The Description of Knowledge Level of Tuberculosis’ Patients in Polyclinic Dots (Direct Observed Treatment Short-Course) RSUD Dr. Soekardjo, Tasikmalaya

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Abstract. Tuberculosis (TB) is a disease caused by Mycobacterium tuberculosis and this disease can be presented in the form either latent or active. This disease is transmitted through the air and mainly affects productive young adults. The purpose of this research is to investigate the description of the knowledge level of TB patients in DOTS polyclinic (Direct Observed Treatment Short-course) RSUD dr. Soekardjo Tasikmalaya. This research is a descriptive observational research with cross sectional approach by using consecutive sampling technique and this study was done by collecting information from respondents by using questionnaire as the primary data and medical record as the secondary data. Based on the results of the 136 respondents from this study, it was found that there are 54.4% fell in knowledgeable, 41.2% fell in moderately knowledgeable, and 4.4% fell in less knowledgeable at DOTS polyclinic (Direct Observed Treatment Short-Course) in RSUD dr. Soekardjo, Tasikmalaya.

1. Introduction
Based on Global Tuberculosis Control WHO Report (2015), the largest number of TB cases in a row were occurred in India, Indonesia and China at 23%, 10% and 10% of the total global TB disease. The province in Indonesia with the prevalence based on the highest diagnosis of pulmonary tuberculosis was West Java at 0.7% (Anonymous, 2013, Anonymous, 2014). According to Tasikmalaya City Health Office (2015) in a study conducted by Nurliawati, et. al. (2016), stated that based on the information from the section of Prevention and Management of Infectious Diseases (P3M) Tasikmalaya City Health Office, it was obtained the data that there is an increase in the number of TB cases in 2011 with 1043 cases and 1084 cases in 2013.

Furthermore, Nurliawati et. al. (2016) said that from the results of the evaluation conducted by TB Prevention Team of Nursing Study Program STIKes BTH Tasikmalaya together with Partner 1 and Partner 2 in their respective region during February-March 2015, it was found that most people (80%) were not aware and understand the risk factors of TB and 75% of the society were not aware and comprehend the right prevention of TB transmission.

The success of pulmonary TB treatment depends not only on the medical aspects but also on social aspects such as lack of knowledge (Pradnyadewi, 2013).
Based on the description above, the researchers are interested to see the description of the knowledge level of TB patients in dr. Soekardjo Tasikmalaya in which one of the hospitals that has implemented DOTS units (Direct Observed Treatment Short-course) as a strategy to overcome TB disease.

2. Research Methods

This research is a descriptive observational research with cross sectional approach by using consecutive sampling technique and this study was done by collecting information from respondents by using questionnaire as the primary data and medical record as the secondary data.

This research was conducted in DOTS polyclinic (Directly Observed Treatment Short-course) RSUD dr. Soekardjo Tasikmalaya. The study was conducted in April-June 2017. The data instrument in this research were primary and secondary data sources. Primary data is questionnaire related with the characteristic of the respondents in the research. On the other hand, secondary data is related with the knowledge about TB disease that will be tested in validity and reliability.

The questionnaire format contains 23 choices of questions (Table 20) using a Guttman scale measurement type with the form of dichotomous choice. The correct answer was given 1 score whereas the wrong one was given a 0 score. The way of classification by means of the total score gained from the questionnaire was divided by the total of all scores that multiplied by 100. This classification uses the argument of Arikunto (1996) which says that the score of 76-100 belongs to good category, 56-75 belongs to moderately good category, and less than 40 belongs to poorly category (Aspuah, 2013). Then the analysis of percentage distribution was conducted and the analysis was including patient's origin, age, education level, occupation, medical history, sputum examination, OAT category (Anti-Tuberculosis Medicine), type of TB, treatment stage, treatment type, medicine type, medicine dosage form, medicine delivery route, comorbidities, sources of information about TB disease, types of medicines consumed, payments, and knowledge categories. The data were analyzed by Chi-square test and Fisher's Exact using SPSS program version 21.

