
Determining Priority Hospitals for Maternity Referral Using the Analytical Hierarchy Process

Firmansyah Pratama Fauzi^{1*}, Achmad Fitro², Ratih Amelia³

^{1,2,3}Faculty Of Economics and Business, Surabaya State University, Surabaya, East Java, Indonesia

*Corresponding Author: Firmansyah Pratama Fauzi

*Email: alfiraqoirinnisa32636@gmail.com

Abstract. *Selecting an appropriate maternity referral hospital is important to ensure that patients receive timely and suitable healthcare services. The availability of multiple hospital alternatives requires a systematic approach that can consider several criteria simultaneously. This study aims to determine the priority of maternity referral hospitals in Sidoarjo Regency as a consideration for midwives in Sukodono District when selecting referral destinations. This study applied the Analytical Hierarchy Process (AHP) to evaluate seven hospital alternatives based on five criteria: Quality of Medical Facilities, Quality of Medical Personnel, Quality of BPJS Services, Hospital Access, and Effectiveness of Service Time. Pairwise comparisons were used to determine the relative importance of the criteria and alternatives. Assessments involving multiple respondents were aggregated using the geometric mean method, followed by matrix normalization, Priority Vector calculation, consistency analysis, and synthesis of alternative priorities. Quality of Medical Facilities was the highest-priority criterion with a weight of 0.42, followed by Quality of Medical Personnel (0.26), Quality of BPJS Services (0.16), Hospital Access (0.10), and Effectiveness of Service Time (0.06). The final synthesis placed Siti Khodijah Hospital (A7) as the highest-priority alternative with a value of 19.12%, followed by Anwar Medika Hospital (A4) at 15.98% and Arafah Anwar Medika Sukodono Hospital (A1) at 15.51%. The AHP method provides a systematic approach for integrating multiple criteria and hospital alternatives in determining priorities for maternity referral destinations. The results can support midwives in considering suitable hospitals for maternity referrals.*

Keywords: Analytical Hierarchy Process, Decision Making, Hospital Selection, Maternity Referral, Referral Hospital

INTRODUCTION

In Indonesia, the Infant Mortality Rate (IMR) was recorded at 14.12 infant deaths per 1,000 live births, while the Maternal Mortality Rate (MMR) reached 144 maternal deaths per 100,000 live births based on the results of the 2025 Intercensal Population Survey (SUPAS) (1). These conditions highlight the importance of efforts to address the risk of maternal and infant mortality in health services. According to WHO in the National Clinical Practice Guidelines for the Management of Hypertension in Pregnancy issued by the Ministry of Health of the Republic of Indonesia, the three main causes of maternal mortality, known as the “lethal trifecta of pregnancy,” are bleeding, hypertension in pregnancy, and infection (2). In addition to these factors, delays in obtaining appropriate treatment may increase the risk of maternal mortality (3). Delays in managing women during childbirth may also increase the risk of complications and maternal mortality (4). Therefore, the referral system is an

important component of midwifery care to ensure that women receive health services that are timely, appropriate, and consistent with their medical conditions (5).

In the maternity referral process, appropriate referral decisions are not only related to the decision to refer a patient but also to determining the hospital as the referral destination. In referral practices, midwives in Sukodono District do not only refer patients to hospitals within the district but also to several other hospitals in Sidoarjo Regency that are part of the BPJS healthcare network and are frequently used as referral destinations, namely RS Arafah Anwar Medika Sukodono, RSU Assakinah Medika, RS Rahman Rahim, RS Anwar Medika, RS Delta Surya, RSUD Sidoarjo Barat, and RS Siti Khodijah. The availability of several hospital alternatives provides options for midwives; however, each hospital has different characteristics, requiring the referral destination to be determined by considering various aspects. Adequate medical facilities are an important component in strengthening the health system (6), while the quality of medical personnel and the services provided are also related to the care received by patients (7). In addition, the quality of BPJS services (8), hospital accessibility (9), and service time effectiveness are also relevant aspects to consider in health services (10), particularly in the context of maternal and neonatal care.

In the healthcare sector, AHP has been applied to determine the priority competencies of medical record officers at community health centers by considering knowledge, skills, attitudes, and education (11). It has also been used in a decision support system for determining the nutritional status of toddlers based on several health-related factors (12). The application of AHP in the hospital context has also been conducted, including for determining the best hospital based on criteria related to services, facilities, cleanliness, and safety (13), as well as for assessing the best hospitals in Central Lampung based on service, facility, safety, comfort, and cleanliness criteria (14).

Although AHP has been widely applied in healthcare to assess and prioritize hospitals, previous studies have primarily focused on general hospital selection based on service, facilities, safety, cleanliness, and comfort. This study addresses a more specific context by applying AHP to prioritize maternity referral hospitals for midwives based on five criteria: medical facility quality, medical personnel quality, BPJS service quality, hospital accessibility, and service time effectiveness. The study aims to determine the priority of maternity referral hospitals in Sidoarjo Regency as a consideration for midwives in Sukodono District when selecting appropriate referral destinations.

