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# **Development of Patient Safety Incident Reporting System Application Web-Based "ASOKA" at Sanjiwani Hospital, Gianyar, Indonesia**

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**Abstract**---This study aimed to develop a Web-based patient safety incident reporting system and evaluate its satisfaction and benefits. Methods: pre-experimental one-group pre-posttest design and simple random sampling were used. The total respondents were 59 subjects. The research instrument used a questionnaire with a statistical test using a paired T-Test. Results and analysis: As seen from the evaluation results before and after the intervention, respondents' satisfaction with ASOKA Web-based has increased. The Mean value before the intervention was 34.73 and increased after the intervention to 51.49. The maximum before (61) and after (80) the intervention experienced has a significant increase. ASOKA Web-based evaluation has a significant effect ( $p < 0.001$ ) with an effect size value of  $d = 0.75$ , which indicates that respondents' satisfaction is in the Moderate Effect range. Conclusion: The testing and evaluation of the ASOKA Web-based at the Sanjiwani Hospital provide satisfaction and benefits for the respondents. The ASOKA Web-based reporting system at the Sanjiwani Hospital is very appropriate to be applied.

**Keywords**---development, patient safety, report system, system application, web-based incident report

#### **Introduction**

Patient safety is a crucial global issue in the world of health. Patient safety is a condition of the absence of unnecessary harm occurring to patients by health professionals (WHO, 2015). Unsafe care is responsible for the loss of life and disability every year in the world. Patient losses during healthcare provision are recognized as one of the top 10 causes of disability and death in the world. The principle of patient safety is a scientific method for achieving a reliable health care system, minimizing incidents, and maximizing recovery from such incidents (Vaismoradi et al., 2020). Patient safety is a part of health care and is defined as the avoidance, prevention, and amelioration of adverse outcomes or injuries resulting from the health care process. In 1999 the Institute of Medicine (IOM) reported, "To

make mistakes is human", thus developing, testing, and using information technology as an important first step in a new way to reduce medical errors and achieve better and safer care (Alotaibi & Federico, 2017).

Reporting frequency can be increased by using a web-based, user-friendly, voluntary, and non-penalty reporting system (Okafor et al., 2015). Since the advent of electronic patient safety reporting (e-reporting) systems, event collection and analysis have been more efficient than traditional paper-based systems (Kang et al., 2018). Based on data from the National Patient Safety Committee (KNKP), patient safety incident reports (PSIR) based on hospitals reporting from 2015 to 2019 experienced a significant increase. In 2018, based on the number of hospitals reporting PSIR per province, 24 provinces and 145 hospitals reported PSIR. Bali province was in fifth place with 9 hospitals reporting PSIR, after West Java province with 17 hospitals, DKI Jakarta and Central Java provinces with 21 hospitals in each province, and the most are East Java 22 hospitals (Daud, 2020).

Based on observations and informal discussions, there are obstacles related to the system of PSIR in Sanjiwani's Hospital. There is a blaming culture when there is an incident that made officers reluctant to report. Another obstacle is that the reporting system still uses a manual system by filling out patient safety report sheets, which adds nurses burden who that have been burdened with writing a lot of medical records. This does not follow the principle of Seven steps towards patient safety, which is described in the Regulation of the Minister of Health of the Republic of Indonesia Number 11 of 2017 concerning Patient Safety written in Chapter 3 Article 5 Paragraph 6 Letter d "Developing a reporting system" in the article, explained that make sure your staff is easy to report incidents internally (locally) and externally (nationally) (Menkes, 2017).

## Methods

The study used the pre-experimental one-group pre-post test design to develop and evaluate the Patient Safety Incident Reporting System Application/Aplikasi Sistem Pelaporan Keselamatan Pasien, which was shortened to "ASOKA" Web-based. The respondents involved 59 subjects in this study to calculate the total sample using the G Power 3.1.9.4 application with 10% substitution added to keep the possibility of research samples dropping out. Determination of the sample used a simple random sampling technique from the entire population of nurses who work at the Sanjiwani Hospital, Gianyar (Bakker et al., 1996).

