



Infection control risk assessment (ICRA) in the isolation room of the respira lung hospital Yogyakarta

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ABSTRACT

Infectious diseases are still a world health problem, including Indonesia. The incidence of Healthcare Associated Infections (HAIs) in the world is still high, not only in America but also in Europe and low- and middle-income countries. Healthcare Associated Infections (HAIs) can be prevented and controlled by implementing infection prevention and control. Infection Control Risk Assessment (ICRA) is a process to assess the implementation of infection prevention and control in health care facilities so as to describe the level of infection risk. Isolation room is a room to treat infectious patients so that they do not spread or spread to officers, visitors or other patients. This study aims to determine the risk of infection in the isolation room of Respira Lung Hospital measured using ICRA instruments from the CDC (Centers for Disease Control and Prevention). This research uses the Mix Method method, a combination of quantitative, descriptive and qualitative. The suitability of ICRA instruments with isolation chambers reached 65.3%. While the assessment of infrastructure facilities is 81% and the assessment for programs and competencies is 57.4%. Thus, overall infection risk control in the isolation room is quite good (69.2%), indicating that the risk of infection in the isolation room of Respira Lung Hospital is included in the medium risk category.

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INTRODUCTION

Diseases caused by infection are one of the human health problems of countries in the world, including Indonesia. Diseases caused by infections can be acquired both from the environment (Community Acquired Infection) and from health care facilities (Healthcare Associated Infection / HAIs) or so-called nosocomial infections (Ministry of Health, 2017). Healthcare Associated Infection is a disease that a person gets when treated in hospitals and other health facilities which when entered without disease and not in the time of disease growth, infections that arise after treatment, and infections caused by being in charge of providing health services in health facilities (Ministry of Health, 2017).

The incidence of Healthcare Associated Infection (HAIs) in the world is still high. Healthcare Associated Infections (HAIs) affect 3.2% of all hospitalized patients in the United

States, while in the European Union/European Economic Area it is 6.5% (Sikora & Zahra, 2021). While low- and middle-income countries have a greater burden of Healthcare Associated Infection (HAIs) compared to high-income countries (Maki & Zervos, 2021). A systemic review of Healthcare Associated Infections (HAIs) in Southeast Asian countries found the overall prevalence to be 9.1% (Ling et al., 2015). In Indonesia, the survey results of the Infection Control Association (Perdalin) Jaya and RS Prof. Dr. Suliarti Saroso Jakarta in 11 hospitals in DKI Jakarta found nosocomial infection rates of Surgical Area Infection 18.9%, Urinary Tract Infection 15.1%, Blood Flow Infection 26.4%, Ventilator Associated Pneumonia 24.5%, Other Respiratory Infections 25.1%, and other types 32.1% (Madjid & Wibowo, 2019).

In hospitals, the most common Healthcare Associated Infections are operating area infections, inflammation of

blood vessels, inflammation of the urinary tract and pneumonia due to ventilators (Ministry of Health 2017). The centers for disease prevention and control generally categorizes Healthcare Associated Infections (HAIs) as, Central Vein Insertion Associated Bloodstream Infections (CLABSI), Catheter-related Urinary Tract Infections (CAUTI), Surgical Site Infections (ILO), and Ventilator-associated Pneumonia (VAP) (Sikora & Zahra, 2021). During the Covid 19 Pandemic, the incidence of Healthcare Associated Infection (HAIs) increased, possibly due to the hospital's ability to prevent prevention efforts to decrease/decrease (Baccolini et al., 2021). From health workers alone, according to the latest report from Amnesty International, at least 17,000 health workers have died worldwide due to covid 19. Meanwhile, in Indonesia, no less than 181 health workers died at the beginning of the pandemic (Irmayanti et al., 2021).

Health facilities where the risk of spreading infection is found is a hospital. When carrying out health care, hospitals are required to apply vigilance in the prevention and control of infections, both standard and transmitted. Patients with infectious diseases must be separated by the hospital. The isolation room is a place to treat infectious patients so as not to transmit to others. The existence of isolation rooms is approximately 10% of the total inpatient capacity in hospitals based on the types of cases that exist in the community (Ministry of Health, 2015).

