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Decision support system for selection of healthy Toddlers using MOORA method

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Abstract: Toddlers are the human stage after infancy, toddlers are one of the most important stages in the quality development of human growth. one way to develop health in toddlers is to carry out routine checks at Public Health Center. Public Health Center has not yet provided a system for selecting healthy toddlers and also requires a system for selecting healthy toddlers. Therefore a decision support system is needed to make decisions related to checking the health of toddlers. decision support system is part of a computer-based information system, which is used to make a decision, in making a decision support system the Multi Objective Optimization by Ratio Analysis (MOORA) method is used. Based on the calculations made regarding the decision to check the health of toddlers, the MOORA method uses weighting criteria and determines the type of criteria, and MOORA does not have sub-criteria weighting provisions using FMADM, FMADM weighting reduces ambiguity because the bigger the value, the better, but if the value is too large then it is not good, such as body weight. It is necessary to provide more sub-criteria so that the accuracy in ranking is better and more accurate with a scale of 0-5. The optimization value for A1 is obtained by adding the cells from A1 0.6765 + 1.0070 + 0.2626 + 0.1195 = 2.0656 and Alternatives A2, A3, A15 have the most optimal weight values with optimization values (2.3282).

Keywords: Toddler; Public Health Center; Decision Support System; MOORA; FMADM

INTRODUCTION

Toddlers are the human stage after infancy which starts from 0 to 5 years old, toddlerhood is one of the most important stages in the development of the quality of human growth in the future, therefore parents play an important role in improving the health of toddlers' bodies. While healthy toddlers are optimal health conditions for children aged around 0 to 5 years. With the increase in malnutrition in toddlers to make people aware that health in toddlers is an important thing to develop (Qisqadartunissa et al., 2022), one way to develop health in toddlers is to carry out routine checks at posyandu and Public Health Center.

One of the Public Health Center located in the city of Medan is the Padang Bulan Health Center, unfortunately this Pukesmas does not yet provide a system for selecting healthy toddlers. Therefore a decision support system is needed and it also requires a system for selecting healthy toddlers. Therefore, a decision support system is needed with the right method for selecting healthy toddlers at the Public Health Center (Fajarika, 2019). The decision support system is part of a computer-based information system, which is used to make a decision, decision-making plays a role in overcoming problems and preventing negative impacts that occur in the future, and also to increase effectiveness by making the right decisions in a problem(Surahaman & Nursadi, 2019).

Previous research using the Simple Additive Weighting (SAW) method concluded that this method was able to help Public Health Center make decisions in selecting healthy toddlers that went well using a calculation process based on established criteria. exists, and suggests for future researchers to try using other methods (Qisqadartunissa et al., 2022). In making a decision support system we need the right method, therefore the researcher in this case uses the Multi-Objective Optimization by Ratio Analysis (MOORA) method in making decisions about selecting healthy toddlers at the Padang Bulan Health Center. Multi Objective Optimization by Ratio Analysis (MOORA) is one of the decision support system methods described by Brauers and Zadvadkas in 2006 in solving complex problems, through optimizing different attributes simultaneously (Fajarika, 2019). The MOORA method is also called the Multi-Objective system which maximizes more than two criteria simultaneously, this method uses multiplication in its calculations to connect all criteria, this method is also very flexible. The advantage of MOORA is that it is very easy to understand in making a decision because it can handle multi-criteria conditions. Based on

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the above background, researchers are interested in designing a decision support to choose the healthiest toddlers at Padang Bulan Health Center using the MOORA method.

LITERATURE REVIEW

Healthy Toddlers

Toddler is a term used to describe children between the ages of 1 to 5 years. As for "healthy toddlers" is a term that refers to information or news relating to the health and well-being of children or toddlers. Healthy toddlers cover topics such as nutrition, medical care, mental health, fitness and dental health in toddlers. Healthy toddlers can help parents or caregivers better understand how to maintain optimal health and wellbeing for their children.

Decision Support System

Decision support system published by Michael S. Scott Morton in 1970 which is familiar with the call Management Decision System. The decision support system is a computer-based system (Sari et al., 2022) which is capable of solving problems in order to produce the best decisions, which are taken by decision makers (Suginam, Ermi Suryani Nasution, Sapria Ulandari Lubis, 2018). The characteristics of decision support systems (SPK) according to (Hasugian & Cipta, 2018).

a) Interactive: The decision support system has a user interface so that users can access it quickly.
b) Flexible: Presents 2 decision alternatives to the user.
c) Quality Data: Have the ability to receive data whose quality is quantified and is subjective.
d) Expert Procedure: SPK contains one or more procedures determined by formal rumors or procedures used by individuals or groups of individuals in solving certain problems involving certain phenomena.

