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Nursing framework for tuberculosis patients with comorbidities in remote areas: a cross-sectional study

Sukatemin^{1*}, Ester²^{1,2,3}Nursing Study Program of Nabire, Health Polytechnic Ministry of Health of Jayapura, Indonesia

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ABSTRACT

The major role of nursing in the management of tuberculosis cases with comorbidities in remote areas is seldom exposed in a structured framework. This study aims to framework for tuberculosis patients with comorbidities in the Directly Observed Treatment Shortcourse (DOTS) program in the nursing profession. The research method was a Cross-Sectional Study with a descriptive design. Data collection was carried out during 2020 in all health service facilities at the public health center (Puskesmas) implementing the DOTS program in Nabire, Papua. The sample was 948 tuberculosis patients. The inclusion criteria were TB patients on anti-tuberculosis drug (OAT) treatment. The exclusion criteria were not TB patients or TB patients without OAT treatment. The results of this study indicated that with the nursing framework there were five stages, namely database creation, identification of priority problems, preparation of referrals, intervention and evaluation. Bacteriologically confirmed samples were 73.7%, diagnosed with pulmonary tuberculosis at 68.7%, extrapulmonary tuberculosis at 1.3%, with comorbid HIV at 10%, and diabetes mellitus at 3%. After six months treatment showed patients recovered from TB was 12.1%, died at 3.7% and 1.6% failed. In conclusion, the nursing framework helps in a structured and systematic way in handling TB cases in remote areas.

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Corresponding Author:

Sukatemin,

Nursing Study Program of Nabire,

Health Polytechnic of Ministry of Health of Jayapura

Jl. Dr. Sam Ratulangi, Oyehe, Nabire District, Nabire District, Papua 98811

Email: soekad3rma@gmail.com

INTRODUCTION

Tuberculosis is the 13th leading cause of death in the world (World Health Organization, 2020). In 2011 Indonesia (with 0.38-0.54 million cases) ranked fourth after India, China, and South Africa (Pradipta et al., 2020). Tuberculosis cases in Papua province in 2017 recorded 6,394 cases with new cases of smear (+) 2,657 (Puspita et al., 2021). In Nabire Regency, the number of TB patients with a smear (+) in 2017 was 1,072 people, and in 2018 it decreased to 977 people (Tri N Kridaningsih, Mirna Widiyanti, Setyo Adiningsih, Hotma ML Hutapea, Eva Fitriana, 2021). From the number of patients in 2017 who were declared cured and underwent complete treatment as many as 188 people, experienced treatment drop-outs of as many as 225 people spread over 21 health centers in the Nabire district (Department of Health Office of Papua, 2019). Pulmonary tuberculosis requires

serious treatment, including finding new cases, proper diagnosis and treatment, and close monitoring to ensure patients get the right treatment (Lu et al., 2019). Otherwise, they will fail or become resistant to one or more drugs (Ugwu et al., 2020). Until 2017, records at the Ministry of Health of the Republic of Indonesia only reached 39.2%, complete treatment 5.8%, 26% dropout, 3.5% dropout, and 18.5% death (Ministry of Health, 2020; Rosiska et al., 2019). The rate of treatment failure with treatment-ending events without conversion has become a global problem (Falzon et al., 2011). In Indonesia, tuberculosis has become one of the main health problems, because it not only requires high costs but is also associated with decreased patient productivity and family burden (Widyasrini & Probandari, Ari N., 2017). Reports from various regions in Nabire, Papua found that the success of treatment is still very low and there has been no significant progress, this is related to patient compliance with the treatment program (Fendy Yesayas, 2021). Patient discipline in taking medication, for example, also affects cure rates and treatment success (Farida, 2020; Febriani et al., 2019). Generally, treatment discontinuation is the result of errors in finding new cases, establishing a diagnosis, and determining inadequate drug doses (County et al., 2021). Many studies have been carried out on the successful management of TB (Mahardani et al., 2022; Malenfant & Brewer, 2021; Mirzayev et al., 2021). The involvement of nurses in TB control has also been widely discussed (Sentana, 2020; Setiawan et al., 2019). It's just that the nursing framework is not specifically mentioned especially in the Directly Observed Treatment Shortcourse (DOTS) program (Paramasivan et al., 2010; Ugwu et al., 2020).