3. Findings and Discussions of Demographic Description

This study aims to investigate the description of the level of knowledge of TB patients in DOTS polyclinic (Direct Observed Treatment Short-Course) RSUD dr. Soekardjo, Tasikmalaya conducted in April to June 2017. The demographics in this study was include patient's origin, age, education level, occupation, medical history, sputum examination, OAT category, treatment stage, treatment type, medicine type, medicine dosage form, medicine delivery route, comorbidities, sources of information about TB disease, types of medicines consumed, payments, and knowledge categories.

3.1. Distribution of Respondents' Age and Body Weight

From the demographic data in Table 1 obtained, the distribution of respondents’ of the TB patient respondents were as follows:

| Patients' Age | TB Incidence | Lk N | % | Pr N | % | Σ | ρ Value |
|---------------|--------------|------|---|------|---|---|---------|
| 12-22 (Adolescent) | 1 | 8.1 | 1 | 13.2 | 29 | | |
| 23-45 (Adult) | 18 | 3 | 4 | 2 | 23.5 | 57 | | 0.023 |
| 46-55 (Middle-Aged) | 1 | 12 | 1 | 7.4 | 27 | | |
| >56 (Elderly) | 12 | 7 | 6 | 4.4 | 23 | | |
financial dependence in transportation can cause difficulties for women to seek treatment as well as concern about the effects of TB diagnosis they receive.

Judging from the characteristics of TB patients according to the age group, the largest age proportion is in the age range 23-45 years were 57 people. Pulmonary TB incidence at productive age may be due to high activity and mobility which provides greater opportunities for contact with others including with TB patients as well as the high risk of contracting pulmonary TB (Setiadi, et al., 2014). Productive age is the most vulnerable age to disease exposure, such as Tuberculosis, it can occur because of the interactive effects with risks and exposure (including lifestyle, such as smoking, occupation, pollution from air as well as industry exposure) and there are variations in geographical area and age group (Allotey, et al., 2008).

In Rukmini’s study (2011), stated that the age group of 55-74 years old has a lower risk of developing TB than the productive age group (15-34 years old), because in the productive age it usually has a fairly solid activities. They tend to spend half of their lives outside the home, whether for work or socializing. The level of one's productivity can be affected by unbalanced optimal rest time with the amount of activity used. The high productivity which is not balanced with the effort to maintain health when the immune system decreases will make a person susceptible to suffer the disease. In addition, there were 80% of workers that desperate to work despite the condition of their body which is not healthy enough, so that their diseases were easily spread in the environment (Prawira, 2015).

| Medical History | TB Incidence | \( \sum \) | \( \rho \) Value |
|-----------------|--------------|----------|----------------|
| Recent          | 59           | 43, 5   | 39,7   | 113  |
| Treatment       | 1            | 0,7     | 1      | 2    |
| Dropout         |              | 0,7     | 1      | 0,927|
| Relapse         | 80           | 7,4     | 1      | 21   |

3.3. The Relationship of Medical History and TB Incidence
In Table 2, based on TB classification of previous medical history, the result of data analysis using Chi Square statistic test obtained \( \rho = 0.927 > \rho (0,05) \) showed that there was no significant difference between medical history and TB incidence in male group with female group.

Based on the previous explanation, it can be seen that one of the causes of new cases of TB was the community does not know the symptoms and late diagnosis of TB, smoking habits, economic status, lack of nutrition, drink alcohol and ignorance that the free TB treatment is a factor supporting new TB incidence.

