PREDICTION MODEL OF TUBERCULOSIS INCIDENCE PROBABILITY BASED ON DETERMINANT VARIABLES IN THE CITY OF BANDAR LAMPUNG

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ABSTRACT

Tuberculosis (TB) has been considered as one of health problems in Bandar Lampung, since its incidence number has been increasing although conversion and cure rate has been more than 90%. Furthermore, case detection rate (CDR) at primary health centre across the city are vary from one to another. List of literatures showed that TB's incidence is significantly affected by number of TB's determinant variables. Those are environment, behaviour, malnutrition, HIV/AIDS and health service. The main objective of this research is to analyze those determinant variables and use them to provide prediction model of TB's incidence probability. This research is a case control study which conducted in Rajabasa Indah and Panjang primary health centre. Number of respondents of this research is divided into cases group and control group. Research survey was conducted to collect primary data of environment, behaviour (knowledge, attitude and practice), and malnutrition and health services. Data were analyzed using bivariate and multivariate logistic regression. The results showed that probability model of TB probability incidence is log (p/1-p)=-2,323 + 1,094 attitude +1,449 practice + 0,711 environment. The probability would increase if there were no influence between behavior and environment. It can be concluded that the model can be used to decrease TB's incidence.

Key words: tuberculosis, prediction model, determinant variables

INTRODUCTION

Tuberculosis (TB) has been considered as one of health problems in Bandar Lampung, since its incidence number that has been increasing although conversion and cure rate has been more than 90%. Based on data, TB's incidence in 2008 was 1.093 cases, decreased in 2009 to 956 cases and 966 cases in 2010. Furthermore, case detection rate (CDR), which based on number of population and TB's prevalence rate, at Primary Health Centre (PHC) across Bandar Lampung city are vary from one area to another.

Some researches show that there are number of determinant variables of TB. Stone (2003) showed that increasing on number of HIV/AIDS has caused TB's incidence in Texas in 1995-1998 still high, although cure rate also high. Rieder (1999) and Lonnroth (2011) state that there are some risk factors in every stage pathogenesis of TB which influence on TB. Some of those variables are: number of TB patients,

environment, density and social economis. Ministry of Health of Indonesia (2007) also mentioned that there are some determinant variables of TB, if have not been identified can cause high incidence of TB's. Those variables are: social behavior, environment, malnutrition, HIV/AIDS and health services.

Beaglehole (1993) confirmed that information about distribution and determinant variables are important for establish health policy. In addition, Arnadottir (2009), Pepperell (2011), Wang (2007), Kalhori (2010) and Tanguus (2000) mentioned that information about TB's determinant variables can be used to predict TB, including the probability of TB's incidence. Prediction approach is believed to be more appropriate since it considers number of determinant variables which vary from one to another area.

The main objective of this research is to analyze determinant variables of TB and used them to formulate a prediction model of probability of TB's incidence. This research conducted in two PHC namely Panjang and Rajabasa in the City of Bandar Lampung between May to August 2011. Panjang PHC is one of PHCs that has high number of TB's incidence. Meanwhile, Rajabasa PHC is considered as a PHC having low number of TB's incidence.

METHODS

This research is a case control study, comparing risk factors of case and control group and used them in order to develop a prediction model.

Population of this research consist of two groups, those are population for case group and population for control group. Population for case group is TB's patients who are registered at Panjang and Rajabasa Indah PHC during data collection. Number of population for case group is recorded as 92 respondents. Meanwhile, population for control group is person without TB who lived in administration area of the Panjang and Rajabasa Indah PHC. Number of population for control group is 77.585 peoples. Meanwhile, there are also two consecutive samples which are sample for case group and sample for control group. Sample for case group are data which fulfill inclusion criteria: can be founded and consent. Number of sample for case group is 92 respondents.

Sample for control group are peoples who lived surrounded TB's patients. Number of samples for control group is 92 respondents.

