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Model statistic with program LISREL for medical solid infectious waste hazardous hospital Type B management in Medan City

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Abstract. The occurrence of medical solid waste could be from the results of treatment activities, such as, in the treatment room for a hospital inpatient, general clinic, a dental clinic, a mother and child clinic, laboratories and pharmacies. Most of the medical solid waste contains infectious and hazardous materials. Therefore it should be managed properly, otherwise it could be a source of new infectious for the community around the hospital type B as well as for health workers themselves. This paper proposes a model for managing the medical solid waste in hospitals in Medan city, in order to create healthy environment around hospitals. Health development in Indonesian aims to achieve a future in which the Indonesian people live in a healthy environment, its people behave clean and healthy, able to reach quality health services, fair and equitable, so as to have optimal health status, health development paradigm anchored to the healthy. The healthy condition of the individual and society can be influenced by the environment. Poor environmental quality is a cause of various health problems. Efforts surveillance of various environmental factors need to be applied in accordance with the principles of sanitation focuses on environmental cleanliness.

Keywords: medical solid waste, quality health services, health problems and environmental cleanliness.

1. Introduction

Hospital activities will generate a number of by-products in the form of waste, both solids, liquids and gases that contain pathogens, chemicals and medical equipment which are generally dangerous and toxic [1,2]. In order to improve the quality of services, hospitals type B should be able to cope with such waste [3,4]. As for the waste treatment facilities in the hospitals type B one of them is to use incinerators [5].

The problem of waste is a serious concern of the people and government of Indonesia, especially since the last decade, mainly due to the business development activities of the hospitals type B which is the backbone of economic development for Indonesia [6]. Waste management is a necessity for the preservation of human health and the environment in general [7]. However, the procurement and



operation of medical solid waste processing facility hospitals type B was still considered burdensome for the hospital with generally [8].

2. Problem Formulation

If the amount of waste collected quite a lot, it is necessary to increase the number of containers. Containers are usually made from metal or plastic [9]. Medical waste category of medical waste can be classified based on the potential dangers of hanging in it, as well as the volume and persistence properties which cause problems [6] for example:

1. Waste sharp objects such as needles, intravenous equipment, pasteur pipette, broken glass, and others;
2. Infectious waste, has a sense as waste associated with patients who require isolation of infectious diseases (intensive care) and laboratory waste [10].
3. Waste pathology (body tissue) is removed from the body tissue surgery or autopsy process;
4. Waste cytotoxic is material contaminated or possibly contaminated with bath cytotoxic during compounding, transport or treatment measures cytotoxic;
5. Waste pharmaceuticals derived from expired drugs that are not needed;
6. Chemical waste resulting from the use of chemicals in action, medical, veterinary, laboratory, sterilization processes and research;
7. Radioactive waste is material contaminated with radio-isotopes originating from medical or research used to radionucleous [11].

Until now, there are various laws and regulations governing the management of hazardous and toxic chemicals, but not sufficient, especially to prevent pollution or environmental damage [12]. For example, the Government Regulation on the Management of hazardous and toxic chemicals, the issue focused on the management of hazardous and toxic materials for solid waste hospital hospitals type B medical and other third parties who act as producers, users, transporters, storage, user and collection especially for solid waste home medical in accordance with certain diseased appendix in the regulation [13].

Sets and indices

One quality that is fairly common in the LISREL model is that the models disregard the means and regard all variables to be centered about their group means. This, in turn, results in having the models with zero means. This is done in order to reduce the complexity associated in the analysis [14].

If a multi-group model is being worked on with the help of LISREL, then it will give the same output of that process as is obtained by running a regression with dummy variables in SPSS [15]. LISREL helps the researcher in providing a fairly influential and flexible means for the examination of various group differences. It provides indicative information called modification indices which help the researcher in identifying the equality constraints [16].

LISREL can help the user to identify the interaction effects that need to be included in the model and the ones that do not need to be included in the model. The indicative information can be used in diagnosing the model specification for medical solid infectious waste hospital hospitals type B management in Medan city [17].

Variables

1. Variable performance of machines and tools (incinerator) in the treatment of hospital hospitals type B medical solid waste (X1).
2. Variable availability of medical solid waste from the activities of hospital hospitals type B activities (X2).
3. Variable of environment variable availability of human resources according to the rules in the Decree of the Minister of Health of the Republic of Indonesia Number 12 Year 2004 (X3).
4. Variable overcome the impact of the hospital's medical solid waste (X4).

