


Analisis Alternatif Prioritas Pemecahan Masalah Pencegahan dan Pengendalian Infeksi di *Hospital Nacional Guido Valadares* Dili Timor-Leste

Analysis Alternative Priority Problem-Solving Infection Prevention and Control in Guido Valadares National Hospital Dili Timor-Leste

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ABSTRAK

Latar Belakang: Pencegahan dan pengendalian infeksi di rumah sakit merupakan pendekatan praktis berbasis bukti nyata untuk mencegah pasien, keluarga dan pengunjung serta tenaga kesehatan dari risiko terkena infeksi.

Tujuan: Tujuan penelitian ini adalah untuk menentukan prioritas alternatif pemecahan masalah pencegahan dan pengendalian infeksi di *Hospital Nacional Guido Valadares Dili, Timor Leste*.

Metode: Metode yang digunakan dalam penelitian ini adalah metode kualitatif dengan melalui wawancara dan diskusi kelompok terarah yang melibatkan 3 orang kunci informan terdiri dari Direktur Eksekutif, Direktur Klinik dan Direktur keperawatan dan kebidanan dan 16 orang informan yang terdiri dari 1 orang kepala departemen kontrol kualitas, 13 orang kepala ruangan dan 2 orang pendidik. Analisis data melalui beberapa tahapan yaitu identifikasi masalah, prioritas masalah dengan non skoring Delphi, akar penyebab masalah dengan diagram Fishbone dan menentukan alternatif prioritas pemecahan masalah dengan metode Kemampuan (Capability), Aksesibilitas (Accessibility), kesiapan (Readiness) dan pengaruh (Leverage) atau CARL.

Hasil: hasil analisis menunjukkan bahwa pencegahan dan pengendalian infeksi yang tidak berjalan secara maksimal memiliki kendala dari Aspek Manusia, Metode, Anggaran, Material dan Mesin atau alat, berdasarkan hasil analisis alternatif prioritas pemecahan masalah dengan menggunakan metode CARL peringkat pertama dan kedua adalah melakukan pelatihan untuk tenaga surveilans, melakukan monitoring dan evaluasi terhadap kegiatan pencegahan dan pengendalian infeksi secara berkala.

Kesimpulan: Berdasarkan hasil analisis prioritas alternatif pemecahan masalah dengan menggunakan Metode CARL adalah mengadakan pelatihan bagi petugas surveilans, melakukan monitoring, dan evaluasi kegiatan pencegahan secara berkala. Monitoring dan evaluasi harus dilakukan secara berkala untuk memantau pelaksanaan kegiatan intervensi dan mengevaluasi kegiatan pencegahan dan pengendalian infeksi, kegiatan surveilans sehingga dapat memastikan pencapaian yang ditargetkan.

Kata Kunci: Infeksi, Pencegahan, Pengendalian, Prioritas, Pemecahan Masalah

ABSTRACT

Introduction: Infection prevention and control in hospitals is a practical approach based on real evidence to prevent patients, families and visitors as well as health workers from the risk of infection.

Purpose: Purpose of this study was to determine alternative priorities for solving infection prevention and control problems at Hospital Nacional Guido Valadares Dili, Timor Leste.

Methods: The method used in this research is qualitative research using interviews and focus group discussions involving 3 key informants consisting of the Executive Director, Clinical Director and Director of nursing and midwifery and 16 informants consisting 1 head of the Quality Control department, 13 head of rooms and 2 educators. Data analysis through several stages, namely problem identification, problem prioritization with the non-scoring Delphi, root cause of the problem with the Fishbone diagram and determining alternative priority problem-solving using the Capability, Accessibility, readiness and leverage (CARL) method.

Results: The results of the analysis show that the prevention and control of infections that are not running optimally have obstacles from the Human Aspects, Methods, Budget, Material and Machine or tools, based on the results of the analysis of alternative problem-solving priorities using the CARL method from the first and second rank are Conducting training for surveillance personnel, monitoring and evaluating infection prevention and control activities regularly.

Conclusion: Based on the analysis of alternative priority problem solving using the CARL Method is to organize training for surveillance personnel, conduct regular monitoring and evaluation of prevention activities. Monitoring and evaluation should be carried out regularly to monitor the implementation of intervention activities and evaluate infection prevention and control activities, surveillance activities so as to ensure targeted achievements.

Keywords: Infection, Prevention, Control, Priority, Problem-solving

INTRODUCTION

Hospital is one of the health facilities that organizes health efforts by empowering various units of trained and educated personnel in handling and dealing with health problems for the recovery and maintenance of good health (Ngatindriatun, Alfari and Arifian, 2023). Health facilities function to organize basic health efforts, referral health efforts, and / or supporting health efforts (Soeripto, 2019). Health efforts are organized with the approach of maintenance, health improvement (promotive), disease prevention (preventive), disease healing (curative) and health recovery (rehabilitative) which are organized as a whole, integrated and sustainable (Mangindara *et al.*, 2022; Ezzati, Mosadeghrad and Jaafaripooyan, 2023). Hospital Nacional Guido Valadares has the responsibility to provide secondary and tertiary health care, as well as support the provision of promotive, preventive, curative, rehabilitative and palliative services; Provide differentiated health care, in inpatient, outpatient and emergency rooms, using diagnostic and therapeutic means; Provide technical support for primary health care services and units; Participate in preventive measures and health education; carry out continuous training and improvement of health professionals; Collaborate in teaching and scientific research, in the field of health in the different specialties of interest to the country, that is, through medical internships and training and internship actions for Health professionals; Establish partnerships with public and private hospitals abroad, that is, to refer patients and

develop research in areas of interest (Ministerio da Saude, 2014).

