

Evaluation of Non-Communicable Disease Information System Acceptance (SI-PTM) using the Technology Acceptance Model (TAM)

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Abstract:- Non-communicable diseases (NCDs) cause 71% of deaths in the world and 76% in Indonesia. Therefore, a systematic and continuous health surveillance system is needed for control and prevention measures with complete, up-to-date and real-time recording and reporting. 90% of excel manual recording and delivery of reports are done by email. So we need an information system that supports surveillance of non-communicable diseases. The model used in this study uses the Technology Acceptance Model to determine perceptions of usefulness, perceived convenience, attitudes and user intentions.

This type of research is qualitative. The main informants are 4 PTM programmers and 9 triangulation informants at the Semarang City Health Center, Central Java, Indonesia. Methods of collecting data is through observation, interviews and documentation.

The results showed that the acceptance of SI-PTM had fulfilled the user's perception of usefulness, the perception of user convenience. attitude and intention to use. Furthermore, there is a need for cross-sectoral collaboration for Information System integration and data security for the implementation of PTM Information Systems.

Keywords:- Non-Communicable Diseases, Non-Communicable Disease Information System, Technology Acceptance Mode.

I. INTRODUCTION

Non-communicable diseases has become a global agenda because it has a very broad impact on public health, as well as the economic status of the region or country. PTM is included in the Sustainable Development Goals (SDGs) goal 3.4, which is to reduce one third of premature deaths due to NCDs through prevention and treatment and improvement of mental health and well-being by 2030.[1] [2]

The most common causes of death in the world are non-communicable diseases (NCD) which is around 71%. In 2016, around 71 percent, which means that around 36 million people per year died from PTM. About 80 percent of these deaths occur in middle- and low-income countries. PTM ranks first, followed by heart and blood vessel disease 35%, 12% cancer, and 6% chronic respiratory disease.[3]

The prevalence of PTM in Indonesia in 2018 has increased compared to that in 2013. The prevalence of cancer increased from 1.4 per mil to 1.8 per mil; stroke prevalence rose from 7 per mil to 10.9 per mil; and chronic kidney disease rose from 2 per mil to 3.8 per mil. Based on blood sugar examination, diabetes mellitus rose from 6.9% to 8.5%; and the results of blood pressure measurement, hypertension increased from 25.8% to 34.1%. [3]

With the increase in PTM cases, it will automatically increase the burden on the community and the government, because the handling of PTM cases is not only according to data from the Health Social Security Administering Agency (BPJS). In 2017, as many as 10,801,787 million people or 5.7% of JKN participants received services for catastrophic diseases by spending approx. 14.6 trillion rupiah[4].

One of the government's strategies in reducing the number of PTM cases is to increase the ability and management of PTM surveillance data, because a complete surveillance system is needed, continued and can be updated every day [5].

Health surveillance is an activity of systematic and continuous observation of data and information about the incident of disease or health problems and conditions that affect the increase and transmission of disease or health problems to obtain and provide information to direct effective and efficient control and response actions [6].

The implementation of surveillance requires planning, preparation and management of all components, including inputs, processes, and outputs so that activities can be carried out and objectives are achieved [7].

The recording and reporting information system via the web is considered simple, acceptable, has high sensitivity and stability, and is timely [8].

Non-Communicable Disease Information System (SI-PTM) that already exists has not yet supported surveillance. Reports are made manually in excel and sent via email, but only about 90% are fulfilled. Therefore, this information system is needed primarily by the PTM Pukesmas programmer and the Semarang City Health Office to facilitate monitoring reporting and control and prevention measures for PTM cases.

In 2020 Farid, et al developed a web-based Non-Communicable Disease Surveillance Information System (SI-PTM) and there has not been an acceptance evaluation for PTM programmers. It is necessary to conduct socialization and trials first and evaluate it to determine the level of user acceptance of the system.

