

# ROLE OF INCIDENT REPORTING SYSTEM IN HEALTHCARE MANAGEMENT: A CASE OF MULTISPECIALITY TERTIARY HOSPITAL IN INDIA

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**Abstract:** The incidence reporting system (IRS) has risen to prominence as a critical tool for enhancing patient safety. The majority of affluent countries (such as the United States of America) are well progressed in implementing and strengthening their IRS systems, while developing countries such as India remain in the nascent stage. This research aims to analyze the role of IRS in healthcare administration through the lens of a multispecialty tertiary hospital in India's Punjab state. We evaluate the hospital's incident records for the years 2019 and 2020. The study emphasizes the inadequacy of the manual approach for reporting healthcare incidents and the importance of reinforcing the usage of the IRS. The study demonstrates that staff training, practical demonstrations, awareness lectures, and continuous nursing education (CNE) in IRS contribute to lowering incident recurrence. In summary, IRS can contribute significantly to incident reporting, patient safety, and effective healthcare management in developing nations such as India.

**Keywords:** Incident Reporting System, India, Healthcare, Hospital Management, Patient Safety, Quality Control

## 1.0 Introduction

An incident reporting system (IRS) is widely acknowledged as a prime technique for improving patient safety (Pfeiffer, 2010). It has been widely implemented in developed countries; however, its adoption in developing countries like India is still not widespread. IRS collects data on all types of occurrences discovered by healthcare personnel and presents it to the quality manager responsible for incident analysis and quality control (Hwang et al., 2012). Incident reports serve as educational tools for hospital staff to enhance patient safety, with the goal of establishing a partaking, translucent, non-punishing, easy, effective, and operational reporting culture in healthcare organizations (Stavropoulou et al., 2015). In healthcare, IRS enables healthcare professionals to voice concerns so that hospital management can ensure the safety of both patients and caregivers (Uyob, 2020). Cloud computing (Singh, 2013) can automate IRS using mobile technology (Bustillo, 2020), allowing healthcare providers flexibility to manage patients' data. This can play a key role in bridging the gap between patients and healthcare providers. Innovative technologies like IRS can also help predict (Singh & Alhulail, 2022) the nature and type of incidents and reduce their recurrence. Thus, innovative technologies such as IRS have the potential to alter the way healthcare is managed fundamentally. Most developed nations have built IRS, which are volitional, anonymous, and private computerized technologies that enable the reporting and studying of healthcare accidents and adverse events by specialists. However, developing nations like India have lagged in this regard. In India, healthcare bodies such as Joint Commission International (JCI, 2022) and National Accreditation Board for Hospitals & Healthcare Providers (NABH, 2022) have recommended hospitals to adopt IRS to improve patient safety. The increasing internet acceptance (Alhamad & Singh, 2021a; Alshammari & Singh, 2018) and internet-based technologies (Singh & Alhamad, 2021, Alhamad & Singh, 2021b; Singh & Alshammari, 2020; Singh, 2019; Singh, 2017) is encouraging the acceptance of technologies like IRS in healthcare. This study investigates the adoption of IRS by a prominent multispecialty tertiary care hospital in Punjab state (India). Specifically, the current research examines the effect of adopting IRS on reporting various kinds of incidents and related healthcare management issues. Additionally, we review the literature on incident reporting in the United States of America (USA) to evaluate how Indian healthcare providers might benefit from the experience in the USA.

## 2.0 Conceptual Framework

There are important concepts related to incidents that we address here:

