

Case Study on Multi-Drug Resistance Tuberculosis in Grobogan, Central Java

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ABSTRACT

Background: Tuberculosis is a communicable disease that remains a major public health issue worldwide. Tuberculosis epidemics have become a primary public health concern for the last few decades. The problem becomes aggravated due to the emergence of Multiple Drugs Resistant Tuberculosis (MDR-TB). It is estimated there are 6,100 MDR-TB cases annually in Indonesia. Grobogan is one of the 6 districts in ex-residential Pati in Central Java with the second highest MDR-TB cases after Kudus. Between 2011 and 2016 the annual incidence was 23 cases with case fatality rate of 52.17%. This study aimed to investigate the different roles of MDR-TB patients, families, TB programmers, and health providers, in the incidence of MDR-TB in Grobogan, Central Java.

Subjects and Method: This was an analytic qualitative study with case study approach. The study was conducted at Grobogan, Central Java, from May to June 2017. A total of 26 informants were selected purposively for this study, consisting of 7 MDR-TB patients, 7 family members who served as drug-taking supervisor, 7 TB programmers at Community Health Centers, 1 TB programmer at District Hospital, 3 Community Health Center doctors, and 1 District Hospital doctor. The data were collected by in-depth interview, direct observation, and document review. Interactive analysis was used to analyze data, including data collection, reduction, presentation, and verification.

Results: All MDR-TB patients had favorable perceived susceptibility, perceived severity, and self-efficacy, that drove them to adhere to TB treatment. Most patients reported that the treatment was beneficial. The existing barrier was not of serious concern that made them to stop treatment. Families of the patients had positive attitude towards TB treatment so they provided the necessary support in accessing treatment and adherence to treatment. However, TB program management at District Hospital, was sub-optimal as it did not administer appropriately the standard DOTS-TB treatment guideline, despite the existence of TB standard operating procedure. Likewise, TB treatment management by hospital doctors and private practice doctors was inadequate, due to the lack of DOTS-TB training. The lack of adherence in implementing the standard DOTS-TB treatment guideline was the dominant causal factor for the incidence of MDR-TB in Grobogan district, Central Java.

Conclusion: Adequate DOTS-TB treatment management and quality health services at both primary and secondary level facilities are needed in the efforts to prevent MDR TB. It is suggested that the government through the District Health Office hold DOTS-TB promotion program and invest in developing skilled DOTS-TB providers.

Keywords: multidrug resistance, tuberculosis, TB management program, adherence.

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BACKGROUND

Tuberculosis (TB) is one of the infectious diseases which is still a public health problem in the world. In the past decade, the

epidemic situation of TB in the world has become increasingly alarming. The number of cases continues to increase, especially in 22 countries with high tuberculosis burden.

According to WHO (2013), Indonesia is the third largest country after India and China with a prevalence of 700,000 cases per year with a mortality rate of 27 per 100,000 population (Suharyo, 2013).

Based on the WHO report (2015), it is estimated that there are approximately 9 million TB cases in the world with 1.5 million of them dead in 2013. This situation is exacerbated by the emergence of increasing cases of drug-resistant TB (TB Multiple Drug Resistant-TB MDR), approximately 480,000 new cases with 170,000 of them dead. Approximately 10% are found and treated, the recovery rate of 48% and approximately 9% were XDR TB cases (extensive Drug Resistant Tuberculosis) which are difficult to treat (Zumla et al., 2015). The productive age group (15-50 years) dominated TB patients with a proportion of 75%. This situation has an impact on the loss of annual household income of around 20-30% and if they die, it has an impact on losing income of around 15 years (RI Ministry of Health, 2014).

Based on The Global Plan to Stop TB in 2006-2015, approximately 1.6 million people with MDR TB in the world are planned to undergo treatment and 60% of them are in countries with high tuberculosis burden. Global WHO Report (2013), Indonesia ranks 8th out of 27 countries with the largest MDR TB cases. The incidence of MDR TB in Indonesia is estimated at 6,100 cases per year or an estimated number of cases of MDR TB of 2% of the number of new TB cases and 12 of cases of TB re-treatment (Ministry of Health, 2014).