MOORA (Multi Objective Obtimization by Ratio Analysis)

According to (R & Haliq, 2021) and (Nugroho et al., 2022) Multi_Objective Obtimization by Ratio Analysis (MOORA) is a multi-objective system that can maximize two or more attributes simultaneously and oppositely, this method uses multiplication, as a link between attributes, after Therefore, the attribute is first raised to the power of weight, then looks for references from alternatives. This method is also easy to understand and flexible (Yendrizal, 2020) dan (Suwandana & Wati, 2020). The stages of the MOORA method according to (El Faritsi et al., 2022) and (Lestari & Sudarsono, 2022).

1. Determining Matrix Value

Determine in advance the value of the matrix in order to identify the attributes to be used.

2. Matrix normalization

$$X = \begin{bmatrix} x_{11} & x_{12} & x_{1n} \\ x_{21} & x_{22} & x_{2n} \\ x_{m1} & x_{m2} & x_{mn} \end{bmatrix} \quad \textbf{(1)}$$

Information:
x = alternative response to the attribute
n = number of goals
m = number of alternativesf

3. Decision Matrix Normalization

$$X\ ij = \frac{x\ ij}{\sqrt{\left[\sum_{i}^{m}{}_{=1}\ x_{ij}^{2}\right]}} \quad \textbf{(2)}$$

4. Multi-objective Optimization

It is necessary to normalize the size for the profit attribute (benefit) added to the maximization case as well as for the attribute (cost) then it is reduced to the minimization case. Optimization of attribute values in the following formula:

$$Y_i = \sum xijgj = 1 - \sum xijnj = g + 1 \quad \textbf{(3)}$$

Information:
Yi = normalized value
(n-g) = attribute value to minimize
g = number of attributes to maximize

5. determining the ranking of the calculation results is the final stage in the MOORA method with the least value being the best alternative.

