Development of Hand Hygiene Audit Information System at Haji Public Hospital of Surabaya

Rezkha Mala Ludyaningrum[1(CA)], Arief Hargono[2], Arief Wijaya Rosli[3]

[1(CA)]Department of Epidemiology, Faculty of Public Health, Airlangga University, Indonesia;
rezkha.ludyaningrum@gmail.com (Corresponding Author)
[2]Department of Epidemiology, Faculty of Public Health, Airlangga University, Indonesia
[3]Chairman of PPI Team at Haji Public Hospital Surabaya, Indonesia

ABSTRACT

Hand hygiene is the act of washing hands using antiseptic or handwash. Implementation of improper hand hygiene is a major cause of HAIs events and the spread of multi-resistant microorganisms in health facilities. WHO states that handwashing compliance can reduce the transmission of microorganisms by 20-40%. This activity aim to identify the type of information needed and the utilization of data on ouput components, processes, and inputs. The method used was descriptive observasional that aims to design the model of system development through data collection by indepth interview using interview guides and documentation studies to key informants and described in the form of DFD diagram. The results of activities in the form of information type needs in the output component include the identification of data that was not yet available on the information system that was running and the development plan of monthly report on the achievement of minimum service standards; process components include daily data collection manually and processed using Microsoft Excel; input components included data collection forms and hand hygiene audit compliance figures. It is recommended to test the information system that has been developed for each room, conduct questionnaires for patient training, and conduct routine monitoring and supervision by the head of the room.

Keywords: Hand hygiene audit, Information system development, Infection control

INTRODUCTION

Haji Public Hospital Surabaya has a general purpose to improve the quality of services through the prevention and control of infections in hospitals conducted by the Committee on Prevention and Control of Infection (PPI Committee). One of the work programs owned by the PPI Committee is regarding the standard awareness that must be implemented and followed by the implementation of hand hygiene monitoring.

Hand hygiene is the act of washing hands using antiseptic and handwash. The hospital is a health service that provides care to patients with various diseases, so it does not close the possibility of the transition of microorganisms known as nosocomial infections[1]. Implementation of improper hand hygiene is a major cause of nosocomial infection and the spread of multi-resistant microorganisms in health care facilities and has been recognized as a major contributing factor to the outbreak[2].

This nosocomial infection can be overcome in a simple way of washing hands. As mentioned before, the pathogens in the hands of medical personnel can survive a few minutes after being contaminated. So, if handwashing is not done optimally, it will be easier to spread or transmit to other patients when direct contact occurs [1].

Adherence to hygiene practices in medical personnel is still low, below 50%. This is reinforced by the quarterly evaluation data conducted by PPI team of Haji Hospital, which experienced a fluctuation in the 1st Quarter of 2016 amounting to 75.8% decreased during the second Quarter of 73.16 increased again in the 3 rd Quarter of 77.7% and declined in Quarter 4 as many as 74% of this matter has not reached the compliance standard set by WHO that is 100%[7]. In addition, the WHO recommends the minimum number of opportunities per month is 200, so when accumulated for one year amounted to 2400. Based on 26 rooms in Haji Hospital of Surabaya known only three rooms that meet the standard opportunity is Marwah 1, Marwah 4, and Pavilion 3 with the acquisition $\geq$ 2400.

While for the reporting of hand hygiene audit reporting report also fluctuated in the year 2016 is the 1st Quarter of 69.6%, decreased in the 2nd Quarter of 65.2% followed by the increase in 3rd Quarter and 4th Quarter respectively by 72.4% and 74.4% but this situation also has not met the set standard that is 100%.

Compliance with handwashing practices is of course influenced by a variety of factors namely external factors (outside the individual) and internal factors (in individuals). External factors include inadequate facilities, cultural background, and trust. While internal factors consist of job status, work area, perception and knowledge of transmitory risk of microorganisms causing nosocomial infection[1].

So that in the framework of planning, controlling and evaluating the implementation of activities on health problems and conditions that affect the occurrence of increased and disease transmission need to be developed hand hygiene audit information system to help facilitate the officer to observe daily, timely data collection, and allows to crosscheck repeated hand hygiene compliance data with recording result from patient and patient's family. The general objective of this activity was to develop hand hygiene audit information system and identify data requirement on input component of hand hygiene audit information system at Haji hopsital of Surabaya.