According to the Central Java Provincial Health Office (2016) report, there were 1500 suspected MDR TB, 210 of which were MDR Confirmed TB and 163 cases underwent treatment in 2015. Furthermore, there was an increase with the discovery of 1948 suspected MDR TB, 220 cases

were confirmed MDR TB and 140 among were treated in 2016. During 2011-2016 there were 638 cases treated, but the new cure rate reached 211 cases (33.07%) and the mortality rate reached 161 cases (25.24%). Lost to Follow Up cases were 73 cases (11.44%), still treated 192 cases (30.09%) and only 1 case (0.16%) resulting in treatment.

Grobogan is one of the regencies with the second largest number MDR TB cases in ex. Pati Residency, Central Java Province. There was 23 cases found in 2011-2016. The cure rate only reached 4 cases (17.39%) and the mortality rate reached 12 cases (52.17%), while 2 cases (8.70%) released treatment (Lost to Follow Up) and 5 cases (21.74%) were still on treatment.

MDR TB is a serious threat to the population in the world and has become a concern for people in various countries in the world, considering that treatment is difficult and requires considerable costs. The causes of resistance to anti-tuberculosis drugs include 1) treatment provided by inadequate medical providers (types), types, dosages, amounts and anti-tuberculosis drugs alloys not DOTS standards taking TB drugs regularly 3) low family support in motivating patients during treatment (Sarwani et al, 2012). Treatment procedures by providers that do not meet DOTS standards include inappropriate diagnosis; administration of anti-tuberculosis drugs with doses, types, incorrect number of alloys and inadequate treatment period are the causes of MDR TB (Nugraheni and Malik, 2015).

A study by Desmukh et al (2015) and Shean et al (2013) on the success of MDR TB treatment showed that the low cause of successful MDR TB treatment was the side effects of excessive medication felt by patients, the burden of taking many drugs (> 10 pills) and drug injection up to 8 months

and a long treatment period of up to 24 months.

The magnitude of MDR TB cases in Grobogan Regency with the number of cases increasing every year, where the mortality rate reached more than half (52.17%) and the low cure rate as a result of drug side effects and the burden of taking excessive medication. This fact encourages the need for early prevention efforts to reduce the risk of MDR TB cases. The interesting thing to be concerned is the need to do an in-depth study of various aspects that cause drug resistance in the perspective of the treatment process that was passed earlier. This study covered the behavior of patients during previous treatment, family support behavior during treatment, the quality of TB program management in health care facilities and treatment management by the provider.

SUBJECTS AND METHOD

1. Study Design

This was an analytic qualitative study with a case control design. The study informants were MDR-TB patients, family members who served as drug-taking supervisor, TB programmers and doctors at Community Health Centers and District Hospital.

According to Denzin and Lincoln (2009), qualitative study is a type of study whose findings all of which are not obtained through statistical procedures, subject conditions are not influenced by the researchers' strict treatment. Whereas, the interpretive point of view is that the interpretation of data (conclusions) ideologically specifies the case rather than following the law of generalization.

The qualitative study design with a single fixed case study strategy was carried out to obtain a basic description and concept of behavior, find unexpected characteristics and relationships about an event of

drug resistance in TB patients. Case studies are empirical inquiry that investigates phenomena in real life contexts, research has only a small chance or has no opportunity at all to control the events studied (Yin, 2005).

This study was carried out in the Grobogan Regency area which included 7 Community Health Centers areas that were found to be MDR TB cases and provided MDR TB treatment services and 2 hospitals that were the places for previous TB treatment.

This study was conducted from May 5, 2017 to June 3, 2017. The interview time was adjusted according to the informants' availability starting from 9 a.m to 9 p.m.

2. Study Sample

The study subjects are selected based on the criteria determined by the researcher and were expected to provide rich information voluntarily (Moleong, 2007). The method of selecting informants focuses on one case of MDR TB that was found and treated, arguing that the case chosen was proof of the theory that had been well developed and the case was a special opportunity for researchers because of the ease of access possessed to conduct study (Yin, 2005). The selection of informants with a purposive sampling approach, in which researchers determined the criteria for study subjects was 1) MDR TB patients diagnosed and treated in health care facilities referral to MDR TB treatment and continuing treatment at MDR TB satellite health care facilities 2) MDR TB patients who had been declared cured, still on treatment or off treatment. Furthermore, the strategy of selecting supporting informants was done using the Snow Balling Sampling approach, which was based on the information provided by the main informants (people with MDR TB).