This is similar to the Legesse study, et. al. (2010) says that this may be due to the fact that people may not suspect that early symptoms (cough, fever and sweating) are caused by pulmonary tuberculosis, unless accompanied by other severe symptoms (eg: chest pain or haemoptysis). In Paz-Soldan study, et. al. (2014) said that almost all participants of the study were aware of the delay in seeking their own TB diagnosis. The main reason for delaying the search for treatment is the lack of knowledge and confusion on symptoms of TB, fear and embarrassment of receiving TB diagnosis, and the tendency of patients to self-medicate before seeking formal medical attention.

| Medical History | TB Incidence | \( \sum \) | \( \rho \) Value |
|-----------------|--------------|----------|----------------|
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| Relapse         | 80           | 7,4     | 1      | 21   |

3.4. The Relationship of Sputum Examination and TB Patients

| Sputum Examination | TB Patients | \( \sum \) | \( \rho \) Value |
|--------------------|-------------|----------|----------------|
| Negative BTA       | 2           | 1,5     | 3              | 2,2 | 5 | 0,472 |
| Positive BTA       | 68          | 50,0    | 63             | 46,3| 131|

3.4. The Relationship of Sputum Examination and TB Patients
The result of data analysis in Table 3 using *Fisher's Exact* statistic test obtained $\rho = 0.472 > \rho (0.05)$ can be concluded that there was no difference between sputum examination with TB patient in male group and female group. There is no relationship between sputum examination with TB patients because it is not guaranteed that people either male or female are diligently carry out sputum examination. This is because there was no difference regarding the awareness to heal both in men and women.

In addition, based on the Table 7, the results of sputum examination was there were more negative acid-fast bacili (AFB) instead of positive AFB. This can be happen because TB patients with positive AFB have experienced conversion to negative AFB within 2 months (Radji, *et al.*, 2015).

### Table 4. The Relationship of Stage of Treatment and Number of Patients

| Stage of Treatment | Number of Patients | $\sum \rho$ Value |
|--------------------|--------------------|-------------------|
| Intensive Stage    | 39 N, 28,7%        | 70                |
| Advanced Stage     | 29 N, 21,3%        | 66                |

#### 3.5. The Relationship of Stage of Treatment and Number of Patients

The results of data analysis in Table 4 using *Fisher's Exact* statistic test obtained $\rho = 0.115 > \rho (0.05)$, it can be concluded that there was no difference between treatment stage with the number of patients in the male group and female group.

Based on Table 4 and Table 5 which included in the intensive phase was the OAT 4KDT package, and the kombipak package is HR. The 4KDT package consists of 4 types of drugs: Isoniazid (H), Rimfapicin (R), Pyrazinamide (Z), and Ethambutol (E) consumed daily for 56 days. While the advanced stage is kombipak package and OAT 2KDT package consists of 2 types of drugs are Isoniazid (H), and Rifampicin (R) and HRZE are consumed for 3 times a week in 16 weeks.

#### 3.6. The Drug use Profile

The use of specific drugs used in patients with tuberculosis is a drug with OAT group (Anti Tuberculosis Drugs).

From Table 5, it can be seen that the most frequently used drugs are OAT 4KDT packages with 65 people (47.8%) people, 2KDT with 64 people (47.1%) people, and kombipak HR packages with 6 people (4.4%), and HRZE with 1 person (7%).

### Table 5. The Drug Use Profile

| Name of OAT’s Drugs | Frequency | Percentage (%) |
|---------------------|-----------|----------------|
| 4KDT                | 65        | 47.8           |
| 2KDF                | 64        | 47.1           |
| HR                  | 6         | 4.4            |
| HRZE                | 1         | 0.7            |

#### 3.7. Tuberculosis Patients’ Knowledge

### Table 6. Distribution Value of Respondents’ Knowledge

| Variable            | Mean | Median | Min | Maks | Std. deviation |
|---------------------|------|--------|-----|------|----------------|
| Knowledge Value     | 78,42| 78,3   | 52,2| 100  | 13,7           |

### Table 7. Knowledge Category

| Knowledge Category     | Frequency | Percentage (%) |
|------------------------|-----------|----------------|
| Knowledgeable          | 74        | 54.4           |
| Moderately Knowledgeable| 56        | 41.2           |
| Less Knowledgeable     | 6         | 4.4            |

