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Risk Management in Mobile JKN Application at Depok Private Hospitals with FMEA Method

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ABSTRACT

The Mobile JKN application that has begun to be implemented in every hospital is the main factor in the success of hospital services. Quite complete features are presented in one application. The variables measured in this study were occurrence (frequency of occurrence), severity (impact), and detectability (monitoring). The research data was obtained based on the results of direct observation at Bhakti Yudha Hospital. Risk management in the use of Mobile JKN is the main topic in this study. This study aims to assess information security risks using the FMEA method. The FMEA method is an error analysis method that arises from the design process of a design work. The results of this study are in the form of Risk Priority Number (RPN) values based on: severity (S = Severity), occurrence (O = Occurrence), and level of detectability (D = Detectability), and a report on risk management results which contains a list of risk analysis priorities accompanied by root causes of problems and risk control measures.

KEYWORDS *JKN, Risk Management, FMEA*

INTRODUCTION

The use of applications that have been integrated with the hospital system makes the registration process very easy. In addition, the features displayed are also very informative; patients can use the Mobile *JKN* application for registration, data changes, and health screening (Setiawan & Usman, 2022). The implementation of the Mobile *JKN* application for users is an important aspect of hospital service at this time (Aprilia Lestari & Rosdiana, 2018). If the service in the use of the application is disrupted, the services in the hospital are similarly affected, because the application system has been integrated between *BPJS* and the hospital information system (Abdussamad, 2021).

The Mobile *JKN* application is an application designed by *BPJS Kesehatan* to provide easy access and comfort for *JKN-KIS* participants (Menteri Pendidikan, Kebudayaan, Riset, dan Teknologi, 2023). This application is complete with information about the *JKN-KIS* Program so that it can be used to change participant data and check contributions (Abubakar, 2021). Participants can freely use this application to manage *JKN-KIS* membership without having to visit the *BPJS Kesehatan* branch office (Rodhiyatussolichah, 2023). In addition to being complete and easy to use, *BPJS Kesehatan* also ensures that fresh information is embedded in this application.

The Mobile *JKN* application used during registration has experienced problems. The obstacles that are often experienced include poor network connectivity for operators and required improvements to the *BPJS* system itself. Risk management is needed by this organization as an indicator of success in carrying out its duties and preventing failures that result in reduced performance (Badan Pusat Statistik, 2023).

Based on this background, these problems can be identified as follows: Mobile *JKN* system constraints are influenced by internet network connectivity (Bintoro, 2018). The estimated wait time for patients is out of sync with actual conditions on the ground. Patients cannot register for more than one *poly* in the application (Grindle, 2017). The main objective of this study is to apply the FMEA method in identifying, evaluating, and managing risks associated with the use of *JKN* mobile applications in private hospitals in Depok. This study also aims to provide recommendations for mitigation measures that can be taken to reduce these risks (Creswell, 2018).

This research attempts to further explore the use of the FMEA method in the field of information technology, especially in the *JKN* mobile application (Shen et al., 2020). Ultimately, the output produced will reduce the problems that exist in mobile *JKN* (Hariyati & Pangaribuan, 2019). Studies on risk acceptance in managerial decision-making reveal that risk is affected by uncertainty, resource limitations, and differences in economic behavior, thus requiring new economic thinking for effective decision-making (Fitri Rachmadhany & Matin, 2021). The contribution of research in risk management analysis on the National Health Insurance (*JKN*) mobile application at Bhakti Yudha General Hospital (*RSU*) using the Failure Mode and Effect Analysis (FMEA) method can be very useful in improving the quality of health services, identifying potential risks, and reducing incidents that can harm patients or health service providers. Some of the key contributions of this research include:

Identification of Potential Risks: This study will help in identifying potential risks associated with the use of the *JKN* mobile application at Bhakti Yudha Hospital. It involves analyzing every "failure mode" in the system, from technical errors to communication issues and process errors.