Hospitals in performing their functions and maintaining the quality of service are well supported by various service units in the hospital itself (Hamidah *et al.*, 2023). One of the units responsible for infection prevention and control at Hospital Nacional Guido Valadares is the quality control department (Ministerio da Saude, 2021). The Quality Control Department is one of the departments whose main activities are planning, implementing, monitoring and evaluating infection prevention and control programs, carrying out activities related to infection prevention and control at Hospital Nacional Guido Valadares (Ministerio da Saude, 2021). In the current of globalization, in order to improve the performance and quality of health programs in hospitals, a planning process is needed that will produce a comprehensive plan or a thorough and complete plan (Kruk *et al.*, 2018). Planning activities in the health sector are the same as planning in operational management which consists of several stages, namely problem identification, problem prioritization, identification of root causes of problems, prioritization of the best alternative solutions (Tsofa, Molyneux and Goodman, 2016). Infection prevention and control in hospitals is a tangible manifestation of the quality of hospital services, besides providing protection to patients, families, visitors and health workers from the risk of contracting infections (Alhumaid *et al.*, 2021).

According to Habboush, Yarrarapu and Guzman (2023) Infection control refers to the

policies and procedures implemented to control and minimize the spread of infection in hospitals and other healthcare facilities with the primary goal of reducing infection rates. Effective infection prevention and control is essential in the provision of high quality healthcare for patients and a safe working environment for those working in the healthcare setting (Purssell and Gould, 2023). The quality control department is one of the supporting departments in improving the achievement of the quality of health services, but in its implementation there are many obstacles, sometimes the programs that have been planned are not all implemented (Ministerio da Saude, 2014, 2021). One of the most important activities of the hospital infection prevention and control program that has not been running optimally is epidemiological surveillance, this situation can occur because there are no competent personnel or personnel who have special skills such as epidemiologists to carry out these activities (Curless, Gerland and Maragakis, 2018). As explained by previous research, there are three barriers to the implementation of infection prevention and control programs, namely nurses experiencing challenges regarding knowledge and attitudes towards infection prevention and control measures, inadequate hospital infrastructure and lack of management support (Dutta and Giri, 2012; Magadze *et al.*, 2022).

According to the Executive Director of the Hospital Nacional Guido Valadares, these obstacles can occur due to limited manpower and especially limited funds. The planning and implementation of infection prevention and control programs in hospitals cannot be separated from the problem of limited human resources, facilities and funds. Therefore, in preparing the activities to be carried out at the initial planning stage of activities for infection prevention and control activities, it is necessary to prioritize alternative problem-solving to find out which problem solving activities need to be prioritized (Magadze *et al.*, 2022). In determining alternative problem solving priorities, one of the methods used is the CARL method (Hurint, 2021; Nofraianti, Rahayu and Purwonegoro, 2022). According to Jamil in Tyas Ratih Cahyaning (2020) CARL Method; Capability is the ability of resources, tools and so on, Accessibility is the ease of a problem to be overcome, Readiness is the readiness of available human resources and Leverage is how much influence one criterion has on the other in solving problems (Tyas Ratih Cahyaning, 2020; Hurint, 2021). This study aims to develop alternative priorities for solving infection prevention and control problems.

MATERIALS DAN METHODS

The research design used is qualitative. The research was conducted for 1 month, starting on

September 27 to October 25, 2021 in Hospital Nacional Guido Valadares Dili, Timor-Leste. In this study, the research focus was on problem identification, problem priority, root cause problem and alternative priorities problem-solving. Data were collected through interviews and Focus Group Discussions (FGD). In determining the priority of the problem using the non-scoring method Delphi Technique, looking for the root cause of the problem with the Fishbone diagram and determining alternative priorities for problems-solving using the CARL method. Participants in this study consisted of 3 key informants, namely the Executive Director, Clinical Director, and Director of Nursing and Midwifery, while the informants totaled 16 people consisting of 1 head of the quality control department, 13 head of rooms and 2 educators.

The data is analyzed based on the scoring of each alternative priorities problem-solving using the CARL method. The CARL method is: C is Capability (availability of resources), A is Accessibility (convenience), R is Readiness (readiness of the implementing staff and target readiness, and L is Leverage (how much influence one criterion has on the other in solving the problem). Each informant is expected to give a score of 1-5 on each alternative priority for solving existing problems. The score determination for CARL is as follows Capability score: 1=Very incapable, 2=incapable, 3=moderately capable, 4=capable and 5=very capable. Score for Accessibility: 1=very not easy, 2=not easy, 3=moderately easy, 4=easy and 5=very easy. score for Readiness: 1=very unprepared, 2=not prepared, 3=moderately prepared, 4=prepared and 5=very prepared. score for Leverage: 1 = very uninformal, 2=not influential, 3=moderately influential, 4=informal and 5=very influential.

RESULTS AND DISCUSSION

Problem Identification

Problem identification was obtained through review of reports, interviews and focus group discussions involving key informants consisting of Executive Directors, Clinical Directors and Directors of nursing and midwifery. from these activities the following problems were found: There are still many shortages of equipment and instruments in the Emergency care unit, services for outpatients have not been maximized, limited beds in inpatient rooms, there are still many shortages of equipment and instruments for clinical support services, reporting systems that have not been running optimally and infection prevention and control programs that have not been running optimally.

Analysis Problem Prioritization

Prioritization of problems using the Delphi

Technique non-scoring method by discussing with the Executive Director, Director of Nursing and Midwifery and Clinical Director of Hospital Nacional Guido Valadares. From the results of the discussion, many of the problems raised were infection prevention and control problems that had not been maximized. Thus, the problem of infection prevention and control that is not running optimally is selected as a priority problem. The Delphi method is a method used to determine problem priorities through group discussions with people who have the same expertise, each participant with the same expertise is asked for his opinion on the problems that arise, the most widely expressed problems are the priority problems sought. from the results of these discussions can result in priority problems that are agreed upon (McMillan, King and Tully, 2016; Tanjung, Suhandi and Tanzila, 2020; Leany *et al.*, 2023). This is in accordance with the research results that one of the non-scoring methods used to prioritize problems is the Delphi method (Sianne Wijaya and Zita Atzmardina, 2024).

