EVALUATION OF RISK MANAGEMENT IMPLEMENTATION IN MEDICAL GAS INSTALLATION HOSPITALS WITH ISO 31000: 2018 APPROACH

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ABSTRACT

Background: Medical gas management system in the healthcare industry must be regulated to capture any potential risk imposed. The number of medical gases required in a hospital must be estimated accurately. Otherwise, it may affect the quality of health service in the hospital. This study aimed to evaluate the medical gas management system and to identify potential risk in a hospital. This evaluation process was expected to help reduce the number of unwanted events, especially in medical gas installations.
Subjects and Method: This was a descriptive study using ISO 31000: 2018 approach con-ducted in several hospitals. The data were collected by observation of medical gas installation followed by detailed interview with the chief, management staff, and logistic report documentation staff of medical gas installation.
Results: The management of medical gas in the hospitals was not effective or efficient due to a number of hospitals in Bekasi were still using conventional medical gas cylinders. In addition, medical gas management was lacking in operational fund and human resources.
Conclusion: The management of medical gas installation in the hospital under study was not effective or efficient.

Keywords: evaluation, risk management implementation, hospital medical gas, ISO 31000: 2018

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BACKGROUND

An organization both in the fields of technology, economy, health and transportation was an example of a business sector that was inseparable from the possibility of potential risks to cause damage and losses if not managed properly (Nota, 2010).

Sabarguna (2008) explained that risk has meaning as a possibility that consisted of unlucky, errors associated with someone, buildings, tools, materials, systems and management, which can indicate a mistake that can occur or not from factors related to service. The purpose and function of risk management according to ISO 31000: 2018 was as the creation and protection of values that can be realized by means of improving performance, encouraging innovation and supporting the achievement of goals. Whereas according to Bryant (1996), risk management has the main objective, which was as prevention and control of losses that can be translated into four functions, namely: (1) as protection against the main financial function of the hospital (2) as protection against the good name of the hospital (3) as prevention of the occurrence of

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unexpected events for patients, visitors, and also employees (4) as a discussion of each incident through risk management. Current risk management has an international standard that referred to ISO 31000: 2018 by implementing a risk management assessment process consisting of risk identification, risk analysis and risk evaluation which can be seen in figure 1. In the picture above illustrated a risk management process that was explained simply based on ISO 31000: 2018.

Figure 1. Risk Management Process Based on ISO 31000: 2018
Source: www.theirm.org

The key stages of the process above were described as risk assessments and their handling that took place in the context of organizational management risk (Airmic, 2010) after knowing the benefits of implementing the risk management process above, hospitals were known to be vulnerable to the risk and medical gas installation units in one risky unit.

Risk management in medical gas installations was very much needed in its management because medical gas was an important element with special specifications, which was useful in the ongoing health services in health facilities, especially hospitals in helping to maintain a patient's life. So that in the management, medical gas must be considered from several aspects, namely, in terms of demand so that the needs of each patient were sufficient, in terms of storage to maintain cleanliness and purity, and in terms of distribution in order to be targeted efficiently and effectively to all patients in need. Medical gas was included in the hardware in the medical services of the type of consumables that must be considered to fulfill their needs for all patients (Imron, 2009). Medical gas installation as one of the important units in a hospital organization has not yet implemented a risk management system that was standardized in ISO 31000.

Therefore, research was needed to explain how doing mapping, risk assessment and design of control systems to prevent the occurrence of risks in medical gas installation units. The research aimed to conduct risk assessment and risk control, including risk identification and hazard analysis in medical gas installations. This research was expected to be able to obtain benefits in the form of a good understanding of risk management and risk assessment with ISO 31000: 2018 standards, risk design and control. Efforts to prevent and anticipate the occurrence of problems that can be caused in the management of medical gas need serious attention. Therefore, the hospital needed to periodically examine the human resources responsible for procurement, maintenance and distribution, as well as reviewing in terms of Standard Operating Proce-

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dure (SOP) for medical gas management to reduce potential risks that might occur. This study was expected to be able to identify problems and be able to provide alternative solutions and implement them.

SUBJECTS AND METHOD

The risk management study method was conducted by referring to the ISO 31000: 2018 standard. This research was conducted at one of the private hospitals in Bekasi which was carried out through identification of problems first in the Medical Gas Installation unit (MGI) and then continued with root problem analysis using Ishikawa diagram (Fishbone analysis) (Figure 2) the data was obtained based on data obtained both primary and secondary for risk evaluation. All risks that have been identified were calculated for their impact related to the objectives to be achieved by the hospital.

Then used as a basis in getting alternative solutions. The stages were by collecting data on all potential risks that might occur by conducting in-depth interviews, literature studies, and field observations. Assess the risk from a list of risks that have been made to determine the level of risk. Risk evaluation aimed to choose the risks that most allows the most extreme risks to occur.