Risk Prioritization: Using the FMEA method, this study will help in identifying which risks have the greatest impact on patients and organizations. This will allow focusing on the most important corrective actions (Sugiyono, 2021).

This research will provide valuable insights into how the process of using the *JKN* mobile application at *RSU* Bhakti Yudha can be improved (Sari & Dewi, 2021). This could include changes in workflows, staff training, or technology updates.

Improving Patient Safety: By identifying risks and appropriate corrective actions, this research will help in improving patient safety. Errors in the use of the application that may result in harm to patients can be avoided or minimized (Sunandar, 2022).

Efficiency and Quality of Service: By reducing risks and improving processes, *RSU* Bhakti Yudha can improve the efficiency and quality of services they offer to patients.

METHOD

This research is quantitative research, which refers to the use of numerical methods to provide a detailed and measurable understanding of a phenomenon or concept. It involves using quantitative data and analytical techniques to explain the underlying mechanisms or patterns

in a given context. With this approach, the analysis calculated through the Risk Priority Number (RPN) formula is expected to produce data that can reduce the risks that may occur. In this study, the author uses several techniques to collect data that aim to assist in writing, namely data collection from internal company information, Mobile *JKN* applications used by patients and employees, and leading journal websites.

The data obtained will be stored in digital form and become the main material in this study, while the analysis of the data collection results will use the RPN method, which is based on severity, occurrence, and level of detectability, each with a value range of 1-10. From the results of the RPN calculation, the highest scores from I to V will be determined. The quantitative analysis used in this study is the calculation of RPN, which produces Severity and Occurrence values to measure the risk of failure mode and determine the priority level of repairs that must be carried out first.

This research was conducted from the end of August 2023 to December 2023, with the research location at Bhakti Yudha Hospital and a focus on the Mobile *JKN* application.

Research Design

Research design is a systematic plan to study a scientific problem. This is intended to provide the appropriate framework for research (Imron, 2011). The selection of a research design is very important in the research design process because it determines how relevant information for a study can be obtained. The research design used is a quantitative descriptive design. This design is suitable because it aims to identify, analyze, and evaluate risks using the Failure Mode and Effects Analysis (FMEA) method. Here are the details of the research design used:

1. **Research Approach: Descriptive Quantitative:** This approach is used to identify and measure risks associated with the use of *JKN* mobile applications. Data is collected, analyzed, and presented in the form of numbers and statistics. Quantitative methods can be interpreted as research methods based on the philosophy of positivism, used to conduct research on certain populations or samples, with data collection using research instruments and quantitative or statistical analysis, with the aim of describing and testing hypotheses that have been established (Permendikbud, 2021).
2. **Population and Sample:** a) **Population:** The population of this study consists of all users of the *JKN* mobile application in Depok private hospitals, including patients, medical staff, and hospital administration. b) **Sample:** The sampling technique used is purposive sampling, where several key users who have direct experience with the *JKN* mobile application are selected. This sample includes patients, doctors, nurses, and hospital IT staff (Martini, 2022; Marwiyah, 2022; Novita et al., 2022: Parela, 2022; Pramono, 2020).
3. **Research Instruments:** Survey methods are quantitative research methods used to obtain data that occurred in the past or present, regarding beliefs, opinions, characteristics, behavior of variable relationships, and to test some hypotheses about sociological and psychological variables from samples taken from specific populations (Suluh Kusuma Dewi, 2022).
4. **Research Procedure:** The design of survey research involves various activities such as literature research, experiments, and cognitive analysis to develop a reliable and valid questionnaire. a) **Data Collection:** Data was collected through questionnaire distribution, structured interviews, and direct observation. b) **FMEA Analysis:** The collected data was analyzed using the FMEA method to identify failure modes, causes, effects, and risk

priorities based on the Risk Priority Number (RPN). c) **Evaluation and Preparation of Recommendations:** Based on the results of the FMEA analysis, recommendations were made to reduce or eliminate the identified risks.