Assessment of respondents' knowledge based on the ability of respondents in answering questions on the questionnaire. Respondents' knowledge of TB disease was measured by 23 questions that have been tested for preliminary validity and reliability. Based on Table 19, the knowledge of TB patients...
was mostly included in good (54.4%) and good enough (41.2%) categories. These results indicate that most respondents have known about TB disease and how to treat it. Based on observations during the study, it can happen because TB patients have been given health education by TB officers at the hospital when they were first diagnosed with tuberculosis. In addition, it can also occur because RSUD dr. Soekardjo Tasikmalaya City has been supporting DOTS program that specifically handles TB treatment so that health workers can conduct health education either provide information or education well to patients with tuberculosis.

Increased knowledge can make a person change the perceptions and habits of a person in terms of behavior. In Martin's study, et. al. (2016) concluded that behavior which was based on good knowledge would have a good impact on behavior instead of one which not based on good knowledge, which means that patients are more health-conscious, if they have been exposed to pulmonary TB disease, they can do prevention to the transmission of the disease to their family and their surrounding areas.

In addition, the environmental factors can also affect the knowledge of the respondents. In other words, environmental factors will be directly proportional to the knowledge, it can happen because the environment can affect the process of entry of knowledge of a person into residing environment.

Respondents with poor knowledge level showed 4.4%. Nurses especially community nurses play an important role in overcoming this problem. The researcher observed that this happened because the respondent was not well understood with what was submitted by the health officer because of the condition of the patient itself so that to absorb the knowledge from the officer was less effective. Furthermore, it can also happen because the respondent is experiencing hearing loss and also the patient's age already old enough so that the understanding of what was delivered by the officer was less absorbed. Other factors can also occur because the education of respondents, where the higher the education of respondents the higher the knowledge of the respondents. However, it cannot be denied, because there are some people with a high education is not necessarily well knowledgeable. This can be directed through health education oriented to the provision of information to the Drug Swallowing Supervisor (PMO), so that the PMO can provide little information about tuberculosis, prevention and the effects of non-adherence to treatment or swallowing of medicines to less-knowledge TB respondents so that they would not become a source of transmission for their family members and the society around them. The respondents who have a high level of knowledge about TB can be given the motivation to complete treatment into completion.

Based on Table 20, the respondents' knowledge about TB disease was measured by 23 questions. Where it is known that most respondents in the study know the meaning, causes, signs and symptoms, function of sputum and x-ray examination, mode of transmission, treatment, prevention, and function of PMO (Superintendent Swallowing Drug). But most of the majority of respondents know less about the transmission of TB. One of which is on the feeding tool as a medium for TB mediator. The results of this study are similar to those of Solliman, et. al. (2016) which states that 53.0% of respondents lack knowledge about TB transmission.

Then, the respondents also do not know about the side effects of TB treatment, it happens because of lack of knowledge of the respondents about it. Particularly with regard to transmission and the side effects of drug use and lack of masses can affect one's knowledge because the mass media holds a lot of information and allows many people to easily access it so that it is easily accessible the information allows a person to gain knowledge.

The next factor is the environment, where knowledge is gained from what we saw and hear every day, where the environment plays a role to form a successful mindset processed from the knowledge we can from that environment. Furthermore, the experience where the brain will automatically save every event recorded by the senses so that any new events associated with the old events will make the individual easy to digest the scope of science being studied. The last factor is age, where the increasing age can increase one's knowledge, attitude, and action to prevent transmission of TB disease.

According to Martin, et. al. (2016) says that one's attitude can change with the acquisition of additional information about a particular object through persuasion and the pressure of its social group. So, it can be concluded that someone who has good knowledge will get a good attitude towards
efforts to prevent the spread of pulmonary TB disease. However, in reality, it can be found that not always the knowledge and good attitude of a person can make the person have good behaviors.