The study subjects are prioritized who provide information density, the sample size is said to be sufficient, researchers are satisfied and sufficient, which the information obtained is rich in information and include the dimensions studied until data saturation is achieved (Murti, 2013)

The data sources used in this study included MDR7 TB patients. Supporting informants were 7 family members who served as drug-taking supervisor, 7 TB programmers at Community Health Centers and 1 TB programmer at District Hospital, 3 Community Health Center doctors and 1 District Hospital doctor. The total number of informants was 26 people in Grobogan Regency.

3. Data Collecion Techniques

Data was collected using in-depth interviews, observations, and documentation studies. The technique of checking the validity of the data used is the triangulation technique, namely triangulation of data (sources), methods and theories. Data triangulation was done with various data sources, namely main and supporting informants. Whereas, method triangulation was done by using data collection by observation, in-depth interviews and documentation studies. The data analysis technique used in the study was the interactive model of Miles and Huberman, which consisted of the stages of data collection, data reduction, data presentation and verification or conclusion drawing.

This study applied the theory of Health Belief Model (HBM) to analyze the behavior of MDR TB patients in making prevention and treatment efforts for perceived health problems.

RESULTS

Based on the results of the study, it was found that the factors behind the occur-

rence of MDR TB cases in Grobogan Regency were as follows:

The characteristics of most MDR TB sufferers were in the productive age group (15-50 years) of 4 people, and 3 people aged >50 years with an education level that was mostly less than high school as many as 5 people. The patients' socio-economic status varied in their level of income. Their income that was less than 1.5 million as many as 4 people, and that was more than 1.5 million as many as 3 people. The occupational background of the sufferer also varied; 1 housewife, 1 private employee, 3 employees and 2 retired employees.

All MDR TB patients had a history of previous recurrent treatment, in hospitals, independent practice doctors and community health centers. Treatment given in hospitals and independent practice doctors did not meet the TB DOTS guideline standards which included type, dose, amount, drug mix and duration of treatment given. Most sufferers underwent initial treatment at the hospital or at an independent practice doctor. This showed that patients believed in providers who provided medical services; that were an independent practice doctor and hospital compared to community health centers. On average, the duration of treatment carried out in hospitals and independent practice doctors was more than 6 months.

Regarding the perception of disease susceptibility, 5 out of 7 people (71%) MDR TB patients had a perception of susceptibility to positive TB disease. This meant that TB sufferers understood that their TB disease was dangerous and they were at risk of transmitting it to other people, especially family members. Two informants admitted that at the beginning of treatment, they thought that TB disease suffered was a common thing like coughing in ge

neral. However, after undergoing the second treatment, then they understood that the disease was very dangerous.

All informants were able to make efforts to prevent the transmission of the diseases, according to the knowledge they had obtained from the officers and information media, such as posters and television. Most of the sufferers stressed prevention efforts to wear masks, did not throw sputum in places, did separation of cutlery and sleeping separately.

Regarding the perception of severity in TB disease, all informants had a positive perception of the severity of their illness. This showed that TB disease was a serious problem that should have treatment. Repeated treatment and symptoms experienced such as coughing up blood, the body became weak and weight loss made the patient aware of the seriousness of the the disease.

The patients' perception of the benefits of the treatment taken was positive. Some sufferers felt the benefits of treatment after the symptoms of coughing were reduced and the body felt good. Most of the informants decided to continue to undergo treatment because they had the motivation to recover and also the support of the family. Meanwhile, 1 sufferer decided to change treatment, after the treatment that was taken did not make him recover.

Patients had positive perception of the perceived barriers to obtaining treatment. All informants decided not to stop the treatment efforts that were carried out, because they were motivated to recover and also considered the family members they loved. The obstacle is in the form of medical expenses incurred, especially for patients who are treated in hospitals or doctors who practice independently. Most informants at the time of TB treatment did not have health insurance coverage at first. However,

some sufferers had been registered as participants of the current national health insurance, so they did not have to pay to redeem prescription drugs. Access to remote health care facilities, the side effects of first-line TB drugs and the service attitude of some officers who were less sympathetic, did not make patients stop the treatment.