RESULTS AND DISCUSSION

Data Analysis

Here are some of the data analyzed on the MJKN application and also the failure process that occurs when using the application:

Table 1. MJKN data analysis

No.	Process	Failure Mode	Potential Failure	Causes of failure	Aspects
1	The use of MJKN in outpatient registration.	Lack of education from BPJS regarding the registration flow in the MJKN application.	Many people do not understand the MJKN application.	Large queue number because you did not register through MJKN	TBSP.
2	Estimated patient waiting time listed in the MJKN application.	It is not appropriate because it is calculated equally per patient.	Patients come in not according to practice hours.	The patient is not examined by a doctor.	System.
3	Information on doctor's practice hours and doctor's name in MJKN registration.	It is not appropriate because the doctor finishes does not always fit the practice hours listed on the application.	The patient came according to the practice hours but the doctor was finished.	The patient did not receive treatment.	TBSP.
4	Cancellation of outpatient visits in the app.	If it is a different day, the application cancellation cannot be canceled.	Patients cannot register through MJKN.	Unable to go to the intended hospital for treatment.	System.
5	Information obtained after registration in the application (e.g.: queue number, doctor's hours, etc.).	An inappropriate queue number, if the doctor applies a per-arrival queue number system.	Patients who register at the initial number if they do not come early then may have the queue number not matched/ended.	Longer patient check-ups due to queue numbers.	System.
6	Patients can register for 2 polyclinics in one hospital.	If in one day it is not possible to register 2 polys.	Patients who have to consult 2 doctors in 1 day cannot register for poly.	Patients repeatedly come to the hospital for consulship.	System.
7	*Check-in* in the app when there is no internet connection.	The *check-in button* on the application cannot be clicked.	Patients must be manually assisted by officers so that they can be examined by doctors.	Patient wait times are longer.	System.
8	Verify the MJKN application but the *mobile phone* is not brought.	The patient has been registered in the MJKN application but *the mobile phone* used is not brought.	Registration is manual because you do not bring *a mobile phone* with the MJKN application.	Patient wait times are longer.	TBSP.
9	Patient registration in different KK in the MJKN application.	If the doctor's practice time is the same for each patient, it results in a clash for *the check-in process.*	The *check-in* process in the app will take longer, as you will have *to log in* repeatedly.	Longer wait times when *check-in* are longer.	TBSP
10	*In-app feedback* .	Criticism or suggestions in the application do not go directly to the intended hospital or clinic, but only the region.	Complaints that conveyed is not directly accepted by the intended party.	The patient did not know the continuation of his report.	About Us

Furthermore, the researcher conducts a Risk Priority Number (RPN) assessment by first determining the values of severity (S = Severity), incidence (O = Occurrence) and level of monitoring (D = Detectable) respectively with a value range of (1-10) Severity is the first step to analyze risk, namely calculating how much impact/intensity of events affects the output process. Occurrence is the likelihood that the cause will occur and result in a form of failure during the lifetime of the product's use. Detection is a measurement of the ability to control or control failures that can occur [48].

RPN = Severity x Occurrence x Detection

Table 2. Calculating the Risk Priority Number value

No	Process	Failure Mode	*Severity*	*Occurrence*	*Detection*	*RPN*	*Ranking*
1	The use of MJKN facilitates outpatient registration	Lack of education from BPJS regarding the registration flow in the MJKN application.	8	7	5	280	I
2	Estimated patient waiting time listed in the MJKN application	It is not appropriate because it is calculated equally per patient.	7	5	4	140	YOU
3	Information on doctor's practice hours and doctor's name in MJKN registration	It is not appropriate because the doctor finishes does not always fit the practice hours listed on the application.	7	5	6	210	II
4	Outpatient visit cancellation in the app	If it is a different day, the application cancellation cannot be canceled.	6	4	4	96	VIII
5	Information obtained after registration in the application (e.g.: queue number, doctor's hours, etc.)	An inappropriate queue number, if the doctor applies a per-arrival queue number system.	8	5	5	200	III
6	Patients can register 2 polys in one hospital	If in one day it is not possible to register 2 polys.	5	3	3	45	X
7	*Check-in* in the app when there is no internet network	The check-in button on the application cannot be clicked.	6	5	6	180	IV
8	Verify the MJKN application but don't bring a cellphone?	The patient has been registered in the MJKN application but the mobile phone used is not brought.	6	4	5	120	VII
9	Patient registration in one family in the MJKN application	If the doctor's practice time is intended by each family at the same time, it results in a clash for *the check-in process.*	4	5	4	80	IX
10	*In-app feedback*	Criticism or suggestions in the application do not go directly to the intended hospital or clinic, but only the region.	7	5	5	175	V