Analysis Root Cause of Problem

Based on the results of Focus Group Discussions with 16 informants consisting of the head of the Quality Control department, the Head of the Room and the teaching nurse, as well as through document review, several root causes of infection prevention and control problems were obtained which were described in the Fishbone diagram. The Fishbone diagram is a method used to describe several root causes of problems in detail based on aspects of people, money, materials, methods and machines. The root causes of the problem can be explained as follows:

1. Man

The root cause of problems in implementing infection prevention and control programs comes from the human aspect, because: Limited organizational structure for infection prevention and control, no organizational structure for infection prevention and control has been established. So far, the infection prevention and control program were only considered as one of the programs under the responsibility of the head of the Quality Control Department, there are no epidemiologists; the presence of epidemiologists in hospitals is very

necessary, because an epidemiologist plays an important role in identifying the risk of nosocomial infections, performing surveillance functions, identifying risk factors for nosocomial infections. In addition, the absence of epidemiology personnel greatly impacts the implementation of infection prevention and control programs such as the absence of nosocomial infection data, surveillance units have not been setup. all surveillance programs are under the quality control department), the absence of surveillance personnel, no personnel for HAI surveillance activities, limited infection prevention and control personnel, infection prevention and control nurses (IPCN) work not maximized, waste management is not maximized, hand hygiene compliance is lacking, hand hygiene is not maximized.

2. Methods

Lack of strategic plan for infection prevention and control program, Recruitment of epidemiology and surveillance personnel is constrained, Reporting system related to nosocomial infection is not running, Waste management is lacking, Roles and responsibilities of infection prevention and control team are unclear, Training related to surveillance is unclear, Monitoring and evaluation of infection prevention and control activities is not running, Health Care Associated Infection (HAI) surveillance activities are not running.

3. Material

Limited trash bins, Limited posters and brochures, Forms for HAI surveillance activity reports are not yet available.

4. Money

Limited budget is the main obstacle faced by the hospital. the funds obtained by the hospital come from the annual budget allocation from the government central. The law restricts hospitals to receive assistance from any party, even if there must be through the central government and managed for all service facilities not just specifically for hospitals.

5. Machine or Tools

Unavailability of computers in every clinical room for HAI surveillance activities, limited hand hygiene facilities, limited personal protective equipment.

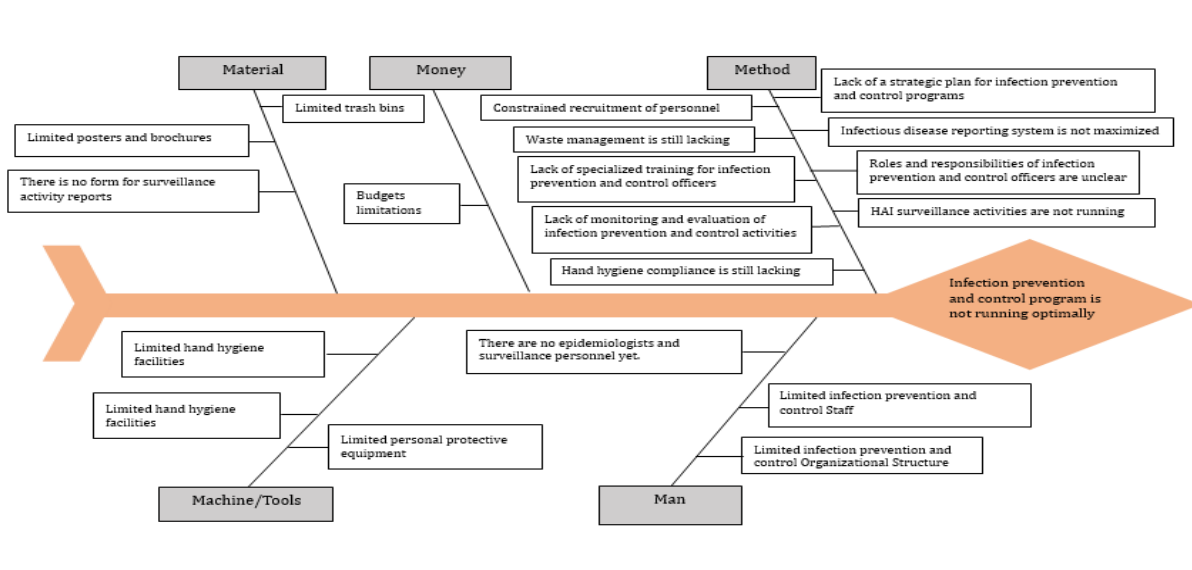


Figure 1. Root Cause of the Problem

Analysis of Alternative Priorities Problem-Solving

Determination of Alternative Priorities Problem-Solving with the CARL Method (Capability, Accessibility, Readiness, Leverage). Respondents are expected to give a score of 1-5 on each alternative priority problem-solving written below. The scoring involved 16 people consisting of: Head of the Quality Control department, head

of the room and Nurse Educator. Each participant gave a score on each alternative item of problem - solving priorities, then each score was multiplied to get the total score for each participant. After that the total score of each alternative item of problem-solving priorities from each participant is summed up. The CARL formula is: score C x score A x score R x score L = total score.

Table 1. List of Root Causes of the Problem and Alternative Prioritization of Problem-Solving

Problem Priority	Root Cause of the Problem	Alternative Priority Problem Solving
Infection Prevention and Control (IPC)	Man:	1. Develop organizational structure Infection prevention and control
	1. Limited infection prevention and control Organizational Structure	2. Recruit epidemiologists and surveillance staff
	2. There are no epidemiologists and surveillance personnel yet.	3. Recruit infection prevention and control staff
	3. Limited infection prevention and control Staff	
	Methods	4. Develop a strategic plan for infection prevention and control
	1. Lack of a strategic plan for infection prevention and control programs	5. Assign specialized staff in all renewable areas and continue to publicize news about hand hygiene activities on an ongoing basis
	2. Constrained recruitment of personnel	6. Maximize the reporting system related to infectious diseases.
	3. Infectious disease reporting system is not maximized	7. Remain attentive to non-stop running water in all clinical patient areas
	4. Waste management is still lacking	8. Pay attention to the availability of empty and ready-to-use waste containers
	5. Roles and responsibilities of infection prevention and control officers are unclear	9. Increase awareness in complying with waste management policies in accordance with procedures
	6. Lack of specialized training for infection prevention and control officers	10. Develop clear duties and responsibilities for easy implementation of infection prevention and control activities.
	7. Lack of monitoring and evaluation of infection prevention and control activities	11. Conduct specific training for infection prevention and control team
8. HAI surveillance activities are not running	12. Conduct training for surveillance staff	
9. Hand hygiene compliance is still		

