ORIGINAL ARTICLE

Tuberculosis Stigma Intervention, Hargeisa Hospital Somalia - A Randomized, Controlled Trial

Mohamed Hashi Faraade[1], *Mohammad Saffree Jeffree[1], Richard Avoi[1], Osman A. Fiidow[2]

[1] Department of Public Health Medicine, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah. Kota Kinabalu, 88400 Sabah, Malaysia.
[2] Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang Selangor, Malaysia.

ABSTRACT

Introduction: Somalia has the lowest Tuberculosis (TB) treatment coverage compared to neighboring East African countries. Stigma is a major cause of discrimination and a leading obstacle to TB elimination worldwide. The study aimed to evaluate the effects of a stigma intervention program to improve TB stigma among TB patients. Methods: A randomized controlled trial was conducted on randomly selected TB patients at Hargeisa TB Hospital, followed by a two-armed intervention (n = 155) group and a control (n =150) group. The study duration was from February to July 2020. Data on community TB stigma and patients' TB stigma perspectives were collected using self-administered validated questionnaires baseline, after two months post-intervention and six months, and analyzed using SPSS version 28 with the repeated measures ANOVA. A stigma intervention video and lecture programs were implemented to improve TB stigma among patients. Then, it evaluates the changes between groups at baselines, two and six months. In the repeated measurement in a mixed design, the influence of between and within groups, as well as group, time, and group-time interaction on the dependent variables, was investigated. Results: Significant improvement in stigma community ($p<0.001$) and stigma patients ($p<0.001$) in the intervention group compared to the control group. By the interaction of group, time, and group and time, there was a significant main effect for the group ($p < 0.001$, partial $\dot{\eta}^2 = (0.913)$), time ($p < 0.001$, partial $\dot{\eta}^2 = (0.729)$), and group and time interaction $p < 0.001$, partial $\dot{\eta}^2 = 0.760$), on the stigma community scores. Also, there was a significant main effect for the group ($p < 0.001$, partial $\dot{\eta}^2 = (0.727)$), time ($p < 0.001$, partial $\dot{\eta}^2 = (0.351)$), and group and time interaction $p < 0.001$, partial $\dot{\eta}^2 = 0.412$), on the stigma patient perspective scores. The effect between stigma and intervention was significantly improved by the different time points (baseline, immediately two months after the intervention, and six months after the intervention). The recently developed stigma intervention, which used a stigma-intervention module, effectively reduced TB-related stigma among TB patients. Conclusions: Overall, stigma intervention regarding TB stigma has improved. Additionally, community TB stigma and patients' TB stigma perspectives were significantly decreased.

Keywords: Intervention; Tuberculosis; Tuberculosis Stigma

Corresponding Author:
Mohammad Saffree Jeffree,
Email: saffree@ums.edu.my
Tel: +6088320000

INTRODUCTION

Tuberculosis (TB) is a leading cause of death and disease burden in Somalia. According to the 2021 global TB report, the estimated TB incidence in Somalia increased marginally from 258 per 100,000 people in 2018 to 259 per 100,000 in 2020. However, Somalia's death rate remained 68 per 100,000 people (1). According to the World Bank of Somalia Development Indicators, the detection rate of tuberculosis cases in Somalia in 2021 was (41%, including all forms), and the death rate from tuberculosis was 66%. (per 100,000 population) (2). Tuberculosis (TB) kills 16% of patients; it is one of the top 10 causes and the leading cause of a single infectious agent in the SDGs' health targets (3). TB can be treated and prevented. Likewise, TB is spread from person to person through the air. People with active TB cough, sneeze, or spit to expel the TB germs into the air. A susceptible person becomes infected after inhaling fewer germs (4). According to WHO 2017, Somalia has the lowest TB treatment coverage compared to neighboring East African countries, Djibouti, Ethiopia, Sudan, Kenya, Uganda, Tanzania, and Somalia 80%, 68%, 66%, 53%, 53%, 44%, and 42% respectively (5). In Somalia, the TB case detection rate is 42%, which is much lower than the WHO's target of detecting 70% of new TB cases (6). The epidemiology of TB in Somalia is comparable to that of other developing nations, where the illness is linked to extreme poverty, substandard

housing, and weakened immune systems, especially in people with HIV and AIDS (7). Stigma is a major cause of discrimination and segregation (8). Stigma is also a leading obstacle to eliminating TB worldwide (9). Stigma and discrimination are major concerns among Somalia's TB preventive, care, and control stakeholders (10). While we are in Somalia and TB is a culture in Somalia, the stigma associated with tuberculosis has resulted in the disease's victims becoming socially isolated. In addition, numerous Somalis have misconceptions about how TB spreads and the long-term consequences for recovery. Moreover, the extent to which people disclose their diagnosis to others is influenced by stigma (11). The social isolation can be so profound that the stigma of tuberculosis in Somali culture can be as severe as that of AIDS in Western culture. Many Somalis interviewed referred to TB as "the worst disease in the world." Persons with symptoms of tuberculosis may avoid seeking health care or, once the diagnosis is known, deny their illness to themselves or others. Children known or suspected to have TB will often not be allowed to go to school, which is increasingly the vehicle through which health education about diseases like TB is taught (12). Furthermore, stigma was a major factor in the delay in seeking TB treatment in Somalia. About two-thirds (64.8%) of highly stigmatized patients were found to have delayed seeking treatment for over 60 days as compared to 41% of those not stigmatized (13). The main reasons for the delay were economic constraints, fear of diagnosis, social isolation (stigma), and perceived poor quality of health services or inadequate staff (14). In Somalia, stigma and prejudice towards TB sufferers are fairly frequent. A significant barrier to TB control is associated with patient non-compliance with medical treatment, leading to personal health problems and negative impacts on public health and the global situation (15). Stigma is one factor that impedes TB control by negatively affecting hospital delay and treatment compliance (16). Self-stigma is negative psychosocial behavior that affects patients' lives and negatively impacts their quality of life (QOL) (17;18). Self-stigma is a negative belief in the weakness of self-character, incompetence, low self-esteem, low self-efficacy, and failure to pursue work and housing opportunities (19). The self-devaluation and acceptance of public stigma (20) can negatively impact adherence and quality of life (21). To date, self-stigmatization often persists beyond the period of infection, after treatment, and hinders complete recovery(22). Self-stigmatization plays a role in many aspects of patients' lives (23). It also discourages treatment (24). A significant correlation between self-stigma and treatment adherence and high levels of self-stigma have been associated with medication discontinuation (25). People suffering from depression, anxiety, or stress may hesitate to seek help or communicate their concerns for fear of being stigmatized. Stigma can make it difficult to obtain appropriate mental health care and support. When people recognize that these emotions are widespread and shared by many people, experiences like loneliness or guilt can be reduced. Being stigmatized or fearing being stigmatized might contribute to increased stress levels. Being stigmatized also can have a negative emotional impact, exacerbating thoughts of tension and worry. When people believe that others are passing judgment on them because of their mental health issues, it can perpetuate feelings of worthlessness and contribute to the development of more severe psychological symptoms. Stigma might discourage people from obtaining professional care for mental health problems (26). The study objective is to evaluate the effects of a stigma intervention program to improve TB stigma among patients of Hargeisa TB Hospital-Somalia.