Table 8. Frequency of Knowledge

| No | Knowledge                                                                 | Response | f (%)     |
|----|----------------------------------------------------------------------------|----------|-----------|
| 1  | The TB bacteria are mostly located in one's lungs                           | Correct  | 116 (85.29%) |
| 2  | TB bacteria can spread to the air whenever the patient sneezes or coughs.  | Correct  | 82 (60.29%)  |
| 3  | The transmission capacity of a TB patient is determined by the amount of    | Correct  | 132 (97.06%) |
|    | bacteria released from their lungs. The symptoms of TB disease are         |          |            |
|    | characterized by a loud cough for 3 weeks / more, chest pain, coughing    |          |            |
|    | with blood / sputum, limp body and get easily exhausted, the decreasing    |          |            |
|    | of weight and appetite, trembling, fever, and night sweats.               |          |            |
| 4  | Sputum examination can ensure that a person has TB disease.                | Correct  | 98 (72.06%)  |
| 5  | Sputum examination which was done in 3 times is an accurate examination    | Correct  | 133 (97.79%) |
|    | to prevent TB disease.                                                    |          |            |
| 6  | Aside from diagnosing TB disease, sputum examination is also performed    | Correct  | 106 (77.94%) |
|    | to evaluate the treatment.                                                |          |            |
| 7  | Chest X-ray (thorax’ photo) is done to see how much the disease spreads    | Correct  | 128 (94.12%) |
|    | in the lungs of tuberculosis patients.                                    |          |            |
| 8  | TB disease can affect anyone.                                             | Correct  | 125 (91.91%) |
| 9  | TB transmission can be done through cutlery.                              | Correct  | 78 (57.35%)  |
| 10 | People who are close to TB patients or living with family members who     | Correct  | 111 (81.62%) |
|    | suffer TB disease are at risk in being infected by TB disease.             |          |            |
| 11 | Tuberculosis can be cured by regular treatment.                           | Correct  | 98 (72.06%)  |
| 12 | TB drugs consist of Isoniazid, Rifampicin, Pyrazinamide, Etambutol, and   | Correct  | 118 (86.76%) |
|    | Streptomycin.                                                             |          |            |
| 13 | The way to take Anti-Tuberculosis Drugs (OAT) is to consume it in daily   | Correct  | 105 (77.21%) |
|    | or 3 times a week.                                                       |          |            |
| 14 | Isoniazid, rifampicin should be taken on an empty stomach (1 hour before | Correct  | 47 (34.56%)  |
|    | / 2 hours after meals)                                                   |          |            |
| 15 | Rifampicin can cause redness in urine (urine), sweat, saliva, and tears.  | Correct  | 62 (45.59%)  |
| 16 | Rifampicin can cause abdominal pain, nausea, vomiting, occasionally       | Correct  | 40 (29.41%)  |
|    | diarrhea.                                                                |          |            |
| 17 | Isoniazid, rifampicin can cause tingling and burning feelings in the legs. | Correct  | 102 (75.00%) |
| 18 | Pyrazinamide can cause joint pain, and sometimes uric acid.               | Correct  | 124 (91.18%) |
| 19 | Ethambutol may cause visual impairment in the form of reduced eye         | Correct  | 127 (93.38%) |
|    | sharpness, color blindness for red and green colours..                    |          |            |
| 20 | Streptomycin can cause balance disorders and hearing loss such as the     | Correct  | 133 (97.79%) |
|    | ears ringing.                                                            |          |            |
| 21 | Bright light and sunlight that can enter the house can kill TB bacteria.  | Correct  | 134 (98.53%) |
| 22 | The Drug Swallowing Supervisor (PMO) is someone who can help the patient | Correct  | 125 (91.91%) |
|    | in the treatment, play a role in reminding and supervising the patient to |          |            |
|    | be obedient in taking the medicine.                                       |          |            |

3.8. The Relationship Between Gender and Knowledge Categories

The results of data analysis in Table 8 using Chi Square statistical test obtained □ 0.029 <□ (0.05) showed that there was difference between gender type with knowledge category in group of knowledgeable, moderately knowledgeable, and less knowledgeable.