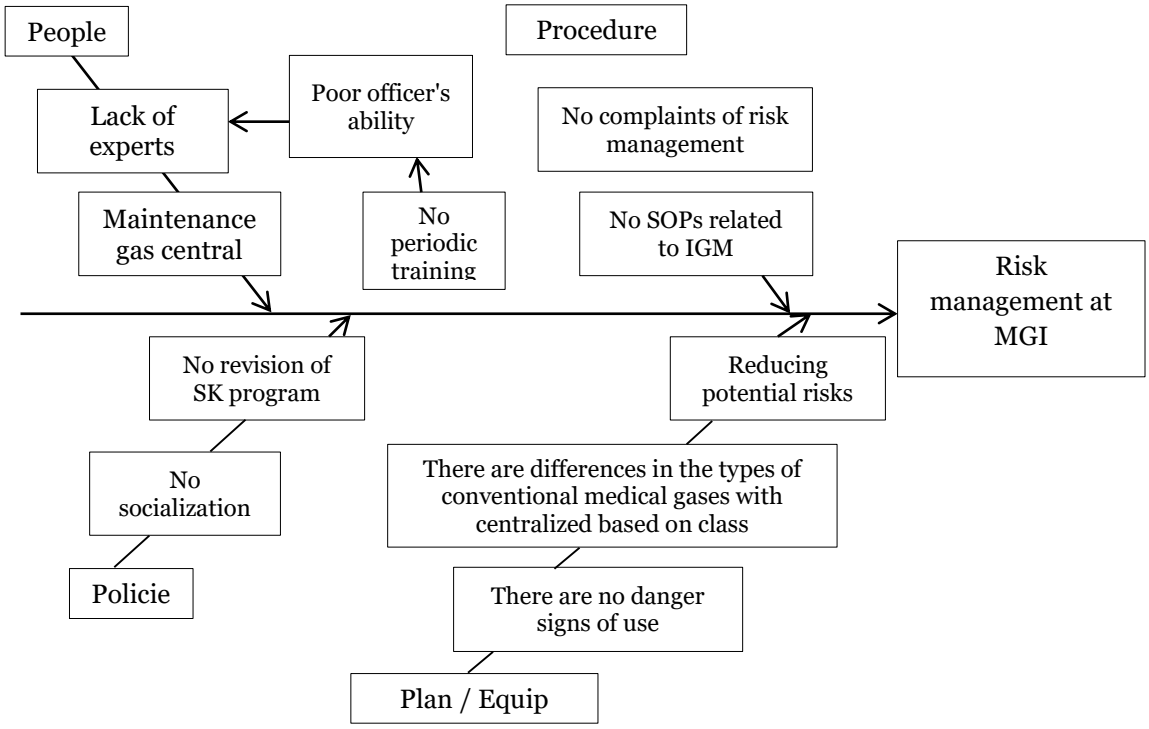

Figure 2. Fishbone root of potential risk analysis MGI

After interviews and observations, it can be in the form of a description of the list of incidents, causes and effects (Table.1). Risk analysis aimed to assess risk from a list of risks that have been made to determine the level of emergency.

Risk evaluation aimed to choose the risks that most allows the most extreme risks to occur. After receiving the

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risk priority, risk aggregation was carried out on the red, yellow and green zones. The risks found in the red zone would be followed up with the design of a risk control system, there was no design on the yellow and green zones because it was considered that it can be handled with the applicable SOP. Meanwhile, this type of research was a descriptive research method with the main purpose of making a description or a description of an objective medical situation, medical gas management staff and documentation staff for logistics reports regarding the management of medical gas in hospitals.

RESULTS

1. Risk Identification

To find out more details about the risks that can occur in the gas installation unit

Table 1. Data on MGI risk incidents and the causes and impacts

Risk incidents	Risk Causes	Risk Impacts
MGI officer Medical gas was poisoned while working	MGI officers did not get training	MGI officers received intensive care for hospitalization for 2 weeks
Medical Gas was out of stock	There is no periodic check in MGI logistics	Health services are disrupted and hampered
Errors in labeling medical gas types	There is no good SOPs related to MGI governance	There can be an error in administering medical gas for patients
Medical gas tube that has fallen	There is no good safety in the storage of medical gas	Potential explosion from gas cylinders
The difference between conventional tube and those that are already centralized	Different types of classes based on inpatient class	There is a gap between patients
Patients get lack of oxygen supply at night	The absence of MGI officers at night	Health care is disrupted and the risk of death in emergency patients
Anesthetic gas explosion	Mistakes of the medical officer in opening the gas cylinder knob	Safety of patients and medical staff is threatened Damage to hospital buildings

This type of research was descriptive medical conducted by using observations from the installation of Ishikawa diagram assistance (Fishbone medical gas followed by analysis interviews) (Figure 2). The process of in-depth identification of the head of the gas installation section can work well if followed by appropriate and structured questions. In the ISO 31000: 2018 standard has a standard question that can be used as a reference in in-depth interviews, namely: (1) what is the source of risk (2) what influence on the hospital or company (3) whether there are current controls (4) when, where, why and how these risks can occur (5) what causes this control to be less effective which was then judged subjectively. For the purposes of risk analysis, numbers of measurement criteria that were commonly used were: (1) The likelihood criterion was a scale used to measure the likelihood of risk (2) impact criteria (impact) a matrix of the relationship between impact types and impact level risk of achievement goals (3) Criteria for Effectiveness.