MATERIALS AND METHODS

Study Method

A randomized controlled trial (RCT) was conducted on randomly selected TB patients in Hargeisa TB Hospital-Somalia and assigned them to intervention and control groups. The study duration was from February to July 2020. We evaluated the changes and improved stigma between groups at baselines, with immediate follow-up after two months and six months of intervention. Ethical clearance to conduct the study was obtained from the Medical Ethics Committee of Universiti Malaysia Sabah (UMS/FPSK6.9/100-2/4/2. Subject no: JKEtika3/19) (14), Ministry of Health and Human Service (MOH&HS) of the Republic Somali Federal Government (MOH&HS/DGO/0238/Feb/2020), and Ministry of Health and Human Development (MOHD) state level (MOHD/DG: 2/186/2020). The trial had been registered at AEA RCT Registry (https://doi.org/10.1257/rct.12166-1.0).

Study Participants

The study was conducted at Hargeisa TB Hospital-Somalia. Somalia, officially the Federal Republic of Somalia, is a country in the Horn of Africa with Ethiopia borders to the west, Djibouti to the northwest, the Gulf of Aden to the north, the Indian Ocean to the east, and Kenya to the southwest. Hargeisa city is located in the northern part of Somalia. The population is estimated to be 1.2 million in 2019. The Hospital is northern Somalia's most extensive referral TB and MDR-TB hospital (27). The Hospital's capacity is 220 beds, and at least 2,500 people are treated at the Hospital every year. The drugs are provided on DOTs. There was the exception of under-age children, older people above 65, and mentally ill people who are supplied weekly. The hospital staff in total is 97, including 6 Doctors and 15 Nurses—The Hospital is funded by the Global Fund for TB and Malaria.

Sample size estimation was done using the two-population mean formula for hypothesis testing as

described by Lemeshow et al., 1990 (28). μ1 = mean stigma level (cue to action) score of TB patients in the intervention group = 34(33-35) SD 6.5. μ2 = mean stigma level (cue to action) score of respondents in the control group among TB patients = 32(31-33) SD 3.9 (Tola et al., 2016). Z1-/2 represents the standard error when = 0.05 (95% CI) = 1.96. Z1- = power-related standard error = 0.842 (= 0.20). Power (1-β) = 80%. Pooled standard deviation= 4.871

$$n = \frac{2\sigma^2[Z_{1-\frac{\alpha}{2}} + Z_{1-\beta}]^2}{(\mu_1 - \mu_2)^2}$$ (Lemeshow, et al, 1990)

$$\mathbf{n} = \frac{\mathbf{2 \times 4.871^2\,[1.96 + 0.842]^2}}{\mathbf{(34\text{-}32)^2}}$$

n = 305 with the addition of attrition rate. (n=155) Intervention / (n=150) Control groups (29). Stigma regarding TB was the outcome variable that provided the largest sample size of 155 intervention groups and 150 control groups (305 for the two arms). A sample frame comprised a list of 305 TB patients registered with the Hospital receiving treatment for TB. Written informed consent was received from each participant before the study. The consent form was made available in English and Somali language. Randomization and Allocation Concealment steps: 1). The Screening test was applied to the participants at the Outpatient Department (OPD). 2) Eligible patients for the study were recruited. 3) Information sheets were distributed, and consent forms were taken. 4) Those who accepted to participate were sequentially randomly allocated to the intervention or control group. 5) The computer number generator method was used to select the sample using the sample frame. 6) The 305 recruited participants were randomized using the computer generator program www.randomizer.org and subsequently simply randomly assigned into intervention and control groups. 7) There were (n=155) participants in the intervention and (n=150) control groups, respectively. The participants were allocated a code number to identify them on the questionnaire to maintain confidentiality. 8) Allocation concealment was implemented to reduce the bias. 9) Single-blind was applied as the participants were not aware of stigma intervention involvement or which group they belonged to and what would be done to their group. The inclusion criteria were newly diagnosed TB patients and those already started on anti-TB for at least two weeks, aged 18 years and above. Those excluded were TB patients with psychiatric disorders (e.g., with schizophrenia) and mentally unstable patients, and the status was identified from the patient's file.

