DECISION SUPPORT WORTHINESS INPATIENT ROOM AT REGIONAL PUBLIC HOSPITAL PRINGSEWU USING SIMPLE ADDITIVE WEIGHTING METHOD

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Abstract

Health is one requirement for humans. Health care is a process to provide facilities for patients treated in hospitals Pringsewu. As well as it is a basic requirement for controlling and maintaining quality of service. One that affects the quality of health care is the worthiness of inpatient room at the grade 3 in hospital Pringsewu. This study is focus on emphasizes the purpose of the system worthiness inpatient is to determine the worthiness of inpatient grade 3 in hospital Pringsewu, furthermore in this study can give a solution to improve the quality of inpatient grade 3 Hospital by delivering systems decision support to determine the worthiness of inpatient grade 3 that can be used to support the evaluation of service in hospital Pringsewu. The research conducted in hospitals Pringsewu by using Simple Additive Weighting method (SAW). The goal of this research was to determine the worthy or not the inpatient in hospitals Pringsewu. The determination of worthiness decision system's inpatient with a view of seven assessment criteria such as service duty, sleeping facilities, showers, support facilities, oxygen, waiting room services and technical services. Based on the calculation the results obtained SAW, among others: the room is very worthy is C room value of 0.66, adequate is A room value of 0:59, room E value of 0:58, room B value of 0:57, and the room was not worth D value of 0:31

Keywords: SPK, Simple Additive Weight (SAW), Hospital

1.0 INTRODUCTION

In the globalization era increasingly development of information technology is rapidly. Information technology can be used to improve quality and productivity for humans. The globalization of information forcing every body of both individuals and groups, both private and government, to take into account the information system will be applied in order to remain competitive. The general public can use information systems to get the information are needed. Almost all of this information is now packaged in the form of an information system that was developed into computer-based information systems or shortened by SIBK. The hospital provides inpatient service in short-term and long-term activities include observation, diagnostic, therapeutic and rehabilitation of all those who suffer from illness or injury, and for those who give birth, and also provided services based outpatient and inpatient care for the needy in accordance with the pain.

Sjamsuhidajat, et al. (2010: 1) the function of the hospital is a place to hold medical services, support services, nursing services, rehabilitation services, and preventive health care. Thus the hospital is an institution with multi-product, capital-intensive, labor-intensive and technology-intensive, so it requires good management in its management. Activities at the hospital include the

implementation of health services and the administration, building maintenance, equipment and supplies.

Hospital Pringsewu is a state hospital grade C. The hospital is able to provide specialist medical care limited service. The hospital also accommodates referral services from health centers. The hospital provided 152 inpatient beds, more than any hospital in Lampung that provided an average of 73 inpatient beds. Numbers of physicians are 25, the physician of the hospital provided less than the average hospital in Lampung. Furthermore Inpatient services including high-class 8 of 152 beds in this hospital classy VIP upwards. (The handbook of Accreditation of Hospital District Pringsewu). Other facilities owned hospitals Pringsewu are includes General Medical Care, Emergency Services, Medical Services Specialist Basic, Services Specialist Medical Support, Medical Care Other Specialists, Medical Services Specialist Dental Mouth, Medical Care subspecialty, Nursing care and Midwifery, Support Services Clinics and Services supporting Non Clinic. (Ministry of Health of the Republic of Indonesia No. 340 / Menkes / Per / III / 2010).

Evaluation of health care is a process to determine the value or amount of the success of the implementation of an activity and a basic requirement for controlling and maintaining quality of service. This evaluation is useful for continuity of service and improving quality service. One that affects the quality of health care is the worthiness of inpatient related hospitalizations with patient in hospitals Pringsewu.

Determining worthy or not a inpatient is very difficult because of the many criteria that must be seen, therefore needed a decision support system to know the worthiness of the inpatient 3 grade in hospitals Pringsewu. This research aims to produce a decision support system SAW method that can be used to support the evaluation of the worthiness of inpatient in hospital Pringsewu.
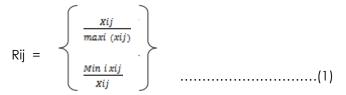
2.0 THEORETICAL
2.1. Data Collection Method

Observation is a method of collecting data about the worthy of the inpatient by way of direct observation of the research object by analyzing a running system existing at the sites. Interview method is a method of data collection inpatient information by conducting activities to speak directly to employees of Hospital Pringsewu. Literature review it is a step that is done by studying reference books or sources related to a method of completion method of SAW (Simple Additive Weight) and decision support systems both from a text book or internet.

