



Wolkite University

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**COLLEGE OF MEDICINE AND HEALTH SCIENCE DEPARTMENT OF
NURSING**

**TREND AND TREATMENT OUTCOME AMONG TUBERCULOSIS
PATIENTS ATTENDING AT BUTAJIRA GENERAL HOSPITAL,
GURAGE ZONE ,SNNPR, ETHIOPIA,2014-2019 : Registry based
retrospective analysis.**

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**A RESEARCH REPORT TO BE SUBMITTED WOLIKITE UNIVERSITY COLLEGE OF
MEDICINE AND HEALTH SCIENCE DEPARTMENT OF NURSING FOR THE
PARTIAL FULFILLMENT OF THE REQUIREMENT FOR BSC DEGREE IN NURSING**

JANUARY, 2021G.C

WOLKITE, ETHIOPIA

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JANUARY, 2021 G.C

WOLKITE, ETHIOPIA

DECLARATION

We here declare that, this is our original work and has not been presented for degree in any other university and all source of material used for this thesis have been fully acknowledged.

Name -----

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WOLKITE UNIVERSITY

DEPARTMENT OF NURSING

ADVISOR'S APPROVAL SHEET

This is to certify that the thesis entitled “TREND AND TREATMENT OUTCOME AMONG TUBERCULOSIS PATIENTS ATTENDING AT BUTAJIRA GENERAL HOSPITAL” submitted in partial fulfillment of requirements for degree of bachelor in NURSING, undergraduate program and has been carried out by AYNALEM GETU, ABERA AREGA and MILKESA SHIMELES under our supervision. Therefore, we recommended that the students has fulfilled the requirements and hence, here by submit the thesis to the department

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ACKNOWLEDGEMENT

First, we would like to express our heartfelt gratitude to Wolikite University College of medicine and health sciences department of nursing for giving us this opportunity.

Secondly, We would like to express our sincere thanks to our advisers Mr. Tamene and Mr. Fisseha for their valuable and constructive comments during the development of the proposal and the research.

Last but not least, our greatest thanks go to Butajira general hospital Health Information Management Service staffs for their collaboration to provide us sufficient information.

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ACRONYMS

AFB	Acid Fast Bacilli
ART	Anti retroviral Drug Therapy
BGH	Butajira General Hospital
DOTS	Directly Observed Treatment Short Course strategy
EPTB	Extra pulmonary Tuberculosis
HIV	Human Immune Deficiency
LTBI	Latent Tuberculosis Infection
MTB	Mycobacterium Tuberculosis
PTB	Pulmonary Tuberculosis
TB	Tuberculosis
TSR	Treatment Success Rate
WHO	World Health Organization
SPSS	Statistical package for social sciences

ABSTRACT

Background: TB is a chronic infectious disease mainly caused by *Mycobacterium TB*. TB remain a major global health problem .it cause ill- health among million of people each year. Early diagnosis, effective treatment and continues assessment of treatment outcome are important indicators of TB control. The trend of TB and treatment outcome has not been assessed at Butajira general hospital. The aim of the study was to analyses the trend in TB and TB treatment outcomes at Butajira general hospital.

Objective: To assess trend and treatment outcome Among Tuberculosis patient attending at Butajira general hospital July 1, 2014-June 30, 2019 G.C

Method and materials: An institutional based retrospective cohort study was conducted among 406 TB patients who were treated in Butajira general hospital from July 1, 2014 to June 30, 2019 G.C . The data was collected on date December 8 - 13 2020 G.C by using a pretested structured data extraction check list and a systemic random sampling technique was used to select the document of TB patients. The data was entered and cleaned on Microsoft Excel sheet and analyzed using SPSS for Windows version 21. Descriptive statics was used to summarize patients characteristics across the outcome variables. Sample size was calculated by using single population proportion formula and the final sample size was 406 subjects.

Result: Of 402 TB patients, most of the attendants (54.1%) were new TB cases. 301(74.1%) of the patients were presented with PTB and the rest presented EPTB. TB Trend from 2015-2019, 60(14.9%) in 2015, 83(20.6%) in 2016,111(27.5%) in 2017, 85(21.1%) in 2018, 63(15.6%) in 2019.

Regarding treatment outcomes, 21.6% of the case were cured, 35.6% of the case were treatment completed, 13.6% was failed ,12.7% were defaulted and 4.5% was died. TB HIV co-infection was increase from 23.3% in 2015 to 34.9% in 2019G.C.

Conclusion and recommendation: prevalence of TB increase from 2015-2017 and decrease from 2018-2019G.C and controlling relapse of TB and screening of all HIV positive patients are recommended steps to reduce the transmission of TB at community.

Key word: Trend, Treatment outcome, TB ,Butajira ,T B patients

1. INTRODUCTION

1.1 .BACK GROUND

Tuberculosis is bacterial disease caused by Mycobacterium tuberculosis, which mostly affect the lung (PTB), beside it can affect other organ as well (EPTB) due to its staining characteristics in laboratory , it has sign and symptom cough, fever, weight loss ,chest pain , shortness of breath , night sweat , loss of appetites, fatigue . [1]

The diagnostic method to confirm or exclude TB are microscopic examination of sputum smears , radiological investigation , AFB culture, Histo-pathology , the identification of TB suspect (cough for more than 2 weeks) and screening them by examination of sputum smear allows discovering those who are transmitting tuberculosis .[2]

It is highly transmitted by untreated smear – positive PTB when the infectious individual expels droplets of the bacilli which are produced during breathing ,coughing ,talking, laughing , sneezing, person living in the same household or who otherwise are infrequent and close contact with an infectious patients have the greatest risk of being exposed to the bacilli.[3]