The confidence of sufferers on the treatment taken (self-efficacy) were positive. All informants believed that the treatment taken would provide healing. 5 out of 7 informants (71%) started TB treatment in hospitals and independent practice doctors. This showed that the patients' trust was large enough for the provider of health care facilities. Beliefs of sufferers were driven by motivation to recover, good clerical service and thoughts of family who still needed their attention.

Family motivation and support for patients seeking treatment and adherence to treatment was positive. 6 of the 7 family members who served as drug-taking supervisor or informants (85.7) realized their role was important. The informants reasoned that sometimes patients felt bored taking medication for a long time, so motivation from the family was needed. The role played by the family in ensuring the adherence of patients was to remind, prepare and ensure the drug had been taken. The reason for some informants to ensure compliance with taking medication for patients was because they were worried that when they dropped out they would have an impact on repetitive treatment. Family understanding of TB disease is the basis for building positive values and attitudes in providing support. All informants understood that TB was dangerous and contagious. 6 out of 7 informants (85.7%) were able to explain efforts to prevent transmission that should be done, by empha-

sizing wearing a mask, not throwing phlegm in any place, separating eating utensils and sleeping separately. An informant initially did not care about her husband's medication adherence because of her busy work. However, she always accompanied him when he went for treatment. After her husband underwent drug-resistant TB treatment, the informant realized the importance of supervision support in taking medication and tried to always prepare the medicine to be taken.

Education provided by TB program administrators and doctors to patients and their families had been done well, especially in Community Health Center. All TB staff informants and doctors at the Community Health Center had educated patients and families before starting the treatment. 3 out of 7 (42.87%) informants from TB Program Managers Community Health Center gave informed consent to patients and families before starting the treatment. This was an effort to emphasize patients, to seek regular treatment and not to discontinue treatment. Based on information from the TB Program Manager in Community Health Center, it was known that almost no TB patients had dropped out of treatment and officers would make a home visit if there were cases of defaulting to treatment. The perceived obstacle was in TB treatment services in hospitals. A TB staff informant admitted that not all TB patients treated at the hospital received education from TB officers. This was due to the non-optimal functioning of the DOTS TB unit, even though the hospital already had TB service standard operating procedures (SOP).

TB program management was supported by trained DOTS health personnel. 5 out of 7 people (71%) informants who managed TB programs at Community Health Centers trained in the TB DOTS program, only 2 officers had never attended

a TB DOTS training program. However, the officer learned from the previous program manager. All TB Community Health Center staffs had a nursing education background. This made it easier for officers to understand the management of the DOTS TB program and all Community Health Center had implemented TB program management based on national TB guideline standards. The obstacle faced was the management of the TB program in the hospital did not work in accordance with the operational standards of TB services that had been set. Despite having TB program managers trained in TB DOTS, the numbers were still limited. Based on information from informants, hospital TB officers admitted that the DOTS TB unit that had been formed had not functioned optimally. This was due to the lack of commitment of the doctors and TB DOTS team in implementing the operational standards of TB service procedures that had been set, and also because the internal network of the TB DOTS team was still weak.

The management of TB treatment by providers in hospitals and independent practice doctors had not met the standards of the DOTS TB guidelines, in contrast to the providers in the Community Health Center that had implemented DOTS TB treatment procedures as a whole. 1 out of 3 Community Health Center doctor informants had attended the TB DOTS training organized by the government. While 2 other people received DOTS TB treatment materials while studying at the medical school. One informant from a pulmonary specialist at the hospital had received TB DOTS training. Based on the information and acknowledgment from a doctor and a TB program management officer who worked in the hospital, the diagnosis of TB by the majority of doctors in the service unit other than lung, was only based on radiological

examination of chest x-rays. Sputum examination to determine the presence of mycobacterium tuberculosis microscopically was rarely done. This was at risk for overdiagnosis of TB because microscopic phlegm examination in the standard DOTS TB guidelines was a top priority in the diagnosis.