METHODS

Conceptual Structure

The research framework consisted of three main stages: construction of the AHP hierarchy, assessment and processing of pairwise comparisons, and synthesis of the alternative priorities. The hierarchy included the research objective, five criteria, and seven hospital alternatives. The subsequent analysis comprised normalization, Priority Vector calculation, consistency testing, and final priority synthesis.

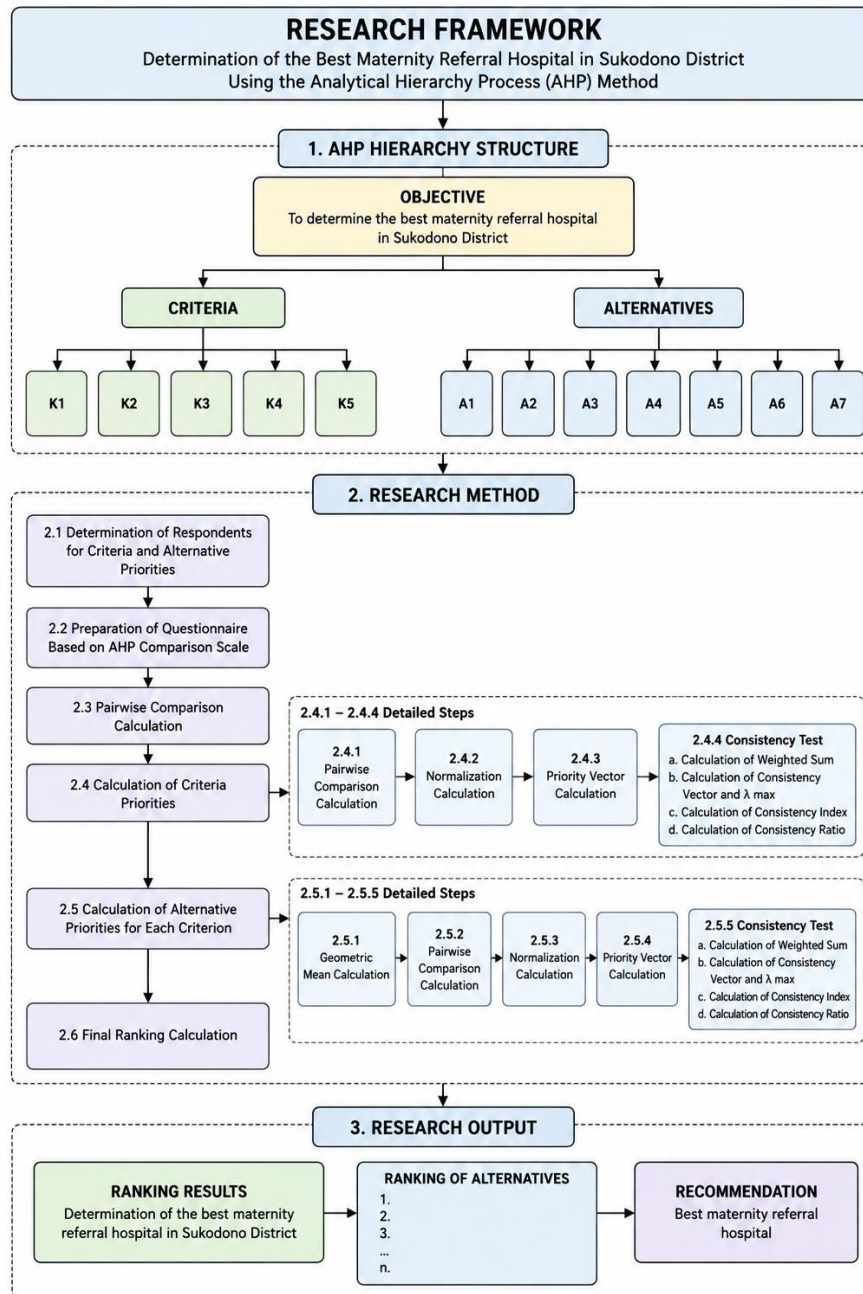


Fig. 1 Conceptual structure of the research

Study Design, Location, Period and Software

This study used a quantitative descriptive design with a multi-criteria decision-making approach using the Analytical Hierarchy Process (AHP). The study was conducted in Sukodono District, Sidoarjo Regency, East Java, Indonesia, in August 2026. The study aimed to determine the priority of maternity referral hospitals based on multiple criteria and hospital alternatives using the AHP method. The AHP calculations, including matrix normalization, Priority Vector determination, and consistency analysis, were performed using Microsoft Excel.

AHP Hierarchy Structure

The AHP hierarchy in this study was constructed to represent the decision-making problem of determining the priority of maternity referral hospitals in Sukodono District. The hierarchy divides the decision problem into three levels: the objective, criteria, and alternatives. This hierarchical structure serves as the basis for the pairwise comparison process and priority determination using the AHP method.

Determination of Respondents

Respondents were selected according to their roles in the maternity referral assessment. The criterion comparison was provided by the Chair of the IBI Taman Barat Branch, while the alternative assessments were provided by 16 midwives and 6 patients.