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METHOD

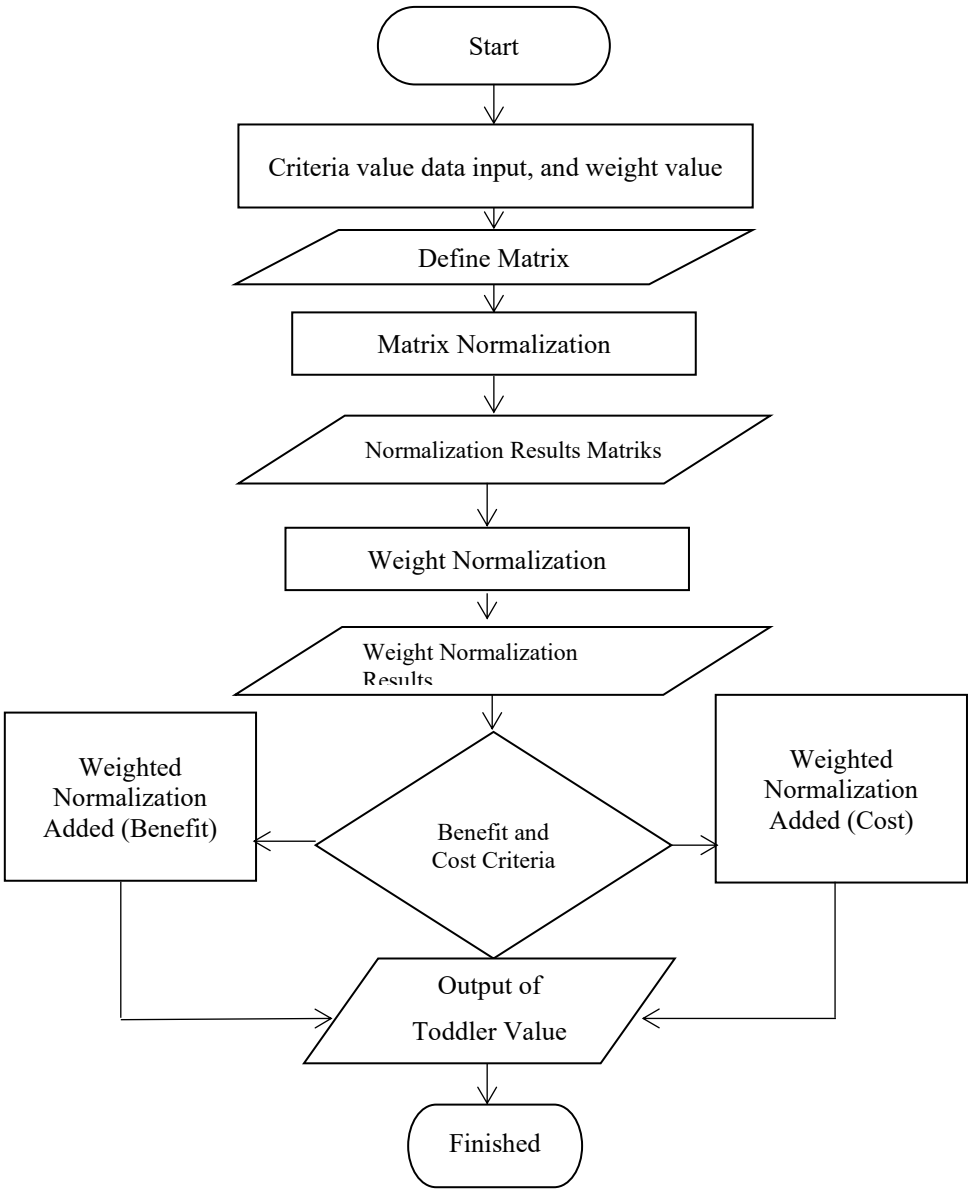

Figure 1. Research Flow

Identification of problems

This step was taken so that researchers could find out the problems in the process of selecting healthy toddlers.

Data collection

Is any information obtained and processed by researchers. In this study, two methods of data collection were applied, namely Primary and Secondary. Where the Primary method is a collection of data obtained through observation and interviews with the health center itself. The secondary data is data obtained through books and journals, as well as other publications from various sources.

Data analysis

The next step is to analyze the data that has been collected.

Processing Data with the MOORA Method

After analyzing the next data, namely processing data using the MOORA method. In the MOORA method the first thing to do is to find the criterion value. Before carrying out the calculation process, the criteria used in decision making are determined to determine the ranking of criteria. Therefore, researchers apply the FMADM method, Fuzzy Multiple Attribute Decision Making (FMADM) is a decision-making method that combines fuzzy

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logic with a multi-criteria approach to overcome uncertainty and complexity in decision making (Hanief, 2011) and (Robert & Brown, 2004) Then the criteria will be weighted, Next is to normalize the matrix, in normalization the matrixkit will display an existing data for attributes so that it can form a decision matrix, benefits and costs are determined by whether a criterion has a higher value the better or the smaller the value of a criterion the better , the last stage is ranking where the highest score is the result of the best toddler.

System planning

Next is to design a decision support system which is the initial stage in building a decision support system. after building the system we will enter the stage of testing the system whether it is feasible or not used by users.

Results and conclusions

The conclusions obtained after going through the testing stages, the conclusions stages are also useful for further researchers.

RESULT

In analyzing and designing a good system, data and information are needed that are appropriate and in accordance with system requirements. This can be obtained by analyzing the system in advance or that is currently running.

Define criteria

Table 1. Criteria for Healthy Toddlers

Code	Criteria
C1	Height
C2	Weight
C3	Arm circumference
C4	Head Circumference

Determine alternatives

Table 2. Healthy Toddler Alternatives

Code	Alternative
A1	Habibi
A2	Kinara
A3	Ara
A4	Winda
A5	Arkan
A6	Absin
A7	Alya
A8	azrab
A9	Wahyu
A10	Risky
A11	Ihwan
A12	Ridwan
A13	Rasya

Code	Name
A14	Aulia
A15	Akip
A16	Umma
A17	Nisa
A18	Sakinah
A19	Puspita
A20	Parhan
A21	Tasya
A22	Dini
A23	Suhairi
A24	Saputra
A25	Zulhamdi