One method of acceptance of Information Systems is the Technology Acceptance Model (TAM) which was first popularized by Fred Davis in 1989. This method is useful for determining the acceptance of Information Systems from perceptions of usefulness, convenience, attitudes and usage intentions [9].

On the basis of the above, it is necessary to evaluate the acceptance of non-communicable disease information systems using TAM.

II. LITERATURE REVIEW

A. Non-Communicable Diseases (NCD)

Non-Communicable Diseases is a disease that is not caused by an infection process. Several studies have shown that PTM does not provide significant symptoms and patients are relatively in a state such as fatigue so that PTM is often ignored and complaints that are actually early symptoms of NCD are not treated. In general, people think that NCD is caused by genetic factors and is a disease of the elderly or rich people, so they don't have much understanding of the risk factors and complications. Non-communicable diseases have several characteristics, including the followings [10]

- The development of the disease does not go through a certain chain of transmission
- Long and latent incubation period
- The disease is protracted (chronic)
- Many face diagnostic difficulties
- Requires high costs in prevention and control efforts
- Factors cause multicausal

B. Information System

An information system is a system that provides information to all levels within the organization whenever needed. This system stores, retrieves, converts, processes and communicates information received by using information systems or other system equipment [8].

C. Technology Acceptance Model (TAM)

TAM was developed based on psychological theories used to explain human behavior or information technology users, based on beliefs, attitudes and intentions as well as the relationship between user behavior and other users.

TAM has 5 main parts, namely perceived usefulness (perception of benefits), perceived ease of use (perceived ease of use), attitude toward using (attitude in using), behavioral intention to use (intention to use), and actual use (actual use). [9] Actual use was not used in this study because it was to determine the acceptance of the newly developed SI-PTM.

C. Non-Communicable Disease Information System (SI-PTM) [11].

SI-PTM was created to support surveillance of Non-Communicable Diseases and to provide convenience for the Health Office, Head of Public Health Center, surveillance officers or programmers, midwives, and the community in monitoring NCD cases in their working areas, so that comprehensive NCD control and prevention efforts can immediately be carried out. This system is integrated with each other so that each can monitor NCD cases. Here are parts of the SI-PTM dashboard:

- a) Admin/Programmer/Surveillance Officer
The SI-PTM admin section contains 4 sections, namely:
 - Dashboard
 - The data menu consists of 3 sub-menu options, namely class, user level, and menu
 - Puskesmas data, consists of 2 sub-menu options, namely information and work area.
 - User data, displays a table of user data, namely number, name, username, puskesmas, kelurahan, status, and action.
- b) City/District Health Office
At the Health Service user level, there are 3 menu to choose from, namely:
 - Dashboard
 - Public Health Center data, consists of 2 sub menu, namely information and work area.
 - User data
- c) Head of Public Health Center
At the user level for the head of the Public Health Center, there are 3 menus to choose from, namely:
 - Dashboard
 - Puskesmas data, consists of 2 sub menus, namely information and work area.
 - User data
- d) Midwife
At the user level, Midwives as program implementers can be used by PTM Programmers as users, there are 8 menus to choose from, namely:
 - Dashboard
 - Sports activities
 - Medication schedule
 - Inspection schedule
 - Consulting data
 - Patient data
 - Inspection data
 - Monitoring report
- e) Patient
At the patient user level there are 6 menus that patients can choose from, namely:
 - Dashboard
 - Sports activities
 - Medication schedule
 - Inspection schedule

- Inspection data
- Consultation

III. METHODOLOGY

The design of this research is qualitative research [12]. The research subjects include 4 PTM Puskesmas programmers as main informants and 9 people consisting of 1 Head of Disease Prevention and Control, 1 Coordinator of Non-Communicable Disease Control and Surveillance, 4 Heads of Puskesmas, 3 staff from the City Health Office and 4 Heads of Puskesmas as triangulation informants. This research was conducted in the city of Semarang, Central Java, Indonesia. The research was carried out at the Semarang City Health Center

Data collection techniques were carried out by observation and interviews. Observation Researchers will use participatory observation techniques (direct observations in the field). record observations based on the results of observations made by researchers. Meanwhile, the interview technique used in this study was an in-depth interview with face-to-face interviews with selected researchers using semi-structured interview guidelines that had been prepared. Researchers interview activities, by previously asking the informant's approval [12].