Preparation of Pairwise Comparison Questionnaires

The questionnaire was designed as an instrument for obtaining respondents' judgments regarding the relative importance of the criteria and the relative preference among alternative hospitals. The assessments were presented in pairwise comparison tables, with two elements compared in each question.

The questionnaire was developed based on Saaty's Fundamental Scale of Absolute Numbers (15). This scale provides a reference for respondents in determining the relative importance or preference of one element over another. The scale used in this study ranges from 1 to 9, with intermediate values of 2, 4, 6, and 8 used when a judgment falls between two adjacent levels of importance. Reciprocal values are used when the element in the opposite direction is considered more important or preferred. The fundamental scale used in the questionnaire is presented in Table 1.

Table 1. Fundamental Scale of Absolute Numbers

Scale	Level of Importance	Information
1	Equally important	Both elements have the same level of importance and have an equal influence on the goal.
3	A little more important	One element is slightly more important than the other. Experience and judgment slightly favor one element over the other.
5	More important	One element is more important than the other. Experience and judgment strongly favor one element over the other.
7	Much more important	One element is clearly more important than the others. The dominance of one element has been proven and strongly supported in practice.
9	Absolute is more important	One element has an absolute level of importance compared to the others. Evidence supporting the superiority of that element has the highest level of confidence.
2, 4, 6, 8	Intermediate value (compromise)	Used as a compromise value between two adjacent levels of importance when an assessment that is in between is required.

Pairwise Comparison of Criteria

The questionnaire used pairwise comparisons to assess the relative importance of the criteria and hospital alternatives. Respondents used Saaty's Fundamental Scale of Absolute Numbers, ranging from

1 to 9, including intermediate values of 2, 4, 6, and 8 and reciprocal values for inverse comparisons (15).

Normalization of the Criteria Pairwise Comparison Matrix

The criterion comparison matrix was normalized by converting each entry into a proportion of its respective column total. This step produced normalized values that were subsequently used to derive the criterion priority weights.

$$\hat{a}_{ij} = \frac{a_{ij}}{\sum_{i=1}^n a_{ij}}$$

Calculation of the Priority Vector

After the normalization process, the Priority Vector (PV) was calculated to determine the priority weight of each criterion. The PV was obtained by calculating the average value of each row in the normalized matrix. The resulting weights represent the relative importance of the criteria being evaluated. The Priority Vector was calculated as shown in the following equation.

$$PV_i = \frac{\sum_{j=1}^n \hat{a}_{ij}}{n}$$

Consistency Test of Criteria Priorities

The consistency of the criteria assessment is evaluated using the AHP consistency procedure. Each row of the comparison matrix is multiplied by the corresponding priority vector (PV) value to obtain the Weighted Sum, which is then divided by the PV value to derive the Consistency Vector. The average value of the Consistency Vector is used as $\lambda_{\max}$. The obtained $\lambda_{\max}$ value is then used to calculate the Consistency Index (CI). Subsequently, the Consistency Ratio (CR) is determined by comparing the Consistency Index (CI) with the Random Index (RI). The RI value represents the average consistency index derived from a set of randomly generated comparison matrices and is determined based on the size of the comparison matrix being analyzed (16).

Table 2. Random Index Table

Scale	Random Index
1	0.00
2	0.00
3	0.58
4	0.90
5	1.12
6	1.24
7	1.32
8	1.41
9	1.45
10	1.49

A judgment matrix was accepted as consistent when its CR did not exceed 0.10.

Calculation of Alternative Priorities for Each Criterion

For the seven hospital alternatives, judgments from the 22 respondents were combined for each pairwise comparison using the geometric mean. The resulting values were used to construct the alternative comparison matrix for each criterion.

$$GM = \left(\prod_{k=1}^m x_k \right)^{\frac{1}{m}}$$

Calculation of the Alternative Priority Vector

The normalized matrices were used to obtain the Priority Vector (PV) for the seven hospital alternatives under each criterion. The resulting PV values represent the relative priority of each hospital and were subsequently combined with the criterion weights in the final synthesis.

Consistency Test of Alternative Priorities

The consistency of the alternative comparison matrices was assessed using the same AHP procedure applied to the criteria matrix. For each criterion, the Weighted Sum Vector, Consistency Vector, λ_{max} , CI, and CR were calculated. A matrix was considered consistent when the CR value was ≤ 0.10 .

Final Ranking

Once the priority weights for each criterion and the priority weights of the alternatives under each criterion have been obtained and declared consistent, the next step is to synthesize the final priority value for each alternative. The final priority value is obtained by multiplying the weight of each criterion by the weight of the corresponding alternative under that criterion and then summing all the resulting values. This calculation is performed for all hospital alternatives to obtain a global priority value for each alternative.