Study Tool

A self-administered and validated questionnaire comprised two parts on the TB-related stigma (30). Baseline data for this study were collected before randomizing respondents into intervention and control groups. The questions were translated into the local language (Somali) to ease the illiterate respondents who could not read and write. Then, they read the translated version and filled it in according to their choices. The questions were initially set in English and translated into the Somali language. Section A enclosed 14 questions on sociodemographic variables. Section B is enclosed on DASS21 [31]. DASS 21 was scaled into (stress, anxiety, and depression), which were analyzed and categorically scored into normal, mild, moderate, severe, and highly severe to determine the patient's psychological status. The DASS questionnaire was designed by Lovibond and Lovibond, 1995, for evaluating significant symptoms of depression, anxiety, and stress, and it has also been used to assess patient response to therapy. The questionnaire has been shown to have appropriate psychometric qualities and is comparable to other reliable instruments. Descriptive Statistics, Internal Consistency Reliability, and group comparisons were used to analyze.

The short form is the DASS-21, and research supports its validity as an accepted tool for measuring unpleasant psychological problems and depression, anxiety, and stress in people or patients. Values for depression, anxiety, and stress are calculated by adding the values of the corresponding items. The Depression, Anxiety, and Stress Scale - 21 Items (DASS-21) is a collection of three self-reported scales used to assess depression, anxiety, and stress. The DASS-21 consists of 21 questions (32). The depression scale measures dysphoria, hopelessness, life devaluation, self-deprecation, and loss of interest. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective anxiousness sensation. The stress scale can be used to assess persistent non-specific arousal. It assesses the difficulty of relaxing, anxious arousal, and being easily disturbed, irritable, overly reactive, and impatient. It was clinically applied to our TB patients in the Hospital and scored as normal, mild, moderate, severe, and highly severe. Section C enclosed 11 questions on Stigma Community perspectives on TB with four options: 0, 1, 2, 3. The answers were on a 4-point Likert scale with the options: strongly disagree, disagree, agree, and strongly agree. Section D enclosed 11 questions on stigma patient perspectives on TB, with options 0, 1, 2, and 3. The responses were on a 4-point Likert scale with the following options: strongly disagree, disagree, agree, and strongly agree.

Validity and Reliability of the Questionnaire

A pretesting of the questionnaire was conducted in order to establish the reliability and validity of the questionnaire. A questionnaire pretesting was conducted among 10% of the sample size, which was 30 people drawn from Hargeisa TB hospital, and measured the Cronbach alpha of the internal consistency. Two sections

of the tuberculosis stigma questionnaire and DASS21 with its stress, anxiety, and depression were pretested among a convenient sample of pulmonary tuberculosis (PTB) patients in the Hargeisa TB Hospital, Somalia clinic. Reliability testing was conducted using Cronbach's alpha reliability analysis for internal consistency. The summary of reliability results is provided in Table 6. For the Confirmatory Factor Analysis (CFA) results, all of the coefficients have been standardized and have a p-value of 0.001. Fit indices of DASS21 measurement model: χ^2/df = 210, p =.001, GFI =.98, AGFI =.96, CFI =.96, IFI =.96, RMSEA =.03. Fit indices of Stress status measurement model: χ^2/df = 1.77, p =.001, GFI =.99, AGFI =.99, CFI =.99, IFI =.99, RMSEA =.03. Fit indices of Anxiety status measurement model: χ^2/df = 2.68, p =.001, GFI =.99, AGFI =.99, CFI =.98, IFI =.99, RMSEA =.04. χ^2/df = 1.85, p =.001, GFI =.99, AGFI =.99, CFI =.99, IFI =.99, RMSEA =.03. Depression status measurement model: χ^2/df = 1.78, p =.001, GFI =.98, AGFI =.98, CFI =.99, IFI =.98, RMSEA =.04. χ^2/df = 1.85, p =.001, GFI =.99, AGFI =.99, CFI =.99, IFI =.99, RMSEA =.05. Fit indices of Community TB Stigma perspectives: χ^2/df = 3.24, p.0001, GFI =.98, AGFI =.96, CFI =.89, IFI =.89, RMSEA =.05. Fit indices of Patient Stigma views measuring model: χ^2/df = 3.91, p.0001, GFI =.99, AGFI =.95, CFI =.98, IFI =.99, RMSEA =.05.

Statistical Analysis

Data analysis was conducted using SPSS version 28 (33). Descriptive statistics frequencies and cross tabulation for analyzing sociodemographic factors of the respondents such as age, sex, marital status, monthly household income, educational status, living by region, uses of traditional medicine, smoking in the intervention, and control group at baseline. A baseline comparison of psychological factors, DASS 21, was scaled into stress, anxiety, and depression, which are analyzed and categorically scored into normal, mild, moderate, severe, and extremely severe. Likewise, data on community TB stigma and patients' TB stigma perspectives were analyzed by repeated measures ANOVA.