Problem Priority	Root Cause of the Problem	Alternative Priority Problem Solving
	lacking	13. Conduct regular monitoring and evaluation of infection prevention and control activities 14. Conduct HAI surveillance activities 15. Ensure posters are in good condition and prominently displayed in appropriate places (e.g. at point of care, above sinks). 16. Making posters, leaflets and brochures about hand hygiene at every point of the care unit 17. Increase hand hygiene training for all staff 18. Establish a strict policy on hand hygiene compliance
	Money Budgets limitations	19. The budget allocation is in accordance with the needs of the prevention and control program so that it does not hamper its implementation.
	Material 1. Limited trash bins 2. Limited posters and brochures 3. There is no form for surveillance activity reports	20. Procure waste management equipment 21. Produce posters and brochures as needed 22. Develop forms for surveillance activity reports
	Machine/Tools 1. Limited personal protective equipment 2. Limited hand hygiene facilities 3. Unavailability of computers in every room for HAI surveillance activities	23. Provision of personal protective equipment for health workers according to needs 24. provision of alcohol hand sanitizer at all times in all clinical patient care areas 25. Provide computers in each room for HAI surveillance activities.

Table 2. Scoring Results Alternative Priority Problem-Solving with CARL Method

No	Alternative Priority Problem-Solving	CxAxRxL	
		Total (n=16)	Rank
1	Develop organizational structure Infection prevention and control	3621	4
2	Recruit epidemiologists and surveillance staff	2450	19
3	Recruit infection prevention and control staff	2719	15
4	Develop a strategic plan for infection prevention and control	2119	20
5	Assign specialized staff in all renewable areas and continue to publicize news about hand hygiene activities on an ongoing basis	2571	16
6	Maximize the reporting system related to infectious diseases.	3621	4
7	Remain attentive to non-stop running water in all clinical patient areas	3005	12
8	Pay attention to the availability of empty and ready-to-use waste containers	3662	3
9	Increase awareness in complying with waste management policies in accordance with procedures	2937	13
10	Develop clear duties and responsibilities for easy implementation of infection prevention and control activities.	3621	4
11	Conduct specific training for infection prevention and control team	3611	5
12	Conduct training for surveillance staff	4129	1
13	Conduct regular monitoring and evaluation of infection prevention and control activities	4082	2
14	Conduct HAI surveillance activities	3277	7
15	Ensure posters are in good condition and prominently displayed in appropriate places (e.g. at point of care, above sinks).	3084	10
16	Making posters, leaflets and brochures about hand hygiene at every point of the care unit	2857	14
17	Increase hand hygiene training for all staff	3133	9
18	Establish a strict policy on hand hygiene compliance	3209	8
19	The budget allocation is in accordance with the needs of the prevention and control program so that it does not hamper its implementation.	2857	14
20	Procure waste management equipment	3133	9

No	Alternative Priority Problem-Solving	CxAxRxL Total (n=16)	Rank
21	Produce posters and brochures as needed	2857	14
22	Develop forms for surveillance activity reports	3025	11
23	Provision of personal protective equipment for health workers according to needs	2489	18
24	Provision of alcohol hand sanitizer at all times in all clinical patient care areas	3598	6
25	Provide computers in each room for HAI surveillance activities.	2515	17

Problem solving based on the first and second rank is obtained: organizing training for surveillance personnel, monitoring and evaluating infection prevention and control activities regularly. Based on the analysis of the root causes of the problem using the Fishbone method, there are two things that can cause Health Care Associated Infection (HAI) surveillance activities not running, lack of monitoring and evaluation of infection prevention and control activities. This is because the task of monitoring and evaluating infection prevention and control activities and HAI surveillance activities is assigned to the person in charge of Quality Control, while the duties and responsibilities are so many that in its implementation it does not run effectively and efficiently. In addition, due to limited manpower, limited budget and unclear duties and responsibilities related to surveillance can be the biggest obstacle in carrying out these activities. Based on these problems, the intervention step that can be taken is to conduct effective training for surveillance staff and infection prevention and control officers so that they have qualified knowledge and skills in carrying out monitoring and evaluation of infection prevention and control activities, carrying out HAI surveillance activities and infection prevention and control activities. These two intervention efforts are interrelated. Training for surveillance staff and infection prevention and control officers aims to improve knowledge and skills for health workers in carrying out infection prevention and control activities and surveillance activities. The strength of this research is that information is obtained not only through interviews, but also through group discussions, so that the information obtained is more objective, while in scoring each alternative priority for problem solving is carried out by the respondents themselves through group discussions so that more accurate data is obtained. The limitations in this research are: at the problem identification and problem priority analysis stages only involved key informants and did not involve informants, while at the alternative priority problem solving analysis stage only involved informants and key informants were not involved.

CONCLUSION

Based on the analysis of the root cause of the problem with the Fishbone diagram and alternative priorities for problem solving with the CARL Method is to organize training for surveillance personnel, conduct regular monitoring and evaluation of infection prevention and control activities. Monitoring and evaluation should be carried out regularly to monitor the implementation of intervention activities and evaluate infection prevention and control activities, surveillance activities to ensure targeted achievements. Based on the description above, there needs to be a commitment to training for surveillance staff, monitoring and evaluation of infection prevention and control activities.

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Conflict of Interest and funding Disclosure

In this study, there is no conflict of interest and this research is funded by the researcher

Author Contribution

V.S: conceptualization, investigation, methodology, writing manuscript, writing review.
C.U.W: review and editing.

