Adherence to PTB Treatment, Sputum Smear Conversion and Mortality of PTB Patients Enrolled in Tb-Dots Clinic of North Datu Odin Sinsuat: A Retrospective Study

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ABSTRACT

Background

Everyone is at risk for acquiring TB. While advancement in the field of medicine already made TB highly curable if treatment commenced promptly and appropriately, still, treatment interruption or poor patient outcomes from tuberculosis treatment are largely caused by non-adherence combined with a lack of understanding about the disease. The researchers nominated to conduct this study since even with access to efficient treatment, tuberculosis remains one of the major causes of death in the Maguindanao Province. Poor adherence to treatment challenges TB management both in local and national levels. Proper adherence to treatment contributes to successful outcomes and prevents the development of drug-resistant forms of TB.

Methods

The research utilized a quantitative study design in a retrospective manner. In this kind of study, the data outcomes have already materialized when the study is being conducted. Research subjects are grouped and information about them is collected based on the available forms and reports. The data is then analyzed to identify what could have led to the outcome.

Results

Over the course of three years from 2020 to 2022, the reported cases of pulmonary tuberculosis (PTB) in North Datu Odin Sinsuat exhibited significant trends. The number of barangays reporting PTB patients increased from 14 in 2020 and 2021 to 15 in 2022. Awang emerged as the predominant contributor, consistently reporting the highest percentages of enrolled patients at 18.87% in 2020, 25.34% in 2021, and 22.45% in 2022. The demographic breakdown revealed the 35-59 age group consistently having the highest enrollment, accounting for 58.49% in 2020, 62.26% in 2021, and 57.14% in 2022. Males bore a disproportionate burden, representing 77% in 2020, 68% in 2021, and 65% in 2022.

Examining PTB prevalence from January 2020 to December 2022, high adherence rates were observed at 96% in 2020 and 2021, escalating to 98% in 2022. Sputum smear conversion demonstrated improvement over the years, rising from 49% in 2020 to 53% in 2022, while the mortality rate remained steady at 4% throughout.

Conclusion

The study concludes that PTB is still an existing problem that affects people regardless of age, sex and even area of living. The cases are increasing but the treatment program is effective since majority of patients diagnosed with PTB are enrolled and adhering to treatment plan. However, the treatment outcome is low since many are not responding effectively in the treatment as supported by the sputum smear conversion. Although the increase in the response of effectiveness is improving still it is lower to the target of at least 75 % cure rate. Worse of all death is still recorded due to PTB despite of adherence to treatment plan. The increasing cases of PTB cases as well as the low cure rate as indicated by low sputum smear conversion result is a problem that should be given attention and intervention.

INTRODUCTION

Worldwide, as of 2021, an estimated 10.6 million people fell ill with TB. Six million men, 3.4 million women and 1.2 million children. Further, a total of 1.6 million people died from TB in 2021. It is the 13th leading cause of death and the second leading infectious killer after COVID-19. TB is present in all countries and age groups (TB - WHO, 2021).

Everyone is at risk for acquiring TB. Prominent Filipino personalities who succumbed to the disease includes nationalist Marcelo H. del Pilar, former President Manuel L. Quezon, and the late actor Rene Requestas, while advancement in the field of medicine already made TB highly curable if treatment commenced promptly and appropriately, still, treatment interruption or poor patient outcomes from tuberculosis treatment are largely caused by non-adherence combined with a lack of understanding about the disease.

The Philippines is the fourth-largest contributor of TB cases at 7 percent of the global total. As of 2022, there are 372,367 active notified cases of TB. It is anticipated to rise by 130% and TB-related fatalities by 170 % by year 2025 (NTP - DOH, 2022).

In the Bangsamoro Autonomous Region of Muslim Mindanao (BARMM) there are 5,269 recorded cases of TB as of 2022. Further, the province of Maguindanao tallied 2,406 cases of TB as of 2022 with a total of 38 patients died during treatment as of 2022 (MOH-BARMM, 2023).

The researchers nominated to conduct this study since even with access to efficient treatment, tuberculosis remains one of the major causes of death in the Maguindanao Province. Poor adherence to treatment challenges TB management both in local and national levels. Proper adherence to treatment contributes to successful outcomes and prevents the development of drug-resistant forms of TB.