The inclusion criteria in this study were: nurses with a minimum education of Diploma Three (DIII) and a Bachelor of Nursing (S1), nurses with a minimum working period of six (6) months, nurses who had attended patient safety orientation and training, nurses who used hand phone or smart phone with an internet network. Exclusion criteria in this study were: nurses who during the study were sick or had health problems, nurses who were not on-site during the study. Drop Out Criteria in research: research respondents cannot fully complete the research process; respondents can not follow research procedures orderly. Collecting data in this study through google form. The research instrument was a questionnaire with a Likert scale consisting of 20 statement items. The questionnaire used consists of two parts. First is a statement for the general characteristics of the respondents (age, gender, education level, and length of work), and second about satisfaction with the system being evaluated. This questionnaire has been tested for Content Validity by five experts and declared valid. Furthermore, the reliability test with Cronbach's Alpha test results obtained a test value of 0.96. Each item's value is greater than 0.60 ( $> 0.60$ ), which means all statement items in the questionnaire are reliable or consistent. The results of the normality test of the data using the Skewness value found that the data were normally distributed. The data analysis was continued by using the Paired T-Test test.

This research has obtained Ethical Clearance from the ITEKES Bali Research Ethics Committee (No. 03.0208/KEPITEKES-BALI/III/2021) and Health Research Ethics Committee of Sanjiwani Regional Hospital, Gianyar Regency (Number: 18/PEPK/III/2021) and a Permit Research from the Sanjiwani Hospital, Gianyar (Number: 070 /5701/ RSU). The author declares there is no conflict of interest related to the publication of this research, and the research was carried out independently without involving any sponsors (Alp et al., 2016; Lu et al., 2015).

## Result

### *Respondent characteristics*

General characteristics of respondents based on age, gender, level of education and length of work.

Table 1  
Respondent characteristics (n=59)

Respondent characteristics	f	%
Age (years)		
21- 30	14	23,7
31- 40	16	27,1
41-50	27	45,8
51- 60	2	3,4
Sex		
Female	45	76,3
Male	14	23,7
Education		
Diploma	13	22,0
Bachelor	46	78,0
Length of working (year)		
Less than < 5	12	20,3
5- 10	7	11,9

Table 1 shows most respondents at the age of 41-50 years (45.8%), the majority of respondents are female (76.3%), Bachelor of Nursing (78%), and more than ten (10) years (67.8%) of length of work.

*Nurse satisfaction with the system and benefits of ASOKA web-based*

The Paired T-Test in ASOKA web-based aims to evaluate the satisfaction of the intervention.

Table 2  
Nurse satisfaction score on the system and benefits of ASOKA web-based

	Mean	SD
Before intervention (Pre Test)	34,73	20,31
After intervention (Post Test)	51,49	10,53

Table 2 shows the Mean value before the intervention is 34.73 and increases after the intervention became 51.49. Judging from the minimum and maximum values, there is a significant increase, the maximum before is 61, and after the intervention is 80.

Table 3  
Web-based ASOKA paired t-test

	Mean	SD	SE	CI 95%	T	df	P Value
Pre & Post	-16,77	22,40	2,92	(-22,60-10,98)	-5,50	58	< ,001*

Table 3 shows that the results of the paired t-test have a statistically significant effect (Mean = -16.77),  $t = (58) = 33.06$ ,  $p < .001$  (two-tailed). The difference in the mean from the pre and post-test results of the recording and reporting system Web-based is -16.76 with a 95% confidence interval range from -22.60 to -10.98. The standard deviation value is 22.40, and the effect size value is 0.75, which indicates that the effect size is in the Moderate Effect range (Nishisaki et al., 2007; Cullen et al., 1995).

The screenshot shows the ASOKA Web-based interface. At the top, there is a navigation menu with options: 'Data Kecelakaan', 'Modal Keselamatan Pasien', 'Tambah Data Kecelakaan', 'Data Kategori Kecelakaan', 'Tambah Data Kategori', 'welcome', and 'Logout'. Below the menu, there is a table with the following data:

No Form	Tanggal	Lokasi Kecelakaan	Yang Melapor	Akibat pada pasien	Tindakan	Pemah terjadi	Jenis Kelamin	Kategori	Action
001	1969-12-31	Poli mata	Nurse	Tidak ada	Konfirmasi pendaftaran	Tidak	Laki-laki	Administrasi Klinis	
002	2021-07-04	ok sito	nurse	tidak ada	melaporkan ke ipsrs	Tidak	Laki-laki	Dokumentasi	

Figure 1. Asoka Web-based preview

ASOKA Web-based is designed that refer to the safety incident reporting form the Ministry of Health of the Republic of Indonesia with the aim of ensuring all staff is easy to access reports. The system uses the hospital intranet through the Hospital Information System/ Hospital Information and Management System that can be accessed using a personal computer or can use a mobile phone with an internet network. This system is made simpler and easier by using drop downs for several options and checkboxes so that the display looks simple with only 1 page with a color display and the use of the latest information technology. In addition, ASOKA Web-based is a synergy of other electronic service systems at the Sanjiwani Hospital, Gianyar, including: SERUNI: Electronic Prescription System at Sanjiwani Hospital, JEPUN: On Line Operation Schedule without delay. Several other excellent programs at the Sanjiwani Hospital are MAWAR: Responding Quickly to Birth Certificates of Gianyar Residents, PUCUK: Utilization of Wastewater for Watering Gardens, all of which are abbreviated using the names of flowers, as well as ASOKA, with the abbreviation of the name flower which describes the beautiful and the art of Gianyar regency (Rosenstein & O'Daniel, 2008; Iedema, 2009).