TB treatment that carried out by some doctors in hospitals and independent practices had not met the standard DOTS TB guidelines. Based on information from a doctor and a TB manager at the hospital, they admitted that most doctors gave a single prescription drug at a cost of 300 - 500 thousand for the patient to pay for the medicine. This is reinforced by the information given by the majority of patients who were treated at the hospital or at independent practice doctors that they spent the fee to redeem the medicine. TB drugs given with dosage, amount, type, drug mix, how to take medication, length and stages of treatment, did not meet the standard DOTS TB guidelines.

The search results of medical documents on 2 MDR TB patients who were treated at the hospital, found that the combination of TB drugs given to first-line TB treatment was incomplete; types of TB drugs, 2 - 3 kinds, coupled with second-line TB drugs (quinolones), drugs were recommended to be taken 3 times a day, the treatment stage was unclear and the treatment duration was more than 6-8 months. This showed inadequate TB treatment by some doctors who practiced in hospitals.

Based on the TB DOTS guideline standard, first-line TB treatment was carried out for 6 months with a 2-month intensive phase with a mixture of 4 types of TB drugs namely Rifampicin (R), Isoniazid (H), Pirazinamide (Z), and Ethambutol (E). While the next 4-month continuation phase continued with a mixture of 2 types

of TB drugs namely Rifampicin (R) and Isoniazid (H). In the intensive phase, the drug was taken daily with a dose once a day and the continuation phase of the drug was taken 3 times a week with a dose once a day (Ministry of Health, 2014).

The government has provided anti TB drugs for free in the form of FDC (Fixed Drugs Combination) packages. The drug was packaged in 1 tablet of intensive phase medicine containing 4 types of anti-tuberculosis drugs (RHZE) and 1 tablet in the advanced phase containing 2 types of anti-tuberculosis drugs (RH). Giving the drug was easier and had minimal side effects. For patients who had side effects such as allergies to one type of anti-tuberculosis drugs, Kombipak anti-tuberculosis drug was provided which included RHZE medicine that are not packaged.

The availability of FDC and Combipak anti-tuberculosis drug packages in the Community Health Center was sufficient. The Community Health Center only provided package of medicines from the government which were provided free of charge, as well as for phlegm examinations. The government had fulfilled anti-tuberculosis drugs and non anti-tuberculosis drugs logistical needs to ensure the quality of the DOTS TB program implementation. Non-anti-tuberculosis drugs logistics provided by the government to support the diagnosis of TB include phlegm pots, smear glass, reagents. Based on information from TB staff and doctors at the Community Health Center, it was known that during this time there had never been a logistical vacuum between anti-tuberculosis drugs and non anti-tuberculosis drugs. To meet these needs, officers coordinated with the District Health Office to make requests.

The government also provided anti-tuberculosis drugs and non anti-tuberculosis drugs logistics for hospitals. How-

ever, TB drugs available in hospitals vary, namely the FDC anti-tuberculosis drugs package from the government and anti-tuberculosis drugs provided by the hospital. Based on information from a resource person, a doctor and TB officer at the hospital, even though the FDC anti-tuberculosis drugs package was available from the government, most doctors chose to use medicines that are not packaged. Meeting the needs of the FDC anti-tuberculosis drugs package, carried out by the pharmacy department without coordinating with TB officers to carry out calculation of needs. This showed that the implementation of TB DOTS program management in hospitals was not optimal.

DISCUSSION

MDR TB is a condition that occurs in TB patients, which TB bacteria (*Mycobacterium Tuberculosis*) are no longer able to be killed with anti-tuberculosis drugs. Immunity to anti-tuberculosis drugs occur as a result of treatment of patients who are inadequate or infected by patients who are drug resistant (Ministry of Health, 2014). MDR TB is resistance to 2 types of first-line anti-tuberculosis drugs, Rifampicin (R) and Isoniazid (H) with or without other anti-tuberculosis drugs resistance (Sembiring, 2008). Factors that play a role in causing the incidence of MDR TB are inadequate treatment provided by the doctor (provider), behavior of patients who do not adhere to treatment, poor management of TB management (Ministry of Health, 2014) and poor family support (Sarwani, 2012).