The WHO declared TB a global public health emergency in 1993.starting in the mid 1990s efforts to improve TB care and control intensified at national and international levels, WHO developed the DOTS within a decade, almost all countries had adopted the strategy and the was considerable progress toward global target established for 2005.[4]

According to the WHO treatment guideline the essential anti-TB drugs are Ionized, Rifampicin , Pyrazinamide , Ethambutol , and Streptomycin. All anti TB drugs should quality assured and management of anti – TB drug should be incorporated into the management of other essential medicines by the ministry of health.[5]

Among the six WHO regions the highest treatment success rates were in the western pacific region, the Southeast Asia region, and the Eastern Mediterranean region .the treatment success rate was 79% in the African region and 75%for the region of the Americas and Europe. [6]

Ethiopia ranked seventh among the 22 high TB, and 30 high MDR TB burden countries. More over TB is third cause of hospital admission and the second top cause of mortality in Ethiopia.[7]

1.2. Statement of the problem

TB is a major public health problem throughout the world, according to the WHO global report 2020 one third of the world population is estimated to be infected with tubercle bacilli and hence at risk of developing active disease ,Globally in 2020, the annual incidence of TB expressed as the number of new TB cases was about 8.8 million people and the annual number of deaths due TB was 1.6 million ,and in developing countries TB comprise 25% of all avoidable adult deaths ,it is estimated that nearly 1 million (11%) of the total TB cases are children less than 15 years of age.[10]

Global TB incidence in 2019 falling at about 2% per year and between 2015-2019 the cumulative reduction was 9%. This was less than half way to the end TB strategy milestone of 20% reduction between 2015 and 2020.[11]

Although the rate of the successful treatment outcome of the disease varies from country to country, 83% has been reported globally and there is also a finding that shows the magnitude of TB burden worldwide. A retrospective study was conducted in turkey in 2008 on the treatment outcome of PTB. The burden of TB in these finding accounts for defaulted treatment 5.1%, dead subjects 2.4%, failure 0.3%, and transfer out 0.5% of all patents and among smear positive PTB there were defaulted treatment 5.4% , dead subject 2.9, failure 0.4% and transfer out 0.7% cases.[12]

In the year 2009/2010 to Ethiopia registered 167,172 cases of TB. Among these .139,261 were new cases;46,132 new smear-positive (33.1%); 49,037 new smear-negative (35.2%); 44.092 new EPTB (31.6%).[13]

A five year retrospective study done in university of Gondar teaching hospital on the treatment outcome of TB and the treatment success rate of TB patients showed unsatisfactorily low rate(29.5%), a high proportion of patient died (10.1%) or defaulted (18.3%), which is a serious public health concern that needs to be addressed urgently.[14]

TB epidemiology is closely connected with social and economic condition which make its prevention, care, and control more challenging. [15]

To the world TB leading cause of death from an infectious disease, especially among women and children. The WHO estimates in 2019 that 10 million people fell ill with TB world wide. 5.6 million men , 3.2 million women and 1.2 million children. TB present in all countries and age groups but curable and preventable. And TB occurs in every part of the world, in 2019 the largest number of new TB cases occurred in the WHO South-East Asian region with 44% of new cases followed by the WHO African region, with 25% of new cases and the WHO western pacific with 18% .[16]

Several reasons and risk factors for poor TB treatment outcome have been reported. High age , male sex, low income , no or limited access to transport, distance from home to the treatment center , incomplete treatment compliance , limited interest in information about the disease and its treatment , limited social support , multi-drug resistance and co morbidity have all been found to be related to unsuccessful treatment outcome.[17]

Of the 10 million people who become ill with TB every year 4million of them do not get the care they need. [19] the rise in incidence of MDR and XDR strain of mycobacterium TB are critical concern .patient with MDR-TB may require more than 2 years of treatment , which can be extremely costly and particularly difficulty in resource limited setting.[20]

Although for TB treatment is available for free in Ethiopia, many patient were found with poor treatment outcome .[22] this poor treatment may led to prolonged period of infection , drug resistance , increased morbidity and mortality , failure to complete treatment indicate the presence of poor treatment outcome. [23]

Ethiopia has applied numerous strategies to prevent and control TB infection, including the expansion of DOTS providing centers in rural and remote areas and the involvement of private health institutions. [19]

Ethiopia has adopted the WHO stop TB strategy , which is reflected in Ethiopia various policy documents and many implementation guidelines, foe example ,HSDP IV, the national TB and Leprosy strategic plan 2011-2015 and the TB/Leprosy ,MDR TB,TB/HIV,PPM-DOTS. Community based TB care implementation, and TB infection control guidelines. The national TB control program has currently achieved 100% geographical coverage and 92% of public hospitals and health centers offer DOTS. [24]

2. LITERATURE REVIEW

Globally, of the estimated 580,000 people who became ill with DR-TB in 2015, the treatment coverage was 23%; only 67,498 people (51%) were successfully treated (people who started a DR-TB regimen in 2013 and completed the course in 2015). Among the remaining 49% of people who were not successfully treated, 17% died, 16% were lost to follow-up, 9% failed and 7% were not evaluated. A 28% treatment success rate was registered among people with XDR-TB – a form of TB caused by bacteria that have developed extensive drug resistance to multiple first- and second-line medicines. [25]

