

Performance of TB health center service officers based on compensation effect, supervision and competence using machine learning technique

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Abstract. Tuberculosis as a major health problem in Indonesia, need to evaluate the procedure to solved and increase the solution. The objectives of the research were to discover the correlation of performance of TB Health center service based on compensation effect, supervision and competence. The population consisted of 78 correspondence were taken as the sample through cluster random sampling technique. The study aims to the identification and evaluates the officer competence, supervision, and compensation of TB problem in the Medan Area, by using Machine learning technique to test the correspondence. The results of the research concluded, there was a significantly positive correlation between compensation effect, supervision and the competence with the performance of TB Health Center officers.

1. Introduction

Tuberculosis (TB) is still one of the major health problems not only in the world but also in Indonesia. Based on the Global TB reports in 2018 [1], TB is one of the top 10 causes of death. In 2017, TB caused around 1.3 million deaths among HIV negative people and there was 300,000 additional death from TB among HIV positive people [2]. It's estimated that there are 10.0 million new TB cases in Indonesia, it's equivalent to 133 cases per 100,000 population. The five countries with the highest incidence of cases were India, Indonesia, China, Philippines, and Pakistan, so that Indonesia ranked second with the highest TB burden in the world. This means that Indonesia has major problems in dealing with TB [3], [4]. Therefore, until now TB is still the top priority in the world and is one of the goals in Sustainability Development Goals (SDGs) [5], [6].

According to this case, we need to evaluate the procedure to solved and increase the solution to TB problems. Understanding supervision for TB problem can be making the big solution to improve the TB problem [7], the other method by look for the composition effect. Based on the case identification of this research, for limited timing, we will focus on compensation variable, supervision and competence variable. This research aims to the identification and evaluates the officer competence, supervision and compensation of TB problem in the Medan Area by using Machine learning technique.

2. Data and Method

2.1 Data

The data were employed in the working area of the UPK (Health Center) Medan City Health Office, Medan, Indonesia, with the consideration that the performance of TB officers was not optimal for five months. The raw data at this paper is the standard metadata exchange formats of Excel. Distribution the data in the working area of UPK in Medan city Health show in Table 1. In this table, UPK (Health Center) Medan city health office in Petisah, Medan is the wide health center areas which distribution of TB officer based on respondent histories.

Table 1. TB correspondent

User ID	Gender	Age	Years of Service
10001	female	43	21
10002	female	46	18
10003	female	48	26
10004	female	32	9
10005	female	30	8
10006	female	50	22
10007	female	32	8
-	-	-	-
-	-	-	-
-	-	-	-
10076	male	46	30
10077	male	46	13
10078	male	51	8

2.2 Method

This research is a quantitative design cross-sectional study with an explanatory approach [8]. Explanatory surveys are studies designed to explain causal relationships between the variable [9], [10]. Machine learning technique is one method to evaluate and look for the causal relationship between variable to know the performance of each model. In this case, we use a machine learning technique by using a support vector machine (SVM) classification KNN [11]–[14].

3. Result and Discussions

The characteristics of respondent include age, gender, education, years of service and marital status. The results showed that respondents with the highest age were 38-46 years, that is as many as 45 people (57.7%), then respondents aged 47-55 years, that is as many as 22 people (28.2%) and the least were respondents aged 29- 37 years, as many as 11 people (14.1%). This shows that TB officers as respondents are more in productive age show in figure 1. Leaders more easily provide direction in completing work. The results showed that the majority was female, that is as many as 63 people (80.8%), and the least were male respondents, namely 15 people (19.2%). This shows that female TB officers play more roles

in implementing suspected TB findings. The Health center needs female officers in terms of technical communication approaches to patients with TB in the field.