Dependent variable of this research is TB occurrence, which categorized by yes and no. Meanwhile, independent variables of this research consist of: 1) knowledge: knowledge of the respondent on TB, categorizing as good and not good; 2) attitude: attitude of the respondent regarding TB, categorizing as good and not good 3) practice: respondents' practice on TB, categorizing as good and not good; 4) environment: condition of house density, ventilation, lightning and sanitary, which categorized by good and not good.

Data of this research are primary data, which was collected using questionnaire. Moreover, data was analyzed using multivariate logistic regression to identify the most dominant independent variable and to develop a proper prediction model.

RESULTS AND DISCUSSIONS

The first step of multivariate logistic regression analysis was conducted by entering independent variables which have p value < 0.25. In this research, all independent variables have p value < 0.25; therefore all variables can be entered to the analysis. Results of the analysis is then presented in Table 1.

Based on Table 1 it can be concluded that the knowledge variable has p value > 0.05, therefore must be excluded for the next step analysis. Result of the second multivariate logistic regression analysis can be seen in Table 2.

Table 1: Multivariate Logistic Regression Analysis between Knowledge, Attitude, Practice and Environment Variables to TB's Incidence Variable

Variable	B	Sig.	Exp (B)	95% CI for Exp(B)	
				Lower	Upper
Knowledge	-,043	,916	,958	,432	2,125
Attitude	1,094	,026	2,987	1,137	7,851
Practice	1,470	,001	4,348	1,829	10,333
Environment	0,723	,052	2,060	,994	4,269
Constant	-2,322	,000	,098		

Table 2: Multivariate Logistic Regression Analysis between Attitude, Practice and Environment Variables to TB's Incidence Variable

Variable	B	Sig.	Exp(B)	95,0% C.I.for Exp(B)	
				Lower	Upper
Attitude	1,094	,026	2,985	1,136	7,842
Practice	1,449	,000	4,258	1,965	9,226
Environment	0,711	,045	2,037	1,015	4,088
Constant	-2,323	,000	,098		

Table 2. shows that all independent variables have p value of smaller than 0.05 which is an indicator that the model presented in table 2 is the final model.

Based on table 2, practice variable has the highest Odds Ratio (4,258), followed by attitude (2,985) and environment variables (2,037). Based on the values above, number of notes can be drawn as the following 1) person with not good practice on TB prevention have risk to have TB of 4,258 higher than person with good practice on TB prevention; 2) person with not good attitude on TB have a risk of having TB of 2,985 higher than person with good attitude; and 3) person with not good environment have a risk of 2,037 higher than person with good environment. The result is similar with work that have been done by Notoatmodjo (2003), Tobing (2009) and Musadad (2002) which stated that attitude, practice and environmet are related to TB incidence.

Regarding to table 2, it can also be concluded that a prediction model of TB incidence, based on determinant variables: attitude, practice and environment, can be developed. The mathematical equation expressing the model is as the following:

$$\text{Log } (p/1-p) = -2,323 + 1,094\ X_1 + 1,449\ X_2 + 0,711\ X_3$$

with Log (p/1-p) = TB incidence,
X_1 = attitude variable,
X_2 = practice variable,
X_3 = environment variable.

The equation can be provided in mathematical probability as follow:

$$P = \frac{1}{1+e^{-R}}$$

with $R = 2{,}323 + 1{,}094\ X_1 + 1{,}449\ X_2 + 0{,}711\ X_3$

The model assumes that if TB's incidence is influenced by determinant variables then, the X_n is equal to 1. On the other hand, if TB's incidence is not influenced by determinant variables then, the X_n is equal to 0. The possible variation of probability can be seen in table 3.

Table 3: Probability TB's Incidence Based on Determinant Variables

X_1	X_2	X_3	Probability (%)
1	1	1	28,28
1	1	0	44,52
1	0	1	83,37
1	0	0	77,36
0	1	0	70,56
0	0	1	83,37
0	1	1	54,06
0	0	0	91,08

Based on Table 3. the highest probability of a person to be infected by TB (91,08%) occurred if there is no influence of knowledge, attitude and environment variables respectively to the TB's incidence that means there is unidentified variables. The probability will be decreasing if relation of determinant variables to the incidence can be clearly identified.