Globally, the treatment success rate for the 6.4 million new and relapse cases TB patients who were treated in the 2017 cohort was 85%, an improvement from 82% in 2016 primarily as a result of efforts in India to reduce the size of the "lost to follow-up" category in the private sector. The absolute number of TB patients reported to have been successfully treated rose substantially over the period 2000–2017, both globally and in all WHO regions. Globally, the Overall, proportion of MDR/RR-TB patients in the 2016 cohort study who successfully completed treatment (i.e. cured or treatment completed) was 56%: in 8% the treatment failed, 15% died, 15% were lost to follow-up and for 6% there was no outcome information. At regional level, the treatment success rate of MDR-TB in 2016 was highest in the WHO Eastern Mediterranean Region (65%) and was lowest in the South-East Asia Region (52%). Treatment failure was highest in the WHO European Region (12%), and the death rate was highest in the African Region (18%). Loss to follow-up was highest in the WHO Region of the Americas (25%), whereas the Western Pacific Region had the highest percentage of cases without outcome data (8%) (25) increased. [26]

A study conducted in Nigeria showed that the trend of TB from 2011 to 2015 a total of 13,635 TB patients of were admitted in the past five. There was a steady yearly decline in the number of TB cases from 2011 to 2015: in 2015 was 2349. The count in 2011 was 3076 while that in 2015 was 2349. [27]

In the year 2009/2010 to Ethiopia registered 167,172 cases of TB. Among these .139,261 were new cases;46,132 new smear-positive (33.1%); 49,037 new smear-negative (35.2%); 44,092 new EPTB (31.6%). Among the total smear- positive TB cases reported in 2009/2010, 55% were males, 7.5% were children <14 years old, and 2% were above the age of 65. The 15 to 34 age

group was found to be the one most affected with TB, accounting for 62% of notified new smear positive TB cases. [13]

A study conducted in Ethiopia showed that the treatment outcome from 2003 to 2016 a total of 60,138 TB patients from seven regions (Amhara, Addis Ababa, Oromia, Southern region, Afar , Gambella, Tigray) of the 52,009 had successful treatment , the remaining 8,129 were unsuccessful treated cases.[28]

A study conducted in Gambella Regional Hospital showed that the trend of TB and treatment outcome in the region for the past 5 years (2006-2010) a total of 5071 TB patients were registered. Of these 4813(94.91%) were new case and the rest 258 (50.09%) were re-treatment cases. Out of the total of new cases 1799(37.38%) were smear positive PTB, 1598(33.2%) were smear negative PTB and the rest 1416(29.42%) were EPTB cases. Out of the total of re-treated cases, 132(51.2%), 34(13.2%), and 92(35%) were relapse, failure and defaulted cases, respectively. And treatment outcome of TB of 2303 TB patients who were registered at the hospital during the study period, 231 (10%) were cured, 1229 (53.4%) completed the treatment, 527 (22.9%) were defaulted, 83(3.6%) died, 2(0.09%) were failed and 231(10%) were transferred out to other health facility. The cure rate of TB patients increased over the study period from 11(2.4%) in 2006 to 106(17.7%) in 2010. [29]

A study conducted at Mizan Aman general hospital shows trends of all forms of TB has increased from 363 in the year 2010 to 634 in the year 2011, then decreased to 330 in 2012 and increased to 823 in the year 2013. The same trends are observed when the data are disaggregated by types of TB: sputum smear positive, smear negative, extra-pulmonary TB cases. There are consistently and significantly more SNPTB cases reported each year than SPPTB or EXPTB cases. And it revealed treatment out comes from a total of 2150 tuberculosis patients analyzed from July 2010 to June 2013: 125 (5.8%) cured, 436 (20.3%) completed treatment, 26 (1.2%) defaulted, 49 (2.3%) died, and 1514 (70.4%) were transferred out to other health facility. [30]

From the total of 506 registered tuberculosis patients included in the study conducted in Debra Berhan Referral Hospital, 480 (94.9%) had successful treatment outcome (favorable treatment outcome). Of these, 172 (34%) and 308 (60.9%) patients were cured and treatment completed, respectively. Similarly, 10 (2%), 2 (0.4%), 9 (1.8%) and 4 (0.8%) were transferred out,

defaulted, dead and treatment failed, respectively. Trend of TB in Deber Berhan Referral Hospital from 2014-2017, The treatment cured rate varies from 23.29% in 2006 E.C to 47.45% in 2007 E.C, whereas treatment completed varies from 46.91% in 2007 E.C to 67.08% in 2009 E.C [32]

A study carried out in Adare General Hospital indicated that The treatment outcome of most cases was promising, (67.1%) were completed anti-TB treatment and (25.3%) cured. Treatment failure, died and defaulters were (0.3%), (4.7%) and (2.6%), respectively. Majority of treatment failure and defaulter were in the age range of 45-64 years and the high rate of death 15% was registered by HIV/TB co-infected patients. [33]