Research aims to describe and explain in detail the problems that will be studied to the maximum extent possible for an individual, group or event [13]. In qualitative research, humans are research instruments and the results are written in the form of words or statements that are in accordance with the actual situation [14].

Data analysis technique is an activity that is carried out interactively and continuously until it is complete, so that the data is saturated. Activities in data analysis are: Data Reduction (Data Editor), Data Presentation (Data Presentation), Conclusion Drawing/Verification [15].

IV. RESULTS AND DISCUSSION

A. Perceived usefulness of SI-PTM

Through interviews conducted by researchers with Community Health Center Programmers, SI-PTM can complete their tasks faster.

"SI-PTM is beneficial for health workers, cadres and several other stakeholders. However, when I tried to input patient data, an error appeared. When I wanted to save the data, I checked that the data is not entered. This troubled us so we had to re-enter the data and the work takes longer."

While the use of the PTM information system can improve the performance of officers, only a few officers experience difficulties in operating information technology. One of the indicators that influence the perception of usefulness is the presence of the technology being able to help improving performance and performance effectiveness, increasing productivity, simplifying user work, and the system used is useful for users [16].

Programmers feel the benefits of SI-PTM because it is easy to find case data, easy to input data and import reports,

has clear and complete features and can find out the patient's current activities such as sports activities. The existence of SI-PTM makes it easier for PTM programmer officers from the Provincial Health Office and the Ministry of Health to import reports and it is easy to update PTM data.

Programmers feel that SI-PTM will be useful in helping them to get the job done faster. However, the burden of reports that must be made by officers is doubling, in addition to carrying out the main task of providing health services to the community.

PTM programmers upload excel manual reports to the SI-PTM of the Ministry of Health of the Republic of Indonesia, while the Central Java Provincial Health Office is still in the socialization stage of the Healthy Indonesiaku Application (ASIK) for Early Detection of Non-Communicable Diseases and the City Health Office has just implemented the PAKEDI PERKASA (Health Examination application and Early Detection of Semarang City Residents), this information system does not yet have a reporting and monitoring feature, it is still in the form of recording health checks for early detection of non-communicable diseases for the people of the city of Semarang.

So that although the SI-PTM according to the informants was useful and helpful in shortening the working time, they objected and thought that if the SI-PTM was implemented it would increase their workload even more. Furthermore, the triangulation informants basically accept the new Information System, but there needs to be integration between systems so that PTM programmers only run one application.

B. Perception of Ease of Use

Perceived ease of use is the degree to which a person believes that technology can complete work more easily. From the results of the interviews, it was concluded that all informants had received this statement in accordance to the triangulation carried out by the researcher.

"Applications will make our work easier because of advances in technology. However, there are so many applications from the Ministry of Health, so many officers have to enter. If the cadres are able to run the system, it will be very helpful, especially if the data can be retrieved and used for other reporting."

"This PTM has very many features, which is more complete and there are other variables outside of PTM in the system such as sports activities"

Programmers agree that it does not take much time for officers to learn SI-PTM, the features in SI-PTM are very clear and easy to understand and operation does not require much effort. Based on the results of observations made by the author, there are no major obstacles experienced by the programmer officer.

"This SI-PTM system is easy to learn and operate. In just 10 minutes I was able to operate the system"

"Earlier I tried to use the system and it took less than 15 minutes. It was easy to understand. There were no problems when I tried it."

Programmers hope that there is integration of PTM information systems both regionally and centrally so that the workload of PTM programmers is not much and is consistent in recording and reporting PTM cases. Most of the programmers agree that the SI-PTM is clearer and easier to understand, easier to find data, and easier to monitor patient data. Patients can input the condition and physical activities carried out by the patient every day, so that health workers will more easily monitor the patient's condition even though they do not meet the patient directly. The data is recorded in the system so that the officer can view the patient's medical record when needed [17].