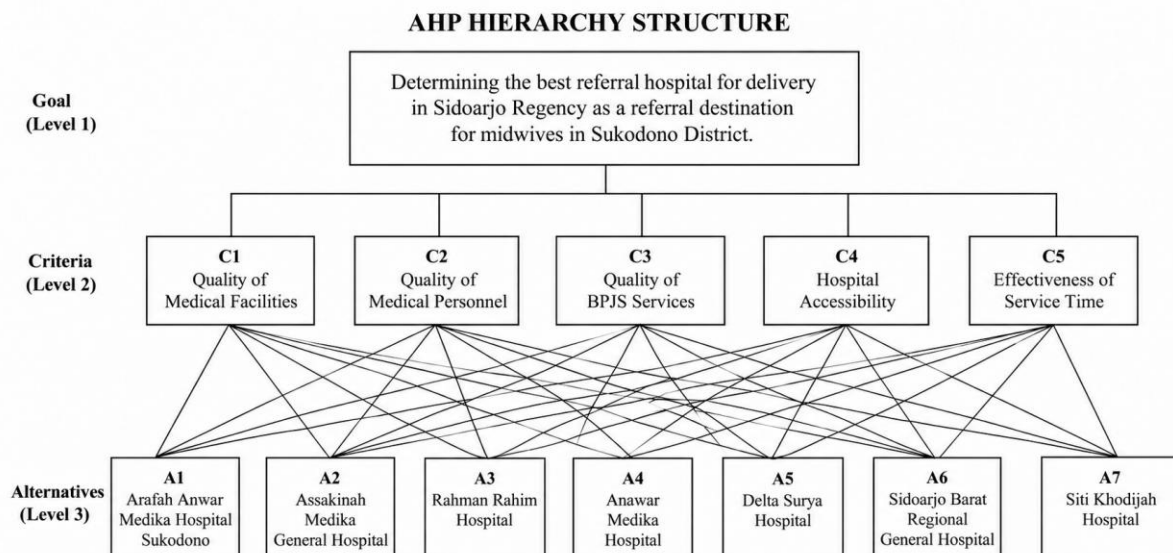
The global priority values are then used as the basis for the final ranking. The alternative with the highest global priority value is ranked first and represents the alternative with the highest priority level, while the other alternatives are ranked according to their global priority values from highest to lowest.

$$P_i = \sum_{j=1}^n w_j \times PV_{ij}$$

RESULT

AHP Hierarchy Structure

Fig. 1 Conceptual structure of the research



The AHP hierarchical structure in this study was developed based on the research objective, assessment criteria, and alternative hospitals. At the first level, the objective is to determine the best maternity referral hospital in Sidoarjo Regency as a referral destination for midwives in Sukodono

District. At the second level, five assessment criteria are used, namely Quality of Medical Facilities, Quality of Medical Personnel, Quality of BPJS Services, Hospital Access, and Effectiveness of Service Time. At the third level, seven alternative hospitals are considered: Arafah Anwar Medika Sukodono Hospital, Assakinah Medika General Hospital, Rahman Rahim Hospital, Anwar Medika Hospital, Delta Surya Hospital, West Sidoarjo Regional General Hospital, and Siti Khodijah Hospital.

Criteria for Comparing Hospital Alternatives as Maternity Referral Hospitals

Quality of Medical Facilities is used to represent the availability and adequacy of facilities and infrastructure that support health services. The World Health Organization emphasizes that the availability of adequate facilities and infrastructure is an integral part of strengthening the health system (health system strengthening) [6]. Therefore, the availability of medical facilities is one of the considerations in determining an appropriate hospital as a referral destination for childbirth.

Quality of Medical Personnel is considered because the competence and quality of medical personnel are related to the quality of care received by patients. Firda Nur Laila showed that service quality is a factor that significantly contributes to patient satisfaction [7]. In the context of childbirth referrals, the quality of medical personnel is a relevant aspect because these services require health workers who are capable of providing care tailored to patients' needs.

Quality of BPJS Services is used to represent the quality of services received by participants in the process of obtaining healthcare services through BPJS. The SERVQUAL approach explains that service quality can be assessed through the dimensions of reliability, responsiveness, assurance, empathy, and tangibles. Furthermore, Iyusarah Pakpahan showed that, in the context of BPJS Kesehatan, the responsiveness of officers, clarity of procedures, administrative reliability, and attention to participants' needs are related to user satisfaction [8]. These aspects were considered in the selection of referral hospitals in this study.

Hospital Access is an important aspect of the maternal and neonatal referral process. The Decree of the Indonesian Minister of Health concerning the Maternal and Neonatal Referral Network explains that maternal and neonatal deaths may be related to delays in referral decision-making, delays in accessing appropriate healthcare facilities, and delays in obtaining services from competent medical or health personnel [9]. Therefore, hospital access is a relevant criterion in determining the priority of maternity referral destinations.

Effectiveness of Service Time is used to consider the speed of a hospital in providing services after a patient receives a referral. Dyah Puji Astuti stated that response time is an important indicator of the quality of emergency obstetric and neonatal care [10]. Therefore, the effectiveness of service time is considered a criterion in determining a referral hospital for childbirth, particularly because timely treatment is related to the need for obstetric and neonatal care.