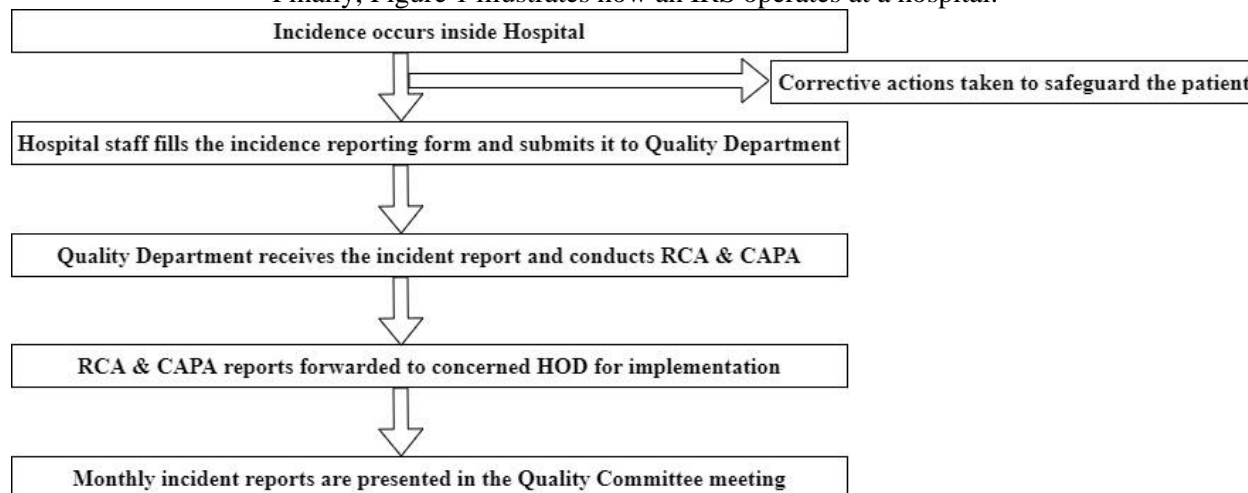
- Incident – It is any non-planned event that causes harm to a patient, health care professional, or the healthcare organization or has the potential to cause injury, impairment, or other loss (Ramírez et al., 2018).
- Near-miss - A near-miss (or close call) is an occurrence or condition that may have caused an accident, impairment, or sickness but could not happen due to good fortune or prompt mediation by healthcare professional(s) (Ramírez et al., 2018).
- No-harm incident – It is an incident of patient safety that resulted in contact with the patient but not in any noticeable harm (Ramírez et al., 2018).
- Adverse event – It is an occurrence that causes harm to a patient or health care professional. It is either preventable or unavoidable (Wu et al., 2007).
- Sentinel event – It is an unexpected event happening in a healthcare organization that results in death or grave physical or psychological injury to an individual. This is unrelated to the patient's illness's natural course. Sentinel events include the loss of a limb or gross motor activity, as well as any other event that, if repeated, poses the risk of a grave unfavorable outcome (Padilla, 2019).

Next, we examine the type of incidents that occur in hospitals in Table 1.

**Table 1: Nature and Type of Incidents in Hospitals**

S.No.	Nature/ Type of Incident
1.	Needle stick/ sharp related incidents
2.	Equipment related incidents
3.	Patient fall incidents
4.	Clinical related incidents
5.	Drug related incidents
6.	Blood bank/ Lab related incidents
7.	Security related incidents
8.	Radiology related incidents
9.	Employee fall incidents
10.	Others (spillage, acids exposure & fumes etc.)

Finally, Figure 1 illustrates how an IRS operates at a hospital.



**Figure 1: Working of IRS in a Hospital**

## 3.0 Incident Reporting In The Usa

Now, we examine in brief the incident reporting in the USA. This will help us to examine what Indian healthcare providers can learn from the USA experience.

Nuckols et al. (2007) reported the frequency and kind of occurrences at two US hospitals that had implemented a voluntary incident reporting system. There were 17 recorded incidents per 1000 patient days with the healthcare provider, with nursing staff filing eighty nine (89) percent of reports. However, qualitative analysis revealed that only a few cases concerned with specifying errors or high-risk treatments. At least 59% of incidents appeared to be entirely preventable.

According to a Roehr (2012) study conducted in the USA, healthcare providers catch and account for 14% of adverse incidents encountered by patients. This occurred because of confusion among hospital workers regarding what should be reported.

Kepner (2021) investigated the incident reports in the USA. The study discovered that in the year 2020, most reports (97 percent) were for incidents, whereas serious events received far fewer reports (3 percent). The most frequent incident type reported was treatment/ procedure/ test error (32.1 percent), followed by an error in medication (16.7 percent), complications related to treatment/ procedure/ test (16.2 percent), and patient fall (11.8 percent).