REFERENCES

- Alhumaid, S. *et al.* (2021) "Knowledge of infection prevention and control among healthcare workers and factors influencing compliance: a systematic review," *Antimicrobial Resistance and Infection Control*, 10(1), pp. 1–32. Available at: <https://doi.org/10.1186/s13756-021-00957-0>.
- Curless, M.S., Gerland, M.A. and Maragakis, L.L. (2018) "Infection Prevention and Control; Reference Manual for Health Care Facilities

- with Limited Resources,” *Jhpiego*, 12(3), pp. 42–52. Available at: <https://doi.org/www.jhpiego.org>.
- Dutta, J. and Giri, M. (2012) “Hospital Infection: Prevention and Control,” *Emerging and Re-emerging Infectious Diseases*, pp. 21–21. Available at: https://doi.org/10.5005/jp/books/11674_6.
- Ezzati, F., Mosadeghrad, A.M. and Jaafaripooyan, E. (2023) “Resiliency of the Iranian healthcare facilities against the Covid-19 pandemic: challenges and solutions,” *BMC Health Services Research*, 23(1), pp. 1–16. Available at: <https://doi.org/10.1186/s12913-023-09180-6>.
- Habboush, Y., Yarrarapu, S.N.S. and Guzman, N. (2023) “Infection Control,” *Digital Mammography: A Holistic Approach*, pp. 281–288. Available at: https://doi.org/10.1007/978-3-031-10898-3_25.
- Hamidah, * *et al.* (2023) “The Influence of Hospital Facilities and Services on Patient Satisfaction with Hospital Image as an Intervening Variable at Haji Abdul Manan Simatupang General Hospital,” *Jurnal Bintang Manajemen (JUBIMA)*, 1(3), pp. 97–112. Available at: <https://doi.org/>.
- Hurint, A.S. (2021) “Analisis Masalah Demam Berdarah Dengue di Kabupaten Magetan Provinsi Jawa Timur,” *Jurnal Kesehatan Global*, 4(2), pp. 92–102. Available at: <https://doi.org/10.33085/jkg.v4i2.4832>.
- Kruk, M.E. *et al.* (2018) “High-quality health systems in the Sustainable Development Goals era: time for a revolution,” *The Lancet Global Health*, 6(11), pp. e1196–e1252. Available at: [https://doi.org/10.1016/S2214-109X\(18\)30386-3](https://doi.org/10.1016/S2214-109X(18)30386-3).
- Leany, T. *et al.* (2023) “Diagnosis Komunitas Dalam Upaya Peningkatan Cakupan Cikupa , Kecamatan Cikupa , Kabupaten Tangerang , Provinsi,” 3(4), pp. 202–213. Available at: <https://doi.org/Prefix 10.31539>.
- Magadze, T.A. *et al.* (2022) “The impediments of implementing infection prevention control in public hospitals: Nurses’ perspectives,” *Health SA Gesondheid*, 27, pp. 1–8. Available at: <https://doi.org/10.4102/hsag.v27i0.2033>.
- Mangindara, M. *et al.* (2022) “Edukasi Pelayanan Prima di RSKD Ibu dan Anak Pertiwi Makassar,” *Padma*, 2(2), pp. 123–128. Available at: <https://doi.org/10.56689/padma.v2i2.692>.
- McMillan, S.S., King, M. and Tully, M.P. (2016) “How to use the nominal group and Delphi techniques,” *International Journal of Clinical Pharmacy*, 38(3), pp. 655–662. Available at: <https://doi.org/10.1007/s11096-016-0257-x>.
- Ministerio da Saude (2014) “Hospital Nacional Guido Valadares: Functional Analysis Report.” Available at: <https://doi.org/https://theasiadialogue.com>.
- Ministerio da Saude (2021) “REGULAMENTO INTERNO DO HOSPITAL NACIONAL GUIDO VALADARES,” pp. 1–75. Available at: <https://doi.org/https://www.mj.gov.tl>.
- Ngatindriatun, N., Alfarizi, M. and Arifian, R. (2023) “Green hospital practices on patient’s satisfaction in Indonesian hospital: medical specialist department case investigation,” *Journal of Modelling in Management*, ahead-of-p(ahead-of-print). Available at: <https://doi.org/10.1108/JM2-05-2023-0108/FULL/XML>.
- Nofraianti, Rahayu, E.P. and Purwonegoro, H.M. (2022) “Prosiding Forum Ilmiah Tahunan IAKMI (Ikatan Ahli Kesehatan Masyarakat Indonesia) ANALISIS PENGGUNAAN ALAT PELINDUNG DIRI TERHADAP KESELAMATAN KERJA PETUGAS LABORATORIUM KLINIS DI RSUD DUMAI,” *Prosiding Forum Ilmiah Tahunan IAKMI (Ikatan Ahli Kesehatan Masyarakat Indonesia)*, (November), pp. 1–6. Available at: <https://doi.org/http://jurnal.iakmi.id/index.php/FITIAKMI>.
- Purcell, E. and Gould, D. (2023) “Infection prevention and control in healthcare settings,” p. 374. Available at: <https://doi.org/https://www1.health.nsw.gov.au>.
- Sianne Wijaya and Zita Atzmardina (2024) “Diagnosis Komunitas Dalam Upaya Penurunan Kasus Kekurangan Energi Kronik Pada Ibu Hamil Di Desa Talaga, Wilayah Kerja Puskesmas Cikupa,” *Jurnal Kedokteran dan Kesehatan : Publikasi Ilmiah Fakultas Kedokteran Universitas Sriwijaya*, 11(1), pp. 16–21. Available at: <https://doi.org/10.32539/jkk.v11i1.223>.
- Soeripto, N.D. (2019) “the Implementation of Clinical Procedures in the Vertical Referral System in a Primary Healthcare Center,” *Indonesian Journal of Health Administration*, 7(1), pp. 73–80. Available at: <https://doi.org/10.20473/jaki.v7i1.2019.73-80>.
- Tanjung, H., Suhandi, T. and Tanzila, W. (2020) “Analisis Strategi Pengelolaan Wakaf Uang di Indonesia (Pendekatan Metode Delphi),” *Al Maal: Journal of Islamic Economics and Banking*, 2(1), p. 1. Available at: <https://doi.org/10.31000/almaal.v2i1.2592>.
- Tsofa, B., Molyneux, S. and Goodman, C. (2016) “Health sector operational planning and

budgeting processes in Kenya-"never the twain shall meet";" *The International journal of health planning and management*, 31(3), pp. 260–276. Available at: <https://doi.org/10.1002/hpm.2286>.