Based on the results of this study, most people with MDR TB had a history of repeated treatment. Patients first seek treatment in hospitals and doctors practice independently. Only a small proportion used the initial treatment at the Community Health Center. Basically, patients and

families chose treatment in hospitals and practice independently doctor because they had or were specialist experts. While at the Community Health Center, they did not provide. This showed the great trust of patients and families towards specialist health services in hospitals and independent practice doctor. But in reality, the management and treatment provided was not in line with the guidelines for DOTS TB treatment. The limitations of doctors trained in DOTS TB were factors that cause inadequate treatment of these services.

History of re-treatment in TB patients occurred due to incomplete treatment, so patients tend to move treatment because there was no change in the perceived health conditions. The results of the study were in line with the study conducted by Nugraheni and Malik (2015) which stated that a history of previous treatment could increase the risk by 10-fold compared to without a previous treatment history.

This study showed that the patient had a positive perception of the vulnerability of the illness. Patients assumed that TB was an infectious disease and was dangerous for themselves and risks transmitting to other people, especially members of the closest family. It was this vulnerability perception that encouraged patients to make efforts to prevent transmission of diseases such as wearing a mask, not throwing phlegm in any place, closing the mouth and looking away when coughing, using separate cutlery and sleeping separately with the closest family. This study was in line with the theory of the Health Belief Model (HBM) proposed by Becker (1997) which explained that why people did certain healthy behaviors depend on two things: their perceived health threat and believe certain healthy behaviors could reduce the perceived health threats.

Another study conducted by Nurhayati et al. (2015) showed that the same results, namely perceptions of vulnerability encouraged someone to take preventive measures and treat their disease. A study by Safri et al. (2014) said that the vulnerability perception was influenced by good knowledge of TB patients obtained from education of health workers. The better a person's knowledge, the more likely it will be to prevent and adhere to treatment.

Another study conducted by Nurhayati et al. (2015) showed that the same results, namely perceptions of vulnerability encouraged someone to take preventive measures and treat their disease. A study by Safri et al. (2014) said that the vulnerability perception was influenced by good knowledge of TB patients obtained from education of health workers. A better knowledge, the more likely it would be to prevent and adhere to treatment.

Positive perceptions were also felt by patients of the seriousness/severity of their TB disease. Patients were aware of the seriousness of their disease that the disease could cause the danger of transmission, difficult treatment and relapse treatment that was undertaken. Symptoms such as coughing up blood, weak body and weight loss encouraged patients to realize the seriousness of the disease. One patient stopped treatment and then moved to another health care facility after treating 6 months but their illness did not heal. This study showed that the seriousness/severity of the disease that was felt, encouraged a person to remain obedient to seek treatment or try to find a place of treatment until recovery is obtained.

The results of the study were in line with the Health Belief Model (HBM) theory proposed by Becker (1997) that perceptions of severity were based on a person's mindset about the extent to which the ill-

ness was truly a threat to him and seriously affects his organs. The same study results by Nugroho (2011) showed that perceived physical symptoms such as coughing up blood, weight loss, physical weakness and inability to engage in activities influenced the perception of patient severity and motivation to follow doctor's instructions for recovery.

Patients who did not experience changes in their health conditions, decided to continue to undergo treatment and adhere to treatment according to the doctor's instructions. However, 1 case was found that he did not experience changes in his health condition and then he decided to change treatment.

Patients benefited from the treatment measures taken. Most sufferers experience reduced complaints such as a reduced frequency of coughing and the body feels good. In line with Nurhayati et al (2015) study, the perception of positive benefits from the actions taken would increase self-confidence to make prevention efforts and continue to undergo treatment.

Obstacles experienced by patients in undergoing treatment did not make patients stop the treatment. Obstacles faced by patients included medical expenses incurred to redeem prescription drugs, especially for patients who seek treatment in hospitals and doctors who practice independently, access to far-reaching services, perceived side effects of drugs, saturation with duration of treatment. These constraints did not make patients and families decided to stop treatment. This showed that high motivation from patients to recover and good family support encouraged a person to continue to undergo treatment and obey the treatment.

The same results obtained from a study by Nugroho (2011), a personal assessment of barriers to health medication taken

could determine a personal decision to make prevention and treatment efforts. This depended on the perceived benefits and constraints that were felt. If the patient felt the benefits were far greater than the barriers, the patient would complete treatment thoroughly.