## Discussion

The results of the evaluation of the ASOKA Web-based indicate that the ASOKA Web-based has a significant effect on respondent satisfaction. Another result show that respondents' satisfaction with ASOKA Web-based increased quite well from before to after the intervention. The mean value before the intervention was 34.75 and increased significantly after the intervention was 51.49. Respondents' satisfaction with ASOKA Web-based includes satisfaction with content, format, ease of use, timeliness, and user satisfaction. Incident reporting is intended to reduce incidents and correct the system to improve patient safety and non-blaming. Incident reporting must be guaranteed safe, confidential, anonymous (without identity), and not easily accessed by unauthorized persons (Giles et al., 2017; Tutiany & Krisanti, 2017). Online reporting systems increase the number of patient safety risk management treatments (Mutu, 2020). Online reporting of fall risk is very useful for patients undergoing treatment. Besides being easy to use, it also makes patients active in treatment (Kannan et al., 2019).

The use of online reporting reduces paper usage and data reliance on retainers. In addition, data updates can be filled quickly, and the investigation process can immediately be carried out (Listiwati et al., 2020). Electronic reporting systems can be viewed as a primitive change from paper-based reporting to intelligent reporting systems. That speed up the electronic entry process and improve data accuracy by reducing data entry errors (Kang & Gong, 2017). The frequency of reporting an incident can be dramatically increased by using a web-based, user-friendly, voluntary, and non-penalty reporting system (Okafur et al., 2015). The online PSIR reporting prototype trial showed that 16.52% of users stated that they were very satisfied and 75.44% were satisfied, while 7.46% of users were dissatisfied and 0.58% were very dissatisfied with the development of this application (Zahro, 2017).

The use of an online reporting system increases effectiveness and efficiency because it can minimize the use of paper in incident reports, there is no double entry, every report will be recorded correctly as well as missing data can be minimized and can be analyzed quickly (Lestari et al., 2019). Online reporting systems can help users to find out what events have occurred as learning material (Ferorelli et al., 2020; Gibbs et al., 2017; Himawan & Ramdhan, 2016). As a learning material, the quality of reporting is also critical in decision-making for follow-up (Gong et al., 2016). Achieving better and safer care is learning from patient experience (Giles et al., 2017).

Information technology management systems, especially in the nursing field, have a positive impact on the development and progress of the health sector, including increasing efficiency and quality of service, maintaining the security and confidentiality of patient data, providing useful and accurate information to support the nursing process (Mulyani et al., 2019; Munawir, 2018; Ahmad, 2018). In addition to developing an advanced reporting system, the quality of human resources also needs to be improved so that the utilization of the system is more optimal (Tristantia, 2018). Training on patient safety culture management is also important in implementing electronic incident reporting (Müller et al., 2019).

#### *Limitation*

The limitation in this study is that the links used to access reports via mobile phones (HP) and personal computers (PCs) are too long process, making them difficult to memorize (Lee et al., 2011; Wu et al., 2002).

#### **Conclusion and Suggestion**

##### *Conclusion*

The results of the evaluation of nurse satisfaction with ASOKA Web-based were very satisfying. This is evidenced by the average value of respondents' satisfaction from 34.73 to 61.49 after the intervention. The increase in the average satisfaction of respondents was due to data security and ease of use through smartphone which is very often used daily. Evaluation of nurse satisfaction with ASOKA Web-based has a significant effect and when viewed from the effect size value of (0.75), which indicates that the effect size is in the Moderate Effect range. Thus the application of ASOKA Web-based is very appropriate to be realized (Kannan et al., 2016; Suryatika et al., 2019).

##### *Suggestion*

Reporting culture must be applied if things are at risk or have even happened to patients through the existing reporting system. This can be used as a lesson either in the unit itself or other units so the same thing will not happen again. The addition of several things to improve the reporting system ASOKA Web-based includes developing access differences and templates for all employees as the user itself, the head of the unit/room as the user's superior, and the patient safety committee. Added a reporting layout for the head of the unit/room containing incident grading, analysis of the causes, and contributing factors behind the incident. Added notification to each access level when a new report is reported in the system. Able to make shorter and easier links to remember, support for awards (addition of room facilities, award certificates/certificates, and so on) for both personal and units that are diligent in reporting incidents. Development of research with qualitative studies with in-depth interviews with the main users, the quality and patient safety committee, and management as a support system and the person in charge of creating quality and standardized health services (Nehru, 2016).