Tyas Ratih Cahyaning (2020) "Penentuan Prioritas Masalah Kesehatan Dan Jenis Intervensi Di Rw 13 Dan Rw 14 Kelurahan Ampel

Kecamatan Semampir Surabaya Tahun 2018 Penentuan Prioritas Masalah Kesehatan Dan Jenis Intervensi Di Rw 13 Dan Rw 14 Kelurahan Ampel Kecamatan Semampir Surabaya ," *Jurnal Penelitian Kesehatan*, 18(1), pp. 10–13. Available at: <https://doi.org/10.35882/jpk.v18i1.2>.

Appendix 1. Scoring Results Alternative Priority Problem-Solving with CARL Method

No	Alternative Priority Problem-Solving	Respondent	C	A	R	L	CxAxRxL	Total	Rank
1	Develop organizational structure Infection prevention and control	1	4	3	4	4	192	3621	4
		2	4	4	4	4	256		
		3	3	4	4	4	192		
		4	3	3	3	4	108		
		5	4	4	4	5	320		
		6	3	5	4	4	240		
		7	4	4	4	5	320		
		8	4	4	4	5	320		
		9	3	3	2	3	54		
		10	3	3	3	3	81		
		11	3	3	3	3	81		
		12	4	3	4	4	192		
		13	4	3	4	4	192		
		14	4	3	4	4	192		
		15	5	5	5	5	625		
		16	4	4	4	4	256		
2	Recruit epidemiologists and surveillance staff	1	4	3	4	4	192	2450	19
		2	4	3	4	4	192		
		3	4	3	4	4	192		
		4	3	3	4	4	144		
		5	4	4	5	5	400		
		6	3	2	3	4	72		
		7	2	2	3	4	48		
		8	3	3	4	5	180		
		9	3	3	3	3	81		
		10	4	4	4	3	192		
		11	3	3	3	3	81		
		12	3	3	3	4	108		
		13	3	3	3	4	108		
		14	2	1	2	3	12		
		15	4	4	4	4	256		
		16	4	3	4	4	192		
3	Recruit infection prevention and control staff	1	4	4	3	4	192	2719	15
		2	4	4	3	4	192		
		3	4	4	3	4	192		
		4	3	4	3	4	144		
		5	4	5	5	5	500		
		6	4	2	2	4	64		
		7	2	2	2	5	40		
		8	4	4	4	4	256		
		9	3	3	3	3	81		
		10	4	3	4	3	144		
		11	3	3	3	3	81		
		12	4	4	4	4	256		
		13	4	4	4	4	256		
		14	2	2	4	3	48		
		15	3	3	3	3	81		
		16	4	4	3	4	192		
4	Develop a strategic plan for infection prevention and control	1	3	4	3	5	180	2119	20
		2	4	4	4	3	192		
		3	4	3	3	4	144		
		4	2	3	3	4	72		

No	Alternative Priority Problem-Solving	Respondent	C	A	R	L	CxAxRxL	Total	Rank				
		5	4	4	4	4	256						
		6	3	3	4	4	144						
		7	3	2	4	5	120						
		8	3	2	4	5	120						
		9	3	3	3	3	81						
		10	3	3	4	3	108						
		11	3	3	3	3	81						
		12	2	2	3	3	36						
		13	3	3	3	3	81						
		14	3	3	2	4	72						
		15	4	3	4	5	240						
		16	4	4	4	3	192						
		5	Assign specialized staff in all renewable areas and continue to publicize news about hand hygiene activities on an ongoing basis	1	4	4	3			5	240	2571	16
				2	4	4	4			3	192		
				3	4	4	3			4	192		
				4	3	4	3			4	144		
5	3			4	4	5	240						
6	4			2	4	4	128						
7	3			3	4	5	180						
8	4			4	4	4	256						
9	2			3	3	3	54						
10	3			4	4	3	144						
11	3			3	3	3	81						
12	4			4	3	4	192						
13	4			3	3	4	144						
14	2			2	3	4	48						
15	3			3	4	4	144						
16	4			4	4	3	192						
6	Maximize the reporting system related to infectious diseases.	1	4	3	4	4	192	3621	4				
		2	4	4	4	4	256						
		3	3	4	4	4	192						
		4	3	3	3	4	108						
		5	4	4	4	5	320						
		6	3	5	4	4	240						
		7	4	4	4	5	320						
		8	4	4	4	5	320						
		9	3	3	2	3	54						
		10	3	3	3	3	81						
		11	3	3	3	3	81						
		12	4	3	4	4	192						
		13	4	3	4	4	192						
		14	4	3	4	4	192						
		15	5	5	5	5	625						
		16	4	4	4	4	256						
7	Remain attentive to non-stop running water in all clinical patient areas	1	3	4	4	5	240	3005	12				
		2	3	4	4	4	192						
		3	3	4	3	4	144						
		4	3	4	3	4	144						
		5	4	4	4	4	256						
		6	3	4	4	4	192						
		7	4	4	3	4	192						
		8	3	4	4	4	192						