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Calculation process

Table 3. Alternative weights for healthy toddlers

Code	C1	C2	C3	C4
A1	99	19	13	42
A2	89	21	17	41
A3	98	16	16	41
A4	93	10	17	47
A5	78	13	17	39
A6	78	19	15	47
A7	77	10	15	45
A8	97	20	13	39
A9	98	16	14	41
A10	89	11	15	44
A11	73	7	16	39
A12	94	18	15	43
A13	88	12	17	39
A14	82	8	15	43
A15	84	21	16	42
A16	71	21	15	39
A17	85	15	17	41
A18	72	8	16	45
A19	70	8	15	40
A20	81	20	15	45
A21	96	14	15	43
A22	82	21	13	40

Fuzzy Multiple Attribute Decision Making (FMADM)

Table 4. Alternative Weighting Using FMADM

Weight	Definition
0	Very Bad
1	Bad
2	Enough
3	OK
4	Enough Fine
5	Very Good

Giving weight and type of criteria

Table 5. Criteria Weighting and Type of Criteria

Code	Criteria	Weight	Type
C1	Height	3	Benefits
C2	Weight	4	Benefits
C3	Arm circumference	2	Benefits
C4	Head Circumference	1	Benefits

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Sub-criteria

Table 6. Body Height Weight Intervals

Height	Weight
50 – 70	1
71 – 80	2
81 – 120	3
<= 49 ,>= 121	0

Table 7. Body Weight Intervals

Weight	Weight
7 – 10	1
11 – 15	2
16 – 21	3
<= 6, >= 22	0

Table 8. Arm Circumference Weight Intervals

LL	Weight
13 – 15	1
16 – 17	2
18 -19	3
<= 12, >= 20	0

Table 9. Head Circumference Weight Intervals

LK	Weight
39 – 42	1
43 – 45	2
46 – 47	3
<= 38, >= 48	0

Alternative weighting

Table 10. Alternative weighting based on criteria

Code	C1	C2	C3	C4
A1	99	19	13	42
A2	89	21	17	41
A3	98	16	16	41
A4	93	10	17	47
A5	78	13	17	39
A6	78	19	15	47
A7	77	10	15	45
A8	97	20	13	39
A9	98	16	14	41
A10	89	11	15	44
A11	73	7	16	39
A12	94	18	15	43

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A13	88	12	17	39
A14	82	8	15	43
A15	84	21	16	42
A16	71	21	15	39
A17	85	15	17	41
A18	72	8	16	45
A19	70	8	15	40
A20	81	20	15	45
A21	96	14	15	43
A22	82	21	13	40
A23	76	15	17	47
A24	78	19	14	39
A25	98	12	17	42

Change the weighting into an assessment based on sub-criteria

Table 11. Changing weighting based on sub-criteria

Code	C1	C2	C3	C4
A1	3	3	1	1
A2	3	3	2	1
A3	3	3	2	1
A4	3	1	2	3
A5	2	2	2	1
A6	2	3	1	3
A7	2	1	1	2
A8	3	3	1	1
A9	3	3	1	1
A10	3	2	1	2
A11	2	1	2	1
A12	3	3	1	2
A13	3	2	2	1
A14	3	1	1	2
A15	3	3	2	1
A16	2	3	1	1
A17	3	2	2	1
A18	2	1	2	2
A19	1	1	1	1
A20	3	3	1	2
A21	3	2	1	2
A22	3	3	1	1
A23	2	2	2	3

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A24	2	3	1	1
A25	3	2	2	1

1. Normalize the criteria of each alternative, and make it a normalization matrix.

Table 12. Normalized Matrix

Code	C1	C2	C3	C4
A1	0.2255	0.2518	0.1313	0.1195
A2	0.2255	0.2518	0.2626	0.1195
A3	0.2255	0.2518	0.2626	0.1195
A4	0.2255	0.0839	0.2626	0.3586
A5	0.1503	0.1678	0.2626	0.1195
A6	0.1503	0.2518	0.1313	0.3586
A7	0.1503	0.0839	0.1313	0.2390
A8	0.2255	0.2518	0.1313	0.1195
A9	0.2255	0.2518	0.1313	0.1195
A10	0.2255	0.1678	0.1313	0.2390
A11	0.1503	0.0839	0.2626	0.1195
A12	0.2255	0.2518	0.1313	0.2390
A13	0.2255	0.1678	0.2626	0.1195
A14	0.2255	0.0839	0.1313	0.2390
A15	0.2255	0.2518	0.2626	0.1195
A16	0.1503	0.2518	0.1313	0.1195
A17	0.2255	0.1678	0.2626	0.1195
A18	0.1503	0.0839	0.2626	0.2390
A19	0.0752	0.0839	0.1313	0.1195
A20	0.2255	0.2518	0.1313	0.2390
A21	0.2255	0.1678	0.1313	0.2390
A22	0.2255	0.2518	0.1313	0.1195
A23	0.1503	0.1678	0.2626	0.3586
A24	0.1503	0.2518	0.1313	0.1195
A25	0.2255	0.1678	0.2626	0.1195