METHODS

The event was held at Haji Public Hospital of Surabaya which was located at Jalan Manyar Kertoadi Surabaya on 16 January-15 February 2018. The method used was descriptive observasional which aims to describe the development model of hand hygiene audit information system in Haji Public Hospital. The form of implementation consists of identifying the information needed for the hand hygiene audit information system, then designing activities to generate the required information and identifying the data needs, resources, and methods to develop the system on input components.

The scope of this activity was to design or design a model of development of hand hygiene audit information system based on information needs and identification of data, resources and methods needed to support the development of the information system. Limitation of this activity was on completion of hand hygiene audit information system in Haji Public Hospital. Data collection was done by in-depth interviews (indepth interview) to hand hygiene audit officer related information system that is running. Indepth interview was conducted to dig deeper about the data and information needed but not yet available in hand hygiene audit information system. In addition to in-depth interviews, document studies were conducted on audit data and reports.

Informants in this activity were members of Infection Prevention and Control Nurse (IPCN) as many as 3 people and Infection Prevention and Control Link Nurse (IPCLN) as many as 3 people so in total there were 6 people. IPCN was a hand hygiene audit officer responsible for conducting audits in every room starting from recaps of data collection to reporting to the Director of Hospital, and monitoring the implementation of hand hygiene audit in the hospital. IPCLN was a daily executive nurse in charge of filling and collecting hand hygiene audit forms and coordinating with IPCN. Analysis of data used in this activity was to identify the needs of data and information that has been obtained then described in the form of DFD diagrams and analyzed descriptively that explains the design of information systems audit hand hygiene to be developed.

RESULTS

Identification of the Type of Information Needed and Utilization of Hand Hygiene Audit Data as Output Component

Identification of information needs is the first step taken as an effort to develop the system. Information needs are obtained from in-depth interviews in accordance with existing policies such as hand hygiene audit guidelines at Haji Hospital of Surabaya and WHO. The need for information on output components is as follows:

Table 1. Design of information needs on Hand Hygiene Audit Information System

Number	Needs of Information	Form of presentation	Period
1.	Percentage of hand hygiene audit compliance rate based on time variable (month)	Table and Graph	Quarter and Semester
2.	Percentage of hand hygiene audit compliance rate based on place variable (room)	Table and Graph	Quarter and Semester
3.	Comparison of the amount of rub/wash (wash hands) and missed (not wash hands) based on the room.	Graph	Quarter and Semester
4.	Percentage of hand hygiene audit compliance rate based on room meeting WHO standard of opportunity	Graph	Quarter and Semester
5.	Percentage of hand hygiene audit compliance rate based on people's variables (profession type)	Table and Graph	Quarter and Semester

Number	Needs of Information	Form of presentation	Period
6.	the ratio of rub/wash (wash hands) and missed (non-hand washing) based on the profession	Graph	Quarter and Semester
7.	Trend of hand hygiene audit compliance figures based on period (month)	Table and Graph	Quarter and Semester
8.	Percentage of hand hygiene audit reporting figures based on time and space	Table and Graph	Quarter and Semester
9.	Trend of hand hygiene audit reporting figures based on period (month)	Table and Graph	Quarter and Semester

Identification of monthly report requirements that are tailored to the minimum service standard (SPM) of hand hygine audits as follows:

Table 2. Monthly Report Design Achievement of Minimum Service Standard (SPM) Hand Hygiene Audit

Monthly Report Achievements Minimal Service Standards *Hand Hygiene Audit* Haji Public Hospital Of Surabaya			
Number	Indicators	Target	Achievement
1.	Completed filling form hand hygiene audit		
2.	Timeliness of hand hygiene audit reporting		

Identification of Activity on Component of Process Development of Hand Hygiene Audit Information System at Haji Public Hospital of Surabaya

Some activities that can be done to generate information on the components of the process when developing information systems hand hygiene audit are as follows:

1. Data Collection
   The flow of hand hygiene audit data collection begins by doing hand hygiene observation to all officers of Haji hospital of Surabaya in each room, then the observation result is recorded by the nurse or Infection Prevention and Control Link Nurse (IPCLN) on the form that has been provided based on the approval of the head room, after which the report submitted to Infection Prevention and Control Nurse (IPCN) before the 5th of each month.

2. Data Processing
   Processing is done by processing the existing data source into a report by making entry into the computer by using Microsoft Excel. The data processing is done by 2 (two) Infection Prevention and Control Nurse (IPCN) personnel assisted by 1 data processing staff, then the result of data processing and analysis is reported to Committee of Infection Prevention and Control (PPI).