RESULTS

A good response rate was given, from 100% at the baseline to 99% at the endpoint. Table I shows the baseline characteristics of the respondents in the intervention and control groups. There was no significant difference between the intervention and control groups at the baseline. In the case of potential confounding variables, the intervention used one prominent strategy to minimize potential confounding variables, which was best randomization, in which individuals were randomly assigned to the treatment group and control group, ensuring that confounders were evenly distributed between groups. Table II showed no statistically significant difference in the proportion of respondents with Depression, Anxiety, and Stress levels among control and intervention groups at baseline. In both groups, most respondents were exceptionally severely depressed and anxious. Repeated Measures were done to evaluate the effect of stigma intervention on the community TB stigma and patient TB stigma perspective level at different times. The difference between the participant effect was tested, where the results appeared that there is a statistically significant group main effect on the community TB stigma perspective, and patient TB Stigma perspective scores at a level of 0.001: F test (1,305) =7905, p= 0.001, and 0.001: F test (1,305) =1930.7, p= 0.001 respectively. Therefore, the difference between the intervention and control groups is statistically significant. Regarding the test between and within the subjects, the results showed a significant main effect for the times of trial on the community TB stigma and the patient TB Stigma perspective scores at the level of 0.001 of significance. According to the pairwise comparison in the SPSS table, the difference between the baseline and the end-term experiment, as well as baseline and six months, were significant p-value < 0.001. Table III shows community TB stigma and patient TB stigma had significantly improved in stigma community and stigma patients in the intervention group as compared to the control group (Meanscore = 29.191(0.229) vs. 29.893(0.231)). 2 months post-intervention, (Ms = 12.132(0.091) vs. 29.893(0.092), and six months, (Ms = 12.132(0.084) vs. 30.000, (0.085), F (1,305) = 7905, p<0.001). as well as: (Ms = 25.145(0.199), vs. 25.940(0.201),)). 2 months post-intervention, (Ms = 13.105(0.109) vs. 25.940(0.109) and six months, (Ms = 11.230(0.350) vs. 25.567(0.352), F test (1, 305) =1930.7, p<0.001) respectively. By the way, the effect of group, time, education, occupation, and their interactions on stigma community scores: Table IV showed that as a result of the repeated measurements, one-way ANOVA of mean community perspective scores was performed on group, time, education, and occupation, as well as their interactions with the mean total stigma Community scores. Because the sphericity assumption was violated (Mauchly's test p-value <0.001) and the Epsilon was less than 0.75 for both groups. As a result, Greenhouse-Geisser corrected estimations were utilized to interpret this finding. There was a significant main effect for the group (F (1,305) = 2495.27, p < 0.001, partial $\dot{\eta}^2$ = (0.913). There was also a significant main effect for time (F (1.03,305) = 641.802, p < 0.001, partial $\dot{\eta}^2$ = (0.729). In addition, there was no significant main effect for education (F (6,305) = 0.256, p < 0.957, partial $\dot{\eta}^2$ = 0.006) as well as occupation (F(7, 305) = 1.503, p <0.167, partial $\dot{\eta}^2$ = 0.042). However, there was a significant main effect for group and time interaction (F (2, 305) = 756.072, p < 0.001, partial $\dot{\eta}^2$ = 0.760). on the stigma community scores. The mean stigma community scores showed a continuously decreasing trend from baseline to the time of the 2 and 6 months post-

Table I : Socio-demographic characteristics of the respondents

Variable	Intervention (n=155)	Control (n=150)	χ^2	*p*-value
Age, mean (SD)	34.8 (14.2)	32.2 (15.7)	1.527	0.44*
Gender			0.070	0.93
Female	52(33.5%)	51(34.0%)		
Male	103(66.5%)	99(66.0%)		
Marital status			2.162	0.34
Single	53(34.2%)	61(40.6%)		
Married	86(55.5%)	79(52.7%)		
Divorced	16(10.3%)	10(6.7%)		
Monthly income			2.729	0.26
<1000,000SLSH	54 (34.8%)	66 (44.0%)		
1000,000-3000,000	78 (50.4%)	66 (44.0%)		
>3000,000	23 (14.8%)	18 (12.00%)		
Education level			7.043	0.07
Primary school	45 (29.0%)	45 (30.0%)		
Secondary school	35 (22.6%)	52 (34.7%)		
Tertiary school	33 (21.3%)	24 (16.0%)		
No school (illiterate)	42 (27.1%)	29 (19.3%)		
Live by region			8.709	0.33
E.Provinces	19 (12.2%)	9 (6.0%)		
Ethiopia	8 (5.2%)	8 (5.4%)		
M.Jeex-Hargeisa	115 (74.2%)	128 (85.3%)		
W.Provinces	13 (8.4%)	5 (3.3%)		
Smoking			0.052	0.82
No	134 (86.5%)	131 (87.3%)		
Yes	21 (13.5%)	19 (12.7%)		
Use Traditional Medicine				
No	145 (93.5%)	138 (92.0%)	0.273	0.60
Yes	10 (6.5%)	12 (8.0%)		

*a. = *t-test, b. = Chi-square, *χ^2, SD=Standard Deviation*

95 % CI: 95% confidence interval, significant at $p < 0.05$

intervention follow-up for the intervention group but not in the control group. Moreover, the effect of group, time, education, occupation, and their interaction on stigma patient perspective scores: Table V showed that as a result of the repeated measurements, one-way ANOVA of mean stigma patient perspective scores was performed on group, time, education, and occupation, as well as their interactions with the mean total stigma patient perspective scores. Because the sphericity assumption was violated (Mauchly's test p-value <0.001) and the Epsilon was less than 0.75 for both groups. As a result, Greenhouse-Geisser corrected estimations were applied to interpret this result. There was a significant main effect for the group (F (1,305) = 637.159, p < 0.001, partial $\dot{\eta}^2$ = (0.727). There was also a significant main effect for time (F (1.417,305) = 129.316, p < 0.001, partial $\dot{\eta}^2$ = (0.351). There was no significant main effect for education (F (6,305) = 3.307, p < 0.004, partial $\dot{\eta}^2$ = 0.077). as well as occupation (F (7, 305) = 1.247, p <0.278, partial $\dot{\eta}^2$ = 0.035). (Table V). There was a significant main effect for group and time interaction (F (1.417, 305) = 167.125, p < 0.001, partial $\dot{\eta}^2$ = 0.412). on the stigma patient perspective scores. The mean stigma patient perspective scores showed an endlessly falling trend from baseline to the time of the 2 and 6 months post-

Table II : Psychological factors (Anxiety, Stress, and Depression) at the baseline

Variable	Intervention group (n=155)	Control group (n=150)	χ^2 test	*p*-value
Stress			4.784	0.310
Normal	27 (17.4%)	25(16.7%)		
Mild	8 (5.2%)	11 (7.3%)		
Moderate	26 (16.8%)	26(17.3%)		
Severe	62 (40.0%)	45(30.0%)		
Extremely severe	32 (20.6%)	43(28.7%)		
Anxiety			0.852	0.931
Normal	5 (3.2%)	6(4.0%)		
Mild	1(0.6%)	2(1.3%)		
Moderate	11(7.1%)	11(7.3%)		
Severe	10(6.5%)	12(8.0%)		
Extremely severe	128(82.6%)	119(79.4%)		
Depression			0.471	0.976
Normal	6(3.9%)	6(4.0%)		
Mild	4(2.6%)	5(3.3%)		
Moderate	21(13.5%)	17(11.3%)		
Severe	27(17.4%)	27(18.0%)		
Extremely severe	97(62.6%)	95(63.4%)		