METHODS

Study Design and Sites

The quantitative study design in a retrospective manner was conducted at TB-DOTS clinic of North Datu Odin Sinsuat.

Participants and Sampling

The research subjects of the study are all adult PTB patients who are at least 18 years old and above and were diagnosed with active PTB as defined in the DOH Manual of Procedures - 6th Edition and was enrolled in North Datu Odin Sinsuat TB DOTS Clinic from the time period of January 2020 up to December 2022 only.

Data Collection Procedure

The authors of this research are also the principal investigators for the study. Data gathering procedure took place after a letter of intent to conduct a study was submitted to the Head of the TB DOTS clinic of North Datu Odin Sinsuat. After securing approval, the principal investigators communicated and requested assistance from the TB DOTS Nurse to gather relevant information that are needed for the study. Using the suitable statistical procedure, all data and pertinent information were tabulated and kept confidential. All data will be collated on a data collection sheet and later encoded to Microsoft Excel spreadsheet.

Tool Development and Measure

The data gathering template was developed by the principal investigators based on the pertinent available data for the retrospective study. Three experts validated the tool by answering the validity survey questionnaire provided. We used the Likert Scale to express their judgement on the degree of relevance and degree of clarity of each item to the measured domain.

A part of the research template will organize particular demographic data from the research subject: age, sex and their barangay address. The next part will organize data for each dependent variable: adherence to treatment, sputum smear conversion and mortality rate.

Statistical Analyses

The study made use of three statistical tools. The percentage was used for demographic profile and prevalence of Tuberculosis for three years. The One Way Anova was used in determining the significant difference when the prevalence was grouped according to demographic profile.

Percentage is a number or ratio that represents a fraction of 100. It is one of the ways to represent a dimensionless relationship between two numbers; other methods include ratios, fractions, and decimals. While, the one-way analysis of variance (ANOVA) is used to determine whether there are any statistically significant differences between the means of three or more independent (unrelated) groups.

Ethics

This research involved human subjects including information about or linked to them such as medical records or other health-related data. The researchers adhered to the following ethical principles:

Compliance with Protocol

Foremost, the researchers secured appropriate clearance and approval from the TB-DOTS clinic. Further, they adhered to the rules and regulations of the clinic to ensure that the facilities, equipment, and employees will be safeguarded.

Confidentiality and Protection from Harm

All the research subjects' identities and privacy are protected. The staff of the clinic were assured that all the gathered data will be kept strictly confidential hence, will not harm their current employment status, salary or benefits.

Results

3.1 Demographic Profile of the Respondents

The profile of the respondents includes the barangay, age and sex.

Table 1. Frequency and Percentage Distribution of the Profile of Respondents.

Barangays	f 2020 n=53	%	f 2021 n=53	%	f 2022 n=98	%
Bitu	2	3.77	2	3.77	3	3.06
Tapian	2	3.77	1	1.87	5	5.10
Dinaig	3	5.66	3	5.66	3	3.06
Semba	9	16.98	2	3.77	11	11.22
Labungan	3	5.66	3	5.66	9	9.18
Awang	10	18.87	19	35.84	22	22.45
Capiton	5	9.43	10	18.87	7	7.14
Tamontaka	6	11.32	10	18.87	15	15.31
Tanwel	3	5.66	2	3.77	2	2.04
Mompong	2	3.77	0	0	2	2.04
Kusiong	2	3.77	0	0	3	3.06
Linek	2	3.77	1	1.87	2	2.04
Badak	2	3.77	0	0	6	6.12
Dulangan	2	3.77	0	0	3	3.06
Tambak	0	0	0	0	5	5.10
Age	f	%	f	%	f	%
18-34	13	24.52	14	26.41	19	19.39
35-59	31	58.49	33	62.26	56	57.14
60 and above	9	16.98	6	11.32	23	23.47
Sex	f	Percentage	f	%	f	%
Male	38	77	36	68	64	65
Female	15	23	17	32	34	35

Table 1 presents that in year 2020 and 2021, there were 14 barangays reported to have enrolled patients with PTB but in 2022 it increased to 15 barangays. Awang emerged as the barangay with the highest rating of patients enrolled at 10 or 18.87% for 2020, 19 or 25.34% for 2021 and 22 or 22.45% for 2022. The number of cases revealed that there were increased cases in 2021 but had decreased in 2022. All in all the table presents that all of the barangays are affected by PTB .