How to normalize the matrix in the following way:

(A1, C1) $3/\sqrt{3^2+3^2+3^2+3^2+2^2+2^2+2^2+3^2+3^2+3^2+2^2+3^2+3^2+3^2+3^2+2^2+3^2+2^2+1^2+3^2+3^2+3^2+2^2+2^2+3^2} = 0.2229,$

(A2, C1) $3/\sqrt{3^2+3^2+3^2+3^2+2^2+2^2+2^2+3^2+3^2+3^2+2^2+3^2+3^2+3^2+3^2+2^2+3^2+2^2+1^2+3^2+3^2+3^2+2^2+2^2+3^2} = 0.2229,$

(A3, C1) $3/\sqrt{3^2+3^2+3^2+3^2+2^2+2^2+2^2+3^2+3^2+3^2+2^2+3^2+3^2+3^2+3^2+2^2+3^2+2^2+1^2+3^2+3^2+3^2+2^2+2^2+3^2} = 0.2229,$

(A4, C1) $3/\sqrt{3^2+3^2+3^2+3^2+2^2+2^2+2^2+3^2+3^2+3^2+2^2+3^2+3^2+3^2+3^2+2^2+3^2+2^2+1^2+3^2+3^2+3^2+2^2+2^2+3^2} = 0.2229,$

(A5, C1) $2/\sqrt{3^2+3^2+3^2+3^2+2^2+2^2+2^2+3^2+3^2+3^2+2^2+3^2+3^2+3^2+3^2+2^2+3^2+2^2+1^2+3^2+3^2+3^2+2^2+2^2+3^2} = 0.1486,$

(A6, C1) $2/\sqrt{3^2+3^2+3^2+3^2+2^2+2^2+2^2+3^2+3^2+3^2+2^2+3^2+3^2+3^2+3^2+2^2+3^2+2^2+1^2+3^2+3^2+3^2+2^2+2^2+3^2} = 0.1486,$

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(A7, C1) $2/\sqrt{3^2+3^2+3^2+3^2+2^2+2^2+2^2+3^2+3^2+3^2+2^2+3^2+3^2+3^2+2^2+3^2+2^2+1^2+3^2+3^2+3^2+2^2+2^2+3^2}$ = 0.1486,

(A8, C1) $3/\sqrt{3^2+3^2+3^2+3^2+2^2+2^2+2^2+3^2+3^2+3^2+2^2+3^2+3^2+3^2+2^2+3^2+2^2+1^2+3^2+3^2+3^2+2^2+2^2+3^2}$ = 0.2229,

(A9, C1) $3/\sqrt{3^2+3^2+3^2+3^2+2^2+2^2+2^2+3^2+3^2+3^2+2^2+3^2+3^2+3^2+2^2+3^2+2^2+1^2+3^2+3^2+3^2+2^2+2^2+3^2}$ = 0.2229,

(A10, C1) $3/\sqrt{3^2+3^2+3^2+3^2+2^2+2^2+2^2+3^2+3^2+3^2+2^2+3^2+3^2+3^2+2^2+3^2+2^2+1^2+3^2+3^2+3^2+2^2+2^2+3^2}$ = 0.2229,

....

(A25, C1) $2/\sqrt{3^2+3^2+3^2+3^2+2^2+2^2+2^2+3^2+3^2+3^2+2^2+3^2+3^2+3^2+2^2+3^2+2^2+1^2+3^2+3^2+3^2+2^2+2^2+3^2}$ = 0.1486,

(A1, C2) $3/\sqrt{3^2+3^2+3^2+1^2+2^2+3^2+1^2+3^2+3^2+2^2+1^2+3^2+2^2+1^2+3^2+3^2+2^2+1^2+1^2+3^2+2^2+3^2+2^2+1^2+1^2+3^2+2^2+3^2+2^2}$ = 0.2517,

....