Respondent Data

This study involved 23 respondents with different roles in the AHP assessment process. One respondent, namely the Chair of the IBI Taman Barat Branch, provided the pairwise comparison assessment for determining the relative priority of the five criteria. Meanwhile, the assessment of the seven hospital alternatives was obtained from 22 respondents, consisting of 16 midwives and 6 patients. The distinction between respondent groups was made according to their respective roles in the assessment process, with the Chair of the IBI Taman Barat Branch providing the criterion-level assessment and the midwives and patients providing assessments of the hospital alternatives. The six patient respondents were women who had undergone childbirth through a referral process, with their residences located within the service areas of the seven hospital alternatives. Therefore, they were considered capable of providing assessments of the hospital alternatives based on their experience with maternity referral services and their familiarity with hospitals serving their residential areas.

Pairwise Comparisons Between Criteria

The pairwise comparison assessment between the five criteria was provided by the Chair of the IBI Taman Barat Branch. The respondent was selected as the criterion-level assessor based on their role in coordinating midwifery activities and their involvement in the maternity referral context in the study area. Therefore, the assessment was used to represent the relative importance of the criteria from the perspective of the midwifery referral process. The resulting pairwise comparison matrix was subsequently processed using the Analytical Hierarchy Process (AHP) method to determine the priority weight of each criterion.

Normalize The Matrix

Once the pairwise comparison matrix between the criteria is obtained, the next step is to normalize the matrix to determine the priority value of each criterion. Normalization is performed by dividing each value in the pairwise comparison matrix by the sum of the values in the corresponding column.

Priority Criteria Weighting

The results of the AHP processing, following the construction and normalization of the pairwise comparison matrix, produce the priority weights for each criterion. These priority weights indicate the relative importance of each criterion based on the respondents' assessments. The results of the priority weighting for the criteria are presented in Table 3.

Table 3. Criteria Priority Weights

Variables	K1	K2	K3	K4	K5	Priority
K1	0,44	0,49	0,44	0,38	0,33	0,42
K2	0,22	0,25	0,29	0,29	0,27	0,26
K3	0,14	0,12	0,15	0,19	0,20	0,16
K4	0,11	0,08	0,07	0,10	0,13	0,10
K5	0,09	0,06	0,05	0,05	0,07	0,06

Based on Table 3, Criteria 1 (Quality of Medical Facilities) has the highest priority, with a weight of 0.42. It is followed by Criteria 2 (Quality of Medical Personnel) with a weight of 0.26, Criteria 3 (Quality of BPJS Services) with a weight of 0.16, Criteria 4 (Hospital Access) with a weight of 0.10, and Criteria 5 (Effectiveness of Service Time) with a weight of 0.06.

Results of Priority Criteria Consistency Test

After obtaining the priority weights for each criterion, a consistency test was performed on the pairwise comparison matrix. The testing process began by calculating the Weighted Sum Vector through the multiplication of the pairwise comparison matrix by the priority weight vector. The resulting values were then used to obtain the $\lambda_{\max}$ value. Subsequently, the $\lambda_{\max}$ value was used to calculate the Consistency Index (CI) and Consistency Ratio (CR). The consistency test results showed a Consistency Ratio (CR) of 0.09, which is below the maximum allowable CR value of 0.10. Therefore, the pairwise comparison assessment was considered consistent.

Calculation of Alternative Priorities for Each Criterion

The pairwise comparison assessments of the seven alternative hospitals were obtained from 22 respondents, consisting of 16 midwives and 6 patients. The assessments were conducted based on each criterion used in the study. The assessments from midwives and patients were aggregated because both groups are directly involved in the maternity referral process, with midwives representing the referring party and patients representing the referred party. Their assessments were combined to represent complementary perspectives in evaluating hospitals as maternity referral destinations. Before

aggregation, the consistency of the individual pairwise comparison judgments was evaluated using the Consistency Ratio (CR). The judgments that met the consistency requirement were then aggregated using the geometric mean to obtain the combined comparison values for each criterion. The aggregated values were subsequently used to construct the pairwise comparison matrices of the alternatives.

Calculation Results of Priority Vector (PV) for Alternative Priorities Under Each Criterion

The aggregated comparison values obtained in the previous stage were subsequently used to calculate the priority of the alternatives for each criterion using the AHP method. The pairwise comparison matrices of the alternatives were normalized to obtain the Priority Vector (PV) for each alternative. The PV represents the relative priority of each hospital alternative based on the criteria used to determine a suitable maternity referral destination.

Based on the calculation results, for Quality of Medical Facilities, Siti Khodijah Hospital (A7) obtained the highest PV of 0.21 (20.55%), while Assakinah Medika General Hospital (A2) obtained the lowest PV of 0.10 (10.11%). For Quality of Medical Personnel, Siti Khodijah Hospital (A7) again obtained the highest PV of 0.21 (20.75%), while Assakinah Medika General Hospital (A2) obtained the lowest PV of 0.09 (8.86%). For Quality of BPJS Services, Siti Khodijah Hospital (A7) obtained the highest PV of 0.21 (20.75%), while Assakinah Medika General Hospital (A2) obtained the lowest PV of 0.09 (8.86%). For Hospital Access, Arafah Anwar Medika Sukodono Hospital (A1) obtained the highest PV of 0.23 (22.91%), while West Sidoarjo Regional General Hospital (A6) obtained the lowest PV of 0.10 (9.87%). Meanwhile, for Effectiveness of Service Time, Arafah Anwar Medika Sukodono Hospital (A1) obtained the highest PV of 0.17 (17.38%), while Delta Surya Hospital (A5) obtained the lowest PV of 0.12 (11.63%).