2.2. Simple Additive Weighting

A weighted summation method. The basic concept is to find a method of SAW weighted summation of ranking performance at each alternative on all criteria (Kusumadewi, 2012: 12). SAW method requires a decision matrix normalization process (X) to a scale that can be compared with all ranking of existing alternatives. SAW method to knowing two attributes that criterion advantages (benefits) and cost criteria (Cost). The fundamental differences of both of these criteria are in the selection criteria when making decisions.

Here is the formula of simple Additive Weighting Method (SAW):

$$R_{ij} = \begin{cases} \dfrac{x_{ij}}{\max_i (x_{ij})} \\[2ex] \dfrac{\min_i x_{ij}}{x_{ij}} \end{cases} \quad \dots\dots\dots\dots\dots\dots\dots(1)$$

If j is an attribute profits
If j is the attribute cost (cost)
Information:

Rij   = Values normalized performance rating
Xij   = Value attributes of each criterion
Maxi (xij)   = The greatest value of each criterion
Min i xij   = Smallest value of each criterion
Benefit   = If the greatest value is the best
Cost   = If the smallest value is best

$$V_i = \sum W_j R_{ij}$$ …………………………………………………(2)

Information:

Vi   = Ranking for each alternative
Wj   = Weight value of each criterion
Ri   = Value normalized performance rating

The steps in the completion of use are:
1. Determining the alternative, that Ci
2. Determine the suitability of each alternative ranking on each criterion.
3. Provide value ranking suitability each alternative on each criterion.
4. Determine the weight of preference or level of interest (W) each criterion. W = [W1, W2, W3, Wh]
5. Create a table ranking suitability of each alternative on each criterion.

Make a decision matrix (X) which is formed of ranking table suitability of each alternative on each criterion. Rated X every alternative (Ai) on each criterion (Cj) is already determined, wherein, i = 1,2, ... m and j = 1,2, ..

In this analysis, all data obtained from the Hospital District Pringsewu will be implemented in the form of decision-making based on the SAW method is used.

3.0 METHODOLOGY

a. Determining each criteria are as follows:

Table 3.1. Description Criteria

Criteria Code	Criteria
C1	Keep services
C2	Bed facility
C3	Bathroom
C4	Facilities (air conditioning / fan, type of flooring, air ventilation, bathroom, Wardrobe)
C5	Oxygen
C6	Waiting Room service
C7	Technical Services (Curtain barrier, electricity)

b. Furthermore, each of these criteria will be determined weight. In the weight consists of five numbers in the table below is a table of data rooms in district hospitals. Pringsewu is an alternative option or inpatient room that will be tested for worthiness.

Table 3.2. Alternative inpatient

No	Alternative	Information
1.	A	Inpatient in 3 grade internal disease
2.	B	Inpatient 3 grade children
3.	C	Maternity room 3 grade
4.	D	surgical inpatient 3 grade
5.	E	Inpatient accidents3 grade

Decision-making give weight to each of the following criteria:

Table 3.3. Weights Criteria

Criteria Code	Weight
C1	5
C2	20
C3	10
C4	10
C5	5
C6	30
C7	20
	100

Tabel 3.4. Bobot Nilai

Weight	Value
Very Low (SR)	1
Low (R)	2
Enough (C)	3
High (T)	4
Very Hight (ST)	5

Table 3.5. Keep Services (C1)

Weight	Value
Polite	1
Friendly	3
standby	5

Tabel 3.6. Bed Facilities (C2)

Weight	Value
Broken	1
Good	4
Very Good	5

Tabel 3.7. Toilet (C3)

Weight	Value
There is no	2
There is	5

Tabel 3.8. Support Facilities (C4)

Weight	Value
Air ventilation	1

Air ventilation, ac, cupboard	3
Types of flooring, air vents, cupboard, AC	5

Tabel 3.9. Oxigen (C5)

Weight	Value
There is no	2
There is	5

Tabel 3.10. Waiting room service (C6)

Weight	Value
Chair	1
Chair, mat	3
Chair, mat, blanket	5

Tabel 3.11Technique service (C7)

Weight	Value
Curtains,	1
Curtains, bed	2
Curtains, bed, Electricity	5

The next step determines suitability ranking:

Table 3.4. Ranking Matches

Alternative	Result						
	C1	C2	C3	C4	C5	C6	C7
A	1	4	2	5	2	3	2
B	3	1	5	3	2	5	1
C	3	5	5	1	5	1	5
D	5	1	2	1	2	1	2
E	1	5	2	3	5	3	5

Then do the decision matrix formed from:

$$X = \begin{bmatrix} 1 & 4 & 2 & 5 & 2 & 3 & 2 \\ 3 & 1 & 5 & 3 & 2 & 5 & 1 \\ 3 & 5 & 5 & 1 & 5 & 1 & 5 \end{bmatrix}$$