(A25, C2) $0/\sqrt{3^2+3^2+3^2+1^2+2^2+3^2+1^2+3^2+3^2+2^2+1^2+3^2+2^2+1^2+3^2+3^2+2^2+1^2+1^2+3^2+2^2+3^2+2^2+1^2+1^2+3^2+2^2+3^2+2^2}$ = 0,

(A1, C3) $1/\sqrt{1^2+2^2+2^2+2^2+2^2+1^2+1^2+1^2+1^2+1^2+2^2+1^2+2^2+1^2+2^2+1^2+1^2+1^2+2^2+1^2+2^2+2^2+1^2+1^2+1^2+2^2+1^2+2^2}$ = 0.1313,

....

(A25, C3) $0/\sqrt{1^2+2^2+2^2+2^2+2^2+1^2+1^2+1^2+1^2+1^2+2^2+1^2+2^2+1^2+2^2+2^2+1^2+1^2+1^2+1^2+2^2+1^2+2^2+2^2+1^2+1^2+1^2+2^2}$ = 0,

(A1, C4) $1/\sqrt{1^2+1^2+1^2+3^2+1^2+3+2^2+1^2+1^2+2^2+1^2+2^2+1^2+2^2+1^2+1^2+1^2+2^2+1^2+2^2+2^2+1^2+3^2+1^2+1^2}$ = 0.1195,

....

(A25, C4) $0/\sqrt{1^2+1^2+1^2+3^2+1^2+3+2^2+1^2+1^2+2^2+1^2+2^2+1^2+2^2+1^2+1^2+1^2+2^2+1^2+2^2+2^2+1^2+3^2+1^2+1^2}$ = 0,

The ranking process is carried out by calculating MOORA to get the optimization value. As follows:

Table 13. Ranking of Healthy Toddlers

Code	C1	C2	C3	C4	Optimization	Rank
A1	0.6765	1.0070	0.2626	0.1195	2.0656	7
A2	0.6765	1.0070	0.5252	0.1195	2.3282	1
A3	0.6765	1.0070	0.5252	0.1195	2.3282	1
A4	0.6765	0.3357	0.5252	0.3586	1.8959	15
A5	0.4510	0.6713	0.5252	0.1195	1.7671	20
A6	0.4510	1.0070	0.2626	0.3586	2.0792	6
A7	0.4510	0.3357	0.2626	0.2390	1.2883	24
A8	0.6765	1.0070	0.2626	0.1195	2.0656	7
A9	0.6765	1.0070	0.2626	0.1195	2.0656	7
A10	0.6765	0.6713	0.2626	0.2390	1.8495	16
A11	0.4510	0.3357	0.5252	0.1195	1.4314	23
A12	0.6765	1.0070	0.2626	0.2390	2.1852	4
A13	0.6765	0.6713	0.5252	0.1195	1.9926	12
A14	0.6765	0.3357	0.2626	0.2390	1.5138	22
A15	0.6765	1.0070	0.5252	0.1195	2.3282	1
A16	0.4510	1.0070	0.2626	0.1195	1.8401	18

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A17	0.6765	0.6713	0.5252	0.1195	1.9926	12
A18	0.4510	0.3357	0.5252	0.2390	1.5509	21
A19	0.2255	0.3357	0.2626	0.1195	0.9433	25
A20	0.6765	1.0070	0.2626	0.2390	2.1852	4
A21	0.6765	0.6713	0.2626	0.2390	1.8495	16
A22	0.6765	1.0070	0.2626	0.1195	2.0656	7
A23	0.4510	0.6713	0.5252	0.3586	2.0061	11
A24	0.4510	1.0070	0.2626	0.1195	1.8401	18
A25	0.6765	0.6713	0.5252	0.1195	1.9926	12

How to get the value A1, C1 = (normalized A1, C1 * weight criteria), C1 is of the benefit type, then (A1, C1) 0.2255 * 3 = 0.6765, (A1, C2) 0.2518 * 4 = 1.0070), (A1, C3) 0.1313 * 2 = 0.2626), (A1, C4) 0.1195 * 1 = 0.1195). The optimization value for A1 is obtained by adding the cells from A1 0.6765 + 1.0070 + 0.2626 + 0.1195 = 2.0656. if the criterion is of type benefit then (normalized value * weight of criteria), if the criterion is of type cost then (-1 * normalized value * weight of criteria) and so on for other cells. Alternatives A2, A3, A15 have the most optimal weight values with optimization values (2.3282).