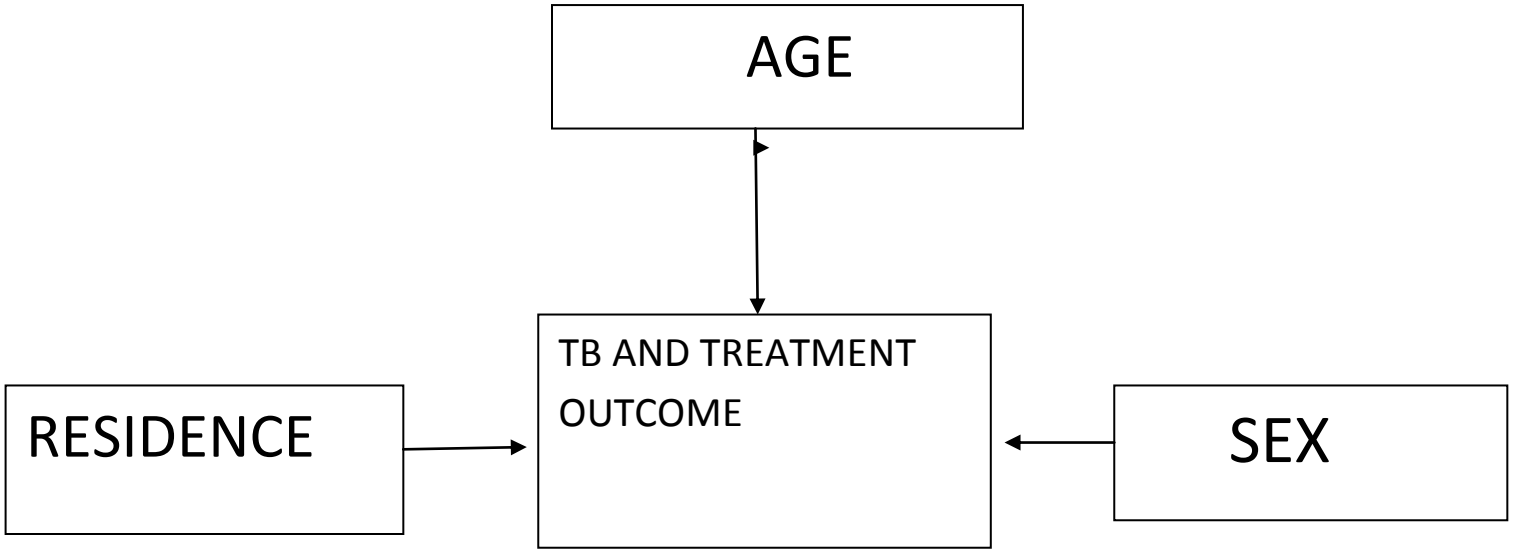
A study conducted in Hiwot fana specialized hospital showed that the trend analysis of TB from a total of 8001 patients a decreasing trend of TB prevalence was observed and decreased from 19.3% in 2015, 18.6% in 2016, to 18.4% in 2017, 13.5% in 2018 and down to 13% in 2019.[35]

2.1. Significance of the study

In this study, we were estimated trend and outcome of PTB. The finding of this study was also give an insight to health professional about magnitude, prevalence and treatment outcome of TB. If it is implemented, also improve patient cure rate and minimize death from TB in children and adult. Better tools are needed to control TB worldwide. By following WHO guidelines and operational hand books decrease TB by recommended systematic testing and preventive treatment for three high risk population groups: PLHIV, household contacts of bacteriological confirmed PTB case and clinical risk group.

Estimating the trend and treatment outcome of PTB, it gives us a great concern in TB-HIV clinic patients. Trends analysis help to allocate resource appropriately regarding clinical evaluation. Determining treatment outcome and performing trend analysis was in turn contribute to the improvement of TB control program and to the decrease of TB morbidity and mortality.

2.2 conceptual framework



3. OBJECTIVES

3.1. General objectives

To determine trend and treatment outcome among tuberculosis patient attending at Butajira General Hospital from July 1, 2014 - June 30, 2019 G.C

3.2. Specific objectives

1, To determine the trend of TB at Butajira General Hospital from July 1, 2014 - June 30, 2019 G.C

2, To determine the treatment outcome of TB patient attending at Butajira General Hospital from July 1, 2014 - June 30, 2019 G.C

4. METHODS AND MATERIAL

4.1. Study area

The study was conducted at BGH. Which is located in SNNPR, Ethiopia in Gurage zone in Butajira city. The city found 135km far from the capital city of Ethiopia and 140km away from Hawassa. The hospital provides service indifferent department like outpatient department, in patient department, emergence and referral clinics. There are also pharmacy and laboratory serving the patients in the hospital. The hospital is also providing TB treatment.

4.2. Study period

The study was conducted between June 1, 2014 - July 30, 2019 G.C

4.3. Study design

Five years institution based retrospective cohort study was conducted among 402 TB patients treated at BGH from June 1, 2014 - July 30, 2019 G.C

4.4. Source of population

The source of population of the study was all medical records of patients for treatment of TB at BGH in the past five years from June 1, 2014- July 30, 2019 G.C

4.5. Study population

The study population was all medical records of TB patients who start treatment from June 1, 2014-July 30, 2019 G.C.

4.6. Inclusion and Exclusion criteria

Inclusion : the past five years medical registered TB patients at BGH

The treatment outcome known in the past five years

Complete individual record

Exclusion : above past five years registered TB patients at BGH

The treatment outcome unknown in the past five years

Incomplete individual record

Transfer out to other health center

4.7. Sample size determination

Sample size was calculated by using a formula of single population proportion considering the following assumption

$$n = Z^2 P (1-P) / W^2$$

where : n =required sample size

Z= Z-score value corresponding to a given level of confidence (1.96)

P= estimated population proportion (50%)

W= allowable margins of error (5%)

$$n = (1.96)^2 0.5 \times 0.5 / (0.05)^2$$

$$n = 384$$

If the target population is less than 10,000 the actual sample size was calculated by as

$$Nf = \frac{No}{1 + \frac{No}{N}}$$

Nf= actual sample size

No= initial sample size (384)

N= total population (9500)

$$Nf = 384 / 1 + (384 / 9500)$$

$$Nf = 369$$

By adding 10% non response rate

$$Nf = 369 + 369 \times 10\%$$

$$Nf = 406$$

4.8. Sampling Technique

Totally 9500 medically registered TB patients from June 1, 2014- July 30, 2019 G.C at BGH which meet the inclusion criteria was selected through a random sampling technique. The sampling interval (k) was obtained by dividing the total medically registered TB at BGH to its final sample size ($9500/406=23$) the first sample was taken by lottery method and taken from the HMIS registry. The next all sample was obtained by every 23 interval.