All TB patients had positive beliefs (self-efficacy) on the treatment taken. Their self-efficacy increased after feeling the benefits of treatment. The good attitude and service of a doctor/health worker had an impact on the trust of patients to undergo treatment and adhere to treatment. High motivation to get healing, encouraged patients to be sure of the treatment they were undergoing.

This study showed that families had a positive attitude to provide support for patients in seeking treatment, adherence to treatment. The positive attitude of the family in providing motivation for treatment was influenced by the family's understanding of TB disease and the treatment process undertaken by family members. The results of the study revealed that most of the informants understood about TB and preventive efforts to be taken. Education provided by health workers to patients and families influenced the attitude of the family in taking action to make efforts to prevent and treat TB diseases suffered by family members.

The results of this study indicated that the role of the family as a drug-taking supervisor was important and most of them had understood their role as drug-taking supervisors, and were able to carry out their duties. Most families realized that the long term TB treatment would have an impact on the saturation of patients to take medication so that assistance and supervision were needed. The form of support in medication adherence was to remind, prepare and assist patients when taking medication.

The family provided support to ensure the continuity of treatment through the help of medical expenses and to bring sufferers to medical treatment. This showed a significant role of the family in influencing the patient to make a decision to seek treatment and adherence to treatment.

The results of a study conducted by Desmukh (2015) suggested the same thing. Family support needed in an oral form in reminding the patients to take medicine, providing food and encouraging them to stay focused on their health, even though the treatment was long and difficult. Informative support in the form of advice, information and advice was also needed for patients in making decisions about the right actions regarding the prevention and treatment of their diseases (Nugroho, 2011).

Based on the theory presented by Green and Kreuter (2000), the family environment is a reinforcing factor that predominantly influences directed individual behavior and tends to be open. A comfortable family environment has a strong response to the efforts made by family members to overcome the health problems faced. Such a situation allows families to be more concerned in taking action for their family members. The results of this study proved that the theory was in line with the study that had been done.

Management of TB programs played a major role in ensuring adequate treatment for TB patients. Good program management would reduce the risk of MDR TB cases. This was indicated by the majority of Community Health Centers in Grobogan Regency that had implemented the TB DOTS guideline standard in the management of TB diagnosis and treatment, supported by trained personnel. Most TB health center managers had been trained in DOTS TB. Based on the information from

the TB management of the Community Health Centers, so far there had never been cases of dropping out of treatment, because if a patient was lost to follow-up, a home visit would be made.

The implementation and management of DOTS TB programs in hospitals was more difficult than the management in Community Health Centers. This was because the management of TB programs in hospitals involved many parties, especially doctors who were the key in TB treatment services. Although the hospital already had TB DOTS units intended for the treatment of TB patients, there had also been a DOTS TB Team and already had TB service standard operating procedures (SOP), but the reality was not working as expected.

TB program managers are technical officers who were administratively responsible, recording and reporting treated TB patients, managing TB treatment programs, providing education to patients and families, scheduling phlegm re-control examinations and coordinating with other health care facilities for referral or transfer of treatment. In line with the study conducted by Suharyo (2013), TB management officer played a role in providing education to patients and families, arranging medication administration and making home visits or calling if they were found to be absent from TB treatment.

TB program managers had an important role in the compliance and success of patient treatment. A TB manager would plan a treatment program after the TB patient had been diagnosed and decided on treatment by a doctor. This process was not felt for TB managers in hospitals because after the patient had been treated by a doctor, then he immediately went to redeem prescription drugs at the pharmacy without meeting with TB officers. This was the impact of the non-optimal functioning

of the DOTS TB unit in hospitals, and the lack of commitment in carrying out operational standards for TB service procedures. TB management in hospitals was an additional task not the main task. Trained TB managers should work with pulmonary specialists in lung units or TB DOTS.

The District Health Office controlled and guaranteed the quality of the implementation of TB DOTS treatment at the Community Health Center. Hierarchically, Community Health Center were under the guidance and supervision of the District Health Office. The management of TB treatment by doctors in the Grobogan district health center had implemented the DOTS TB guideline standard. This was supported by the trained DOTS doctors who had the obligation to implement TB DOTS service standards. This was different from hospitals that were parallel or in a hierarchical coordination relationship. Although the District Health Office had the responsibility of conducting guidance, in reality it was more difficult and had many obstacles. The implementation of TB treatment procedures in independent practice services also had many obstacles. This was due to the limitations of trained TB DOTS personnel, especially in hospitals and independent practice services. Although some puskesmas have networked TB programs with independent doctors and clinics in finding suspicion, sputum examinations and treatment, the reality was not optimal.