DISCUSSIONS

In this study, the authors wanted to examine a decision regarding the selection of healthy toddlers at the Padang Bulan health center. This research was conducted to determine a decision regarding healthy toddlers, which can be monitored later between critical or unhealthy conditions and which are already in healthy condition. In the decision-making process, the MOORA method is used and weighted by FMADM. In analyzing and designing a good system, data and information are needed that are appropriate and in accordance with system requirements. This can be obtained by analyzing the system in advance or that is currently running. Because from this information, it can be seen how far the current system is running, what are the needs in running it and what needs are to be achieved but cannot be provided by the current system.

Determine the criteria used in making decisions to determine healthy toddlers. The criteria used at the Padang Bulan Health Center were height, weight, arm circumference, head circumference. Determine the alternative to be used by collecting data in the form of a soft copy provided by the Padang Bulan Health Center, where the data obtained is only information such as short names and information related to the criteria for each toddler.

The MOORA calculation process is carried out to obtain priority weight values from predetermined criteria, by filling out questionnaires, collecting data by related experts. To produce an objective priority weight, the questionnaire was given to competent people in their fields. Based on an analysis of the running system, the authors found several advantages that could be an advantage for current users, but there are also weaknesses in the system that could become a problem with the current running system. In the following, the author describes the weaknesses in the current system: Full assessment through the data provided by the Padang Bulan Health Center is related to referring data for healthy toddlers and the data used is only data obtained from the Padang Bulan Health Center, so there is less relation related to weight outside the Padang Bulan Health Center area Fuzzy Multiple Attribute Decision Making (FMADM) is a decision-making method that combines fuzzy logic with a multi-criteria approach to overcome uncertainty and complexity in decision making. The weighting and type of criteria is carried out with information obtained from research results and the total number of weights must be worth 10, where C1 = 4, C2 = 3, C3 = 2 and C4 = 1, for a total of (4 + 3 + 2 + 1 = 10).

The sub-criteria is carried out to make it easier to give alternative weights based on criteria according to the scale determined based on information from research results. Alternative weighting is obtained from the results of research conducted where the alternatives taken are 25 and weighted according to data from the Padang Bulan Health Center. Changing the weighting into an assessment based on sub-criteria which has been determined according to the FMADM table to simplify the calculation process and reduce ambiguity, when the larger value is not the better but the worse

Giving the type of criteria is done in a way, if the value is greater then the better, if it is smaller then the value is not good = benefit, if the value is smaller then the better, if it is greater then the value is not good = cost so that the results of testing and analysis have been obtained related to decision making for selecting healthy toddlers using the MOORA method, starting from the initial stages of determining criteria to the final stage of the ranking process, the analysis obtained by weighting alternatives using FMADM is: Optimization Value A1 = 2.0656 while Alternatives A2, A3, A15 have weight values the most optimal with optimization value (2.3282).

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CONCLUSION

Based on the results of research on decision support systems in determining healthy toddlers at the Padang Bulan Health Center, the authors conclude that alternative weighting using FMADM reduces ambiguity because the larger the value the better it should be, but if the value is too large then it is not good, such as body weight. more subcriteria so that accuracy in ranking is better and more accurate with a scale of 0-5. According to the description and discussion in the previous chapters, there are several suggestions, namely the system can be developed so that it is integrated with the needs of all processes in the Padang Bulan Health Center. The system can be developed to use other methods in determining the increase in Healthy Toddlers. The system needs to add test data in order to get maximum results with SPK calculations. The system needs to be added to determine subcriteria in order to get maximum results with MOORA.