4.9. Variable of the study

4.9.1. Dependent variable

TB trend and treatment outcome

4.9.2. Independent variable

Sex

Age

Residence

4.10. Operational Definition

Treatment outcome was defined according to the exiting WHO definition at the time of data collection. [43]

Treatment after failure: a patient schedule for re-treatment due to positive smear or culture at the end of the 5th month or later after commencing the previous treatment.

Return after default: a patient previously recorded as a default from treatment who return to the health facility with smear positive sputum results.

Defaulter: a patient who has been on treatment for at least 4 weeks and whose treatment was interrupted for 8 or more consecutive weeks.

Cured : a patient whose sputum smear or culture was positive at the beginning of the treatment but who was smear or culture negative in the last month of treatment and on at last one previous occasion.

Died :a patient who dies for any reason during the course of TB treatment.

Treatment completed: a patient who completed anti-TB treatment without evidence of failure, but for whom sputum smear culture result are not available in the last month of treatment and on at least one previous occasion.

Treatment success: the sum of patient who are cured and those who have completed treatment.

Treatment failure: a patient whose sputum smear or culture is positive at 5th month or later during treatment.

Unsuccessful outcome: the sum of patient who are defaulter, died, transferred out, and patient with treatment failure.

4.11. Data collection Tools

A five years medical registers TB patients from June 1, 2014- July 30, 2019 G.C was extracted from BGH health management information system (HIMS) data base.

Ethical clearance was obtained from CHMS ethical review board for the hospital and lists of the data was collected on standardized form check list. The check list included year of treatment , sex ,age, treatment history , type of TB ,HIV test result and treatment outcomes. Each check list was evaluated for completeness and presence of all required documentation.

4.12. Data processing and analysis

The collected data was entered and cleaned on Microsoft Excel spread sheet and analyzed using SPSS for windows version 21.Descriptive statics was used to summarize patients, characteristics across the outcomes variables. Trend analysis was performed using the percentages of successful treatment outcomes. Moreover percentage change in outcome indicator for five years period was analysis. The results were presented in the form of tables and graphs.

4.13. Ethical consideration

Formal letter was written to BGH since it is retrospective study informed consent from individual patients were not requested. All information obtained from patients card were strictly kept confidential.

4.14. Dissemination plan

The result of this study was be presented to the department of nurses, College of Medicine and Health sciences, Wolkite University for partial fulfillment of a BSc in Nursing. Furthermore, the result document was disseminated and utilized by all responsible bodies in the study area.

5. Result

5.1 Socio demographic characteristics of TB patient

From the total evaluated TB cases 219(54.3%) were male and 183(45.45%) were female and 41(10.2%) were urban residents and 361(89.6%) were rural residents. About 51(12.7%) of the participants were in the age range 0-14 years, 92(22.8%) were in the age range between 15-24 years, 101(25.1%) were in the age range between 25-34 years, 72(17.9%) were in the age range between 35-44 years, 58(14.4%) were in the age range between 45-54 years and 28(6.9%) were in the age range above 55 years.(table,1)

Table 1

Socio demographic characteristics of TB patients at BGH ,SNNPR, Ethiopia July 1, 2014-June 30 2019 G.C			
		frequency	Percent
SEX	Male	219	54.5%
	Female	183	45.5%
	Total	402	100%
Age	0-14	51	12.7%
	15-24	92	22.8%
	25-34	101	25.1%
	35-44	72	17.9%
	45-54	58	14.5%
	>55	28	7%
	Total	402	100%
Residence	urban	41	11.4%
	Rural	361	89.6%
	Total s	402	100%

5.2 Clinical characteristics of patients

Most of the attendants (54.1%) were new TB cases. 301(74.1%) of the patients were presented with PTB and the rest presented EPTB. Clinical characteristics of TB/HIV co-infected patients HIV testing for TB patients precede the offer of provider initiated HIV testing and counseling and acceptance. Almost all TB patients 402 were tested for HIV and 111(27.5%) HIV positive and 291(72.2%) were HIV negative. Significant number of the patients 111(27.5%) were HIV positive whom 60(26.8%) were smear positive and 34 (28.8%) smear negative, and 291 (72.2%) were HIV negative whom 164(73.2%) were smear negative. 301(74.1%) of the patients were presented with PTB of whom 166(55.1%) were Smear positive and 101(25.1%) of the patients were presented with EPTB of whom 58(57.4%) were smear positive EPTB.