Healthcare Associated Infections (HAIs) can actually be prevented and controlled by implementing Infection Prevention and Control. In addition, to control the high level of Healthcare Associated Infection (HAIs), namely by conducting infection risk assessment and control or Infection Control Risk Assessment (ICRA) periodically (Ministry of Health, 2017).

The Centers for Disease Control and Prevention (CDC) has issued a standardized instrument for infection risk assessment called the Infection Control Risk Assessment (ICRA). ICRA from CDC consists of four instruments that can be used according to the health facilities to be assessed, namely out patient, Hemodialysis Facilities, Acute Care Hospital and Long Term Care Facilities (CDC, 2015). However, not many hospitals in Indonesia have implemented the ICRA instrument from the CDC. Because so far the application of ICRA for the construction and renovation of hospital buildings.

Yogyakarta Respira Lung Hospital is a hospital that has special services in lung and respiratory health. In providing health services, Respira Lung Hospital has an isolation room devoted to treating TB patients, both Drug Sensitive TB and Drug Resistant TB. During the pandemic, the isolation room was also used to treat Covid-19 patients. According to a report from the Hospital Infection Prevention and Control Committee (PIRS) in 2021 at the Yogyakarta Respira Lung Hospital, HAIs data was found at 11.4%.

Based on these facts, researchers are interested in conducting a study entitled "Infection Control Risk Assessment (ICRA) in the Isolation Room of Yogyakarta Respira Lung Hospital".

METHODS

This type of research is a mix method, which is a combination method between quantitative descriptive and qualitative to deepen the results obtained. The research was included in field research because the data was taken

through document tracing and direct observation in the isolation room of Yogyakarta Respira Lung Hospital using ICRA instruments from CDC that had been adapted. The subjects in this study were Infection Prevention Control Nurse (IPCN), Head and staff of the isolation room of Yogyakarta Respira Lung Hospital. While the object in this study is documents and infrastructure facilities in the isolation room of the Yogyakarta Respira Lung Hospital located on Jl. Panembahan Senopati No. 4 Palbapang Bantul. The study was conducted from September 2022 to October 2022.

The stages carried out in this study are the first to see, study and assess documents related to infection prevention and control as well as infection prevention and control facilities in the isolation room. The assessment was conducted using the ICRA Acute Care Hospital instrument from the CDC. The second step is to conduct an interview with officers in the isolation room to confirm the results of the examination of documents and facilities carried out.

Data analysis in this study uses univariate analysis to explain the characteristics of the variables in the study. Data is processed and analyzed based on frequency distribution and presented in tabular form. Assessment of infection risk control by giving a "yes" (value 1) or "no" (value 0) answer to each question/statement. Then it is added and converted in the form of a percentage of 1% to 100%. The percentage of < 50% means that the application of infection control is still lacking so that the risk of infection is high (high risk), 51% - 75% indicates that the implementation of infection control is good enough so that the risk of infection is medium (medium risk), 76% - 100% describes the implementation of infection control programs that have run well so that the risk of infection is low (low risk).

RESULTS AND DISCUSSION

Frequency distribution based on respondent characteristics

Table 1
 Distribution of respondents by gender

Job title/position	Sum	Man	Woman
IPCN	1	1	0
Head of space	1	0	1
Managing nurse	10	3	7

From table.1 it can be seen that most of the respondents in this study were women, namely 8 people. While the male respondents were 4 people.

Table 2
 Distribution of respondents by age

Age group	Woman	Man	Sum
20 – 30 years	3	0	3
31 – 40 years	2	2	4
>40 years	3	2	5

From table 2 above, it can be seen that respondents with the age group of >40 years are the most, namely 5 people. Respondents with the age group of 31 – 40 years amounted to 4 people and respondents with the age group of 20 – 30 years 3 people.