*Chi-square, *χ^2, SD=Standard Deviation*

95 % CI: 95% confidence interval, significant at $p < 0.05$

Table III : Community and patient TB Stigma perspectives

Measure time	Mean score (SD) Intervention group	Mean score (SD) Control group	F test	*p*-value
Community Stigma at Baseline	29.191 (0.229)	29.893 (0.231)	7905	< 0.001
Community Stigma at two months	12.132(0.091)	29.893 (0.092)		
Community Stigma at six months	12.132 (0.084)	30.000 (0.085)		
Patient Stigma at Baseline	25.145 (0.199)	25.940 (0.201)	1930.7	< 0.001
Patient Stigma at two months	13.105(0.109)	25.940 (0.109)		
Patient Stigma at six months	11.230 (0.350)	25.567 (0.352)		

*(*ANOVA) SD=Standard Deviation.* 95 % CI: 95% confidence interval, significant at $p < 0$.

Table IV : Effect of the group with regards to time on the mean stigma community scores

Source Variable: stigma community scores	F	df	Sig.	Partial Eta Squared
Group	2495.27	1	0.000	0.913
Time	641.802	1.03	0.000	0.729
Education	0.256	6	0.957	0.006
Occupation	1.503	7	0.167	0.042
Time*Group	756.072	2	.000	0.760

Note: Results adjusted for education and occupation. (*ANOVA)

Table V : Effect of the group with regards to time on the mean stigma patient perspective Scores

Source Variable: Stigma Patient scores	F	df	Sig.	Partial Eta Squared
Group	637.159	1	0.001	0.727
Time	129.316	1.417	0.001	0.351
Education	3.307	6	0.004	0.077
Occupation	1.247	7	0.278	0.035
Time*Group	167.125	1.417	0.001	0.412

Note: Results adjusted for education and occupation (*ANOVA)

Table VI : Reliability Test Results at Pre-test (N = 30)

Instrument		Number of Items	Cronbach's Alpha
TBSCQ		11	0.9
TBSPQ		11	0.931
TBDASSQ		21	0.853
Psychological status:	**TBSQ**	7	0.678
	TBAQ	7	0.645
	TBDQ	7	0.695

Refer e.g. the abbreviation: **TBSCQ**: Tuberculosis stigma community questionnaires. **TBSPQ**: Tuberculosis stigma patient's questionnaires. **TBDASSQ:** Tuberculosis DASS questionnaires.

intervention follow-up for the intervention group but not in the control group. The impact between community TB stigma, patient TB stigma, and intervention was considerably improved by the different time points (baseline, immediately two months, and six months after the intervention).

DISCUSSION

This study shaped a significant improvement in the stigma community and stigma patients regarding TB in the intervention group as compared to the control group, and the effect between stigma and intervention was significantly improved by the different time points (baseline, immediately two months, and six months after the intervention). Moreover, overall, stigma intervention regarding TB stigma has improved. Additionally, community TB stigma and patients' TB stigma perspectives were significantly decreased. Macq et al., 2008, conducted Tackling TB Patients Internalized Social Stigma through Patient-centered Care: An Intervention Study in Rural Nicaragua; patients experienced, as well as the provisions of DOT, in reducing internalized social stigma in new AFB-positive TB (TB) patients. After calculating the internalized stigma, one was measured for 15 days of treatment and another for two months. After 15 days of treatment, outcomes were equivalent for both intervention and control. At two months, the outcome difference was statistically significant (control = 33.1, intervention = 27.4 p = 0.001). It showed reduced internalized stigma in the intervention group and not the control group (34). Sommerland et al., 2017, showed a significant negative relationship between the perception of co-worker stigma and the use of OHUs for TB testing (β -0.21, P=0.000), treatment (β -0.16, P= 0.00 1), and Isoniazid preventive treatment (β-0.17, P=0.000). The impact of stigmatizing attitudes among HCWs is reduced among possible stigma-reducing interventions and TB awareness concerning TB durability (35). Balogun et al., 2015, Stated that the health workers' TB knowledge improved, and the stigma was eliminated after a training workshop (36). Talosa et al., 2014, also mentioned that (37). And Juliao dos Reis, 2016 (38). Grace Wambura Mbuthia et al., 2020 studied the burden of stigma in TB patients in a pastoral community in Kenya. They reported the confidence coefficients of internal consistency using Cronbach alphas of 0.87 and 0.86 for stigma measurement using 11 and 12 items as satisfactory scales. The investigation found that the TB stigma was high. A woman was significantly associated with high levels of experienced stigma (p=0.007) and perceived stigma (p=0.005) (39). The current study resulted after

consistency reliability coefficients were satisfactory with Cronbach alphas of 0.964 and 0.931 for the 11-item and 11-item stigma measurement scale with the significance level of both (p = 0.001) and (p = 0.001), respectively. It also stated no statistically significant difference in the proportion of respondents with depression, anxiety, and stress levels among control and intervention groups at baseline p = 0.976, p =0.931, and p = 0.310, respectively. Furthermore, a baseline comparison of psychological factors (Anxiety, Stress, and Depression) presented that most respondents were extremely severely depressed, 62.95%, and exceptionally severely anxious, 81.0%. It severely stressed 35% among control and intervention groups at baseline. Chindo, Ibrahim Bisallah, et al. 2017, showed in the baseline comparison of psychosocial factors (Anxiety and Depression) of the study respondents no significant difference in psychosocial factors (Anxiety and depression) among the intervention and control group in the study respondents p=0.075 and p=0.275 (40, 41). Muhammad Anwar Sulehri et al, 2010 (42), Ayla Yilmaz et al, 2016 (43), Mohammedhussein M, et al, 2020 (44), Amreen et al., 2016 (45). Suhail Bhat et al. 2015 (46), Kunal Kumar et al., 2016 (47), and Grace Wambura Mbuthia et al., 2020(39) reported that their TB patients had varying degrees of loneliness, depression, anxiety, stress, and stigmatization due to various reasons. G.W. Mbuthia added that the confidence coefficients of internal consistency using Cronbach's alphas of 0.87 and 0.86 for stigma measurement using 11 and 12 items were satis factory scales among burden of stigma TB patients in Kenya (39). Chindo, Ibrahim Bisallah, et al 2017 (41). In this RCT of stigma intervention reduction of stigma-related tuberculosis, in the repeated measurement in a mixed design, the influence of between and within groups as well as group, time, and group-time interaction on the dependent variables was investigated. Compared to the control group, there was a substantial decrease in stigma community and stigma patient perspective scores in the intervention group.