Table 2

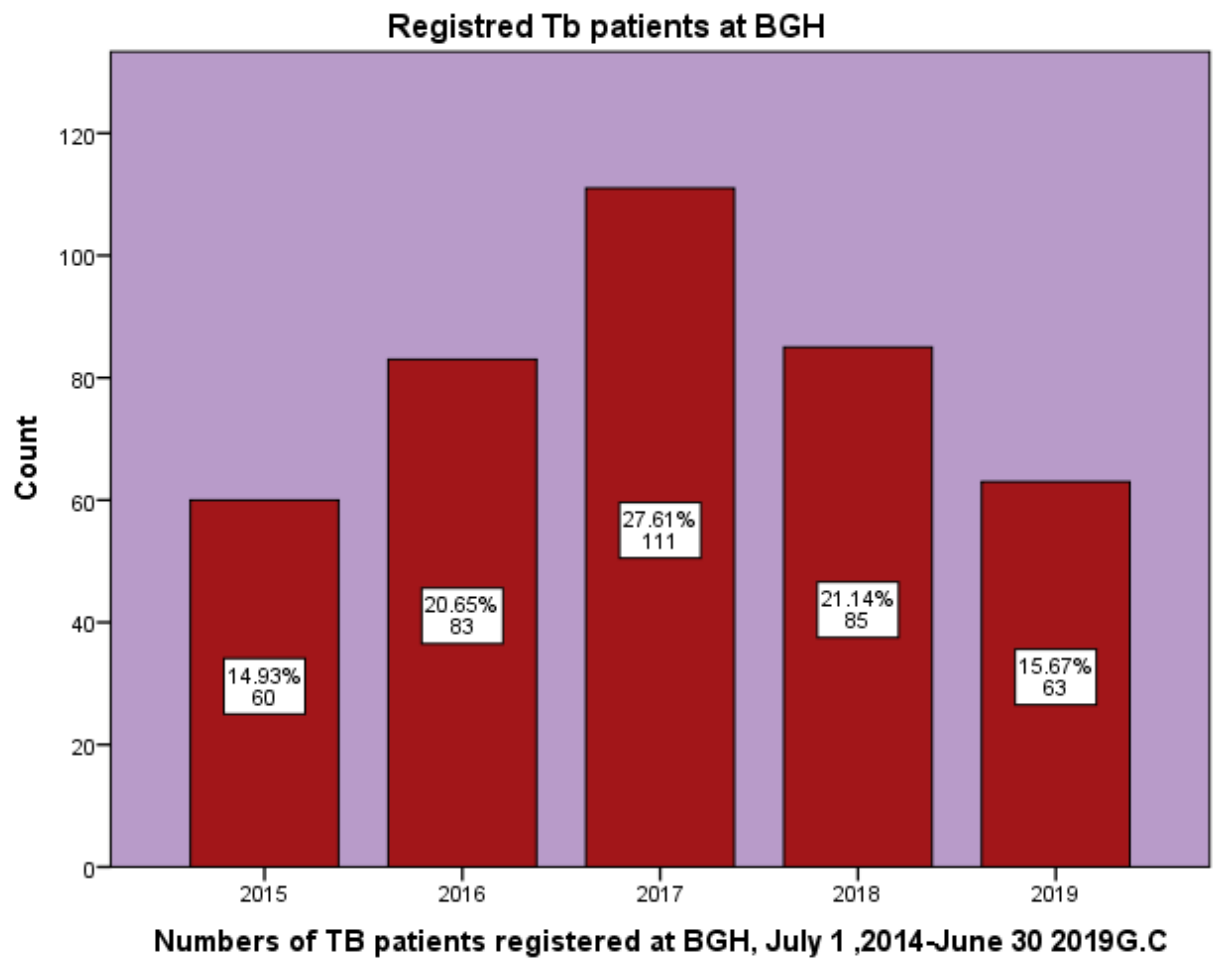
		Types of TB	
		PTB	EPTB
		%	%
Smear result for TB patients	positive	55.1%	57.4%
	Negative	44.5%	42.6%
HIV test result for TB patients	HIV positive	24.9%	35.6%
	HIV negative	75.1%	64.4%

5.3 Over all of patients category

Among registered and analyzed TB patients 219(54.3%) were new case, 110 (27.3%) were relapse, 38(9.4%) were failure, 35(8.7%) were return after treatment defaulting.

5.4 Trend over time

The proportion of TB was increase between 2015-2017G.C and decreased between 2018-2019G.C. The high rate of TB was presented 111(27.5%) in 2017G.C and with a low rate, 60 (14.9%) in 2015. The rate of PTB cases increase from 66.7% in 2015 to 82.5% in 2019 and the rate of EPTB cases decrease significantly from 33.3% to 17.5% in 2019. TB HIV co-infection was increase from 23.3% in 2015 to 34.9% in 2019. (Figure 1)