CONCLUSION

Prediction model of TB incidence based on determinant variables (knowledge, attitude and environment) can be used to predict probability of people, especially who lived in Panjang and Rajabasa Indah PHC area, to be infected by TB. Moreover, the probability can be reduced if relation of determinant variables to the incidence can be clearly identified.

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Purwokerto

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"Interprofessional Education: Walking Through Collaborative Learning To Collaborative Practice"

HORISON HOTEL, PURWOKERTO, 29 November – 1 December 2011

PROCEEDING

THE FIRST INTERNATIONAL CONFERENCE IN MEDICINE AND HEALTH SCIENCES: INTERPROFESSIONAL EDUCATION: WALKING THROUGH COLLABORATIVE LEARNING TO COLLABORATIVE PRACTICE

Editor:

Made Sumarwati, MN

dr. Agung S. Dwi Laksana, M.Sc.PH

Tunggul Adi P., M.Sc., Apt.

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FOREWORD

Assalamu'alaikum Wr.Wb

First of all, let us give thanks to God the almighty who bless us to finish this proceeding. It is realised that health proffessionals who have been studying together since the beginning of study, as graduates they will improve patient outcomes by working more collaboratively, communicating better with each other, and fostering a health care delivery system that assures quality and patient safety. Moreover, research shows that health care delivered by interprofessional team, not only improves quality of care, and produces better patient outcomes, but also produces greater patient satisfaction, improved efficiency, and increased job satisfaction on the part of health professionals. This seminar wants to explore of common issues around interprofessional education and practice and to inspire policy makers in order to educate health profession students to ensure they have the necessary knowledge, skills, and attitudes to work effectively in interprofessional teams.

This proceeding is an official proceeding of the International Seminar on Medicine and Health Sciences, which was held at Dynasty Conference Center in Purwokerto on 29 November to 1 December 2011. The seminar was and attended by 200 participants from health proffessionals, hospital, health office, primary health care centres as well as public and private colleges and universities.

We realize that this activity could not be conducted without the help and support from all of you. Therefore, the committee thanks to your help and support. Finally, we would like ask Rector, Jenderal Soedirman University to give speech and officially open this seminar.

Wassalamu'alaikum Wr.Wb

Chairman
Agung S. Dwi Laksana

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CONFERENCE PROGRAM

DAY 1. Tuesday, November 29, 2011, Banyumas Room

08.00-08.30	Registration		
08.30-08.45	Opening Ceremony National Anthem of Indonesia Raya		
	Opening Speech	:	1. Chairman 2. Rector of UNSOED
	Traditional dancing		
08.45-09.45	Plenary Session I		Dr. Lisa McKenna (Australia)
	Title	:	Interprofessional Education: A Holistic Model of Health Professional Education
09.45-10.00	Coffee Break		
10.00-12.00	Plenary Session II		
	Invited Speaker -1	:	Assoc. Prof. Vivian Lee, Pharm.D (Hong Kong)
	Title	:	Team-Based Care
	Invited Speaker -2	:	Prof. Dr. Iwan Dwi Prahasto
	Title	:	Interprofessional Education: Current and Future Challenge
12.00-13.00	Lunch Break		
13.00-15.30	Plenary Session III		
	Invited Speaker -1	:	Prof. Dr. Sunartini Iman
	Title	:	Interprofessional Education and Practice at the Paediatric Unit, Sardjito Hospital
	Invited Speaker -2	:	Prof Dr Nancy Margarita Rehatta, Sp.AnK. IC
	Title	:	Building A Culture For Interprofessional Education
	Invited Speaker -3	:	Prof. Dr. Budi Susilo Supanji
	Title	:	Trend And Policy Of Interprofessional Education In The National Education System
15.30-15.45	Coffee Break		
15.45-17.00	Parallel Session 1		