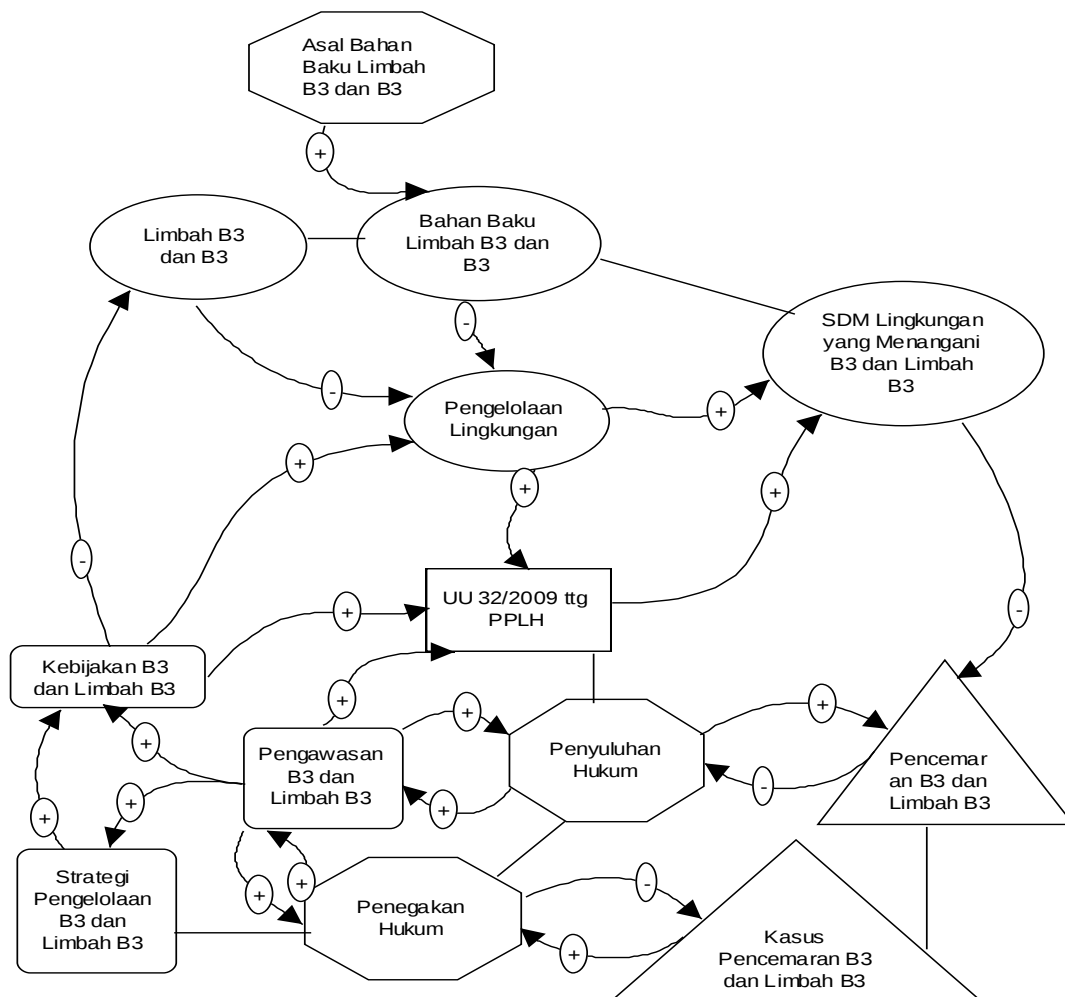


Figure 1. Causal case diagram

Parameters

1. X1.1 = Source hospital medical solid waste.
2. X1.2 = Type hospital medical solid waste.
3. X1.3 = Number of hospital medical solid waste.
4. X1.4 = Production of hospital medical solid waste.
5. X2.1 = Number of rooms and patient.
6. X2.2 = Facilities or Facility Storage While medical solid waste.
7. X2.3 = Physical condition of availability of raw materials activities of hospital activities.
8. X2.4 = Medical solid waste collection process hospital.
9. X3.1 = Condition Availability HR environment.
10. X3.2 = Graduates HR environment.
11. X3.3 = Ability or expertise HR environment.
12. X3.4 = Training officers in the handling of hospital medical solid waste.
13. X4.1 = Condition of society in the hospital environment.
14. X4.2 = Attitude of people in a hospital environment.
15. X4.3 = The level of awareness of the hospital against medical solid waste treatment.
16. X4.4 = Level of medical solid waste pollution hospital.