Results of the Consistency Test of Alternative Priorities Under Each Criterion

Once the priority weights for the alternatives had been determined for each criterion, the consistency of the resulting judgments was evaluated. The analysis involved determining the Weighted Sum Vector by multiplying the pairwise comparison matrix by the priority weight vector corresponding to each criterion. The obtained values were subsequently used to determine the maximum eigenvalue (λ_{max}), followed by the calculation of the Consistency Index (CI) and Consistency Ratio (CR). The resulting CR values were 0.0161 for Criterion 1 (Quality of Medical Facilities), 0.0044 for Criterion 2 (Quality of Medical Personnel), 0.0082 for Criterion 3 (Quality of BPJS Services), 0.0120 for Criterion 4 (Hospital Access), and 0.0070 for Criterion 5 (Effectiveness of Service Time). Since all CR values are below the acceptable threshold of 0.10, the alternative comparison matrices for all five criteria were considered consistent.

Final Rangking Result

Table 4. Final Calculations

ALTERNATI VE HOSPITAL	K1 Quality of Medical Facilitie s	K2 Quality of Medical Personn el	K3 Qualit y of BPJS Service s	K4 Hospit al Access	K5 Effectivene ss of Service Time	AMOUN T	PRESENTATI ON
(A1) Arafah Anwar Medika Sukodono Hospital	0,0557	0,0381	0,0279	0,0226	0,0108	0,1551	15,51%
(A2) RSU Assakinah Medika	0,0421	0,0232	0,0176	0,0163	0,0082	0,1074	10,74%

ALTERNATIVE HOSPITAL	K1 Quality of Medical Facilities	K2 Quality of Medical Personnel	K3 Quality of BPJS Services	K4 Hospital Access	K5 Effectiveness of Service Time	AMOUNT	PRESENTATION
(A3) RS Rahman Rahim	0,0434	0,0281	0,0206	0,0122	0,0081	0,1125	11,25%
(A4) RS Anawar Medika	0,0663	0,0478	0,0223	0,0131	0,0103	0,1598	15,98%
(A5) RS Delta Surya	0,0656	0,0337	0,0217	0,0122	0,0072	0,1404	14,04%
(A6) West Sidoarjo Regional Hospital	0,0577	0,0367	0,0219	0,0097	0,0075	0,1336	13,36%
(A7) RS Siti Khodijah	0,0856	0,0543	0,0288	0,0125	0,0100	0,1912	19,12%

Based on the final calculations in Table 4, the ranking of alternative hospitals is obtained. Alternative 7 (Siti Khodijah Hospital), with the highest priority value, is ranked first, while Alternative 2 (Assakinah Medika Hospital), with the lowest priority value, is ranked last.

DISCUSSION

The high priority of Medical Facility Quality indicates that the availability and adequacy of hospital facilities are important considerations in determining maternity referral destinations. This finding is relevant to referral regionalisation, in which appropriate maternal and perinatal care requires adequate healthcare infrastructure and skilled personnel across the referral system (17). In maternity care, the availability of appropriate facilities also contributes to the hospital's capacity to provide care for referred patients, particularly when referrals require more advanced medical management (17). The second-highest priority of Medical Personnel Quality further indicates that the clinical capability of a referral hospital is not determined solely by physical facilities, but also by the availability and competence of healthcare personnel. This is consistent with evidence showing that limitations in maternity healthcare provider capability can influence referral decision-making and service provision (18). Quality of BPJS Services ranked third, with a weight of 0.16. This finding indicates that the quality of services provided to BPJS users remains a consideration in hospital selection. This result is consistent with Reyvinnta Azka Agnaty, who showed that the dimensions of assurance and empathy were dominant factors influencing patient satisfaction (19). Hospital Access and Effectiveness of Service Time obtained weights of 0.10 and 0.06, respectively. Munjaja P in Luh Nik Armini, 2020 stated that travel time in obstetric and neonatal emergency cases needs to be considered so that patients can receive appropriate assistance (20). In addition, Haryatun and explained that an appropriate and efficient response time plays an important role in the patient care process (21). Thus, the lower weights assigned to these criteria indicate their relative priority based on the respondents' assessments and do not imply that these two aspects are irrelevant.