Identification of Data Needs on Input Components Development of Hand Hygiene Audit Information System at Haji Hospital of Surabaya

1. Data
   Identification of data requirement on input component in developing hand hygiene audit information system are as follows:

Table 3. Identification of Data Requirement on Development of Hand Hygiene Audit Information System

Number	Information	Required data	Sources of Data Acquisition
1.	Observer Characteristic Data	Observation Date Observer: IPCLN, IPCN, CARD Unit / room made by observation	Data collection form
2.	Characteristic Data of Officer	Observation Date The name of the Officer being observed Sex Profession	Data collection form
3.	Data Opportunity and Moment of hand hygiene audit	Opportunity to- Five Moments: a. Before contact with patient b. Before aseptic action	Data collection form

Number	Information	Required data	Sources of Data Acquisition
		c. After exposure to body fluids	
		d. After contact with the patient	
		e. After contact with the patient's environment	
4.	Type of action taken during observation	Use of gloves: on, off, hold Wash hands: rub, running water, not washing hands Hand hygiene compliance rate	Data collection form

2. Form

In relation to incomplete completion of hand hygiene audit data collection form, it is necessary to add a new form that is the form of hand hygiene audit data collection comes from the observation of the patient and the patient's family so that it can help lighten the workload of the officer to do the recording and can be used to cross check the data with the result observation officers. Display the form can be seen in Figure 1.

Figure 1. Design of Hand Hygiene Audit Data Collection Form Involves Patient and Family Patients

3. Human Resources

The availability of human resources in collecting and recording hand hygiene audit data is 2 officers of Infection Prevention and Control Link Nurse (IPCLN), who also serves as nursing nosocomial surveillance nurses and data collectors.

4. Method

Standard Operating Procedures (SPO) that have been provided to overcome the problem of completion of form filling, compliance time reporting and handwashing compliance is SPO Hand Hygiene Audit and SPO Hand Washing Basics.

Design of Development of Hand Hygiene Audit Information System at Haji Public Hospital of Surabaya

Here is a context diagram and data flow diagram development of hand hygiene audit information system.
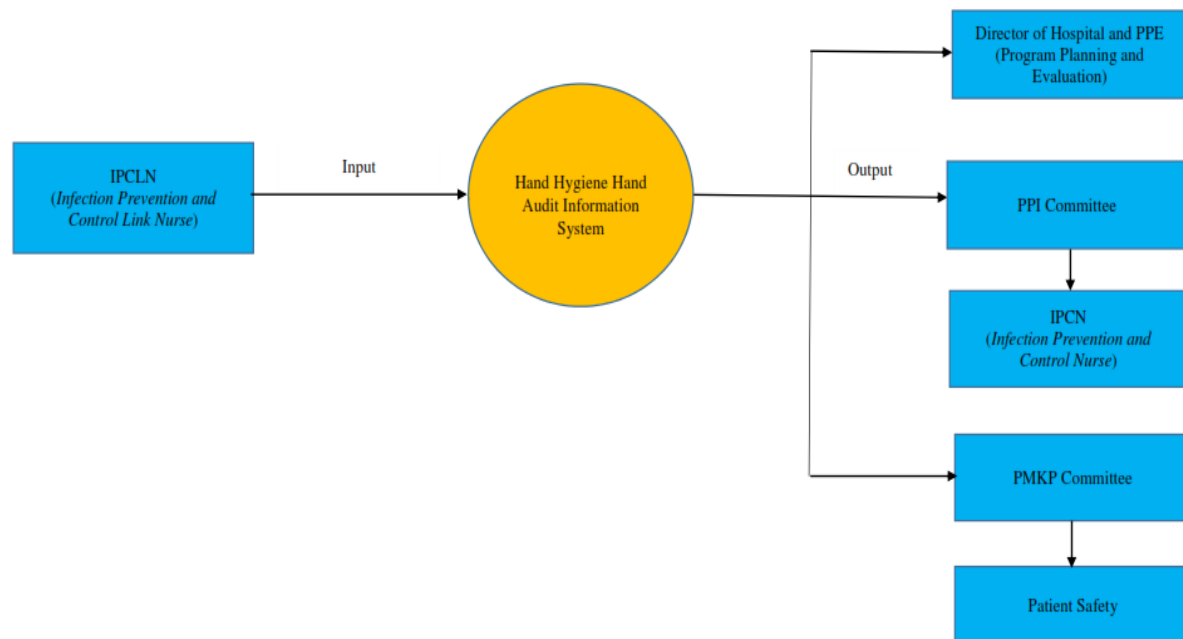
1. Context Diagram

