Hospital gave the researcher an approval letter allowing her to collect data. The study commenced after explaining the objectives of the study to participants who then voluntarily consented to participate in the study. Respondents were assured of maximum confidentiality of all the information given and numbers instead of names were used to keep respondents' identity anonymous. All consenting participants signed the consent forms, while illiterate individuals would signify consent by use of a thumbprint, witnessed by a relative or caregiver of that participant. Participants who declined consent were not prejudicially treated and all their care was uninterrupted. The researcher abode by the guidelines given by the Butabika Hospital Research Ethics Committee (BHREC) for the protection of patients and the committee was consulted for dissemination of results.

The study limitations

1. The researcher encountered limitations such as; limited time since the TB clinic was receiving very few patients weekly and this made the researcher extend the data collection period. 2. The study also used a small sample size and thus cannot be generalized to the entire country due to ethnic minority groups and regional differences in standards of living and health care.

Dissemination of results: The study results were disseminated to the following: Uganda Allied Health Examinations Board, Butabika National Referral Mental Hospital, Butabika School of Psychiatric Clinical Officers, Research supervisor

3 RESULTS

4 Socio-demographic characteristics among respondents:

Data was collected from 82 respondents aged 18 years and above, with TB. There socio-demographic characteristics are shown in the table below

From the table above; majority 41(50%) were 31 to 60 years and male 51(62.2%); most 31(37.8%) were Catholic, had attained secondary level of education 37(45.1%), were staying in a nuclear family 53(64.6%), single 34(41.5%) and employed 43(52.4%).

From table above; most 43(52.4%) had stayed on anti TB treatment for 1 month, HIV was the most reported chronic physical illness 27(32.9%), 21(25.6%) were on treatment for mental illness and

Table 1. shows socio-demographic characteristics of the respondents

Category	Variable	Frequency n=82	Percentage (%)
Ages	18-30 years	38	46.3
	31-60 years	41	50.0
	Above 60 years	3	3.7
Sex	Male	51	62.2
	Female	31	37.8
Religion	Protestants	16	19.5
	Catholics	31	37.8
	Muslims	7	8.5
	Born again	27	32.9
	SDA	1	1.2
Level of education	No formal education	6	7.3
	Primary	32	39.0
	Secondary	37	45.1
	Tertiary/university	7	8.5
In what type of family do you stay	Nuclear family	53	64.6
	Extended family	29	35.4
Marital status	Married/cohabiting	23	28.0
	Widowed	2	2.4
	Separated	23	28.0
	Single	34	41.5
Employment	Unemployed	30	36.6
	Employed	43	52.4
	Student	9	11.0

Table 2. shows the other illness related socio-demographic characteristics

Category	Variable	Frequency n=2	Percentage (%)
Duration on anti-TB treatment	1 month	43	52.4
	3 months	23	28.0
	6 Months	16	19.5
Have another chronic medical illness	Yes	33	40.2
	No	49	59.8
If yes, please specify	HIV	27	32.9
	Hypertension	3	3.7
	None	52	63.4
Receiving treatment for any mental illness	Yes	21	25.6
	No	61	74.4
History of depression in the family	Yes	19	23.2
	No	63	76.8

19(23.2%) had a family member who was suffering from depression.

4.1 Prevalence of depression among respondents

Figure 1: shows the prevalence of depression among respondents.

From figure above; the prevalence of depression was 45(54.9%) among respondents.

Figure 2: shows the prevalence of depression according to duration on treatment among respondents

From the figure above; most 26(31.7%) of those who had been on anti-TB treatment for 1 month had depression and only 8(9.8%) of those who had been on treatment for 3 months had depression.

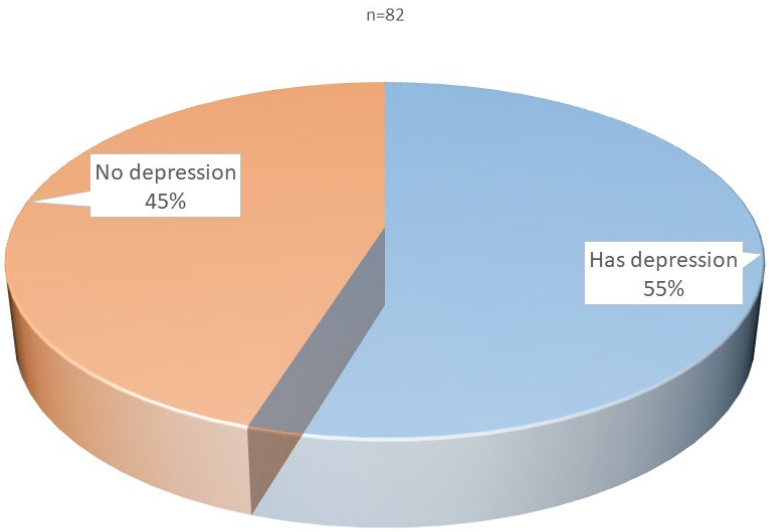

Chart 1. shows the prevalence of depression among respondents.