At the alternative level, Siti Khodijah Hospital (A7) obtained the highest priority values for Quality of Medical Facilities, Quality of Medical Personnel, and Quality of BPJS Services, at 20.55%, 20.75%, and 17.89%, respectively. Meanwhile, Arafah Anwar Medika Sukodono Hospital (A1) obtained the highest priority values for Hospital Access and Effectiveness of Service Time, at 22.91%

and 17.38%, respectively. These results indicate differences in the relative strengths of the alternatives across the individual criteria. A7 was more dominant in the three criteria with the highest weights, whereas A1 had higher priority values in the aspects of access and service time. Based on the synthesis of all criteria, Siti Khodijah Hospital (A7) obtained the highest final priority value of 19.12%, followed by Anwar Medika Hospital (A4) at 15.98% and Arafah Anwar Medika Sukodono Hospital (A1) at 15.51%. These results indicate that the final priority is not determined solely by the alternative value under a single criterion but results from the synthesis of alternative priority values and the importance weights of the respective criteria. A7 obtained the highest final value because it had the highest priority values for three criteria with a combined weight of 0.84, whereas A1, despite having the highest priority values for Hospital Access and Effectiveness of Service Time, obtained a lower final value because these two criteria had a combined weight of only 0.16.

The results for the Hospital Access criterion also need to be considered in relation to the composition of respondents, namely 16 midwives and 6 patients. This composition resulted in a greater representation of midwives' perspectives in the alternative assessment, so the findings related to access primarily reflect considerations of access from the midwives' locations to the hospitals rather than the patients' perspectives. With a more limited number of patient respondents, perspectives regarding distance and ease of access from patients' residences were not fully represented. Therefore, the findings of this study should be considered in light of the limitation in respondent composition, particularly regarding the representation of patients' perspectives on hospital access.

CONCLUSION

This study applied the Analytical Hierarchy Process (AHP) method to determine the priority of maternity referral hospitals based on five criteria and seven alternatives. The weighting results showed that Quality of Medical Facilities was the highest-priority criterion, with a weight of 0.42, followed by Quality of Medical Personnel at 0.26, Quality of BPJS Services at 0.16, Hospital Access at 0.10, and Effectiveness of Service Time at 0.06. The AHP synthesis results placed Siti Khodijah Hospital (A7) as the alternative with the highest priority, with a value of 19.12%, followed by Anwar Medika Hospital (A4) at 15.98%, Arafah Anwar Medika Sukodono Hospital (A1) at 15.51%, Delta Surya Hospital (A5) at 14.04%, West Sidoarjo Regional General Hospital (A6) at 13.36%, Rahman Rahim Hospital (A3) at 11.25%, and Assakinah Medika General Hospital (A2) at 10.74%. These results show that alternative priorities are determined through a combination of criterion weights and alternative values under each criterion. Thus, the results of this study can be used as supporting information when considering the selection of a maternity referral hospital.

This study has limitations related to the number and characteristics of respondents, as well as the scope of the five criteria and seven alternatives used. The priority results obtained also depend on the structure of the criteria, alternatives, and respondents' assessments in this study. Future research may involve a larger and more diverse group of respondents to obtain broader perspectives. Further research may also incorporate additional relevant criteria and expand the alternatives and geographical scope of the study. In addition, future studies may compare AHP with other decision-making methods or develop the results into a decision support system to assist in the evaluation of maternity referral hospital alternatives.