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#### **References**

- Ahmad, L. (2018). Munawir, Sistem Informasi Manajemen: Buku Referensi.
- Alotaibi, Y. K., & Federico, F. (2017). The impact of health information technology on patient safety. *Saudi medical journal*, 38(12), 1173.
- Alp, E., Cevahir, F., Ersoy, S., & Guney, A. (2016). Incidence and economic burden of prosthetic joint infections in a university hospital: a report from a middle-income country. *Journal of infection and public health*, 9(4), 494-498. <https://doi.org/10.1016/j.jiph.2015.12.014>
- Bakker, J., Gris, P., Coffernils, M., Kahn, R. J., & Vincent, J. L. (1996). Serial blood lactate levels can predict the development of multiple organ failure following septic shock. *The American journal of surgery*, 171(2), 221-226. [https://doi.org/10.1016/S0002-9610\(97\)89552-9](https://doi.org/10.1016/S0002-9610(97)89552-9)
- Cullen, D. J., Bates, D. W., Small, S. D., Cooper, J. B., Nemeskal, A. R., & Leape, L. L. (1995). The incident reporting system does not detect adverse drug events: a problem for quality improvement. *The Joint Commission journal on quality improvement*, 21(10), 541-548. [https://doi.org/10.1016/S1070-3241\(16\)30180-8](https://doi.org/10.1016/S1070-3241(16)30180-8)

- Daud, A. (2020). Sistem Pelaporan dan Pembelajaran Keselamatan Psien Nasional (SP2KPN). *Jakarta: Kementerian Kesehatan Republik Indonesia*.
- Ferorelli, D., Solarino, B., Trotta, S., Mandarelli, G., Tattoli, L., Stefanizzi, P., ... & Dell'Erba, A. (2020). Incident reporting system in an italian university hospital: A new tool for improving patient safety. *International Journal of Environmental Research and Public Health*, *17*(17), 6267.
- Gibbs, N. M., Culwick, M., & Merry, A. F. (2017). A cross-sectional overview of the first 4,000 incidents reported to webAIRS, a de-identified web-based anaesthesia incident reporting system in Australia and New Zealand. *Anaesthesia and intensive care*, *45*(1), 28-35.
- Giles, S. J., Reynolds, C., Heyhoe, J., & Armitage, G. (2017). Developing a patient-led electronic feedback system for quality and safety within Renal PatientView. *Journal of renal care*, *43*(1), 37-49.
- Gong, Y., Hua, L., & Wang, S. (2016). Leveraging user's performance in reporting patient safety events by utilizing text prediction in narrative data entry. *Computer methods and programs in biomedicine*, *131*, 181-189.
- Himawan, C., & Ramdhan, M. (2016). Incident Reporting System for EHS Division. *Information System Application*, *1*(1).
- Iedema, R. (2009). New approaches to researching patient safety. *Social science & medicine*, *69*(12), 1701-1704. <https://doi.org/10.1016/j.socscimed.2009.09.050>
- Kang, H., & Gong, Y. (2017). Design of a User-Centered Voluntary Reporting System for patient safety events. In *MEDINFO 2017: Precision Healthcare through Informatics* (pp. 733-737). IOS Press.
- Kang, H., Zhou, S., Yao, B., & Gong, Y. (2018). A prototype of knowledge-based patient safety event reporting and learning system. *BMC medical informatics and decision making*, *18*(5), 13-22.
- Kannan, M., Hildebrand, A., Hugos, C. L., Chahine, R., Cutter, G., & Cameron, M. H. (2019). Evaluation of a web-based fall prevention program among people with multiple sclerosis. *Multiple sclerosis and related disorders*, *31*, 151-156.
- Kannan, P., Flechas, T., Mendez, E., Angarita, L., Chaudhari, P., Hong, Y., & Mannan, M. S. (2016). A web-based collection and analysis of process safety incidents. *Journal of Loss Prevention in the Process Industries*, *44*, 171-192. <https://doi.org/10.1016/j.jlp.2016.08.021>
- Lee, T. T., Liu, C. Y., Kuo, Y. H., Mills, M. E., Fong, J. G., & Hung, C. (2011). Application of data mining to the identification of critical factors in patient falls using a web-based reporting system. *International journal of medical informatics*, *80*(2), 141-150. <https://doi.org/10.1016/j.ijmedinf.2010.10.009>
- Lestari, E. S., Dwiantoro, L., & Denny, H. M. (2019). Sistem Pelaporan Insiden Keselamatan Pasien Di Sebuah Rumah Sakit Swasta Di Kudus. *Jurnal Keperawatan dan Kesehatan Masyarakat Cendekia Utama*, *8*(2), 169-180.
- Listiowati, E., Soularito, D. S., & Arini, M. (2020). E-Note System: Pencatatan, Pelaporan Dan Analisis Insiden Keselamatan Pasien. In *Prosiding Seminar Nasional Program Pengabdian Masyarakat*.
- Lu, J., Wu, D., Mao, M., Wang, W., & Zhang, G. (2015). Recommender system application developments: a survey. *Decision Support Systems*, *74*, 12-32. <https://doi.org/10.1016/j.dss.2015.03.008>
- Menkes. (2017). Peraturan Menteri Kesehatan Republik Indonesia Nomor 11 Tahun 2017 Tentang Keselamatan Pasien.
- Müller, B. S., Beyer, M., Blazejewski, T., Gruber, D., Müller, H., & Gerlach, F. M. (2019). Improving critical incident reporting in primary care through education and involvement. *BMJ open quality*, *8*(3), e000556.
- Mulyani, I., Zamzami, E. M., & Zandrato, N. (2019). Pengaruh Sistem Teknologi Informasi Pada Manajemen Data Dan Informasi Dalam Layanan Keperawatan: Literature Review. *Inspiration: Jurnal Teknologi Informasi dan Komunikasi*, *9*(2), 137-142.
- Munawir, L. A. (2018). Sistem Informasi Manajemen. *Banda Aceh*.
- Mutu, M. (2020). Laporan Peningkatan Mutu Implementasi Sistem Pengendalian Internal Rumah Sakit Mata Bali Mandara (SIPRIMA) Dalam Manajemen Risiko.
- Nehru, R. S. S. (2016). Corporate social responsibility & education for sustainable development. *International Research Journal of Engineering, IT and Scientific Research*, *2*(3), 72-81.
- Nishisaki, A., Keren, R., & Nadkarni, V. (2007). Does simulation improve patient safety?: self-efficacy, competence, operational performance, and patient safety. *Anesthesiology clinics*, *25*(2), 225-236. <https://doi.org/10.1016/j.anclin.2007.03.009>
- Okafor, N. G., Doshi, P. B., Miller, S. K., McCarthy, J. J., Hoot, N. R., Darger, B. F., ... & Chathampally, Y. G. (2015). Voluntary medical incident reporting tool to improve physician reporting of medical errors in an emergency department. *Western Journal of Emergency Medicine*, *16*(7), 1073.