Figure 2. Context Diagram of Hand Hygiene Audit Information System at Haji Hospital of Surabaya

2. Data Flow Diagram (DFD) Level 0

The main processes in designing the development of hand hygiene audit information system include data collection, data processing, and report submission. Here is a DFD drawing design with the addition of customized information.
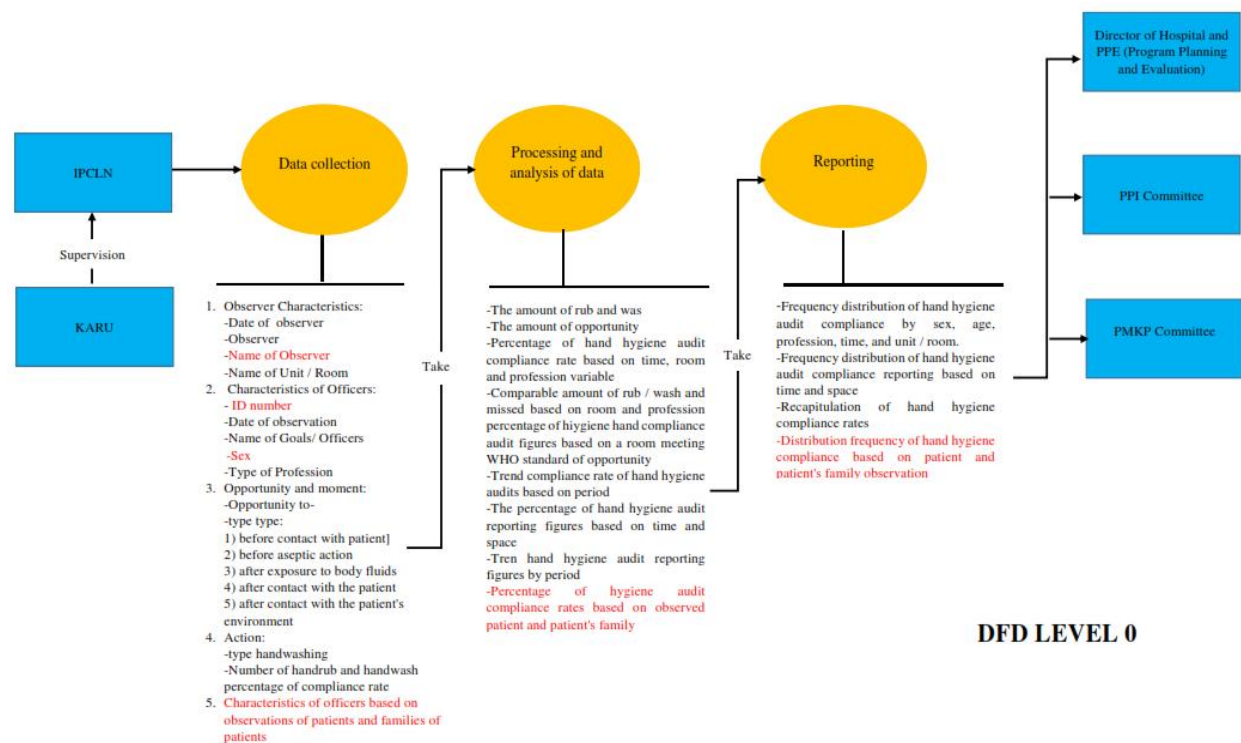

Figure 3. Data Flow Diagram Level 0 Hand Hygiene Audit Information System at Haji Hospital of Surabaya

3. Differences of Hand Hygiene Audit Information System in Progress and System to be Developed

The identification of hand hygiene audit information system according to input, process and output components can be seen in table 4 below.

Table 4. Differences of Hand Hygiene Audit Information System currently underway and developed at Haji Hospital of Surabaya

Number	System Components	The system is running	System developed
1.	Input	Hand hygiene audit data collection forms and recap compliance figures.	WHO Hand Hygiene Observation, SPM attainment form, and data collection form involving patient and patient families.
2.	Process	Daily data collection by IPCLN, data processing and analysis using Microsoft Excel.	Daily data collection by patient and patient family, data processing and analysis using epi info 7.
3.	Output	% Hand hygiene compliance rate.	Frequency distribution of hand hygiene audit compliance by sex, age, profession, time, and unit / room; Frequency distribution of hand hygiene audit reporting based on time and space; Recapitulation of hand hygiene compliance rate; Distribution of hand hygiene compliance frequencies based on patient observation and family of patient.