#### **4. Methodology**

This study examines the incidents reports gathered from various departments in a multispecialty tertiary care hospital over the last two years (2019 & 2020). All incident types are reported including near-miss, no harm, adverse events, and sentinel events. Incidents are received from various departments/ categories of staff across the healthcare organization. Incident reports are reviewed based on the nature or type of the incident and analyzed on a quarterly basis. Incidents are reported using "Incident Reporting Form" & analysis is done using "Incident Analysis Form". Maximum time limit to report near-miss, no harm & adverse events is 24 hours, and the time limit to report sentinel event is within 2 hours from the time of incident occurrence. Root Cause Analysis (RCA) and Corrective and Preventive Actions (CAPA) for the incident reported is done by the Quality Team at the earliest possible (immediately for sentinel events & within 24 hours for other events).

#### **5. Incidents Analysis**

Now, we investigate the nature of various incidents reported in 2019 and 2020 in the multispecialty tertiary care hospital. It is worth mentioning that the hospital introduced staff training in IRS in 2020. The hospital employed the tools like RCA and CAPA to reduce the incidents from recurring. Table 2 presents the nature of incidents reported in 2019 and 2020.

**Table 2: Nature of Incidents Reported (2019 & 2020)**

S.No.	Nature of Incident	2019		2020	
		Number of Incidents	%Age of Incidents	Number of Incidents	%Age of Incidents
1	Needle stick/ sharp related incidents	21	27.3	8	16.7
2	Equipment related incidents	17	22.1	8	16.7
3	Patient fall incidents	11	14.3	7	14.6
4	Clinical related incidents	5	6.5	11	22.9
5	Drug related incidents	5	6.5	4	8.3
6	Blood bank/ Lab related incidents	3	3.9	2	4.2
7	Security related incidents	3	3.9	0	0
8	Radiology related incidents	2	2.6	0	0
9	Employee fall incidents	1	1.3	2	4.2
10	Others (spillage, acids exposure & fumes etc.)	9	11.7	6	12.5
<b>Total</b>		<b>77</b>	<b>100</b>	<b>48</b>	<b>100</b>

Table 2 portrays the nature of incidents reported in 2019 and 2020. It can be observed that total 77 and 48 incidents were reported in 2019 and 2020, respectively. In 2019, the highest nature of incidents reported were needle stick/

sharp related incidents (21 incidents, 27.3%), equipment related incidents (17 incidents, 22.1%), patient fall incidents (11 incidents, 14.3%) and others (spillage, acids exposure & fumes etc.) (9 incidents, 11.7%). In 2020, the highest incidents reported were clinically related incidents (11 incidents, 22.9%), needle stick/ sharp related incidents (8 incidents, 27.3%), equipment related incidents (8 incidents, 22.1%), and patient fall incidents (7 incidents, 14.6%).

**Table 3: Type of Reported Incidents (2019 & 2020)**

S.No.	Nature of Incident	2019				2020			
		NME	AENH	AEH	SE	NME	AENH	AEH	SE
1	Needle stick/sharp related incidents	0	17	4	0	0	8	0	0
2	Equipment related incidents	0	17	0	0	0	8	0	0
3	Patient fall incidents	0	10	1	0	0	7	0	0
4	Clinical related incidents	0	5	0	0	0	10	1	0
5	Drug related incidents	2	2	1	0	0	4	0	0
6	Blood bank/ Lab related incidents	2	0	0	0	1	1	0	0
7	Security related incidents	0	2	1	0	0	0	0	0
8	Radiology related incidents	0	2	0	0	0	0	0	0
9	Employee fall incidents	0	1	1	0	0	2	0	0
10	Others (spillage, acids exposure & fumes etc.)	0	9	0	0	0	6	0	0
<b>Total</b>		<b>04</b>	<b>65</b>	<b>08</b>	<b>0</b>	<b>01</b>	<b>46</b>	<b>01</b>	<b>0</b>
<b>Percentage</b>		<b>5.2</b>	<b>84.4</b>	<b>10.4</b>	<b>0</b>	<b>2.1</b>	<b>95.8</b>	<b>2.1</b>	<b>0</b>

Where NM is Near-Miss Events, AENH is Adverse Events (No Harm), AEH is Adverse Events (Harm), Sentinel Events (SE)

Table 3 depicts the type of incidents reported in 2019 and 2020. In 2019, the highest type of incidents reported were adverse events causing no harm (65 incidents – 84.4%), adverse events causing harm (8 incidents – 10.4%), and near-miss events (4 incidents – 5.2%). In 2020, the highest type of incidents reported were adverse events causing no harm (46 incidents – 95.8%), adverse events causing harm (1 incident – 2.1%), and near-miss events (1 incident – 2.1%). No sentinel event was reported in the years 2019 and 2020.