3. Results and Discussion

Mathematical formulation with model statistic such as program LISREL used dependent and independent variables influence in the determination of the conceptual study, are $R = Y$, and we explain, $Y = a1X1 \{ (a1X1.1) + (a1X1.2) + (a1X1.3) + (a1X1.4) \} + a2X2 \{ (a2X2.1) + (a2X2.2) + (a2X2.3) + (a2X2.4) \} + a3X3 \{ (a3X3.1) + (a3X3.2) + (a3X3.3) + (a3X3.4) \} + a4X2 \{ (a4X4.1) + (a4X4.2) + (a4X4.3) + (a4X4.4) \}$.

Model LISREL medical solid infectious waste hospital management in Medan city for Living protected Environmental Law paying. Applicable Legislation (Y). Whatever t formula = statistic test if will $n1$ = the total number of samples and $n2$ = number of sample groups. We can see the results of the program statistical methods using LISREL can be given results at the beginning (Table 1 combination with Figure 2) and end resistances (Table 2 combination with Figure 3).

Table 1. SEM conformity index before modification model

Criteria	Value 89; df=96; alpha=0.05	Result LISREL	Solution
Free degree (db)	> 0	96	Qualify
Chi – Square	< 197.064	107,99	Qualify
P-value	P value $\square$ 0.05	0,17091	Qualify
CMIN/DF	$\square$ 2,00	3,712	Not Qualify
Root Mean Square Error of Approximation (RMSEA)	$\square$ 0.08	0,37	Qualify
Goodness of Fit Index (GFI)	$\square$ 0.90	0,878	Not Qualify
Adjusted Goodness of Fit Index (AGFI)	$\square$ 0.90	0,846	Not Qualify
Tucker Lewis Index (TLI)	$\square$ 0.95	0,872	Not Qualify
Comparative Fit Index (CFI)	$\square$ 0.94	0,853	Not Qualify

Explain : n = number of samples; df = free degree

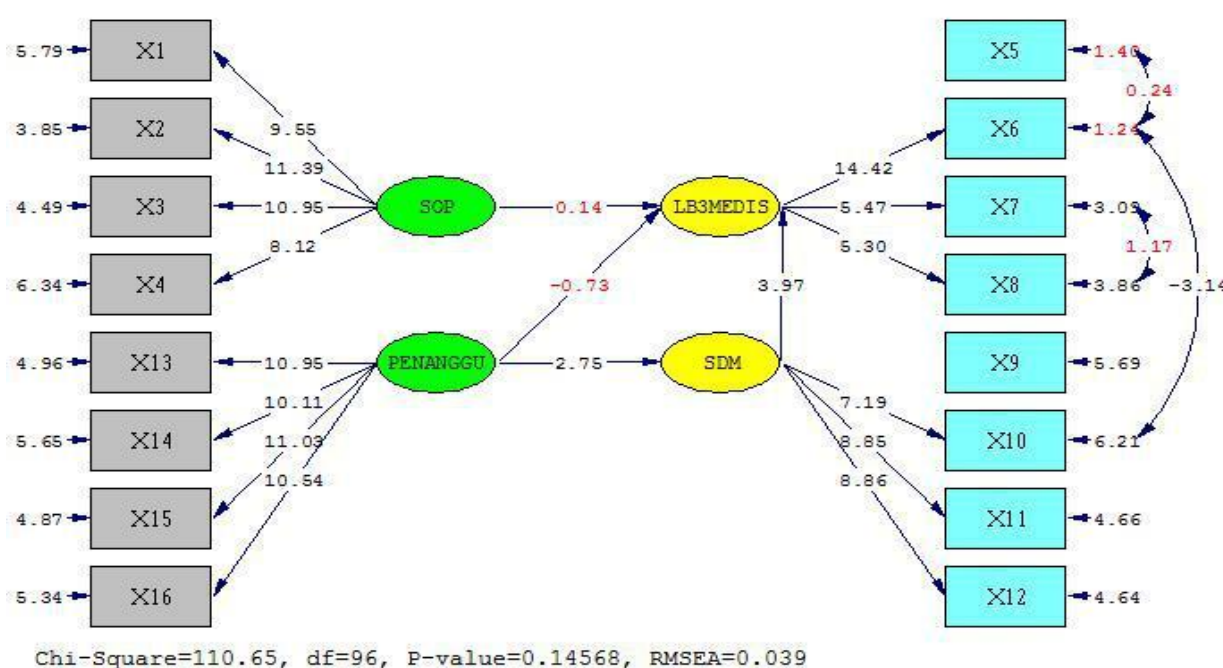


Figure 2. Statistical T test table LISREL models

The final results of data processing are summarized in the following in Table 2, for Model Statistic with Program LISREL for Medical Solid Infectious Waste Hazardous Hospital Type B Management in Medan City.