5.5 TB treatment outcome

Table 3

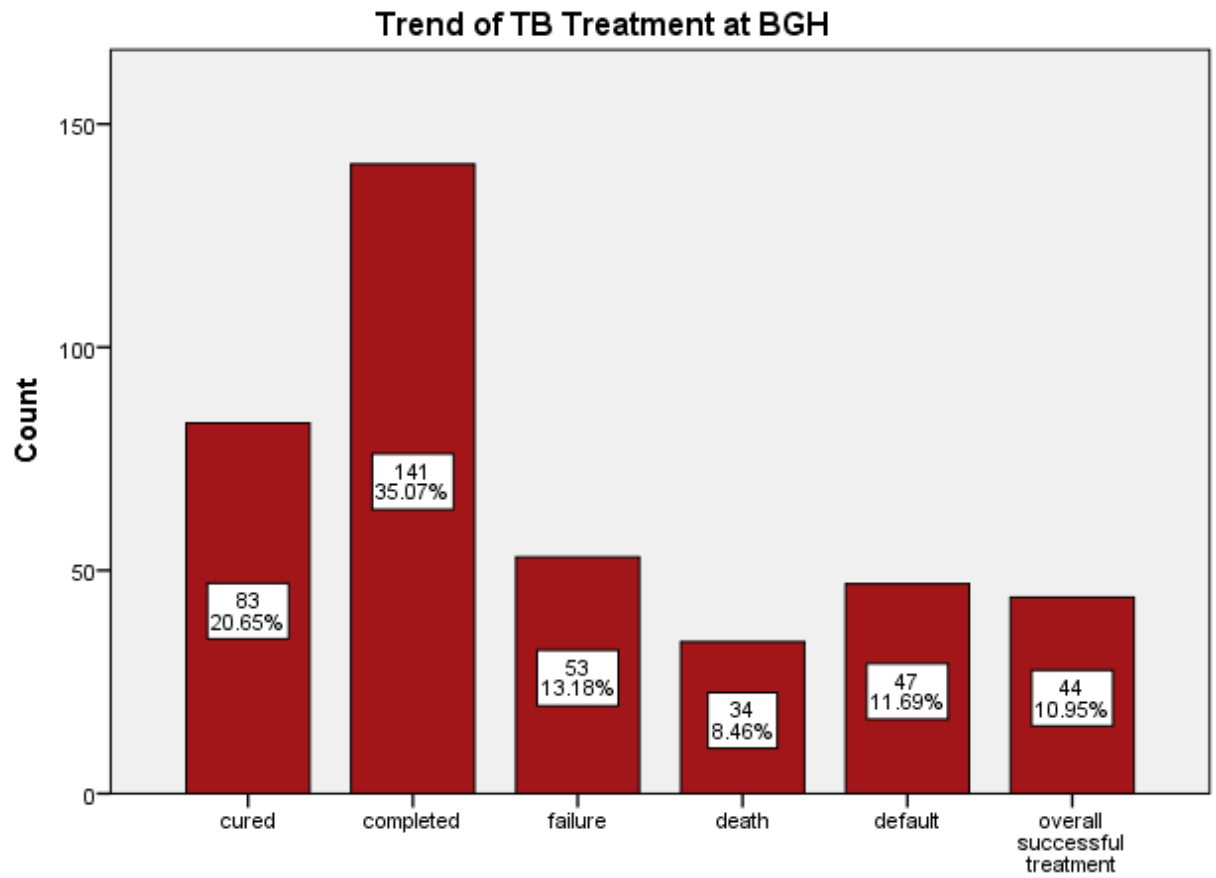
		Years				
		2015	2016	2017	2018	2019
		%	%	%	%	%
TB treatment outcome	Cured	21.7	26.5	26.1	17.6	12.7
	Completed	36.7	32.5	37.8	36.5	39.7
	Failed	11.7	16.9	12.6	11.8	15.9
	Death	3.3	2.4	5.4	7.1	3.2
	Default	10	8.4	11.7	12.9	22.2
	Over all successful treatment	16.7	13.3	6.3	14.1	6.3

Table 4 Treatment outcome by age category

		Age category					
		0-14	15-24	25-34	35-44	45-54	>55
		%	%	%	%	%	%
Trend of TB treatment outcome	Cured	19.6	26.1	21.8	22.2	19	14.3
	Completed	31.4	38	39.6	33.3	41.4	28.6
	Failed	11.8	13	10.9	19.4	13.8	14.3
	Death	0	0	2	4.2	6.9	32.1
	Default	11.8	12	11.9	13.9	15.5	10.7
	Over all successful treatment	25.5	12.9	13.9	6.9	3.4	0

The treatment outcome The treatment success proportion was increasing 58.4% (2015), 59% (2016), and 63.9% (2017) were cured and completed treatment but decrease 54.1% (2018), 52.4% (2019). The highest treatment success rate 63.9% observed at 2017 as compared to across the years in the study period. The Default increase from 11.7% to 22.2% but the death decreases from 5.4% to 3.2%. Female patients had higher defaulter rate 13.7% than male. The death rate increased as age increase from 2% (25-34) to 32.1% in the age group >55 year. Smear negative TB patient had higher death rate of 5.1% than smear positive TB.

Figure 2



**trend of TB treatment outcome, treatment regimens, July 1,2014-June 30
2019G.C**

Table 5

		Numbers of TB patients registered at BGH, July 1,2014-June 30 2019 G.C				
		2015	2016	2017	2018	2019
		%	%	%	%	%
Sex	Male	61.7	77.1	38.7	60	38.1
	Female	38.3	22.9	61.3	40	61.9
Age	0-14	8.3	28.9	7.2	9.4	9.5
	15-24	40	14.5	25.2	23.5	12.7
	25-34	21.7	9.6	32.4	30.6	28.6
	35-44	28.3	10.8	13.5	22.4	19
	45-54	0	28.9	14.4	5.9	20.6
	>55	1.7	7.2	7.2	8.2	9.5
Residence	Urban	11.7	4.8	6.3	10.6	22.2
	Rural	88.3	95.2	93.7	89.4	77.8
Type of TB	PTB	66.7	79.5	72.1	74.1	82.5
	EPTB	33.3	20.5	27.9	25.9	17.5
HIV test result for TB patients	Positive	23.3	33.7	26.1	21.2	34.9
	Negative	76.7	66.3	73.9	78.8	65.1
Patients category	New	55	57.8	50.5	58.8	50.8
	Relapse	26.7	21.7	35.1	21.2	30.2
	Failure	8.3	10.8	5.4	14.1	9.5
	Return after defaulting	10	9.6	9	5.9	9.5
Smear result for TB patients	Positive	45	61.4	57.7	48.2	65.1
	Negative	55	38.6	42.3	50.6	34.9

6. Discussion

TB is a disease that continues to be a major public health problem among the ten top disease causes of mortality. Millions of people continue to fall sick with TB each year, particular in developing countries.