DISCUSSION

Identification of the Type of Information Needed and Utilization of Hand Hygiene Audit Data as Output Component

Required information obtained from in-depth interviews with IPCLN officers and IPCN is adjusted with literature study based on hand hygiene audit guidance in Haji Hospital of Surabaya and guidline hand hygiene according to WHO. The resulting output in the form of hand hygiene compliance achievement information has not met WHO standard because officers have limited time when recording using paper sheets and data entry result of observation one by one using Microsoft Excel.

Some information to be added to the output of hand hygiene audit reports is the frequency distribution of hand hygiene audit compliance based on gender, age, profession, time, and unit/room; frequency distribution of hand hygiene audit compliance reporting based on time and space; recapitulation of hand hygiene compliance rate; frequency distribution of hand hygiene compliance based on observations of patients and families of patients; and report on achievement of Minimum Service Standards (SPM) hand hygiene audit.

Identification of Activity on Component of Process Development of Hand Hygiene Audit Information System at Haji Hospital of Surabaya

1. Data Collection

Recording the results of hand hygiene audit observations using standard forms manually then each room collects the form into one bundle and then reported to the IPCN before the 5th of each month.

2. Data Processing

Data processing is tailored to the information needs or data output required by the Director of Hospital and Program Planning and Evaluation (PPE), the Committee, and the PMKP Committee.

Identification of Data Needs on Input Components Development of Hand Hygiene Audit Information System at Haji Hospital of Surabaya

1. Data

The required data are variables that need to be added to the ouput of the hand hygiene audit information system used to generate the necessary indicators and information. Data that need to be added include observer characteristic data, officer characteristic data, Opportunity data and moment of hand hygiene audit, and data type of action performed during observation.

2. Form

The design of the development of data collection form involving patient and patient's family was made to complete the complaint audit report of hand hygiene result of officer observation so that the information produced was more accurate.

3. Human Resources

Based on Director Decree of Haji Hospital of Surabaya 2016 stated that every room there are 2 people IPCLN officer to collect, control and recording data hand hygiene audit. The total number of IPCLNs in Haji

hospital of Surabaya is 53 people, but not all officers receive training and socialization on how to observe and fill in form hand hygiene.

4. Method

Guidelines used in the implementation of hand hygiene audit activities include SPO Hand Hygiene Audits and SPO Hand Washing Basics. SPO hand hygiene audit describes how to perform routine observations, how to fill in the form, and determine the results of compliance figures. SPO basic handwashing explains how to properly wash hands according to WHO recommendations.

Design of Development of Hand Hygiene Audit Information System at Haji Hospital of Surabaya

Development of hand hygiene audit information system is described with context diagram and data flow diagram. Context diagram is a diagram that is at the highest level can describe the relationship between the system with the environment outside[5].

1. Context Diagram

The three components of the system that make up the hand hygiene audit are the input components consisting of Prevention and Control Link Nurse (IPCLN) officers as data collectors, the process components of the hand hygiene audit information system, and the output component consists of the Director of Hospital, PPI Committee, and PMKP Committee as a user of information generated.

2. DFD Level 0

DFD is a graphical display that uses four elements to describe how data flows through interconnected processes[9]. The addition of several indicators that have been adjusted to the needs of RSU Haji Surabaya on the development of hand hygiene audit information system is related to data collection process, data analysis, and reporting. The indicator that has been added is marked with red text on the strore data.

CONCLUSION

The types of information required on output components include hand compliance frequency hygiene audit compliance data based on gender, age, profession, time, and unit/room, frequency distribution of hand hygiene audit reporting based on time and space, and recapitulation of hand hygiene compliance rates, and SPM audit hand hygiene. The design on the components of the development process of hand hygiene audit information system is the process of collecting data from the daily form of observation and then in the entry to the computer in accordance with the design of DFD and data processing on the new variables in accordance with the design. Processing is done by processing the existing data source into a report by making entry into the computer by using Epi Info 7. Data requirements on the input components are observer characteristic data, observed officer data, data opportunity and moment, and data types of actions taken when observation, development of data collection form involving patient and patient's family, SOP related to hand hygiene, groove filling hand hygiene form.

Development of hand hygiene audit information system using epi info 7 application requires testing in every room to obtain valid and relevant data, training of hand hygiene record recording and reporting questionnaire involving patient need assistance, monitoring and supervision of completing hand hygiene observation audit form by head room.

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