Based on the Table 8, mostly female were better in knowledge about TB disease than male, it can happen because the majority of female were unemployed and they were housewife so that they have more time than male in order to get information easily from their environment and electronic media more than the majority of male who had to work hard in order to support the needs of themselves and their family. This is similar to Solliman's research, et. al. (2012) and Samargandi, et. al. (2012) which revealed that female have better knowledge about TB disease than male. Samargandi, et. al. (2012) adds that the increased knowledge of diseases among female may only reflect the fact that female are usually more sharp and diligent than male.

Table 9. The Relationship Between Gender and Knowledge Categories

| Gender | Knowledge Categories | Σ     | P Value |
|--------|----------------------|-------|---------|
|        | Knowledgeable        |       |         |
|        | Moderately Knowledgeable |     |         |
|        | Less Knowledgeable   |       |         |
3.9. The Relationship Between Patients’ Age and Knowledge Categories
The result of data analysis at Table 9 using Chi Square statistical test obtained $\rho < 0.05$ showed there was difference between patients’ age with knowledge category in group of knowledgeable, moderately knowledgeable, and less knowledgeable. Based on the results of the research, most respondents are in adulthood. This happens because adulthood is the productive age where most people are actively doing activities outside their house, so there would be likely more great opportunity in order to obtain sources of information both from written and oral sources.

3.10. The Relationship of Educational Level with Knowledge Categories
The result of data analysis in Table 10 by using Chi Square statistic test obtained $\rho = 0.092 < 0.05$ showed that there was no difference between education level with knowledge category in group of knowledgeable, moderately knowledgeable, and less knowledgeable. Education is related to knowledge which will be used in order to search for the treatment. The knowledge which is influenced by education level is one of the predisposing factors that play a role in influencing one's decision to have healthy lifestyle. The higher a person's education the better their knowledge of TB disease so that their restraint in infected by the disease would likely be stronger and the treatment effort when they were infected would likely to be more maximal. However, in this modern era, there is a lot of sources of information that is easily obtained through electronic media, print media and mouth-to-mouth in order to increase the knowledge of someone either intentionally or unintentionally. Thus, to get a lot of information cannot be seen from one's educational status.

4. Conclusions and Suggestions
4.1. Conclusions
Based on the results of the research on 136 respondents of this study, it was known that there were 54.4% respondents who were knowledgeable about TB disease, 41.2% fell in moderately knowledgeable, and 4.4% fell in less knowledgeable in DOTS polyclinic (Direct Observed Treatment Short-course) RSUD dr. Soekardjo, Tasikmalaya City.

4.2. Suggestions
4.2.1. It is better if every patient who comes to treatment at DOTS polyclinic (Direct Observed Treatment Short-course) RSUD dr. Soekardjo, Tasikmalaya City, was given the extension of the importance of wearing masks both at home and outside the home.

5. References
[1] Allotey, P., Gyapong, M. 2008. Gender in Tuberculosis Research. *Int J Tuberc Lung Dis* 12(7):831–836.

[2] Anonim. 2014. Pedoman Nasional Pengendalian Tuberkulosis. *Kementrian Kesehatan Republik Indonesia Direktorat Jendral Pengendalian Penyakit Dan Penyehatan Lingkungan*.

[3] Anonim. 2015. Global Tuberculosis Report. 20 th edition. *Geneva: World Health Organisation*.

[4] Aspuah, Siti. 2013. *Kumpulan Kuisiner dan Instrumen Penelitian Kesehatan*. Yogyakarta: Nuha Medika.