This study's primary and first strength was that the effect of the intervention was established using a gold standard experimental design, randomized control trial design (RCT). This is the most significant pillar of actual experimental designs, which essentially included manipulation, comparison, and randomization, a study in which people are allocated randomly (by chance alone) to receive one experimental intervention or control group. The random allocation to study groups assisted in overcoming especially threats of selection bias. The other strength of the study was the blinding of respondents. The respondents were unaware of the allocation to treatment groups, so it did not influence their responses to answer questions, which reduced response bias. Another strength of this study was an adequate sample size of 305 respondents who participated and a reasonable response rate, from 100% at the baseline to 99% at the endpoint.

Patients recruited for this study were from one main TB hospital, a core referral TB hospital care and treatment. Although our respondents come from different areas, some are from faraway places. Therefore, respondents may only fully represent some populations living in Somalia. This result was not a generalizable result that could reach or represent the entire country. Contamination was another limitation that was considered before the commencement of the research. This occurs when there is mixing and interaction between the intervention and control groups, leading to the exchange of information.

CONCLUSION

The stigma intervention program outlined stigma-related TB was experimentally effective; the components of the TB stigma in the community and the perspectives of the TB stigma of the patients had improved significantly. Overall, it is true that the stigma about TB had changed after interventions were made to address the stigma associated with TB; the stigma being intervened with was a combination of community and patient stigma of TB. Additionally, community TB stigma and patient perspectives on TB stigma were significantly reduced. Therefore, this will strengthen the current strategies to prevent and control TB in Somalia. The outcome of this study will serve as a door of prospect for improving policy and service delivery in the implementation, prevention, and control of TB among TB patients in Somalia. The limitations underlined in this study should also provide encouraging areas for future research. The significance of this study is that coordinated stigma intervention regarding TB should be included in the national TB control guidelines as a plan to enhance the current approaches available in the prevention and control of TB among TB patients.

ACKNOWLEDGEMENT

The authors honestly acknowledged the contributions of the staff of Hargeisa TB Hospital Somalia, MOH & Human Services Federal government of Somalia, MOH development (MOHD) state level, the Office of TB control under MOHD, Hargeisa TB Hospital Director, administrators, facilitators, and research assistants. The research is funded by Universiti Malaysia Sabah (UMSGreat Fund - GUG0360-1/2019).

REFERENCES

1. WHO. 2022. World TB Day 2022: Getting back on track to diagnose and report TB cases to save lives. Relief web. News and Press Release.
2. World Bank, 2021. Somalia World Bank Development Indicators. https://data.worldbank.