C. Intention to Use SI-PTM

Programmer officers are interested in SI-PTM and have the desire or intention to use SI-PTM, but they follow the policies made by the health office regarding the system to be used.

"I intend and want to use this information system, but I follow the policies that will be taken by the health department".

"I'm interested in this application. If the office use this application then I will look for cadres or people to help me in entering data even though I actually object because there are a lot of reports".

From the results of the interviews, it was found that programmers intending to use SI-PTM will support and simplify their tasks. This is in accordance with other studies which state that perceptions of usefulness, perceptions of convenience and attitudes of officers will affect their intention to use an information system. Community Health Center programmers in Semarang City consider SI-PTM useful in facilitating and improving their performance, and according to them this system makes it easier for them to record and monitor PTM case data.

However, there are still some officers who do not agree that SI-PTM is more useful and has more complete features. Programmers stated that the current system was sufficient for them to report PTM cases and they objected to the new system.

"We have a lot of reports that we have to work on and there is a system regarding PTM with almost the same features, so we object to learn more about the new system and if there are problems in inputting it will take a long time"

"Currently, the Ministry of Health already has a system in place. Moreover, the same system will be added by Mr. Edi regarding SI-PTM. The existing features are also almost the same, so I would object if this system was implemented because we have a lot of tasks in reporting."

D. Attitude of Using SI-PTM

Based on the results of interviews conducted by researchers to triangulated informants, it was obtained:

"Basically we agree with the existence of the system, but it must be clarified again where the data bank is. Whether it is held by the health department or held by the system maker. Because patient's data is privat so confidentiality can be maintained. Especially this is related to someone's illness. There must be an MOU related to the data bank".

"We strongly support the use of this information system, but purpose of the data must be clear, who can access the data, and what kind of reporting. There needs to be an integrity pact related to the system."

From the results of interviews with respondents, it was found that the main informants liked to use SI-PTM, this is because SI-PTM provides many benefits, the system is easy to learn and makes it easier to control and report cases of PTM.

This is in accordance to other studies which state that the perception of the usefulness of the system and the perception of the ease of use of the system will affect their attitude towards the system [18]. Apart from being easy, the completeness of the SI-PTM recording and reporting feature is also complete which includes the number of elderly data screened, coverage of BMI examination, coverage of blood pressure examination, coverage of examination of blood sugar, cholesterol, uric acid, percentage of people who smoking, the patient's sports activities that can be monitored every day by the PTM programmer [19].

Programmers consider SI-PTM useful and simplify their daily work so they like to use SI-PTM. Although there are some officers who do not like to use SI-PTM because they think that their workload is already heavy with the many reports they have to make. The results of this study are in accordance with the results of previous studies where the usefulness variable affects attitudes to using information systems for maternal health services [20].

V. CONCLUSION

The programmer officer agrees that the use of SI-PTM in recording and reporting PTM cases can complete tasks more quickly and easily, the features in SI-PTM are very clear, complete and can understand current patient activities and easy to operate. With the SI-PTM online recording and reporting, it helps and makes it easier for programmers to input PTM case data, but with case reporting that has not been integrated between the regions and the center, it adds to the programmer's workload and the recording of PTM case reporting, it is necessary to have an integrated Ministry of Health Information System, Provincial Health Office and City/Regency Health Office in the context of implementing complete, easy and comprehensive recording and reporting of PTM monitoring.

So that the PTM programmer's workload is not heavy, performance can be maintained primely. In addition, with a system that is integrated throughout Indonesia into national big data in controlling and preventing PTM cases, it must be handled properly and data validity needs to be maintained. Furthermore, there is a need for cross-sectoral collaboration for Information System integration and data security for the implementation of PTM Information Systems.

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