Table 2. SEM conformity index after modification model

Criteria	Value 89; df=96; alpha=0.05	Result LISREL	Solution
Free degree (db)	> 0	96	Qualify
Chi – Square	< 155.405	110,65	Qualify
P-value	P value $\square$ 0.05	0,14568	Qualify
CMIN/DF	$\square$ 2,00	0,0800	Qualify
Root Mean Square Error of Approximation (RMSEA)	< 0.08	0,0390	Qualify
Goodness of Fit Index (GFI)	$\square$ 0.90	0,9638	Qualify
Adjusted Goodness of Fit Index (AGFI)	$\square$ 0.09	0,9406	Qualify
Tucker Lewis Index (TLI)	$\square$ 0.95	0,9894	Qualify
Comparative Fit Index (CFI)	$\square$ 0.94	0,9929	Qualify

Explain : n = number of samples; df = free degree

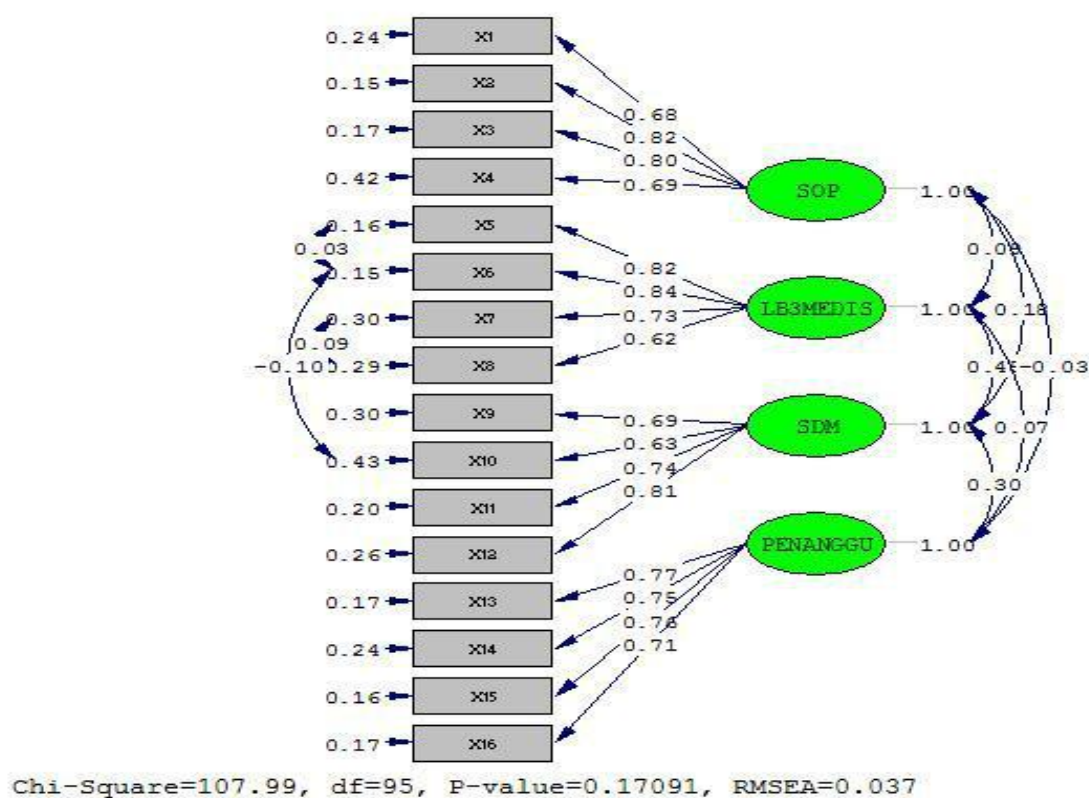


Figure 3. LISREL models

4. Conclusions

The conclusions of the model LISREL medical solid infectious waste hospital management in Medan City, can be stated as follows. a. Internal hospital solid waste collection process internally. ($X_1 = 0.768$). b. Sources of hospital medical solid waste. ($X_2 = 0.743$). c. Number of hospital medical solids produced ($X_3 = 0.738$). d. Type of hospital medical solid waste ($X_4 = 0.665$). e. Model suitable measures and efforts to become a model statistic with program LISREL medical solid infectious waste hospital type B management in Medan City, is $Y = 0,768 X_1 + 0.743 X_2 + 0.738 X_3 + 0.665 X_4$.

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