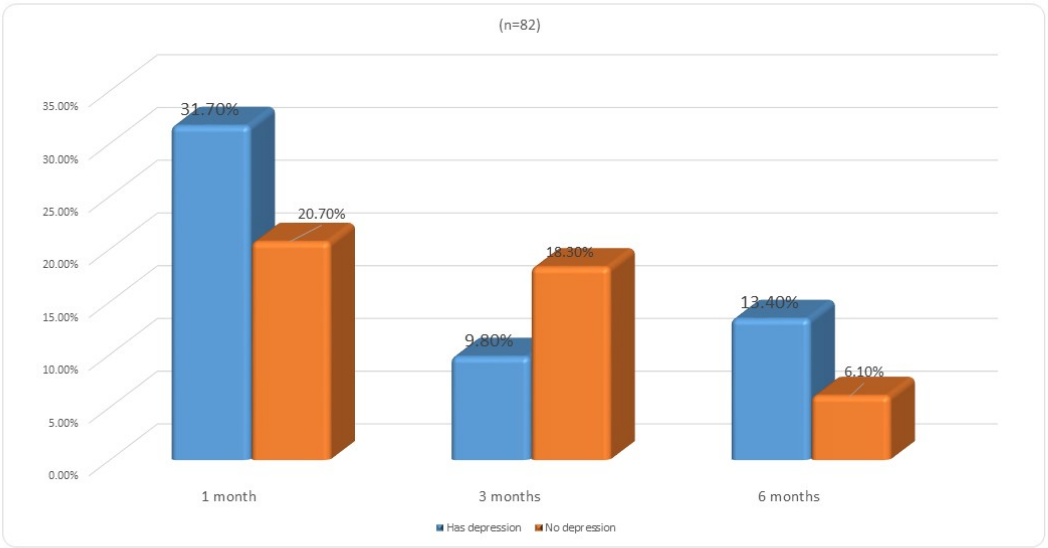

Chart 2. shows the prevalence of depression according to duration on treatment among respondents

5 Severity of depression

Figure 3: shows the severity of depression among respondents who had depression.

From the figure above; majority 30(66.7%) had moderate depression while 5(11.1%) had mild depression.

6 Socio-demographic characteristics associated with depression among respondents

From table above; majority of respondents who had depression were 31 to 60 years 32.9%, female 29.3%, born again 23.2%, had attained primary level of education 22%, were staying in a nuclear family 34.1%, single 20.7% and unemployed 28%.

7 DISCUSSION

Prevalence of depression among respondents

This study set out to determine the prevalence of and socio-demographic factors associated with depression among patients with TB in Butabika Hospital. From the data analysis, the prevalence of depression was found to be 54.9%. This suggests a high burden of depressive illness among patients with TB as compared to a prevalence of 5.2 – 12.9% in the general population (Ainaitwe., 2018). This prevalence is probably because of the chronic nature of TB, the disease is stigmatizing, patients worry about the disease outcomes, distorted social and work relationships, etc. The findings are similar to another study carried out in Pakistan that 56% of tuberculosis patients had moderate to severe depression using PHQ-9 (Amreen, Rizvi., 2016).

Contrary to this study, Alinaitwe (2018) in Mulago hospital reported a lower prevalence of 23.7% using the MINI. However, this difference may have been due to the different tools to collect data and Alinaitwe used a relatively larger population size.

In contrast to the current study, Amuthon (2011) discovered a higher prevalence of 63% in Kenya using the BDI. The BDI tool results are considerably higher because it's a screening tool for depression and not a diagnostic tool thus exaggerates results.

The severity of depression.

Findings indicated varying levels of severity among the 45 depressed patients. 30(66.7%) were moderately depressed, 10(22.2%) were mildly depressed and 5(11.1%) were severely depressed. The difference in severity is probably due to differences in severity of symptoms, in social support, in economic status, education levels, different effects of the disease on one's personal life and individual characteristics as some people are more prone to severe depression, co-morbidity with HIV were also associated with severe depression, being in the intensive phase of treatment was associated with mild and moderate depression. Contrary to this study, results from a study in Pakistan showed there were less moderately (45.8%) and mildly (16.7%) depressed patients as compared to this study (66.7% and 22.2% respectively), and this huge difference could be due to use of different data collection tools and the other study had only in patients.