Based on the results of the calculation above (Table 2), the 5 largest priority rankings were obtained, namely:

a. The use of MJKN makes it easier to register for outpatient treatment: with a failure mode, namely the lack of education from BPJS regarding the registration flow in the MJKN application with a value of RPN 280 (Rank I).
b. Information on doctor's practice hours and doctor's name in MJKN registration: with failure mode, which is not appropriate because the doctor is finished does not always fit the practice hours listed on the application with a value of RPN 210 (Rank II).
c. Information obtained after registration in the application: with the failure method, namely the inappropriate queue number, if the doctor applies a queue number system per arrival with a value of RPN 200 (Rank III).
d. Check-in in the application when there is no internet network: with the failure method The check-in button on the application cannot be clicked with a value of RPN 180 (Rank IV).
e. In-app feedback: with the failure mode of criticism or suggestions in the application does not go directly to the intended hospital or clinic, but only to areas with a value of RPN 175 (Rank V).

Planning Action Stage

At the planning action stage, replanning was carried out in the use of the Mobile JKN application in outpatient registration and as a source of patient information. The recommended redesign activities include:

a) Priority recommendation I: Hospitals schedule to routinely provide education to patients regarding the use and benefits of the MJKN application.
b) Priority recommendation II: Patients do not stick to the estimates in the application.
c) Priority recommendation III: Patients are required to arrive 1 hour before the practice doctor, in anticipation of the queue number being called.
d) Priority recommendation IV: Adding a free Wifi network that can be used by the public to prevent no signal or no internet quota.
e) Priority recommendation V: Reporting can be directly entered into the Health Facility's email, so that it can be followed up immediately.

Taking Action Stage

At this stage, it explains the implementation of the recommended redesign at the planning action stage and socialization has been carried out to staff. Mobile JKN Corner Officers, Customer Service and Admissions routinely provide education on how to use and benefits in the Mobile JKN application. Because there are still many patients who still don't know what are the uses and benefits that can be taken in the application. For example: patients can register for treatment through the Mobile JKN application, at Level 1 Health Facilities and Level 2 Health Facilities which makes it easier to register when receiving treatment, and also the patient's waiting time becomes more efficient. Another benefit is that the Mobile JKN application can also change Level 1 Health Facilities (Puskesmas or Clinics) with our place of residence in collaboration with BPJS. Furthermore, changes to participant data can also be done through the application, because the data has been integrated with the Disdukcapil.

Then, the doctor's arrival and finish hours are also not fixed with the schedule or estimate in the application. Because every day the specialist doctor may have a cito action that must be taken immediately, the patient at the previous hospital has not been examined, or traffic jams. So patients are required to come 1 hour before the practicing doctor, if there is a supporting examination of the Laboratory or Radiology can be done first before the doctor practice, so that there are already results during the consultation. In addition, you can get the initial queue number (if the queue number is according to the arrival), and also anticipate that the doctor has finished, and will not be examined if the arrival is not according to the practice hours.