org › indicator › SH.TBS.INCD.
3. Global TB Report 201824 Sep 2018 https:// reliefweb.int/ report/world/ global-TB-report-2018.
4. WHO, 2018. TB (TB), Jan 18, 2018, | Q&A. https:// www.who.int/news-room/questions-and-answers/ item/TB.
5. World Health Organization (WHO, 2017). Global TB report 2017. www.who.int/tb/publications/ global_report/gtbr2017_main_text.pdf.
6. Naima Said Sheikh, Abdulwahab M. Salad, Abdi A. Gele. 2021. Delay of TB patients in diagnosis in a conflict setting of Mogadishu, Somalia - a cross-sectional study. medRxiv preprint doi: https://doi.org/10.1101/2021.11.24.21266678. medrxiv.org/ content/10.1101/2021.11.24.21266678v1.full.pdf.
7. Marian Khalif Ali, Simon Karanja, & Mohammed Karama. (2017). Factors associated with tuberculosis treatment outcomes among tuberculosis patients attending tuberculosis treatment centers in 2016-2017 in Mogadishu, Somalia. Pan African Medical Journal.
8. World Health Organization (WHO). (2014). Stigma and discrimination. Retrieved from http://www.euro.who.int/en/health-topics/noncommunicable-diseases/mental-health/priority-areas/stigma-and-discrimination.
9. KNCV TB Foundation (KNCV,2017). Why we need to measure TB Stigma. Nov 16, 2017. International Journal of TB and Lung Disease (IJTLD), https:// www.kncvtbc.org/en/2017/11/16/why-we-need-to-measure-tb-stigma/.
10. Somali National TB Program (NTP), 2019. SOMALI NATIONAL STRATEGIC PLAN FOR TUBERCULOSIS CONTROL 2015-2019. Integrating Tuberculosis Control Programme into the primary health care services. https://moh.gov.so/en/wp content/uploads/2020/07/Somali-national-strategic-plan-for-tuberculosis-control-2015-2019.pdf
11. Mubarak Ismail. (2013). Knowledge of TB within the Somali Community. Nursing Times 109(20):22–23.
12. Gerrish K, Naisby A, Ismail M. (2012). The meaning and consequences of tuberculosis among Somali people in the United Kingdom. Journal of advanced nursing2012; 68(12): 2654–63. doi: 10.1111/j.1365-2648.2012.05964. x.
13. Nur, Abukar Yusuf, & Rohde, S. J. (2008). Factors influencing delay in seeking tuberculosis treatment in Belet-Weyne District, Somalia. UWCScholar-ETD Repository http://hdl.handle.net/11394/2778. https://etd.uwc.ac.za/xmlui/handle/11394/2778.
14. WHO. 2006. Diagnostic and treatment delay in tuberculosis An in-depth analysis of the health-seeking behavior of patients and health system response in seven countries in the Eastern Mediterranean Region. WHO-EM/TDR/009/E. 2006.
15. Queiroz, Raquel, Nogueira, Péricles Alves, Differences in the Adherence to TB treatment about sex in the health district of Freguesia do Ó/ Brasilândia - São Paulo, Saúde e Sociedade – SciELO. Vol. 19 No. 3 (2010) DOI: https://doi.org/10.1590/S0104-12902010000300014.
16. Anne Lia Cremers, Myrthe Manon de Laat, Nathan Kapata, Rene Gerrets, Kerstin Klipstein-Grobusch, Martin Peter Grobusch, Assessing the consequences of stigma for TB patients in urban Zambia. PLoS One, 2015 Mar 25;10(3): e0119861.Doi: 10.1371/journal.pone.0119861. eCollection 2015. PMID: 25806955. PMCID: PMC4373828 DOI: 10.1371/journal.pone.0119861.
17. Patrick W. Corrigan and Deepa Rao. On the Self-Stigma of Mental Illness: Stages, Disclosure, and Strategies for Change Can J Psychiatry. Author manuscript; available in PMC 2013 Aug 1. PMCID: PMC3610943. NIHMSID: NIHMS363969. PMID: 22854028.doi: 10.1177/070674371205700804.
18. Michaela Holubova , Jan Prasko , Marie Ociskova , Marketa Marackova , Ales Grambal , Milos Slepecky, 2016. Self-stigma and quality of life in patients with depressive disorder: a cross-sectional study. Neuropsychiatr Dis Treat 2016 Oct 19; 12:2677-2687. PMID: 27799775, PMCID: PMC5077239. DOI: 10.2147/NDT.S118593. eCollection 2016.
19. Patrick W. Corrigan, Amy C. Watson, (2002). Understanding the impact of stigma on people with mental illness, 2002 Feb; 1(1): 16–20. PMCID: PMC1489832.PMID: 16946807.https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1489832/pdf/wpa010016.pdf.
20. Ching-Ming Cheng, Chih-Cheng Chang Jung-Der Wang, Kun-Chia Chang, Shuo-Yen Ting, and Chung-Ying Lin. Negative Impacts of Self-Stigma on Patients' Quality of Life in Methadone Maintenance Treatment: The Mediated Roles of Psychological Distress and Social Functioning. Int J Environ Res Public Health v.16(7); 2019Apr PMC6480473. Int J Environ Res Public Health. 2019 Apr; 16(7): 1299.Published online 2019 Apr 11. DOI: 10.3390/ ijerph16071299 PMCID: PMC6480473. PMID: 30978986
21. Eshetu Girma, Markos Tesfaye, Guenter Froeschl, Anne Maria Möller-Leimkühler, Sandra Dehning & Norbert Müller. Facility based cross-sectional study of self-stigma among people with mental illness: towards patient empowerment approach. International Journal of Mental Health Systems, 7(1), 21. https://doi.org/10.1186/1752-4458-7-21. (2013).
22. Nadine Ferris France, Ian Hodgson, Bobby Ramakant, Steve Macdonald, Ellen M.H. Mitchell, The Work for Change KNCV, September 2018). From the Inside Out: Dealing with TB-related Self-stigma and Shame, A pilot toolkit for people with TB to deal with self-stigma and shame,