Based on national TB program data, it was found that health service facilities were not fully involved in the TB control program. In 2012, it is recorded that the Lung Health Center and Lung Hospital are 100%, Community Health Center reaches 98%, while government and private hospitals only 38% apply the DOTS TB treatment strategy. The trained staff of TB DOTS for Community Health Center has reached

98% and hospitals are only 24% (RI Ministry of Health, 2014). Utilization of health care facilities by the community for Java and Bali regions, shows that hospitals and pulmonary health centers are the most desirable facilities in seeking TB treatment with a utilization percentage of 44%, then 35% of independent / clinical doctors and only 21% of Community Health Center. This is certainly a big obstacle in guaranteeing the quality of TB services in primary and secondary health care facilities, especially for hospitals and independent/clinical practice doctors (Ministry of Health, 2010).

Diagnosis by some doctors who did not meet the TB DOTS guideline standards, which were only based on radiological examination of chest rontgen photos without microscopic phlegm examination, would have an impact on the accuracy of TB diagnosis, namely over diagnosis. This resulted in the possibility that someone who was not infected with TB, but received TB treatment. Based on the National TB Treatment guidelines stated that radiological examination of chest x-rays did not show a specific picture for TB. The truth could only be accounted for by 40%. While phlegm examination with specimens at a time-time (SPS) provided a picture of TB that the truth reached 98%. Some doctors in hospitals and independent practice rarely carried out sputum examinations because many doctors had not been trained in DOTS TB. Doctors had their own principles in establishing a diagnosis and required a longer time of 2-3 days to obtain results.

Based on information from informants, a doctor and a TB manager in a hospital, TB treatment provided by some doctors in hospitals and independent practices used more drugs with dosages, types, and mixtures of drugs that were not in accordance with TB guideline standards.

Based on the search for medical documents of patients with MDR TB, a history of treatment with second-line TB drugs (quinolones) was obtained in first-line TB treatment. Duration of treatment more than 6 months, intensive and advanced treatment stages were unclear and how to take medication was given 3 times a day. This showed that TB treatment was inadequate, even though the hospital had a DOTS unit and standard operating procedures for TB services. But the fact was, it did not go as expected and package drugs were available, but rarely used. Economically, the administration of FDC drug packages from the government was free, whereas if the patients used medicines that were not packaged, he should pay 300 - 500 thousand.

A study conducted by Fauziah (2013) states that TB treatment by health workers that do not use the right anti-tuberculosis drugs in administering doses, types, number of drugs and the duration of treatment is inadequate. Failure to identify resistant TB has an impact on the treatment of inadequate TB patients.

Based on the description above, it can be concluded that 1) MDR TB patients have perceptions of vulnerability and seriousness of TB disease suffered, and also positive self-efficacy which encourages patient adherence to treatment. 2) Most patients feel the benefits of the treatment taken. The perceived obstacle does not make the sufferer to stop treatment because of the motivation to recover and the consideration of the loved ones 3) Families have a positive attitude in providing support for sufferers in seeking treatment and adherence to treatment 4) Education and service attitudes provided by TB program managers and doctors play a role in increasing the confidence of patients undergoing treatment, encouraging treatment compliance and also increasing family roles 5) Manage-

ment of TB programs in hospitals has not been optimal in implementing the TB DOTS guideline standards even though they already have operational standards for TB service procedures 6) Inadequate TB treatment management by some providers in hospitals and doctors who practice independently as a result of the limitations of trained TB DOTS personnel. Not implementing the DOTS TB treatment guideline standard is the dominant factor that causes the incidence of MDR TB in Grobogan Regency.

Based on the conclusions above, it can be suggested that adequate TB treatment management in primary and secondary health care facilities that ensure service quality with the standard DOTS TB, is needed as an effort to prevent the incidence of MDR TB. The participation of the government through the District Health Office in promoting the TB DOTS program and preparing trained TB DOTS personnel for providers is very urgent.

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