This result conforms with the report of MOH (2021) that PTB is still a big problem for the Bangsamoro people. This had been continuously increasing despite of the efforts implemented to prevent and eliminate it.

In terms of age, for the last three years the age group of 35-59 years old got the highest number of patient enrolled in PTB treatment respectively at 31 or 58.49% for 2020, 33 or 62.26% for 2021 and 56 or 57.14%. It further shows that the number of PTB cases to this age group increased in 2021 but decreased in 2022 in percentage but in number of cases it continuously increased. All in all PTB inflicts varied age group. But moslty of the affected were the adults . This is similar to the findings of the study of Gisso, et al (2022) wherein many adult were affected by PTB due to the work related factors and activities of this age group.

In terms of sex, males were the most affected individuals with PTB specifically; 38 or 77 % for 2020, 36 or 68% and 64 or 65%. The table further shows that in terms of percentage over the total population the number of cases to male individual is increasing. All in all the table shows both males and females are inflicted with tuberculosis. The same report was released by CDC (2022) that shows males are the high risk group to PTB. They are at risk due to their lifestyles and practices. Their treatment adherence is also lower compared to females.

Table 2. Prevalence of PTB patients enrolled in the TB DOTS clinic of North Datu Odin Sinsuat from January 2020 – December 2022. N= 53.

Prevalence of PTB Patients	**2020 (n=53)**		**2021(n=53)**		**2022(n=98)**	
	F (53)	5%	F (53)	%	F (98)	%
Adherence to treatment	51	96	51	96	96	98
Sputum smear conversion (positive upon smear, negative after 2 months and 6 months)	26	49	36	67	52	53
Mortality Rate	2	4	2	4	2	2

Table 2 presents the prevalence of PTB patients enrolled in the TB DOTS clinic of North Datu Odin Sinsuat from January 2020 – December 2022.

In year 2020 there were 51 0r 96% enrolled adhered to the treatment while only 26 or 49% revealed an improved sputum smear conversion based on positive result upon enrollment and had a negative result after 2- and 6-months smear. Two or 4% died. This result showed despite the adherence to treatment many are still not immediately responding to the medications.

In year 2021 there were 51 0r 96% enrolled adhered to the treatment while only 36 or 67% revealed had improved sputum smear conversion based on positive result upon enrollment and had a negative result after 2- and 6-months smear. Two or 4% died. This result means that there is an improvement in the percentage of effective response among patients taking the medications.

In year 2022 there were 96 0r 98% enrolled adhered to the treatment while only 52 or 53% revealed an improved sputum smear conversion based on positive result upon enrollment and had a negative result after 2- and 6-months smear. Two or 2% died. This result reflects a big increased in the number of patients with PTB but the adherence rating is good although the responsiveness to treatment is lower.

All in all the table shows that there is an increasing number of patients with PTB, although they are adherent to treatment but not all are responsive to the treatment and some even died despite of being enrolled to the treatment course.

In the study of Gitonga (2020) it was revealed that despite of higher adherence rating among PTB patients, cure rate remains low due to various factors such as drug resistance or weak physical health of the person. The study proposes that the patients should be sensitized on the importance of adherence to TB drug medication.

Table 3 Significance Difference Between the Demographic Profile (Age and Sex) and the Prevalence of Adherence to Treatment, Sputum Smear Conversion and Mortality Rate

Demographic Profile	Overall Adherence			Overall Sputum Smear Conversion			Overall Mortality Rate		
	f	p	Interpretation	f	p	Interpretation	f	p	Interpretation
Age	12.865	0.005	Significant	2.337	0.157	Not Significant	2.903	0.114	Not Significant
Sex	4.909	0.062	Not Significant	0.117	0.742	Not Significant	9.131	0.019	Significant

Legend: p value is Significant at the 0.05 level

Table 3 presents the results of a significant difference analysis conducted to examine the relationship between the demographic profile of the respondents in terms of age and sex and overall adherence, overall sputum smear conversion and overall mortality rate. To determine the significant difference, the One Way Anova at .05 level of significance was used.

The p-value measures the statistical significance of the correlation coefficient. A p-value less than a predetermined threshold 0.05 typically indicates statistical significance.