PARALLEL SESSIONS 1

15.45-17.05	PARALLEL A — Banyumas Room
15.45-16.05	**Lisa Musharyanti** The importance of academic integrity among nursing students
16.05-16.25	**Tunggul Adi Purwonugroho** E-professionalism issue regarding pharmacy students' activity on facebook
16.25-16.45	**Wastu Adi Mulyono** Students' problems on first ners clinical practice placement at padiatric care stage
16.45-17.05	**Sylvi Irawati** Clinical pharmacy course: assessment of case-based learning and lectures method in achieving students' learning objectives

15.45-17.05	PARALLEL B — Garuda Room
15.45-16.05	**Vitis Vini Fera R.U** The effect of information quality and system quality on user satisfaction and individual impact on staff of department of pharmacy
16.05-16.25	**Suryanto** Female students' level of knowledge of puberty in the first grade of Magelang city 1 vocational high school related to the opportunity to enter the job market
16.25-16.45	**Dyah Wulan Sumekar RW** Prediction model of tuberculosis incidence probability based on determinant variables in the city of Bandar Lampung
16.45-17.05	**Tiyas Kusumaningrum** Seft (spiritual emotional freedom technique) therapy decrease anxiety level of childbirth in third trimester primigravida

15.45-17.05	PARALLEL C — Merak Room
15.45-16.05	**Mira Triharini** The influence of finger painting on decreasing psychological responses of stress hospitalization at the preschool children (3-6 year)
16.05-16.25	**Lutfatul Latifah** The role of family in blood glucose control to family members with type 2 diabetes mellitus
16.25-16.45	**Diah Krisnansari** The correlation between selenium levels and depression scores on the students medical department faculty of medicine and health sciences Jenderal Soedirman University
16.45-17.05	**Iting Shofwati** Factors associated to welder's complaints musculoskeletal disorders

DAY 2. Wednesday, November 30, 2011: Banyumas Room

08.00-10.00	Plenary Session IV		
	Invited Speaker -1	:	Assist Prof. Dr. Surakit Nathisuwan, Pharm. D., BCPS (Thailand)
	Title	:	Medication Safety: Interprofessional-based Intervention
	Invited Speaker -2	:	Prof.Dr. Lisa McKenna (Australia)
	Title	:	Team-based Learning: Improving Quality by Improving the System
10.00-10.20	Coffee Break		
10.20-12.20	Plenary Session V		
	Invited Speaker -1	:	Muhammad Affandi, MAN
	Title	:	Interprofessional Education in Teaching Hospital
	Invited Speaker -2	:	Prof. Dr. Umar Fahmi Achmadi
	Title	:	Spatial Management of the Disease occurrences: a model for Community Based interprofessional education and practice in Medicine and health sciences
12.20-13.00	Lunch Break		
13.00-16.30	Parallel Session 2		
16.30-17.00	Closing Ceremony		

PARALLEL SESSION 2

13.00-16.30	**PARALLEL A**	**Banyumas Room**
13.00-13.20	**Heny Ekowati**	
	Identification of potential drug interaction in patient with congestive heart failure at RSUD Kota Tasikmalaya in 2008	
13.20-13.40	**Febrianti**	
	Prevalence and determinant factors of chronic energy deficiency in pregnant women (cedpw) in Indonesia in 2007	
13.40-14.00	**Fauna Herawati**	
	Correlation study of *Pseudomonas aeruginosa* antibiotic sensitivity and antibiotic consumption at a private hospital in Surabaya	
14.00-14.20	**Dwi Sarwani SR**	
	A Predictive model for the occurrence of pulmonary tuberculosis on a productive age group (Case Study at BP4 Purwokerto)	
14.20-14.40	**Nanang Munif Yasin**	
	Patterns of adherence to antiretroviral medications and therapeutic response in HIVAids patients	
14.40-14.50	**Coffee Break**	