Socio-demographic characteristics associated with depression among respondents

Results of the study showed that 32.9% of the patients with depression were aged 30-60 years; this is possibly due to stigma, and compromised social and work relationships that are associated with TB in this age group. This is in line with findings of another study that depression among TB patients was common in the elderly (Ahmed, *et al.,* 2016) and Ambaw *et al.,* (2017) added that increasing age was reported as a significant factor in developing depression, in that for every 14 years increase in age, the risk of having depression increases by 19% (Ambaw *et al.,* 2017).

The prevalence of depression was also significantly associated with the duration of anti TB treatment; 31.7% of depressed respondents had been on treatment for 1 month and only 9.8% of those who had been on treatment for 3 months had depression; this implies that depression resolves with time as one gets anti TB treatment. Contrary to the present study, Ambaw Rosie *et al*., (2018) reported a higher prevalence rate 53.3% at baseline following diagnosis which may have been a drastic reaction to the diagnosis of a stigmatizing disease but the same study discovered similar results that the prevalence of depression was 7.8% by 2 months and 6 months. This could be because the symptoms of tuberculosis tend to be prominent in the intensive phase compared to the continuation phase of TB treatment. The coughing, chest pain, night sweats, and fevers probably affect an individual's quality of life in terms of sleep, appetite,

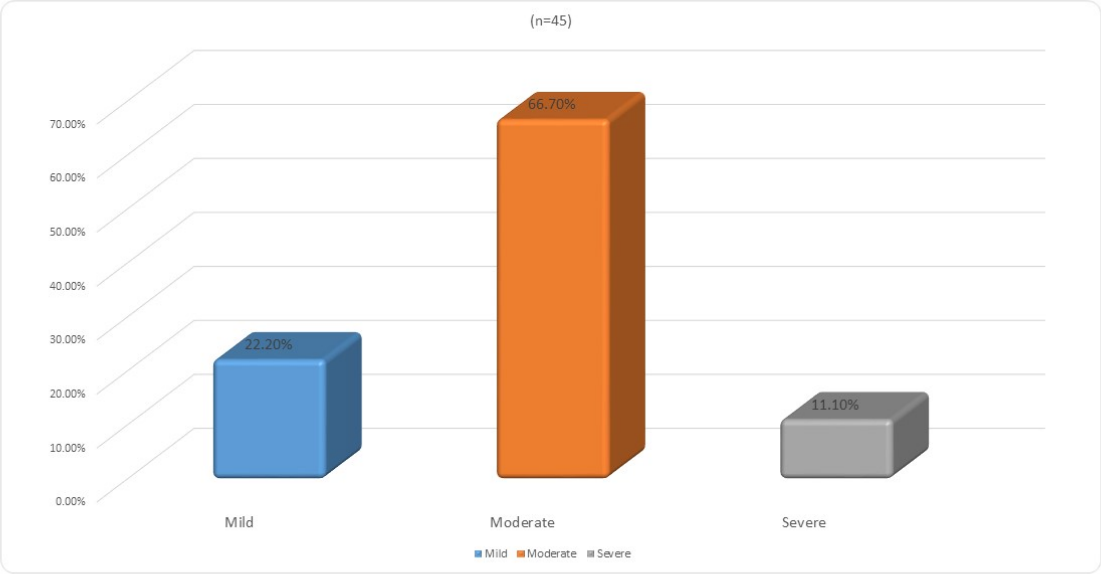

Chart 3. shows the severity of depression among respondents who had depression.

Table 3. shows the bi-variate analysis of socio-demographic characteristics significantly associated with depression using chi-square test.

Category	Variable	Prevalence of depression using patient questionnaire-ninth item			
		Has Depression		No depression	
		F	%	f	%
Age	18-30 years	15	18.3	23	28.0
	31-60 years	27	32.9	14	17.1
	Above 60 years	3	3.7	0	0.0
Sex	Male	21	25.6	30	36.6
	Female	24	29.3	7	8.5
Religion	Protestants	13	15.9	3	3.7
	Catholics	9	11.0	22	26.8
	Muslims	3	3.7	4	4.9
	Born again	19	23.2	8	9.8
	SDA	1	1.2	0	0.0
Level of education	No formal education	6	7.3	0	0.0
	Primary	18	22.0	14	17.1
	Secondary	16	19.5	21	25.6
	Tertiary/university	5	6.1	2	2.4
In what type of family do you stay	Nuclear family	28	34.1	25	30.5
	Extended family	17	20.7	12	14.6
	Married/cohabiting	12	14.6	11	13.4
Marital status	Widowed	1	1.2	1	1.2
	Separated	15	18.3	8	9.8
	Single	17	20.7	17	20.7
Employment	Unemployed	23	28.0	7	8.5
	Employed	19	23.2	24	29.3
	Student	3	3.7	6	7.3

and self-esteem hence more chances of one being depressed. However, depression can also increase the severity of physical symptoms of TB (APA 2013, Ambaw *et al.,* 2017).