[5] Legesse, Mengistu., et. al. 2010. Knowledge and Perception of Pulmonary Tuberculosis in Pastoral Communities in The Middleand Lower Awash Valley of Afar region, Ethiopia. *BMC Public Health*. 10:187. [http://www.biomedcentral.com]. (Diakses 15 Juli 2017).

[6] Martin, Alvishenna., Simbolon, Rohani Lamaria., Restuastuti, Tutii. 2016. Pengetahuan Sikap dan Tindakan Penderita TB Paru Terhadap Pencegahan Kontak Serumah di Puskesmas Airtiris Kecamatan Kampar Kabupaten Kampar Provinsi. *JOM FK* 1(3).

[7] Notoadmodjo, S. 2007. Kesehatan Masyarakat Ilmu dan Seni. Jakarta: Rineka Cipta.

[8] Nurliaawati E., Ety Komariah S., Wawan Rismawan., Tetti Agustin. 2016. *IbM Pencegahan Penularan Tuberkulosis. Surya: Seri Pengabdian kepada Masyarakat* 2 Edisi 1 ISSN 2460-576x.

[9] Paz-Soldan, Valerie A., Alban, Rebecca E., Jones Christy Dimos., Powell, Amy R., dan Oberhelman, Richard A. 2014. Patient Reported Delays in Seeking Treatment for Tuberculosis Among Adult and Pediatric TB Patients and TB Patients Co-Infected with HIV in Lima, Peru: a Qualitative Study. *Fronteir in Public Health*. [www.frontiersin.org]. (Diakses tanggal 15 Juli 2017).

[10] Pramono, Ristyo Sari., A, Mas Imam Ali., Nahariani, Pepin. 2013. Hubungan Tingkat Sosial Ekonomi Dengan Angka Kejadian TB Paru BTAPositif di Wilayah Kerja Puskesmas Peterongan Jombang Tahun 2012. *Jurnal Metabolisme* 3(2). [Diakses tanggal 15 Juli 2017].

[11] Prawira, Aditya Eka. 2015. Kenapa di Usia Produktif Anda Rentan Sakit?. [http://health.liputan6.com/read/2197427/kenapa-di-usia-produktif-anda-rentan-sakit]. (Diakses 13 Juli 2017)

[12] Radji, Maksum., M. Biomed. 2015. *Mekanisme Aksi Molekular Antibiotik dan Kemoterapi*. Jakarta: Buku Kedokteran EGC.

[13] Rukmini., Chatarina U.W. 2011. Faktor-Faktor yang Berpengaruh Terhadap Kejadian TB Paru Dewasa di Indonesia (Analisis Data Riset Kesehatan Dasar Tahun 2010). *Buletin Penelitian Sistem Kesehatan* 4(14), 320–3.

[14] Samargandi, Osama A., Abulaban, Ahmad A., Deek, Bassem S. El., Mirdad, Lujain H., dan Wali, Siraj O. 2012. Knowledge Of Pulmonary Tuberculosis in The Saudi Community In Jeddah. *Saudi Journal of Internal Medicine* 1(2).

[15] Setiadi, M Alif., Hermawati, Ema. 2014. Analisis Kondisi Lingkungan Fisik Rumah dengan Kejadian TB Paru di Kecamatan Cengkareng Kota Administrasi Jakarta Barat Tahun 2013. *Departemen Kesehatan Lingkungan FKM UI*.

[16] Solliman, Mukhtar A., et. al. 2012. Assessment of Knowledge Towards Tuberculosis Among General Population in North East Libya. *Journal of Applied Pharmaceutical Science* 2(4) ISSN: 2231-3354, 24-30.

[17] Tachfouti, Nabil., Slama, Katia., Mohammed, Berraho., Chakib, Nejjadi. 2012. The Impact Of Knowledge and Attitudes On Adherence to Tuberculosis Treatment: A Case-Control Study In A Moroccan Region. *Pan African Medical Journal* ISSN: 1937-8688.