No	Alternative Priority Problem-Solving	Respondent	C	A	R	L	CxAxRxL	Total	Rank
		9	3	3	3	4	108		
		10	4	4	4	4	256		
		11	3	3	3	3	81		
		12	4	3	4	4	192		
		13	5	3	4	4	240		
		14	4	3	4	4	192		
		15	3	4	4	4	192		
		16	3	4	4	4	192		
8	Pay attention to the availability of empty and ready-to-use waste containers	1	4	4	5	4	320	3662	3
		2	4	4	4	4	256		
		3	4	4	4	4	256		
		4	4	4	4	4	256		
		5	4	4	3	4	192		
		6	4	4	4	4	256		
		7	4	3	4	4	192		
		8	4	4	4	5	320		
		9	3	3	3	3	81		
		10	4	4	4	4	256		
		11	3	3	3	3	81		
		12	4	4	4	4	256		
		13	4	4	4	5	320		
		14	3	3	4	3	108		
		15	4	4	4	4	256		
		16	4	4	4	4	256		
9	Increase awareness in complying with waste management policies in accordance with procedures	1	4	4	4	4	256	2937	13
		2	4	4	3	4	192		
		3	4	4	3	4	192		
		4	4	4	3	4	192		
		5	4	4	3	4	192		
		6	4	4	3	4	192		
		7	4	4	4	4	256		
		8	4	4	4	4	256		
		9	3	4	3	3	108		
		10	4	4	3	4	192		
		11	3	3	3	3	81		
		12	3	4	3	4	144		
		13	3	3	3	4	108		
		14	4	3	4	4	192		
		15	4	4	3	4	192		
		16	4	4	3	4	192		
10	Develop clear duties and responsibilities for easy implementation of infection prevention and control activities.	1	4	3	4	4	192	3621	4
		2	4	4	4	4	256		
		3	3	4	4	4	192		
		4	3	3	3	4	108		
		5	4	4	4	5	320		
		6	3	5	4	4	240		
		7	4	4	4	5	320		
		8	4	4	4	5	320		
		9	3	3	2	3	54		
		10	3	3	3	3	81		
		11	3	3	3	3	81		
		12	4	3	4	4	192		
		13	4	3	4	4	192		

No	Alternative Priority Problem-Solving	Respondent	C	A	R	L	CxAxRxL	Total	Rank
		14	4	3	4	4	192		
		15	5	5	5	5	625		
		16	4	4	4	4	256		
		1	3	4	3	5	180		
		2	4	4	4	3	192		
		3	4	4	4	5	256		
		4	3	3	3	3	81		
		5	4	4	4	5	256		
		6	4	5	5	5	500		
11	Conduct specific training for infection prevention and control team	7	4	4	4	5	320	3611	5
		8	4	4	4	4	256		
		9	3	3	3	3	81		
		10	4	4	4	3	192		
		11	3	3	3	3	81		
		12	4	4	4	5	320		
		13	4	4	4	5	320		
		14	4	4	4	3	192		
		15	4	4	4	3	192		
		16	4	4	4	3	192		
		1	4	4	4	5	320		
		2	4	4	4	4	256		
		3	4	4	4	4	256		
		4	4	4	4	4	256		
		5	4	3	4	5	240		
		6	4	5	5	5	500		
		7	4	4	4	5	320		
12	Conduct training for surveillance staff	8	4	4	4	4	256	4129	1
		9	3	3	3	4	108		
		10	4	3	4	4	192		
		11	3	3	3	3	81		
		12	4	4	4	5	320		
		13	4	4	4	4	256		
		14	4	4	4	4	256		
		15	4	4	4	4	256		
		16	4	4	4	4	256		
		1	4	4	4	5	320		
		2	4	4	4	4	256		
		3	4	4	4	4	256		
		4	4	4	4	4	256		
		5	4	4	5	4	320		
		6	4	4	5	5	400		
		7	4	4	4	5	320		
		8	4	4	4	4	256		
13	Conduct regular monitoring and evaluation of infection prevention and control activities	9	3	3	3	3	81	4082	2
		10	4	4	4	4	256		
		11	3	3	3	3	81		
		12	4	4	4	4	256		
		13	4	4	4	4	256		
		14	4	4	4	4	256		
		15	4	4	4	4	256		
		16	4	4	4	4	256		
14	Conduct HAI surveillance activities	1	4	3	3	3	192	3277	7
		2	4	3	4	4	192		

No	Alternative Priority Problem-Solving	Respondent	C	A	R	L	CxAxRxL	Total	Rank
		3	4	3	4	4	192		
		4	4	3	4	4	192		
		5	4	5	4	4	320		
		6	4	3	4	4	192		
		7	4	4	4	4	256		
		8	4	4	4	4	256		
		9	4	3	3	4	144		
		10	4	3	4	4	192		
		11	3	3	3	3	81		
		12	4	4	4	4	256		
		13	4	4	4	5	320		
		14	3	3	4	3	108		
		15	4	3	4	4	192		
		16	4	4	4	3	192		
		1	4	4	4	5	320		
		2	4	4	4	4	256		
		3	3	4	3	5	180		
		4	3	2	3	3	54		
		5	5	5	5	5	652		
		6	3	5	4	5	300		
		7	3	4	3	4	144		
15	Ensure posters are in good condition and prominently displayed in appropriate places (e.g. at point of care, above sinks).	8	3	3	4	5	180	3084	10
		9	3	3	2	3	54		
		10	3	2	3	3	54		
		11	3	3	3	3	81		
		12	3	3	4	3	108		
		13	3	4	3	3	108		
		14	3	3	3	3	81		
		15	4	4	4	4	256		
		16	4	4	4	4	256		
		1	4	4	4	4	256		
		2	4	4	4	3	192		
		3	3	4	4	4	192		
		4	3	4	4	3	144		
		5	4	4	4	5	320		
		6	4	4	4	3	192		
		7	4	4	3	4	192		
16	Making posters, leaflets and brochures about hand hygiene at every point of the care unit	8	4	4	4	4	256	2857	14
		9	3	4	3	4	144		
		10	4	4	4	3	192		
		11	3	3	3	3	81		
		12	3	3	3	4	108		
		13	4	3	3	4	144		
		14	2	2	3	5	60		
		15	4	4	4	3	192		
		16	4	4	4	3	192		
		1	4	3	5	5	300		
		2	4	3	5	4	240		
		3	4	3	4	4	192		
		4	4	3	4	4	192		
		5	4	3	4	4	192		
		6	4	3	5	4	240		
		7	4	3	4	4	192		
17	Increase hand hygiene training for all staff	8	4	3	4	4	192	3133	9
		9	4	3	4	4	192		
		10	4	3	4	4	192		
		11	4	3	5	4	240		
		12	4	3	4	4	192		