Data from the Nabire District Health Office in 2019, the number of TB patients with AFB TB (+) in 2017 was 1,072 people, and in 2018 it decreased to 977 people (Herawati, 2021). Of the total number of patients in 2017 who was declared cured and had complete treatment, 188 people had dropped out of treatment as many as 225 people spread across 21 Puskesmas in Nabire Regency (Herawati, 2021). Another problem faced by the Nabire District Health Office is the emergence of a phenomenon that is not yet known about the success of TB control through the results of the examination (Department of Health Office of Papua, 2019). Therefore, researchers are interested in studying it through this study.

This cross-sectional study is expected to provide an overview of the number of pulmonary tuberculosis patients after intermittent OAT treatment, patient characteristics, sputum examination results, and the percentage of successful treatment in Nabire Regency. The results of this study is also expected to provide an overview of the type and number of comorbidities, namely HIV and Diabetes Mellitus (DM). Therefore, this study offers a nursing framework for treating TB in remote areas in order to help nurses know their concrete roles and responsibilities in the TB program. The implication is for nursing professionals, health office holders, and other related researchers, both at the national and national levels, to help formulate anticipatory steps in the management of TB control programs in the future.

RESEARCH METHOD

The study used a cross-sectional study and a descriptive design. This study only took secondary data. Data collection was carried out at the public health center (Puskesmas) administering the DOTS program spread across Nabire district from January to December 2020. The sample was 948 tuberculosis patients who had undergone advanced (intermittent) OAT treatment. The research instrument was data obtained from the results of the examination of acid-fast bacteria (BTA) at the Wanggarsari Health Center, Kalibumi, Bumiwonorejo, Kalibobo, Nabire City, Nabarua, Siriwini, and Samabusa. The inclusion criteria were TB patients on anti-tuberculosis drug (OAT) treatment. The exclusion criteria were not TB patients or TB patients without OAT treatment in the Nabire area.

The stages of data processing applied a nursing framework which includes five stages, namely database creation, identification of problem priorities, preparation of referrals, intervention, and evaluation. The theory that supports this research is the Nursing Framework on tuberculosis (Oermann, 2014). A similar theory is used by several related studies (Aqtam & Darawwad, 2018; Health Education England, 2017; Vaismoradi et al., 2020). The nursing framework is a nursing structure that has an abstract and logical meaning that guides the development of nursing studies and allows us to link findings to the body of knowledge in nursing science (Masters, 2011).

At the database creation stage, cleaning was carried out where all the information contained in the document was checked again. The coding was then given as a code to maintain the confidentiality of identity (Table 1, 2, and Diagram 1). In the second stage, which is the identification of problem priorities (Table 2, 3, 4 and Diagram 1 and 2), scoring was done by providing a code, whether it requires a referral. Each data result obtained was given a score and data entry was performed. At this stage, the data was entered into the computer, such as entering it into an excel spreadsheet program. Data was finally entered manually into columns (Data processing sheet).

Data analysis in this study used descriptive analysis. The descriptive analysis is a statistical analysis method that aims to provide a description or description of the results of the examination of Acid Resistant Bacteria (BTA) of Pulmonary Tuberculosis patients who are undergoing Anti Tuberculosis Drug (OAT) treatment in Nabire Regency as research subjects. Interventions were carried out based on the results of the examination, i.e. referrals, re-examinations, or health education. The final stage was carried out after six months of therapy (Table: 4 and Diagram 2).

RESULT AND DISCUSSION

Result

Table 1. Demographic Data

No	Demographic Data	n	%
	Age: (years)		
	17-25	217	23.1
1	26-35	492	52.4
	36-45	129	13.7
	>45	100	10.6
	Sex:		
2	Lazy	531	56.6
	Females	407	43.4
	Employment:		
	Labors	9	1.0
	Teachers	6	0.6
	Housewives	87	9.3
	Private Company	12	1.3
3	Students	137	14.6
	Civil servant	17	1.8
	Driver	1	0.1
	Army/Police	2	0.2
	Businessman	22	2.3
	Unemployed	274	29.2
	Unknown	309	33.0
	Total	938	100

Analysis: The table above shows that there are more male TB patients than women (n = 531 or 56.6%), aged between 26-35 years (n = 52.4%), taking standard treatment (n = 880 or 93.8%), but the majority were unknown about their employment status (n=309 or 33.0%).