Suitability of Infection Control Risk Assessment instrument

Table 3
Conformity Results of the Infection Control Risk Assessment instrument

Instruments	Percentage (%)
Usable/compliant	65.3
Unusable/non-compliant	34.7

Infection Control Risk Assessment (ICRA) isolation room

Table 4
Results of demographic facility variable compliance

Instruments	Percentage (%)
Usable/compliant	77
Unusable/non-compliant	23

Table 5
Assessment Results of infrastructure variables

Instruments	Percentage (%)
Instruments available/compliant	81
Instrument unavailable/non-compliant	19

Table 6
Results of Program Variable and Competency Assessment

Instruments	Percentage (%)
Hand Hygiene	
Instruments available/compliant	100
Instrument unavailable/non-compliant	0
Personal Protective Equipment	
Instruments available/compliant	86
Instrument unavailable/non-compliant	14
CAUTI	
Instruments available/compliant	65
Instrument unavailable/non-compliant	35
CLABSI	
Instruments available/compliant	0
Instrument unavailable/non-compliant	100
VAE	
Instruments available/compliant	0
Instrument unavailable/non-compliant	100
Injection Safety	
Instruments available/compliant	83
Instrument unavailable/non-compliant	17
SSI	
Instruments available/compliant	63
Instrument unavailable/non-compliant	37
CDI	
Instruments available/compliant	0
Instrument unavailable/non-compliant	100
Environmental Cleanliness	
Instruments available/compliant	100
Instrument unavailable/non-compliant	0
Tool Reprocessing	
Instruments available/compliant	49
Instrument unavailable/non-compliant	51
MDROs	
Instruments available/compliant	86
Instrument unavailable/non-compliant	14
SUM	57.4

From table 3 it can be seen that the elements in the Infection Control Risk Assessment instrument that can be used are 65.3%, while the elements that cannot be used are 34.7%.

From table 4 it can be seen that the elements of usable/appropriate demographic facilities are 77%, while the elements that cannot be used/appropriate are 23%.

From table 5 it can be seen that the element of infrastructure variables that can be met / available is 81%. While the elements that are not available / fulfilled by 19%.

From table 6. Above it can be seen that the assessment elements of programs and competencies that can be fulfilled / available are 57.4%, while those that have not been fulfilled are 42.6%.

DISCUSSIONS

Conformity of CDC's Infection Control Risk Assessment (ICRA) instrument

The high incidence of HAIs in hospitals requires a good infection prevention and control system. With good infection prevention and control in hospitals, it is expected to reduce or suppress the incidence of nosocomial infections that occur. To find out the extent of infection control efforts carried out, it is necessary to assess infection risk control or known as ICRA (*Infection Control Risk Assessment*). The application of ICRA methods is effective in improving the prevention and control of cross-infection (Junaidi et al., 2018). So far many hospitals have used ICRA when building or renovating hospital buildings. Every Infection Preventer in a healthcare facility works to ensure that an Infection Control Risk Assessment (ICRA) is consistently used to reduce the risk of patient injury during renovation or construction (Grupa & Meller, 2018). In this study, infection risk control assessment was carried out at the stage of the service delivery process. The assessment was conducted using ICRA instruments from the CDC. CDC's ICRA instrument can be used to assess infection risk control in health care (Abiya et al., 2017; Dhani et al., 2017; Salsabella et al., 2022) The result of this study is that 65.3% of the assessment elements of the CDC ICRA instrument can be used in the isolation room of the Respira Lung Hospital.