No	Alternative Priority Problem-Solving	Respondent	C	A	R	L	CxAxRxL	Total	Rank
		8	4	3	4	4	192		
		9	4	3	3	4	144		
		10	4	3	4	4	192		
		11	3	3	3	3	81		
		12	3	4	4	4	192		
		13	4	4	4	4	256		
		14	2	2	4	3	48		
		15	4	3	5	4	240		
		16	4	3	5	4	240		
		1	4	4	4	4	256		
		2	4	4	4	3	192		
		3	4	4	4	4	256		
		4	4	3	3	4	144		
		5	4	5	5	4	400		
		6	4	4	4	3	192		
		7	4	4	4	4	256		
18	Establish a strict policy on hand hygiene compliance	8	4	4	4	4	256	3209	8
		9	3	3	4	4	144		
		10	4	4	4	3	192		
		11	3	3	3	3	81		
		12	3	3	3	4	108		
		13	3	3	3	4	108		
		14	4	3	4	5	240		
		15	4	4	4	3	192		
		16	4	4	4	3	192		
		1	4	4	4	4	256		
		2	4	4	4	3	192		
		3	3	4	4	4	192		
		4	3	4	4	3	144		
		5	4	4	4	5	320		
		6	4	4	4	3	192		
		7	4	4	3	4	192		
19	The budget allocation is in accordance with the needs of the prevention and control program so that it does not hamper its implementation.	8	4	4	4	4	256	2857	14
		9	3	4	3	4	144		
		10	4	4	4	3	192		
		11	3	3	3	3	81		
		12	3	3	3	4	108		
		13	4	3	3	4	144		
		14	2	2	3	5	60		
		15	4	4	4	3	192		
		16	4	4	4	3	192		
		1	4	3	5	5	300		
		2	4	3	5	4	240		
		3	4	3	4	4	192		
		4	4	3	4	4	192		
		5	4	3	4	4	192		
		6	4	3	5	4	240		
		7	4	3	4	4	192		
		8	4	3	4	4	192		
		9	4	3	3	4	144		
		10	4	3	4	4	192		
		11	3	3	3	3	81		
		12	3	4	4	4	192		
20	Procure waste management equipment	1	4	3	5	5	300	3133	9
		2	4	3	5	4	240		
		3	4	3	4	4	192		
		4	4	3	4	4	192		
		5	4	3	4	4	192		
		6	4	3	5	4	240		
		7	4	3	4	4	192		
		8	4	3	4	4	192		
		9	4	3	3	4	144		
		10	4	3	4	4	192		
		11	3	3	3	3	81		
		12	3	4	4	4	192		

No	Alternative Priority Problem-Solving	Respondent	C	A	R	L	CxAxRxL	Total	Rank
		13	4	4	4	4	256		
		14	2	2	4	3	48		
		15	4	3	5	4	240		
		16	4	3	5	4	240		
		1	4	4	4	4	256		
		2	4	4	4	3	192		
		3	3	4	4	4	192		
		4	3	4	4	3	144		
		5	4	4	4	5	320		
		6	4	4	4	3	192		
		7	4	4	3	4	192		
21	Produce posters and brochures as needed	8	4	4	4	4	256	2857	14
		9	3	4	3	4	144		
		10	4	4	4	3	192		
		11	3	3	3	3	81		
		12	3	3	3	4	108		
		13	4	3	3	4	144		
		14	2	2	3	5	60		
		15	4	4	4	3	192		
		16	4	4	4	3	192		
		1	4	4	4	4	256		
		2	4	3	4	4	192		
		3	3	3	4	4	144		
		4	3	3	4	4	144		
		5	4	4	4	4	256		
		6	4	3	4	4	192		
		7	4	4	4	4	256		
22	Develop forms for surveillance activity reports	8	4	4	4	4	256	3025	11
		9	4	3	3	4	144		
		10	4	3	4	4	192		
		11	3	3	3	3	81		
		12	4	3	3	4	144		
		13	4	4	3	4	192		
		14	4	4	3	4	192		
		15	4	3	4	4	192		
		16	4	3	4	4	192		
		1	4	3	4	5	240		
		2	4	3	4	4	192		
23	Provision of personal protective equipment for health workers according to needs	3	3	4	3	5	180	2489	18
		4	2	3	4	3	72		
		5	4	4	4	5	320		
		6	4	2	4	5	160		

No	Alternative Priority Problem-Solving	Respondent	C	A	R	L	CxAxRxL	Total	Rank
		7	3	3	4	4	144		
		8	4	4	4	5	320		
		9	2	3	3	3	54		
		10	3	2	3	3	54		
		11	3	3	3	3	81		
		12	4	4	3	3	144		
		13	2	2	3	3	36		
		14	3	3	3	4	108		
		15	4	3	4	4	192		
		16	4	3	4	4	192		
		1	4	4	4	4	256		
		2	4	4	4	5	320		
		3	4	3	3	4	144		
		4	3	3	3	4	108		
		5	4	5	4	5	400		
		6	4	4	4	5	320		
24	Provision of alcohol hand sanitizer at all times in all clinical patient care areas	7	4	4	4	4	256	3598	6
		8	4	4	4	4	256		
		9	3	3	3	3	81		
		10	4	4	4	4	256		
		11	3	3	3	3	81		
		12	3	3	4	4	144		
		13	4	3	4	4	192		
		14	3	3	4	4	144		
		15	4	4	4	5	320		
		16	4	4	4	5	320		
		1	3	4	4	5	240		
		2	4	4	3	4	192		
		3	3	4	3	4	144		
		4	3	4	3	4	144		
		5	4	4	5	5	400		
		6	4	4	3	4	192		
		7	3	3	3	4	108		
25	Provide computers in each room for HAI surveillance activities.	8	3	3	4	5	180	2515	17
		9	3	3	3	3	81		
		10	3	2	4	3	72		
		11	3	3	3	3	81		
		12	3	3	3	3	81		
		13	4	4	3	3	144		
		14	3	3	2	4	72		
		15	4	4	3	4	192		
		16	4	4	3	4	192		