Table 2. Type of TB Diagnosis and Anatomical Location

Types of Diagnosis	n	%	Location	n	%
Clinically Diagnosed	584	62.3	Extra lung	294	31.3
Bacteriologically Diagnosed	354	37.7	Lung TB	644	68.7
Total	938	100	Total	938	100

Analysis: The table above shows clinically diagnosed TB patients n=584 (n=62.3%). And bacteriologically n=354 (37.7%). The number of pulmonary TB patients was much higher (n=644 or 68.7%) than extrapulmonary TB (n=294 or 31.3%).

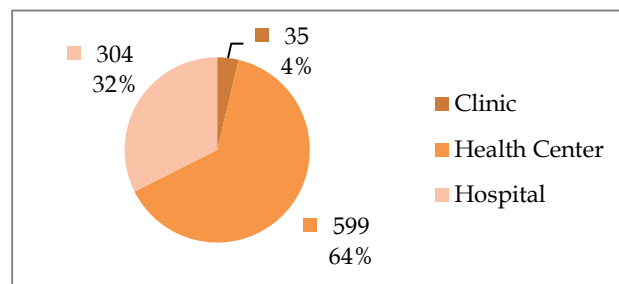


Figure 1. TB Patient Checkpoint

Analysis: The majority of TB patients received treatment at the Puskesmas (n=599 or 63.9%).

Table 3. TB patients with a history of diabetes mellitus and HIV

Diabetes Mellitus	n	%	HIV	n	%
Yes	28	3.0	Negative	178	19.0
No	180	19.2	Positive	96	10.2
Unknown	730	77.8	Unknown	664	70.8
Total	938	100	Total	938	100

Analysis: The table above shows TB patients with a history of DM (n=28 or 3.0%). TB patients with a history of HIV (n=96 or 10.2%).

Table 4. Final Result of Treatment

Results	n	%
File	12	1.3
Dead	31	3.3
Complete Treatment	595	63.4
Drop-out Treatment	166	17.7
Recovered	107	11.4
Unevaluated	27	2.9
Total	938	100

Analysis: The table above shows the results of failed treatment $n=12$ (1.3%). The majority showed complete treatment and recovered $n=107$ (11.4%), and died $n=31$ (3.3%).

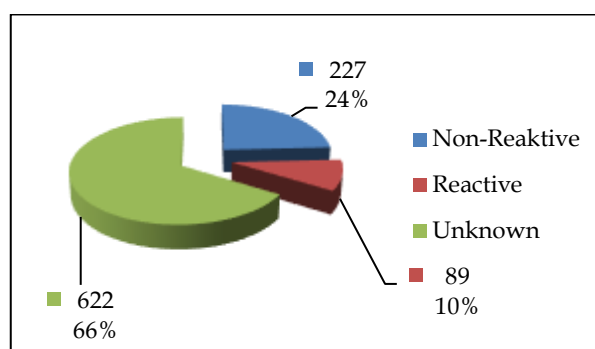


Figure 2. HIV test results after TB treatment

Analysis: The table above shows that after TB treatment the patients who were tested for HIV showed non-relative results $n=227$ (24.2%). However, the majority is unknown ($n=622$ or 66.3%).

Concluding Analysis

The results of this study prove that the pulmonary TB cases still dominate compared to TB in other places or countries anatomically, it is more common in males, and the majority of treatment services are in public health centers. In Nabire, the comorbidities that are considered chronic and serious are HIV and DM (Smith et al., 2018; Tamuhla et al., 2021). With the Nursing Framework approach, it is recommended that in principle, vital problems that are dangerous are prioritized in TB patients as recommended by research findings (Yusnaini et al., 2021). In general, TB cases faced in Nabire as a remote area are demographic conditions, health service facilities, and the presence of co-morbidities.