REFERENCES

El Faritsi, D. M., Saripurna, D., & Mariami, I. (2022). Sistem Pendukung Keputusan Untuk Menentukan Tenaga Pengajar Menggunakan Metode MOORA. *Jurnal Sistem Informasi Triguna Dharma (JURSI TGD)*, *1*(4), 239. https://doi.org/10.53513/jursi.v1i4.4948

Fajarika, S. (2019). Sistem Pendukung Keputusan Pemilihan Balita Sehat Se-Kecamatan Sei Lepan Menggunakan Metode Multi Atributte Utility Theory (Maut) (Studi Kasus: Puskesmas Desa Lama). *KOMIK (Konferensi Nasional Teknologi Informasi Dan Komputer)*, *3*(1), 515–521. https://doi.org/10.30865/komik.v3i1.1635

Hanief, S. (2011). Penggunaan Algoritma FMADM pada Sistem Pendukung Keputusan untuk Seleksi Penerima Bantuan Dana Pendidikan Untuk Mahasiswa Tidak Mampu atau Kurang Mampu pada Yayasan Rumah Singgah XYZ. *Eksplora Informatika*, *1*(1), 6–16. https://eksplora.stikom-bali.ac.id/index.php/eksplora/article/view/171/119

Hasugian, A. H., & Cipta, H. (2018). Pengertian Sistem Pendukung Keputusan. *Jurnal Ilmu Komputer Dan Informatika*, *02*(April), 14–30.

Lestari, S. P., & Sudarsono, B. G. (2022). Penerapan Metode MOORA Pada Sistem Pendukung Keputusan Penilaian Kinerja Program Studi. *Jurnal Media Informatika Budidarma*, *6*(2), 1024. https://doi.org/10.30865/mib.v6i2.3934

Nugroho, F., Harmayani, H., Mesran, M., Mulia, R. H., Situmorang, E. M. T., & Ricardo, R. (2022). Penerapan Metode Multi-Objective Optimization on The Basic of Ratio Analysis (MOORA) Dalam Seleksi Siswa Unggulan Sekolah. *Jurnal Media Informatika Budidarma*, *6*(4), 2287. https://doi.org/10.30865/mib.v6i4.4856

Qisqadartunissa, D., Irawan, H., Ariyani, P. F., & Santika, R. R. (2022). Penerapan Metode Simple Additive Weighting untuk Pendukung Keputusan Pemilihan Balita Tersehat. *EXPERT: Jurnal Manajemen Sistem Informasi Dan Teknologi*, *12*(1), 40. https://doi.org/10.36448/expert.v12i1.2477

R, M. A. J. P., & Haliq. (2021). Implementasi Metode Multi Objective Optimization On The Basis Of Ratio Analysis (MOORA) Untuk Penentuan Agen 46 BNI Cabang Pembantu Tulang Bawang. *Jurnal SISFOKOM (Sistem Informasi Dan Komputer)*, *10*, 120–125.

Robert, B., & Brown, E. B. (2004). *No 主観的健康感を中心とした在宅高齢者における 健康関連指標に関する共分散構造分析Title*. *1*, 1–14.

Sari, R. P., Ilhamsyah, I., & Alliandaw, A. M. (2022). Penerapan Metode MOORA Untuk Pemilihan Jurusan Pada SMA Negeri 3 Pontianak. *Jurnal Sisfokom (Sistem Informasi Dan Komputer)*, *11*(2), 266–275. https://doi.org/10.32736/sisfokom.v11i2.1417

Suginam, Ermi Suryani Nasution, Sapria Ulandari Lubis, M. (2018). Sistem Pendukung Keputusan Penerima Bantuan Siswa Miskin Menerapkan Metode WASPAS dan MOORA. *Seminar Nasional Sains & Teknologi Informasi*, 719–727.

Surahaman, A., & Nursadi. (2019). Sistem Pendukung Keputusan Kenaikan Gaji Karyawan Dengan Metode Topsis Berbasis Web. *JTKSI (Jurnal Teknologi Komputer Dan Sistem Informasi)*, *2*(3), 82–87. http://www.ojs.stmikpringsewu.ac.id/index.php/jtksi/article/view/763

Suwandana, S., & Wati, E. (2020). Sistem Pendukung Keputusan Dalam Pemilihan Supplier Barang Dengan Menggunakan Metode Moora Di Cv . Cxy. *Jurnal Informatika Dan Sistem Informasi (JIFoSI)*, *8*(2), 40–50.

Yendrizal. (2020). Penentuan Siswa SMK Kimia Analisa Terbaik Yang Akan Dikirim Mengikuti Olimpiade Kimia Tingkat Nasional Menerapkan Metode Entropy dan MOORA. *Jurnal Media Informatika Budidarma*, *4*, 963–969. https://doi.org/10.30865/mib.v4i4.2350

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