Risk control assessment of infection in isolation room of Respira Lung Hospital

The risk of infection is all elements that can cause infection in the hospital both from external factors and internal factors. External factors include community, disasters and mass accidents. While internal factors include patients, officers, visitors, procedures, equipment and the environment. In this study the assessment of infection risk control using ICRA instruments from the CDC which include:

Infrastructure

Infrastructure is very important in infection prevention and control efforts in hospitals. Healthcare planning and design can help or hinder infection prevention and control (IPAC) efforts. Patient separation, room size and layout, room fixtures and finishes, indoor air quality, and water system design can all support IPAC best practices if planned appropriately (Fullerton & Hota, 2022). Respira Lung Hospital in addition to having infrastructure also has an

infection control program. This can be known by the presence of officers appointed as the person in charge of infection prevention and control programs. The hospital also provides a budget for the implementation of the infection prevention and control program. The officer in charge of the program has a certificate from the Association of Infection Control (PERDALIN) and the Association of Infection Control Nurses (HIPI). Hospitals assess and evaluate the risk of infection and prepare programs to reduce the risk of infection based on a priority scale. But it has not been done periodically. The hospital also has infection prevention and control policies and procedures that are updated regularly in accordance with applicable regulations. In addition, the hospital also has infrastructure facilities to provide infection prevention and control education to patients and their families. The existing infrastructure can meet 81% of the assessments required by ICRA instruments.

Hand Hygiene

Since most HAIs are most likely to spread through direct contact with staff hands, hand hygiene should logically provide an effective way to reduce the risk of cross-infection. Organizations also need to make decisions about which approach to use for hand hygiene audits, as each has limitations. The presence of observers is very likely to increase the frequency of hand hygiene and exaggerate compliance, but relying solely on product uptake or electronic counting equipment results in loss of information because it does not provide information about hand hygiene events in the context of care delivery (Gould et al., 2017). The hospital provides regular hand hygiene/hand washing training to all officers involved in the service through IHT activities. Training is also provided to employees or new employees before starting to do their work. Hand washing with alcohol-based liquids is recommended (Vermeil et al., 2019). Each officer who attended the training was asked to demonstrate the ability to do proper hand washing and was given an IHT certificate. In addition, the hospital also conducts compliance audits, conducts regular hand washing and determines the follow-up actions to be carried out. From the results of the audit conducted by the hospital provides feedback to employees / employees. To improve handwashing compliance, hospitals also provide facilities needed to support handwashing compliance such as soap, tissue and wastaple in places that are easily accessible. The hospital also prepares handscrubs in every service room and patient room. Monitoring hand hygiene performance and providing feedback to personnel on their performance are important elements of a successful improvement program (Boyce, 2019). From the element of hand hygiene is able to meet 100% of the assessment requested by ICRA instruments.

Personal Protective Equipment

Overall, there is evidence that PPE use does reduce disease transmission rates and protect staff. Staff should understand the purpose of PPE and its role as part of a system to reduce disease transmission from patient to staff and other patients. It is just as important as staff use them appropriately, keeping stocks that may be limited to ensure there is an adequate supply for the use required during epidemic surges (Cook, 2020). In order for health care professionals to provide safe care, they need adequate protection and training in its use. If an employer fails to

provide adequate PPE, safe health care cannot be provided (Herron et al., 2020). The hospital has a training program on the use of Personal Protective Equipment (PPE) for all hospital personnel, especially officers who use PPE regularly once a year with IHT activities. Training is also provided for new employees admitted to the hospital. But training has not been provided when there is new equipment. All trainees are asked to practice the selection and use of appropriate and correct PPE after receiving training materials and are given certificates after completing the training. The hospital periodically conducts audits on compliance with the use of PPE and determines follow-up if non-compliance is found. The results of this audit are used as a basis for providing feedback to officers. The hospital also provides the need for compliance with the use of PPE according to the standards determined at the point of use of PPE that has been determined. PPE selection is based on the risk of exposure and the possible mode of transmission. The level of protection provided by PPE differs based on standards and test methods (Park, 2020). It's just that the hospital does not yet have respiratory protective equipment such as air purifying respirators intended for unhealthy staff. From this aspect of personal protective equipment, isolation rooms can meet 86% of the assessments required by ICRA instruments.