Discussion

The analysis of this cross-sectional study leaves four groups of problems, namely demographic problems, location of the examination, types of TB, and comorbidities. Our data showed TB patients were more males ($n=531$ or 56.6%) than females, aged between 26-35 years ($n=52.4%$), but the majority were unknown about their employment status ($n=309$ or 33.0%) (Table 1). The second problem is the place of examination where the majority of TB patients received treatment at the Puskesmas ($n = 599$ or 63.9%), even though 63.4% had complete treatment. Still, they got treatment results failed ($n=12$ or 1.3%), died ($n=31$ or 3.3%), only 11% recovered ($n=107$) (Table 13). The third problem is most types of TB were pulmonary TB (68.7%) (Table 9), they were bacteriologically diagnosed ($n=354$ or 37.7%). The fourth problem is that TB patients with comorbidities i.e. DM (3%) and HIV (10%) (Tables 3 and Diagram 2). Around the world an estimated 10 million people will fall ill with tuberculosis (TB) worldwide, 5.6 million men, 3.3 million women, and 1.1 million children (Malenfant & Brewer, 2021). TB is present in all countries and age groups (Liu et al., 2022). This proves that the phenomenon occurs in Nabire also occurs in many other countries around the world. What makes the difference is the prevalence rate (Mehari et al., 2019). The death rate due to tuberculosis is estimated to be between 7%-35% (Pham et al., 2022). One of the steps to prevent tuberculosis (tuberculosis) is to receive the BCG (Bacillus Calmette-Guerin) vaccine.

In Indonesia, this vaccine is included in the list of mandatory immunizations and is given before the baby is 2 months old (Berendsen et al., 2019; Machlaurin et al., 2020). For those who have never received the BCG vaccine, it is recommended to get the vaccine if there is a family member who suffers from tuberculosis (Priestnall et al., 2020). TB can also be prevented simply, namely wearing a mask when in crowded places and when interacting with people with TB, and washing hands frequently (Alfadhila Khairil Sinatrya & Lailatul Muniroh, 2019). Other preventive measures include covering your mouth when sneezing, coughing, and laughing, or wearing a tissue to cover your mouth, throwing it away immediately after use, not throwing phlegm or spitting carelessly, ensuring the house has good air circulation, for example by opening the door frequently. and windows so that fresh air and sunlight can enter and not sleep in the same room with other people until the doctor declares that a person's tuberculosis is no longer contagious (Mirzayev et al., 2021; Sianturi & CB, 2020).

Regarding the treatment of TB patients with comorbidities (DM and HIV) so far they can be classified into the treatment group for 6 months or more, which is adjusted to the presence or absence of drug resistance (Tulu et al., 2021). The risk factors for diabetes and HIV are certainly different from TB. Even if the family has both diseases, many findings suggest the incidence of children can suffer from the same disease (Priestnall et al., 2020; Tulu et al., 2021). However, those two diseases can have different causes of risk factors (Tamuhla et al., 2021). For now, treating tuberculosis first in the right way and until it is declared complete or complete treatment is advised (Tamuhla et al., 2021). In summary, preventive measures are very important in controlling TB disease to aggravate patients who are on treatment, besides getting used to a healthy life, and have regular consultations with healthcare workers. Those are the intervention of nurses in handling TB by implementing the TB nursing framework before the evaluation steps.

The weakness of this study is that there is no complete comparison between the data before and after treatment so that it can be used to analyze the factors causing the success or failure of the program and the possible causes of comorbidities. This study also did not reveal the data of patients' lifestyle and the environment in which TB patients lived. Therefore, in the future, related research can be carried out to answer what were not presented in this study.

CONCLUSION

This study attempts to present an overview of the results of the examination of Acid-Resistant Bacteria (BTA) of pulmonary tuberculosis patients who are undergoing anti-tuberculosis drug (OAT) treatment in Nabire district. This study aims to partially prove that TB cases in Nabire are not much different from TB cases in other countries, which mostly affect men. In remote areas, they lack facilities and infrastructure and are vulnerable to co-morbidities. The difference is that Nabire is one of the districts in Papua that has experienced similar cases, namely Diabetes Mellitus and HIV. Therefore, empowering nurses in handling this case is one step that offers a concrete solution to the TB problem.

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