- Rosenstein, A. H., & O'Daniel, M. (2008). A survey of the impact of disruptive behaviors and communication defects on patient safety. *The Joint Commission Journal on Quality and Patient Safety*, 34(8), 464-471. [https://doi.org/10.1016/S1553-7250\(08\)34058-6](https://doi.org/10.1016/S1553-7250(08)34058-6)
- Suryatika, I. B. M., Sutapa, G. N., & Kasmawan, I. G. A. (2019). Radiology patient dosage monitoring for local diagnostic reference level. *International Research Journal of Engineering, IT and Scientific Research*, 5(5), 26-31.
- Tristantia, A. D. (2018). Evaluasi Sistem Pelaporan Insiden Keselamatan Pasien di Rumah Sakit. *Jurnal Administrasi Kesehatan Indonesia*, 6(2), 83-94.
- Tutiany, L., & Krisanti, P. (2017). Bahan ajar keperawatan: manajemen keselamatan pasien. *Pusat Pendidikan Sumber Daya Manusia Kesehatan Kementerian Kesehatan RI*, 297.
- Vaismoradi, M., Tella, S., A Logan, P., Khakurel, J., & Vizcaya-Moreno, F. (2020). Nurses' adherence to patient safety principles: A systematic review. *International Journal of Environmental Research and Public Health*, 17(6), 2028.
- World Health Organization. (2015). *WHO global strategy on people-centred and integrated health services: interim report* (No. WHO/HIS/SDS/2015.6). World Health Organization.
- Wu, A. W., Pronovost, P., & Morlock, L. (2002). ICU incident reporting systems. *Journal of critical care*, 17(2), 86-94. <https://doi.org/10.1053/jcrc.2002.35100>
- Zahro, S. (2016). *Pengembangan Sistem Pencatatan Dan Pelaporan Insiden Keselamatan Pasien (IKP) Berbasis Web Di Rumah Sakit* (Doctoral dissertation, Universitas Gadjah Mada).