The trend of TB number in this study gradually increase after 2015 then decreased 21.14% in 2018, and 15.87% in 2019. this finding is consistent with a report from Hiwot Fana specialized University Hospital, Eastern Ethiopia [35]

In which the trend of TB fluctuated year to year. The occurrence of this difference in different years and countries can be affected by a higher tendency for clinicians to consider presumptive TB staff conducting the test and may be a different level of awareness of people about early diagnosis and treatment might also have great contribution for it.

Male participants had a significantly higher proportion of TB cases than female. This agree with a study reported from, Gondar , Northwest[36], Jimma, Southwest[37]. This might be because male usually have more social contact in the community than female and males are more likely either to be exposed to the disease or utilize health service than the female. Women may also under report their disease and seek care outside health institution because of socioeconomic constraints.

In this study, the age group of 25-34 years was the most infected by TB, which was similar to studies reported from report from Hiwot Fana specialized University Hospital, Eastern Ethiopia [35]

This might be due to this age group being more sexually active and infected with HIV and by working condition, which predispose to TB. Disproportionately, a large burden of TB cases in the age group share a high number of total work forces which could contribute to the poverty of ones country. People living without HIV are more likely to have TB compared to people living with HIV in the present study.

We reveal an average TSR of 56.76%. TB/HIV co-infection was present in 27.5% patients higher than many previous studies. [38] this may be due to improvements in community awareness ,implementation of multi-sectorial HIV/AIDS prevention activities and geographic, socio-economic and cultural variability between the study area. The co-infection rate showed increase through two successive year from 2015 & 2016(23.3%&33.7% respectively) and decline to 21.2% in 2018 then increase to 34.9% in 2019.

The TB success rate was lower than the national average for Ethiopia (89%).[39] it was higher than the study conducted in Mizan Aman General Hospital (21.59%)[40]which might due to transferring a large proportion of TB patients to other treatment center and not due following their respective treatment.

TB patients poorly treated (failed) and suffered death, default (13.28%, 4.28%, 13.04% respectively) the level of unsuccessful treatment outcome was higher than with that reported at Gondar [36]

An average default rate reported here 13.8% was higher than report from Ethiopia. [38]

This may be due to Geographic variability in the study setting, the study period difference and mechanism of defaulter tracing.

The over all proportion of death (4.28%) was greater than previously reported in different region of Ethiopia (Addis Ababa (3.7%), Mizan Aman General Hospital(1.22%)[40] lower less than a previous study across Ethiopia (10.1%). [41]

The death rate increase in 2018 (7.1%) compared to 2015(3.3%) and it decrease in 2016(2.4%).

The death rate increased from in those age less than 24 years to 32.1% in those age above 55 years. In the previous reports indicating that increasing age is a risk factor for death from TB due to increasing co-morbidities. In this research showed that HIV-infected TB patients were more prone to poor treatment outcomes than non-infected patients.

TSR varied between treatment years in this study. This similar with report from Addis Ababa. [42]

PTB had greater chance of succeeding treatment than EPTB. In contrast to previously reported finding in the Gondar University. [36]

7. Limitation of the study

The major limitation of this study was that the full range of socio-demographic were not available, the use of retrospective secondary data which is limited to whatever documented in the TB registers of the TB clinic variables such as treatment adherence and other disease condition which might affect outcome were not captured in the patients life.

This retrospective institution based study lack inclusion of patients important variables such as educational status, occupation , marital status ,knowledge about TB, duration of the treatment , family size,medication side effect that have an association with TB treatment outcome.

8. Conclusion

The overall TSR was low the WHO TSR target (90%) and TB success rate was lower than national average for Ethiopia (89%)TB success rate reported by the WHO in 2020.

The trend of TB proportion increase the following two years (2015 and 2016) then decrease consecutively. The age category of 25-34 years was the most affected and a high proportion of TB was observed in newly treated patients.

The proportion of death was higher in Male, >55 year ,smear negative and EPTB while defaulter and treatment failure rate were increases from 10% in (2015) to 22.2% in (2019) and 11.7%(2015) to 15.9%(2019) respectively.

9. Recommendation

1, continuous and close follow-up of TB patients during the course of treatments are recommended.

2, facilities should follow the overall condition of transferred out TB patients to other facilities, possibly introducing mechanisms to report their respective treatment outcome.

3,treatment of TB-HIV positive patients should screened by Gene- Xpert, which give quick results to identify new TB patients to reduce infection.

Improvement and strengthening of comprehensive and targeted TB-HIV control program are recommended to the study area.

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11. ANNEX

Table 1, Socio demographic characteristics of TB patient at BGH , Gurage , Ethiopia 2020G.C

Variable	Categories	Frequency	Percentage
Sex	Male		
	Female		
Age	0-14		
	15-24		
	25-34		
	35-44		
	45-54		
	>55		
Place of residence	Urban		
	Rural		

Table 2, patients category

Patients category	2015	2016	2017	2018	2019
New					
Relapse					
Failure					
Return after defaulting					

Table 3, trend of treatment outcome, treatment regimens , July 1, 2014- June 1, 2019 G.C

Variable	2015	2016	2017	2018	2019 G.C
Successful					
Cured					
Treatment completed					
Unsuccessful					
Failure					
Death					
Default					

Table 4, types of PTB and HIV test result of TB patient at BGH

Variable	2015	2016	2017	2018	2019
PTB					
EPTB					
HIV – positive					
HIV –negative					