Normalization of each alternative.The formula used as follows:
Normalisasi Matrik From calculation the above normalization matrix obtained as follows:

$$R = \begin{bmatrix} 0.2 & 0.8 & 0.4 & 1 & 0.4 & 0.6 & 0.4 \\ 0.6 & 0.2 & 1 & 0.6 & 0.4 & 1 & 0.2 \\ 0.6 & 1 & 1 & 0.2 & 1 & 0.2 & 1 \end{bmatrix}$$

Assign a value to each of the following criteria:

W1= 5%, W2=20%, W3=10%, W4=10%, W5=5%, W6= 30, W7= 20

W= [0.05, 0.2, 0.1, 0.1, 0.05, 0.3, 0.2]

Furthermore, the results of the rank or the best value for each alternative (Vt) can be calculated with the following formula:

$V_t = \sum W_j R_{ij}$……………………………………..(3)

The results obtained as follows:

V_1 = (0.2)(0.05) + (0.8)(0.2) + (0.4)(0.1) + (1)(0.1) + (0.4)(0.05)+ (0.6)(0.3)+(0.4)(0.2)

= 0.01+0.16+0.04+0.1+0.02+0.18+0.08

= 0.59

V_2 = (0.6)(0.05) + (0.2)(0.2) + (1)(0.1) + (0.6)(0.1) + (0.4)(0.05)+ (1)(0.3)+(0.2)(0.2)

= 0.03+0.04+0.1+0.06+0.02+0.3+0.04

= 0.57

V_3 = (0.6)(0.05) + (1)(0.2) + (1)(0.1) + (0.2)(0.1) + (1)(0.05)+ (0.2)(0.3)+(1)(0.2)

= 0.03+0.2+0.1+0.02+0.05+0.06+0.2

= 0.66

V_4 = (1)(0.05) + (0.2)(0.2) + (0.4)(0.1) + (0.2)(0.1) + (0.4)(0.05)+ (0.2)(0.3)+(0.4)(0.2)

= 0.05+0.04+0.04+0.02+0.02+0.06+0.08

= 0.31

V_5 = (0.2)(0.05) + (1)(0.2) + (0.4)(0.1) + (0.6)(0.1) + (1)(0.05)+ (0.6)(0.3)+(1)(0.2)

= 0.01+0.2+0.04+0.06+0.05+0.0.18+0.2

= 0.58

Based on the calculation above ranking of the calculation results can be seen in the table below:

Room	Ranking	Value	Describe
A	II	0.59	Worthy
B	IV	0.57	Worthy
C	I	0.66	Very Worthy
D	V	0.31	Not Worthy
E	III	0.58	Worthy

5.0 CONCLUSION

After conducting an analysis and direct observation of the research object, the writer can draw the conclusion, based on the calculation SAW results obtained include: room that very viable is room C value of 0.66, adequate room A value of 0.59, room E values 0.58, room B value 0.57, and the rooms are not worth is the room D value of 0.31.

REFERENCE

[1] Muslihudin, Muhamad., A. Wulan Arumita. 2016. *Pembuatan Model Penilaian Proses Belajar Mengajar Perguruan Tinggi Menggunakan Fuzzy Simple Additive Weighting (SAW) (Sudi: STMIK Pringsewu)*. SEMNASTEKNOMEDIA. Vol 4, No 1. Hal 4.11-31 - 4.11-36. STMIK AMIKOM. Yogyakarat.

[2] Hanifa., Muslihudin, Muhamad., Hartati, Sri. 2016. *Sistem Pendukung Keputusan Menentukan Besar Gaji Untuk Guru Honorer Di Kabupaten Pesawaran Menggunakan Metode Fuzzy SAW.* Jurnal Teknologi, Vol. 09 No.01 Juni 2016, hal. 83-88. IST Akprind. Yogyakarta.

[3] Abadi, Satria., Sri, Hartati. 2015. *Determination Model Of Independent Business Credit "Grameenbank" Pattern Using Simple Additive Waighting (SAW) Method To Enhancing The Rural Economic Development.* ICITB2015. IBI Darmajaya. Lampung.

[4] Ulfah, Maria. 2013. *Perancangan media promosi PT. Pegadaian Dalam Upaya Meningkatkan Brand Equity Melalui CSR.* STIKOM Surabaya.

[5] Maseleno, Andino. *Fuzzy Logic and Dempster-Shafer belief theory to detect the risk of disease spreading of African Trypanosomiasis.* IEEE. Page 153-158. ICDIPC 2015.

[6] Zadeh LA. Fuzzy Sets. *Information and Control.* 1965; 8: 338-353.

[7] Kusumadewi, Sri., Hartati, S., Harjoko, A., dan Wardoyo, R. 2013. *Fuzzy Multi-Attribute Decision Making (FUZZY MADM).* Yogyakarta: Penerbit Graha Ilmu.