Catheter-associated urinary tract infection (CAUTI)

Catheter-associated urinary tract infection (CAUTI) has long been considered a preventable healthcare-related infection. Many federal agencies, the Centers for Medicare and Medicaid Services (CMS), and public and private healthcare organizations have implemented strategies aimed at preventing CAUTI (Advani & Fakhri, 2019). Urinary tract infections (UTIs) are considered the most common healthcare-associated infections (HAIs) (Parker et al., 2017). Ensuring compliance with infection prevention efforts through timely audits and feedback is also common (Patel et al., 2018). The hospital does not yet have a special doctor or nurse for CAUTI prevention activities, so CAUTI prevention activities are still coordinated by IPCN. The hospital only provides catheter insertion and maintenance training to all room nurses, and is then asked to practice the correct techniques after receiving training materials. However, training has not been carried out regularly, nor has it been carried out when there are new employees or when there is new equipment. This training is also not given a certificate. But the hospital already conducts periodic audits and provides feedback to officers. Nurses conduct daily assessments for catheter-fitted patients and their compliance is audited by IPCN. The data related to CAUTI obtained is used as a basis for providing feedback and directing further activities. The assessment of this aspect of CAUTI reaches 65% of what is required by ICRA instruments.

CLABSI

CLABSI has an estimated mortality rate of 12-25% and is considered one of the deadliest types of healthcare-associated infections (HAIs). After catheter-related urinary tract infections, CLABSI is estimated to be the second most preventable HAIs (Madni & Eastman, 2018). The required assessment of ICRA's CLABSI instrument elements cannot be applied in isolation rooms because there are no policies and programs related to this. So from this CLABSI element, the assessment is 0%.

VAE

The required assessment of ICRA's VAE instrument elements cannot yet be applied in isolation because there are no policies and programs related to it. So from this VAE element, the assessment is 0%.

Injection Safety

Unsafe injection practices can lead to new infection problems. Pharmaceutical support and health worker education can improve safe injection practices (Anderson et al., 2017). The hospital provides training in the preparation and administration of parenteral medicine to all personnel who administer parenteral injections and infusions periodically once a year. Training is also provided for new employees who are admitted to the hospital before being allowed to prepare and administer injections. But training has not been provided when there is new equipment. All trainees are asked to practice proper and correct preparation and injection after receiving training materials and are given a certificate after completing the training. The hospital regularly conducts audits of compliance with safe injection practices and determines follow-up if non-compliance is found. The results of this audit are used as a basis for providing feedback to officers. But the hospital does not yet have a drug diversion prevention program. From the safety aspect of this injection, the isolation chamber can meet 83% of the assessment required by ICRA instruments.

Surgical site infection

Surgical site infection is a persistent and preventable health care-related infection. Antimicrobial prophylaxis should be administered only if indicated under published clinical practice guidelines and timed in such a way that bactericidal concentrations of the agent are formed in serum and tissue when the incision is made (Berríos-Torres et al., 2017). The hospital does not yet have a program of administering antibiotic prophylaxis, periodic audits and feedback to officers. But hospitals are already auditing compliance with infection control practices for SSI prevention such as adherence to aseptic hand washing before surgery, use of surgical gowns, adherence to aseptic and sterilization techniques, ventilation requirements, minimizing traffic and compliance with cleaning and disinfection of environmental surfaces. The hospital also provides feedback on compliance with surgical infection control practices both to room personnel and to surgeons and other teams. Surgical site infection management strategies are carried out by breaking the chain of infection, bacterial identification, rational use of antibiotics, optimization of HAI surveillance, implementation of periodic routine meetings, reporting, cooperation, evaluation, socialization, monitoring and prevention, strengthening SOPs (Rosa et al., 2019). The assessment of this aspect reached 63% of the required ICRA instruments.

CDI

The required assessment of ICRA's CDI instrument elements cannot be applied in isolation rooms because there are no policies and programs related to this. So from this CDI element, the assessment is 0%.