23. Dana Kamaradova, Klara Latalova, Jan Prasko, Radim Kubinek, Kristyna. Vrbova, Barbora Mainerova, Andrea Cinculova1 Marie Ociskova, Michaela Holubova, Jarmila Smoldasova, and Anezka Tichackova, 2016. The connection between self-stigma, treatment adherence, and medication discontinuation. Patient Prefer Adherence. 2016; 10: 1289–1298. Published online 2016 Jul 22. DOI: 10.2147/PPA.S99136.
24. Naglaa M. Gaber and Nesrine A. Wadie,2016. Perceived Self-Stigma, Adherence to Treatment and Discontinuation of Medication among Schizophrenic Patients. World Journal of Nursing Sciences 2 (3): 61-70, 2016 ISSN 2222-1352 © IDOSI Publications, 2016 DOI: 10.5829/idosi.wjns.2016.61.70.
25. Kamaradova et al., 2016.The connection between self-stigma, treatment adherence, and medication discontinuation. Patient Prefer Adherence. 2016; 10: 1289–1298. Published online 2016 Jul 22. DOI: 10.2147/PPA.S99136.
26. Kunal Kumar, Abhinit Kumar, Prakash Chandra, & Hari Mohan Kansal (2016). A study of depression and anxiety prevalence in patients suffering from TB. J Family Med Prim Care. 2016 Jan-Mar; 5(1): 150–153. Doi: 10.4103/2249-4863.184641. PMCID: PMC4943123.
27. Kate Macintyre and Karanja Kinyanjui, (2014). Global Fund's investments are channeled through World Vision. First Shipment of Drugs to Treat MDR-TB in Somalia Expected to Arrive Soon, PR Says. Aidspan.https://gfo.aidspan.org/ru/ comment/ reply/ 1831?94ca_name=a0
28. Stanley Lemeshow, David W. Hosmer Jr., Janelle Klar, and Stephen K. Lwanga, World Health Organization, (1990). Adequacy of sample size in health studies. Published on behalf of WHO by Wiley, Chichester, 1990. https://doi.org/10.1002/sim.4780091115.
29. Urbaniak, G. C., & Plous, S. (2013). Research Randomizer (Version 4.0) (Computer software). Retrieved on Jun 22, 2013, from http://www.randomizer.org/.
30. Moya et al., 2014. on Assessment of the stigma associated with TB in Mexico. Project: SOLUCION TB PROJECT. DOI:10.5588/pha.14.0065.
31. Motor Accident Insurance Commission (MAIC) (MAIC) for mental health assessment and treatment measures for psychologists, DASS 21Questionnaires, 2016. Depression, Anxiety, and Stress Scale - 21 Items (DASS-21). Stress scale DASS -21: Topics by Science.gov. https://www.science.gov › topic pages stress+scale+das.HTTPS:// maic.qld.gov.au/wp-content/uploads/2016/07/DASS-21.pdf.
32. Lovibond SH, Lovibond PF. Manual for the depression anxiety and stress scales (DASS21) Second edition. Sydney, NSW: Psychology Foundation of Australia; 1995. pp. 1–3.
33. IBM® SPSS® Statistics 28, 2021. https://www.ibm.com/support/pages/downloading-ibm-spss-statistics-28010. Nov 10, 2021. IBM SPSS Desktop Documentation
34. Macq J, Solis A, Martinez G, Martiny P. Tackling TB patients' internalized social stigma through patient-centered care: an intervention study in rural Nicaragua. BMC Public Health. 2008 May 8; 8:154. https://doi.org/10.1186/1471-2458-8-154.
35. Sommerland N, Wouters E, Mitchell EMH, Ngicho M, Redwood L, Masquillier C, van Hoorn R, van den Hof S, Van Rie A. Evidence-based interventions to reduce TB stigma: a systematic review. Int J Tuberc Lung Dis. 2017;21(11):81–86. https://doi.org/10.5588/ ijtld.16.0788.
36. Balogun M, Sekoni A, Meloni ST, Odukoya O, Onajole A, Longe-Peter O, Ogunsola F, Kanki PJ. Trained Community Volunteers Improve TB (25) and Attitudes Among Adults in a Periurban Community in Southwest Nigeria. Am. J. Trop. Med. Hyg. 2015.92(3):625-632. https://doi.org/10.4269/ajtmh.14-0527.
37. Daniel Tolossa , Girmay Medhin, Mengistu Legesse, 2014. Community knowledge, attitude, and practices towards TB in Shingle town, Somali regional state, eastern Ethiopia: a cross-sectional study. BMC Public Health 2014 Aug 7; 14:804. DOI: 10.1186/1471-2458-14-804. https://pubmed.ncbi.nlm.nih.gov/25099209/.
38. Juliao dos Reis, 2016. Factors Associated with Medication Adherence among TB Patients in Timor-Leste. QUT ePrinted. https://eprints.qut.edu.au/ 94662/1/ Juliao_Dos% 20Reis_Thesis.pdf
39. Grace Wambura Mbuthia, Henry D. N. Nyamogoba, Silvia S. Chiang, & Stephen T. McGarvey (2020). The burden of stigma among TB patients in a pastoralist community in Kenya: A mixed methods study, 2020; 15(10): e0240457. 2020 Octdoi: 10.1371/journal.pone.0240457. PMCID: PMC7561176.https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7561176/.
40. Tola HH, Shojaeizadeh D, Tol A, Garmaroudi G, Yekaninejad MS, Kebede A, Ejeta LT, Kassa D, Klinkenberg E. Psychological and Educational Intervention to Improve TB Treatment Adherence in Ethiopia Based on Health Belief Model: A Cluster Randomized Control Trial. PLoS One. 2016.11;11(5). https://doi.org/10.1371/journal.Pone.0155147.
41. Chindo Ibrahim Bisallah , Lekhraj Rampal , Munn-Sann Lye , Sherina Mohd Sidik , Normala Ibrahim, Zubairu Iliyasu , Michael Ochigbo Onyilo, 2018. Effectiveness of health education intervention in improving knowledge, attitude, and practices regarding TB among HIV patients in General Hospital Minna, Nigeria - A randomized control trial. PLoS One. 2018; 13(2): e0192276.Published online 2018 Feb 22. DOI: 10.1371/journal. Pone.0192276 https://www.ncbi.nlm.nih.gov/pmc/

articles/PMC5823396/

42. Muhammad Anwar Sulehri, Imtiaz Ahmad Dogar, Hamza Sohail, Zain Mehdi, Muhammad Azam, Obaid Niaz, M. Sheraz Javed, Istikhar Ali Sajjad, Zahid Iqbal, 2010. Prevalence of Depression Among TB Patients. December. 2010 APMC Vol: 4 No.2 July-December 2010.
43. Ayla YilmazOzden Dedeli, 2016. Assessment of anxiety, depression, loneliness, and stigmatization in patients with TB. SciELO Brazil. Acta Paul Enferm. 29 (5) • Sep-Oct 2016 • https://doi.org/10.1590/1982-0194201600076.
44. Mustefa Mohammedhussein, Arefayne Alenko, Worknesh Tessema, Almaz Mamaru, 2020. Prevalence and Associated Factors of Depression and Anxiety Among Patients with Pulmonary TB Attending Treatment at Public Health Facilities in Southwest Ethiopia. Neuropsychiatr Dis Treat. 2020 Apr 28; 16:1095-1104. Doi: 10.2147/NDT.S249431.
45. Amreen, Nadeem Rizvi, 2016. Frequency of Depression and Anxiety among TB Patients. Journal of TB Research > Vol.4 No.4, December 2016. Scientific research.DOI: 10.4236/jtr.2016.44021.
46. Suhail Ahmad Bhat & Dr. Shawkat Ahmad Shah, Study of Depression, Anxiety, and Stress among TB patients and its relationship with their Life Satisfaction. JMSCR Volume 03 Issue Jun 6.
47. Kunal Kumar, Abhinit Kumar, Prakash Chandra, & Hari Mohan Kansal (2016). A study of depression and anxiety prevalence in patients suffering from TB. J Family Med Prim Care. 2016 Jan-Mar; 5(1): 150–153. Doi: 10.4103/2249-4863.184641. PMCID: PMC4943123.