14.50-15.10	**Reni Dwi Setyaningsih** Secondary infertility risk and contraceptive use in Indonesia (analysis of Indonesian demographic health survey 2002-2003)
15.10-15.30	**Farida Wahyuningtyias** Risk factors of food pattern and consumption level of iodine and thiocyanate on goiter incidence in Jember
15.30-15.50	**Pramesti Dewi** Praise to make everlasting factors influencing occurrence of TB lung at productive age in region work community health service Bobotsari Purbalingga regency
15.50-16.10	**Dian Ramawati** Factors that related to self-care ability in mental retardation children in Banyumas district Central Java
16.10-16.30	**Indra Jati Kusuma** Sports development index of district Banyumas

13.00-16.30	**PARALLEL B** **Garuda Room**
13.00-13.20	**Indra Jati Kusuma** Relationships between physical fitness and blood sugar levels among patients with Diabetes mellitus type 2
13.20-13.40	**Yudhi Wibowo** Sensitivity test: Sahli and Hemocue methods for detection maternal anemia in Cemani and Makamhaji villages Sukoharjo district, Central Java Indonesia 2011
13.40-14.00	**Saryono** Hemoglobin levels and the role of parents to prevent of anemia in children in the elementary school of Bojongsari district Banyumas
14.00-14.20	**Bobby Presley** The influence of drug related problems intervention for inpatients with pneumonia in " x" private hospital
14.20-14.40	**Harwoko** Rationality of antiretroviral therapy for HIVAids inpatients in a hospital in Yogyakarta
14.40-14.50	**Coffee Break**
14.50-15.10	**Lantip Rujito** Quality of life, ferritin levels, and screening patients with thalassemia in Banyumas
15.10-15.30	**Didik Setiawan** The comparison cost of treatment based on immunohistochemistry status in breast cancer patient who is treated with 5-fluorouracyl, doxorubicine, and cyclophosphamide (fac) combination chemotherapy

15.30-15.50	**Endang Triyanto** Family support needed for adolescent puberty
15.50-16.10	**Irfan Dwiandhono** Aspects which influence the existence of cost sharing health insurance in civil servants, retirees and their families
16.10-16.30	**Sri Nurlaela** Prediction model to identify tuberculosis case among households contact of TB case (contact investigation in Banyumas district)
13.00-16.30	**PARALLEL C Merak Room**
13.00-13.20	**Aguslina Kirtishanti** Ethanol extract of tiken leaves (*Fraxinus griffithii* Clarke) as anticonvulsant in mice
13.20-13.40	**Hendri Wasito** The total phenolic content of *Zingiber officinale*, *Piper retrofractum*, and their combinations
13.40-14.00	**Hanif Nasiatul Baroroh** The cleaving activity assay on supercoiled dna by protein fraction from *Jatropa curcas* leaves
14.00-14.20	**Dwi Utami Anjarwati** Extended spectrum β – lactamases **(esbls) screening for** nosocomial infection control among enterobacteria of medical interest in Intensive Care Unit Prof. Margono Soekarjo Hospital, Purwokerto
14.20-14.40	**Dhadhang Wahyu Kurniawan** Lozenges of ethanol extract rosella (*Hibiscus sabdariffa* L.) Calyx with variation of mannitol
14.40-14.50	**Coffee Break**
14.50-15.10	**Tuti Sri Suhesti** Formulation and evaluation of piroxicam tablets on the different excipients (flowlac, avicel and compritol)
15.10-15.30	**Anisyah Achmad** The bioactivity of losartan serum levels of aminotransferase and bilirubin rat liver fibrosis
15.30-15.50	**Nur Khikmah** Factors affecting women's motivation in using tubectomy contraception method in Dukuhturi village Bumiayu sub regency Brebes regency
15.50-16.10	**Wahyu Ekowati** Exploration of mental disorders patient response after getting health officer home visite in the district of Banyumas
16.10-16.30	**Agung Saprasetya Dwi Laksana** Associations between chlorine level in the drinking water source and the occurence of low birth weight at Margono Soekarjo Hospital Purwokerto