Participants with no employment were more likely to have a depressive illness (28%) than those with employment (23.2%). Unemployment affects one's socioeconomic status and this increases the individual's risk of having a depressive illness, it also compromises access to quality health care. Similar findings are reflected in the study carried out by Issa *et al.,* (2009) at a University teaching hospital outpatient clinic in Nigeria. Low socioeconomic status has been implicated in many studies as a risk factor for depression (Alinaitwe., 2018).

34.1% of respondents with depression were staying in a nuclear family; this may be due to compromised social support in face of a stigmatizing disease such as TB. This was supported by Olusoji & Olufolahan (2011) that nuclear family and lack of socio-economic support (Argiro *et al.,* 2013) was associated with depression among TB patients.

Gender distributions were inclined more to the female as 29.3% of the depressed patients were all female; similar to this study, being female was also shown to be associated with a higher prevalence of depression in patients with TB and this has been attributed to the association between female hormonal factors and depression(Kehbila, *et al.,* 2016). The association between depressive illness and females could be due to female hormones like estrogen and also social roles of women in society (Ahuja 2011).

The study revealed that 23.2% of depressed respondents were of the born-again religion. It is suspected that many patients with depression or no hope end up joining the born-again religion for companionship and hope for special healing because born-again worship is believed to be good therapy for patients with depression. However, there is no literature published on a religious basis among TB patients with depression.

Respondents at the primary level of education had the highest prevalence of depression (22%); a low level of education has been associated with ignorance of transmission about TB hence can easily be exposed to TB, and may not be able to recognize symptoms of TB. A low level of education has also been associated with unemployment (28%) and low standards of living which may not be supportive enough for a person with TB (Aniebue et al., 2007). A higher level of education leads to better income and access to a wide range of health services, hence better (mental) health outcomes (Ambaw *et al.,* 2017). Level of education was independently associated with depressive illness even at multivariate analysis (Alinaitwe., 2018).

Being single, or separated were associated with a higher prevalence of depression than other counterparts; several studies discovered that being single was significantly associated with depression among TB patients (Aniebue *et al.,* 2007), unmarried (Olusoji *et al.,* 2011) and widow(er) (Issa, *et al.,* 2009). Being single or widowed is greatly associated with a lack of supportive care and motivation to complete treatment regimen, difficulty in finding a partner, and loneliness hence depression.

The study revealed that other co-morbidities like HIV/AIDS were associated with a high prevalence of depression, and this could be due to the stigma from both TB and HIV, the pill burden, and the debilitating effects of both TB and HIV. This is similar to studies by Kehbila *et al.,* (2016), Duko *et al.,* (2015), and Ambaw *et al.,* (2017) which have all shown a significant association between TB and HIV/AIDS co-morbidity with depressive illness.

Conclusion

In conclusion, the prevalence of depression (54.9%) in TB patients is high, with most patients moderately depressed and this could be associated with multiple socio-demographic factors like being female, age of 30-60 years, being single or separated, unemployment, low education level, being in the intensive phase of TB treatment, family history of depressive illness, HIV and TB co-morbidity.

Recommendations

1. The ministry of health should publish and equip all TB clinics with guidelines to screen and treat depression and other common mental disorders among TB patients, to prevent co-morbidity of such disorders with TB. 2. The ministry of health together with other research bodies needs to research other regions of the country using a larger sample size to estimate the actual prevalence of depression among TB patients and to identify more risk factors for depression in the TB patients. 3. There is a need to train general health workers in mental health such that they can identify those at risk of developing mental disorders and refer them for full assessment as early as possible.

4. Health workers in TB clinics ought to address other psycho-social challenges faced by TB patients

to prevent patients from getting depressed, as well as mass sensitization of the public about TB to address social stressors towards TB patients.

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9 LIST OF ABBREVIATIONS

AIDS: Acquired Immune Deficiency Syndrome

BDI: Beck's Depression Inventory

BNRMH: Butabika National Referral Mental Hospital

DALYs: Disability Adjusted Life Years

DOT: Directly Observed Therapy

DSM: Diagnostic and Statistical Manual for Mental disorders

GHQ-12: Genera Health Questionnaire twelfth item.

HADS: Hospital Anxiety and Depression Scale

HIV: Human Immunodeficiency Virus

MDR-TB Multi-Drug Resistant Tuberculosis

MOH: Ministry Of Health

PHQ-9: Patient Health Questionnaire ninth Item

SPSS: Statistical Package of Social Sciences

TB: Tuberculosis

WHO: World Health Organization

YLDs: Years Leaved with Disability

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