REFERENCES

1. Badan Pusat Statistik. Penduduk dan Indikator Kependudukan Hasil Survei Penduduk Antar Sensus 2025. Jakarta; 2026.
2. Kementerian Kesehatan Republik Indonesia. Keputusan Menteri Kesehatan Republik Indonesia Nomor HK.01.07/MENKES/701/2026 tentang Pedoman Nasional Pelayanan Klinis Tata Laksana Hipertensi dalam Kehamilan. HK.01.07/MENKES/701/2026. Jakarta: Kementerian Kesehatan Republik Indonesia; 2026.
3. Ardian M, Laksana C, Damayanti NA, Suhargono MH, Pranadyan R, Prasetyo B, et al. Analysis of Maternal Death Causes at Tertiary Referral Hospitals. *J Int Dent Med Res* [Internet]. 2024. Available from: <http://www.jidmr.com>
4. Uci Yulan Ningsih; Rida Oktami; Yolanda Fidorova; Fitriani Pramita Gurning. Analisis pelaksanaan sistem rujukan persalinan peserta Badan Penyelenggara Jaminan Sosial (BPJS) Kesehatan di Puskesmas Tanjung Langkat. *Jurnal Kesmas Prima Indonesia*. 2023;7(2):88–91. doi:<https://doi.org/10.34012/jkpi.v7i2.3925>
5. Tinggi Ilmu Kesehatan Bina Bangsa Majene S, Wulandari E, Busman A, Damayanti U, Tinggi Ilmu Kesehatan bina Bangsa Majene S. Kegawatdaruratan Maternal dalam Perspektif Pelayanan Kebidanan Esensial. *Jurnal Pendidikan dan Teknologi Kesehatan*. 2026;9(1). doi:10.56467/jptk.v8i2
6. Jurnal P.; Masyarakat K, Syauqi Marzukie M, Florence Vionita W, Yani A, Magister P, et al. LITERATUR REVIEW : HUBUNGAN KETERSEDIAAN SARANA DAN PRASARANA DENGAN KEPUASAN PASIEN DIFASILITAS KESEHATAN. *Jurnal Kesehatan Masyarakat* . 2026;10.
7. Firda Nur Laila; Vip Paramarta. Pengaruh Kualitas Pelayanan Pada Kepuasan Pasien Dan Konsekuensinya Terhadap Loyalitas di Rumah Sakit. *Jurnal Kesehatan Ilmiah Indonesia (Indonesian Health Scientific Journal)*. 2024;9(2). doi:10.51933/health.v9i2.1709
8. Pakpahan I, Asido Rossevelt F, Aisyah D, Azzahra S, Bortana Br Munthe J, Ulina Sitompul G, et al. Jurnal Penelitian dan Pengkajian Ilmiah <https://manggalajournal.org/index.php/cendekia> Pengaruh Kualitas Layanan BPJS Kesehatan terhadap Tingkat Kepuasan Pengguna Layanan Kesehatan Khususnya pada Pelayanan Rujukan di Kota Medan. *Jurnal Penelitian dan Pengkajian Ilmiah*. 2025;2(12):2005–19. doi:10.62335
9. Kementerian Kesehatan Republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia Nomor 16 Tahun 2024 tentang Sistem Rujukan Pelayanan Kesehatan Perseorangan. Kementerian Kesehatan Republik Indonesia [Internet]. Jakarta; 2024. Available from: <https://jdih.kemkes.go.id/documents/peraturan-menteri-kesehatan-nomor-16-tahun-2024>
10. Puji Astuti D, Sofiana J. Evaluasi Response Time Pelayanan terhadap Kepuasan Pasien di Ruang PONEK. *Jurnal Ilmiah Kesehatan*. Online; 2025.
11. Talaa F, Flora Ninta Tarigan S, Abudi R, Kesehatan Masyarakat J, Ung F, Penelitian A. Penerapan Metode Analytical Hierarchy Process (AHP) Dalam Menentukan Kompetensi SDM di Bidang Rekam Medik di Puskesmas Se Kota Gorontalo Application of Analytical Hierarchy Process (AHP) Method in Determining Human Resources Competence in the Field of Medical Records in Health Centers throughout Gorontalo City. *Jurnal Kolaboratif Sains*. 2025;8(6):3273–80. doi:10.56338/jks.v8i6.7745
12. Hayati Nasution N, Hakim Dalimunthe A, Teknik Informatika J, Ilmu Komputer F, Al Washliyah Labuhanbatu Jl Adam Malik Lingkar By Pass Rantauprapat UH. Sistem Pendukung Keputusan Penentuan Gizi Balita Di Posyandu Dengan Metode AHP. *Jurnal Teknologi dan Manajemen Industri Terapan (JTMIT)*. 2025;4(2):275–81.

13. Nanda Dimas Prayoga. SISTEM PENDUKUNG KEPUTUSAN PEMILIHAN RUMAH SAKIT TERBAIK DI ASAHAN MENGGUNAKAN METODE AHP (ANALITYCAL HIERARCHY PROCESS). Jurnal Pilar Nusa Mandiri. 2018. doi:10.31227/osf.io/whz5r
14. Aziz Pramudita D, Christy R. SISTEM PENDUKUNG KEPUTUSAN UNTUK PENILAIAN RUMAH SAKIT TERBAIK DI LAMPUNG TENGAH MENGGUNAKAN METODE AHP (Studi Kasus: Dinas Kesehatan Kabupaten Lampung Tengah). JDMSI. 2020.
15. Saaty TL. A scaling method for priorities in hierarchical structures. J Math Psychol. 1977 Jun 1;15(3):234–81. doi:10.1016/0022-2496(77)90033-5
16. Crawford GB. THE GEOMETRIC MEAN PROCEDURE FOR ESTIMATING THE SCALE OF A JUDGMENT MATRIX? Math/ Modelling. 1987.
17. Ali AA, Naseem HA, Allahuddin Z, Yasin R, Azhar M, Hanif S, et al. The Effectiveness of Regionalization of Perinatal Care and Specific Facility-Based Interventions: A Systematic Review. Neonatology. S. Karger AG; 2025. p. 245–61. doi:10.1159/000541384 PubMed PMID: 39504943.
18. Selemani S, Mwakyusa MO, Bashiri S, Ezekiel MJ, Mwakawanga DL, Al-Beity FMA, et al. “Are all referrals necessary?” Experiences and perceptions of maternity healthcare providers on emergency intrapartum referrals in Dar es Salaam, Tanzania. PLoS One. 2024 Feb 1;19(2 February). doi:10.1371/journal.pone.0298103 PubMed PMID: 38381739.
19. Manajemen J, Kesehatan P. Analysis of BPJS Patient Satisfaction on the Quality of Outpatient Services in Hospitals Using the SERVQUAL Approach. Vol. 28.
20. Armini LN. Hambatan Rujukan pada Kasus Kegawatdaruratan Maternal.
21. Tirtaningrum DA, Sariatmi A, Suryoputro A. Analisis Response Time Penatalaksanaan Rujukan Kegawatdaruratan Obstetri Ibu Hamil. Media Kesehatan Masyarakat Indonesia. 2018 Jun 16;14(2):139. doi:10.30597/mkmi.v14i2.2866