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Table 2. Scale of Probability and Impact

The likelihood of occurrence and impact		Severity/Impact	
Frequent	5 Frequent	Catastrophic	5 Big disaster
Probable	4 Possible	Hazardous	4 Dangerous
Remote	3 Small Chance	Major	3 Big
Extremely remote	2 Very small chance	Minor	2 Small
Extremely improbale	1 Very impossible	No safety effect	1 No Impact

2. Risk Analysis

A risk analysis was an activity to assess the level of risk, both in terms of the threat of loss and opportunities that were beneficial for achieving the goals. A risk analysis was a stage of the list of successful risk incidents identified by the current risk control (Effectiveness of existing risk control) (4) Risk level criteria (Leo and Victor, 2018). The next step after the impact value and probability were obtained, then it was entered into the Risk Grading Matrix table which was useful for knowing the risk score calculation and by finding the color of the risk bands.

a. Risk Score

Risk Score = Impact x Probability

How to calculate risk scores:

By using the risk grading matrix (table 3): (1) Determine the frequency in the left column; (2) Determine the impact on the line to the right; (3) Set the color of the bands, based on frequency and impact

b. Risk Bands

Risk bands were the degree of risk that was described in four colors, namely: blue, green, yellow and red. The "bands" color would determine the investigation to be carried out (table 2) (1) Blue and green bands: simple investigation; (3) Yellow and red bands: comprehensive investigation / RCA. Example: Explosion of anesthetic gas in Hospital X occurred 3 years ago Impact value: 4 (Probable) because it might happen Probability value: 3 (may occur) because it happened 3 years ago Scoring: risk = 4x3 = 12 Color Bands: Red (extreme).

Table 3. Risk Grading Matrix

Probability		Not significant	minor	moderate	major	catastrophic
		1	2	3	4	5
very frequent (every week/month)	5		6	2		
frequent (several times/year)	4					
may occur (1 <2-<5 year/time)	3				7	
rare (> 2 <5 years/times)	2			4		1.3
Very rare (>5 years/times)	1		5			

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DISCUSSION

1. Analysis of Human Resources problems

Based on the results of interviews conducted with the head in charge of the MGI, one of the private hospitals in Bekasi, it showed that human resources can be distinguished from the human resources responsible for the management of medical gas logistics including the procurement, storage and distribution of medical gases as well as direct human resources that directly faced patients namely nurses and general practitioners and anesthesiologists.

To reduce the potential for risk, the role of HR was the most noteworthy thing, one of them was by conducting regular training, and checking logistics in storage warehouses and giving color labels that match the contents of tubes to reduce the risk of errors and exchange of medical gas needed by each patient. In addition, the preparation and the implementation of a clear SOP was very necessary to be able to control the potential risk that can be caused by disseminating its application to all parties responsible for the management of medical gas.

A collaboration between the management of the hospital and the responsible human resources in the MGI as well as the health personnel's who go directly to the patients who need it must be considered for the sake of the realization of the quality of excellent health services.

2. Preparation of Standard Operating Procedures (SPO)

According to Minister of Health article 1 Number 1439/Menkes/SK/XI/2002 which has been explained above about the use of medical gas in health service facilities, it can be used as a basis for good SOP preparation. The researcher and the management team attempted to compile the SOP and the creation of a special program in handling the management of medical gas. With periodic checks in the procurement, maintenance and distribution it was expected that patient needs for the use of medical gas can be fulfilled.

All of these programs can be supported by including SOP of different color labeling for each type of tube according of the contents of the tube, SOP labels the dangers of the tube, SOP regarding the provision of medical gas to patients in need by nurses or doctors according to their competencies, and educational SOP and dissemination of application to all parties who directly responsible for medical governance.

The program was compiled and then approved by the Director of the Hospital and then conducted socialization and training of the number of parties who responsible for implementation.

3.Inspection Standards for Testing Medical Gas Installation Systems according to the Minister of Health

Some standard Inspection Tests on Medical Gas Installation Systems were: Complete installation, goods supporting equipment for installing medical gas installations; (2) Requirements for piping installations Installed pipe installations must be ensured to meet the stipulated requirements of the Ministry of Health; (3) Requirements for a central gas system, complete cen-

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tral machinery in medical gas installations, according to the provisions of the Ministry of Health; (4) Pipe flow system coloring code. After conducting piping installation, the medical gas pipeline flow system was labeled and colored according to the labeling standard in the hospital medical gas installation piping system; (5) Requirements for medical gas cylinders. The source of supply of contents and packaging of tubes must be in accordance with the provisions of the Ministry of Health; (6) System functional tests, after carrying out gas installations, all installation equipment must be ensured that it was installed properly and correctly, then the system was tested; (7) Procedure commissioning test, after the overall function test, the test results must be presented according to the standard results of the test.

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