The table shows that age and overall adherence got a p-value of .005 interpreted as significant. This means the null hypothesis is rejected. But in terms of age and overall sputum smear conversion the p-value is .157 interpreted as not significant and overall mortality rate with a p-value of .114 interpreted as not significant. This means that the null hypothesis is accepted.

All in all, age has difference in adherence to treatment, but has no difference in terms of sputum smear conversion and mortality rate.

In the study of Caraux-Paz, et al (2021) it was found out that age has direct correlation to adherence. The elder the individual the higher the adherence of the person to treatment.

While in the study of Nazenega,et al (2020) revealed that response rate and mortality rate among individual vary. There were different reasons why treatment is not effective resulting to complications and death.

On the other hand, the significant difference between sex and overall adherence got a p-value of .062 interpreted as not significant, in terms of overall sputum smear conversion it got a p-value of .742 interpreted as not significant. This means that regardless of sex, patient adhered and had manifested response to treatment. But the result between sex and overall mortality rate, the p-value is .019 interpreted as significant. This means that the null

hypothesis is rejected. This implies that sex has manifested difference in the number of deaths. In the study of Humayun, et al (2022) the findings revealed that women had a greater likelihood of severe forms of TB and TB-HIV coinfection compared to men has important implications for women's health in TB-HIV high-burden settings including mortality rates. This proves that sex is a factor to mortality rates.

Discussions

The following are the major findings of the study:

In year 2020 and 2021, there were 14 barangays reported to have enrolled patients with PTB but in 2022 it increased to 15 barangays. Awang emerged as the barangay with the highest rating of patients enrolled at 10 or 18.87% for 2020, 19 or 25.34% for 2021 and 22 or 22.45% for 2022. In terms of age, for the last three years the age group of 35-59 years old got the highest number of patients enrolled in PTB treatment respectively at 31 or 58.49% for 2020, 33 or 62.26% for 2021 and 56 or 57.14%. In terms of sex, males were the most affected individuals with PTB specifically; 38 or 77 % for 2020, 36 or 68% and 64 or 65%.

The prevalence of PTB patients enrolled from January 2020 – December 2022 revealed in year 2020 there were 51 0r 96% enrolled, adhered to the treatment while only 26 or 49% revealed an improved sputum smear conversion based on positive result upon enrollment and had a negative result after 2- and 6-months smear. Two or 4% died.

In year 2021 there were 51 0r 96% enrolled adhered to the treatment while only 36 or 67% revealed had improved sputum smear conversion based on positive result upon enrollment and had a negative result after 2- and 6-months smear. Two or 4% died.

In year 2022 there were 96 0r 98% enrolled adhered to the treatment while only 52 or 53% revealed an improved sputum smear conversion based on positive result upon enrollment and had a negative result after 2- and 6-months smear. Two or 2% died.

 The significant difference between age and overall adherence revealed there is a significant difference but the overall sputum smear conversion the null hypothesis is rejected. But the age and overall mortality rate revealed there was no significant difference. The null hypothesis is accepted. The significant difference between sex and overall adherence revealed and overall sputum smear conversion revealed there is no significant difference , this means that the null hypothesis is accepted. But the sex and overall mortality rate rejected.

Strengths and Limitations

One of its strengths is that research is locally relevant, concentrating on a particular region, which improves the findings' direct applicability to the people of North Datu Odin Sinsuat. The retrospective design is a cost-effective and time-efficient choice, enables a thorough examination of the available data regarding treatment adherence and outcomes over a prolonged period of time. Furthermore, the incorporation of various outcome indicators, including adherence, sputum smear conversion, and mortality, offers a thorough comprehension of patient outcomes related to PTB. However, the study is not without limitations. There may be issues with data quality, which could compromise the validity of the conclusions. Retrospective data collection raises the risk of inaccurate or missing information potentially leading to incomplete or biased data.

Conclusions

The study concludes that PTB is still an existing problem that affects people regardless of age, sex and even area of living. The cases are increasing but the treatment program is effective since majority of patients diagnosed with PTB are enrolled and adhering to treatment plan. However, the treatment outcome is low since many are not responding effectively in the treatment as supported by the sputum smear conversion. Although the increase in the response of effectiveness is improving still it is lower to the target of at least 75 % cure rate. Worse of all death is still recorded due to PTB despite of adherence to treatment plan. The increasing cases of PTB cases as well as the low cure rate as indicated by low sputum smear conversion result is a problem that should be given attention and intervention.

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