Environmental Cleanliness

Comprehensive monitoring of hospital environmental hygiene during pandemic outbreaks is conducive to improving hospital infection control. It is imperative to ensure the safety of medical care and the quality of hospital infection control through environmental hygiene monitoring (Jiang et al., 2020). Strict disinfection and hand hygiene can lower the risk of hospital-related COVID-19 infection in staff in isolation wards (Wang et al., 2020). The hospital provides training to all personnel who clean and disinfect the patient care area periodically. Training is also provided when there are new employees or new equipment. For contract officers, training also involves service providers. For cleaning certain equipment / medical devices carried out by certain officers who have been determined in hospital policies. Cleaned tools are reported and marked so that officers can easily identify them. The hospital has procedures for conducting regular audits of compliance with cleaning and disinfection procedures and providing feedback on the results of audits conducted. From this aspect of cleanliness, the isolation room reaches 100% of the assessment required by ICRA instruments.

Tool Reprocessing

There has been a paradigm shift over the past 10 years in terms of cleaning medical equipment, including surgical instruments and flexible endoscopy, with an emphasis on using a quality management system approach. This approach ensures that there are regulations that medical device manufacturers must comply with to provide viable and effective validated cleaning protocols in healthcare settings. Furthermore, health service facilities that reprocess medical devices (Alfa, 2019). There is a large gap between instrument reprocessing practices in LMICs and recommended policies/procedures. Areas identified for improvement include instrument cleaning and decontamination, sterilization aspects of instrument reprocessing, and sterilization verification. Education and training of staff responsible for reprocessing realistic and defined instruments and policies and procedures is essential, and supports corrective interventions (Forrester et al., 2018). Hospitals provide training in reprocessing critical devices as well as semi-critical devices to designated personnel, especially if there are new devices or protocols. But training has not been provided periodically and also has not been given to new employees. Officers who receive training are required to demonstrate proficiency in device reprocessing after attending the training but have not been given a certificate. The hospital has also not cooperated with other parties in the reprocessing of the device. The compliance audit carried out has also not run well so it has not been able to provide good feedback. The hospital is already documenting device reprocessing activities. But hospitals do not yet have policies or procedures in place to address problems in case of errors in reprocessing. The achievement of this assessment is 49% of what is required by ICRA instruments.

MDROs

In recent decades, [antibiotic resistance](#) has become a major problem worldwide (Fernández et al., 2021). When implementing important preventive measures for COVID-19, it is important to consider the additional impact of changes in PPI practices and antimicrobial stewardship (ASP)

programs. The disruption caused by PPI and ASP practices during the pandemic will most likely see an increase in counter-intuitive MDRO transmission (Jin & Fisher, 2021). The hospital has an early detection system by including work and travel history in admission and triage procedures. The hospital also has a system of identifying patients with MDRO. In addition, the hospital also has a respiratory hygiene program by installing banners, preparing tissues, preparing trash cans, hand washing equipment, masks for patients and special waiting rooms. The hospital has procedures to conduct rapid isolation for identified patients including communication systems both intra and inter-facility if follow-up is needed. The hospital has an organism surveillance program although it has not been going well. Antibiotic management has not been going well, however, hospital leadership has a strong commitment to improve antibiotic stewardship. The hospital has an occupational health program with periodic employee health checks, providing leave if there are employees who are sick. The hospital also provides vaccinations including hepatitis B vaccination. The hospital also implements infection control measures relevant to construction and renovation before the project begins. From this aspect, the assessment was achieved 86% of the required ICRA instruments.

LIMITATION OF THE STUDY

This research was only conducted in one room. In the future, it will be better if the research is carried out in several other rooms so that it can get a more complete picture.

CONCLUSIONS AND SUGGESTIONS

The conformity assessment of the ICRA for Acute Care Hospital instrument from CDC concluded that the ICRA for Acute Care Hospital from CDC can be used for isolation rooms at Yogyakarta Respira Lung Hospital.

Infection risk control assessment with ICRA instruments from CDC obtained 81% infrastructure results, 57.4% program and competence. Thus, the risk control of infection in the isolation room is quite good (69.2%), so that the risk of infection in the isolation room of the Respira Lung Hospital is included in the medium category.

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