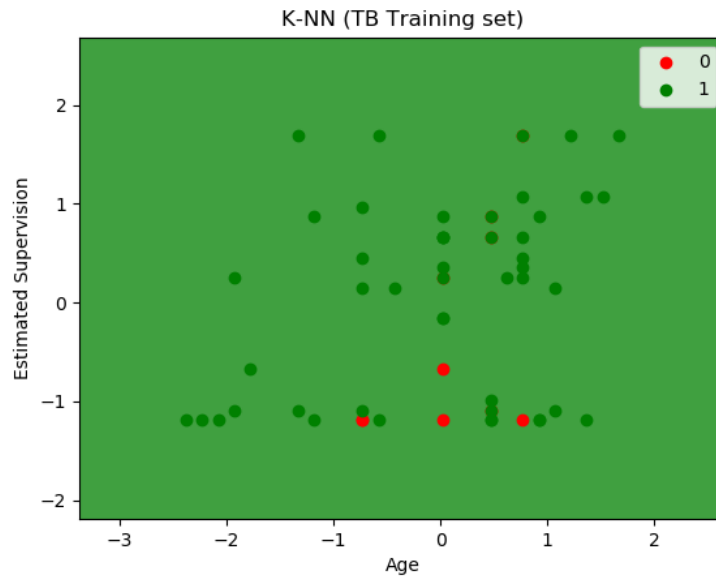


Figure 1. Classification TB correspondence based on Age and Supervision

The results showed that the majority of the educational characteristics of respondents with Diploma education level, namely as many as 74 people (94.9%), and the least were respondents with S1 education level, as many as 4 people (5.1%). This shows that TB officers recruited by the health center are at the level of education that are ready to do their jobs and are given training according to their job competency demands.

The results showed that the majority of the working period of respondents was 6-10 years, that is as many as 49 people (62.8%), then work period ≤ 5 years, namely as many as 21 people (26.9%) and at least respondents with tenure > 10 years, which is as many as 8 people (10.3%). This shows that most of them are classified as not long ago as TB officers, so there is still a need for more training to achieve competence in their fields and supervision in work must be more consistent to avoid mistakes made by TB officers.

The results showed that the majority of marital status with marital status, namely as many as 70 people (89.7%), and the least were respondents with unmarried status, namely as many as 8 people (10.3%). In figure 2, the majority of health center TB officers work to meet family needs with the aim of getting a more decent income for family welfare.

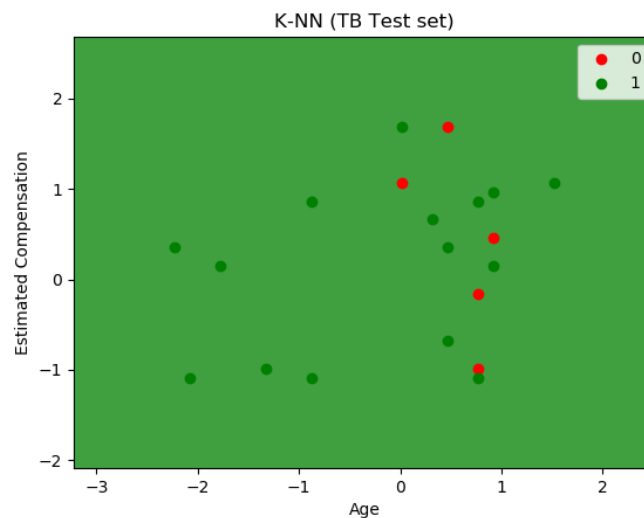


Figure 2.Classification TB respondent based on supervision Test

The result of this study are accordance and represented of calculation of simple regression analysis

$$\hat{Y} = 0,081 + 1,035X_1 + 1,017X_2 + 0,574X_3 + \varepsilon$$

The results of multiple linear regression equations show that constants are 0.081. If the variable compensation, supervision, and competence are assumed to be 0, then the performance of the TB officer is 0.081 units. The compensation coefficient is 1,035. This shows that if compensation increases by one unit, the performance of TB officers will increase by 1,035 units. The supervision coefficient value is 1.017. This shows that if supervision increases by one unit, the performance of TB officers will increase by 1.017 units. The coefficient of competence is 0.574. This shows that if competence increases by one unit, then the performance of TB officers will increase by 0.574 units.

Table 2.The Test Result for Multiple Linear Regression Effect of Compensation, Supervision and Competence of Performance TB Officer

Variabel	<i>Coefficients</i>	<i>t</i>	<i>Sig.</i>
	<i>B</i>		
(Constant)	0,081	0,014	0,989
Compensation	1,035	8,100	0,000
Supervision	1,017	6,696	0,000
Competence	0,574	4,373	0,000

4. Conclusions

Based on the results obtained in the study, the compensation, supervision and competence has a positive and significant effect and the compensation variable is the most influential variable on the performance of health center of TB officers in the Working Area of the Medan City Health Service.

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