Furthermore, the installation of Wifi in hospitals is also one of the things that can help the smooth use of applications in the registration process. Because there are several signal providers if they are not available in the hospital. And also anticipating patients who come to run out of quota, so they cannot check-in. And finally, is the BPJS evaluation regarding the feedback on the Mobile JKN application. Incoming feedback can be sent directly to the hospital's email inbox, so that it can be corrected immediately if needed.

Evaluating Stage

After the implementation process is carried out, monitoring is carried out, namely recalculating the RPN value as follows:

Table 3. Calculating the value of the Risk Priority Number after the Redesign

No	Process	Failure Mode	*Severity*	*Occurrence*	*Detection*	*RPN*
1	The use of MJKN facilitates outpatient registration	Lack of education from BPJS regarding the registration flow in the MJKN application.	4	4	6	72
2	Estimated patient waiting time listed in the MJKN application	It is not appropriate because it is calculated equally per patient.	7	5	4	140
3	Information on doctor's practice hours and doctor's name in MJKN registration	It is not appropriate because the doctor finishes does not always fit the practice hours listed on the application.	6	3	4	72
4	Outpatient visit cancellation in the app	If it is a different day, the application cancellation cannot be canceled.	6	4	4	96
5	Information obtained after registration in the application (e.g.: queue number, doctor's hours, etc.)	An inappropriate queue number, if the doctor applies a per-arrival queue number system.	5	4	4	80
6	Patients can register 2 polys in one hospital	If in one day it is not possible to register 2 polys.	5	3	3	45
7	*Check-in* in the app when there is no internet network	The check-in button on the application cannot be clicked.	4	5	3	60
8	Verify the MJKN application but the cellphone is not brought	The patient has been registered in the MJKN application but the mobile phone used is not brought.	6	4	5	120
9	Patient registration in one family in the MJKN application	If the doctor's practice time is intended by each family at the same time, it results in a clash for *the check-in process.*	4	5	4	80
10	*In-app feedback*	Criticism or suggestions in the application do not go directly to the intended hospital or clinic, but only the region.	5	5	3	75

Based on table 3, it can be stated that after the redesign, there is a decrease in the value of the RPN as follows:

a) The use of MJKN makes it easier to register for outpatient treatment: with a failure mode, namely the lack of education from BPJS regarding the registration flow in the MJKN application with an RPN value dropped from 280 to 72.

b) Information on doctor's practice hours and doctor's name in MJKN registration: with failure mode, which is not appropriate because the doctor is finished does not always fit the practice hours listed in the application with an RPN value dropped from 210 to 72.
c) Information obtained after registration in the application: with the failure method, namely the inappropriate queue number, if the doctor applies a queue number system per arrival with an RPN value down from 200 to 80.
d) Check-in in the application when there is no internet network: with the failure method The check-in button on the application cannot be clicked with the RPN value dropping from 180 to 60.
e) In-app feedback: with the failure mode of criticism or suggestions in the application does not go directly to the intended hospital or clinic, but only the area with an RPN value drops from 175 to 75.

Thus, it can be conveyed that after evaluation and monitoring, the implementation of the redesign is able to significantly reduce the risk in the use of the MJKN application.

CONCLUSION

Based on the results of the document analysis, the 8 stages of RPN (Risk Priority Number) in this study resulted in risk priorities that need to be immediately addressed in the use of the Mobile *JKN* application at Bhakti Yudha Hospital. Specifically, these 8 stages yielded the following: identification of the most critical failure modes, such as lack of enrollment education, inaccurate physician practice hours information, patient queue number errors, check-in constraints without an internet network, and application feedback issues. The calculation of the initial RPN value was based on a combination of Severity, Occurrence, and Detection. Determination of improvement priorities was based on the highest RPN values. Failure modes with high RPN were prioritized for process redesign. Implementation of improvements (redesign) was conducted on the application and its supporting processes. Re-evaluation of RPN values after redesign showed a significant decrease in most risk values. For example, the RPN for outpatient registration dropped from 280 to 72, the problem of information on practice hours dropped from 210 to 72, and others experienced similar reductions.

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