Table 4 shows the quarterly reported incidents in the years 2019 and 2020.

**Table 4: Quarterly Incidents Reported (2019 & 2020)**

S.No.	Quarter	Number of Incidents	%Age of Incidents	Number of Incidents	%Age of Incidents
1	January to March	10	13	16	33.4
2	April to June	17	22	17	35.4
3	July to September	25	32.5	5	10.4
4	October to December	25	32.5	10	20.8
<b>Total</b>		<b>77</b>	<b>100</b>	<b>48</b>	<b>100</b>

In 2019, the third quarter (July to September) (25 incidents – 32.5 percent) and the fourth quarter (October to December) (25 incidents – 32.5 percent) recorded the most incidents. This is followed by the second quarter (April to June) (17 incidences – 22% of total) and the first quarter (January to March) (10 incidents – 13% of total). As shown in Table 4, of the total 77 incidents recorded in 2019, the first two quarters (January to June 2019) reported the fewest incidents, with 27 incidents (35 percent), while the following two quarters (July to December 2019) reported the most incidents, with 50 incidents (50 incidents - 65 percent).

In 2020, the second quarter (April to June) had the most reported incidents (17 – 35.4 percent). Quarter 1 (January to March) had the highest number of incidents (16 incidents – 33.3 percent), followed by quarter 4 (10 incidents – 20.8 percent) and quarter 3 (July to September) with the lowest number of incidents (5 incidents – 10.4 percent). As shown in Table 4, the first two quarters (January to June 2020) had the highest number of incidents reported, 33 incidents (68.8 percent), whereas the following two quarters (July to December 2020) had the lowest number of reported incidents, 15 incidents (31.2 percent).

It can be noted from Tables 2, 3, and 4 that generally, 2019 had more incidents reported than 2020. Root Cause Analysis (RCA) found that due to constant staff training in IRS in the year 2020, the number of incidents getting reported was reduced as compared to 2019. It was also found that nurses, on average, report more frequently than doctors.

In 2020, all occurrences reported within the specified timeframe received Corrective and Preventive Actions (CAPA). Corrective actions include those conducted immediately to bring patients' conditions back to normal and to protect them. Preventive actions are those made to avert a repeat of the situation. Several effective CAPAs have been implemented, including practical demonstrations of IRS, awareness seminars on IRS for all levels of staff, and continuing nursing education (CNE). The training sessions covered the treatment of patient falls, needle stick injuries, international patient safety goals (IPSG's), medication errors, adverse drug reactions, equipment management, and risk assessment & mitigation process. This played a substantial part in reducing the number of occurrences recorded in 2020 compared to 2019.

## **6. Discussion**

Adverse events in hospitals occur because of unintentional errors; most of them do not cause harm to the patient or healthcare employees. However, most of the adverse events cause no harm. In this regard, our work concurs with past studies undertaken in the USA (Roehr, 2012).

Incident reporting in the USA (Nuckols et al., 2007; Kepner, 2021) suggests a higher incidence rate. In comparison, our study hospital recorded fewer incidents, showing that incident reporting is less widespread in developing countries like India.

It is important to recognize that manual method for reporting incidents is insufficient, and the use of IRS should be reinforced. The hospital staff should be given the necessary training to use the IRS effectively. Additionally, hospital workers should be encouraged to report all instances, including near-misses and no-harm incidents.

The examination of incidents in our multispecialty tertiary care hospital between 2019 and 2020 demonstrates that the implementation of IRS contributed to the reduction of incident recurrence. IRS simplified the process of conducting Root Cause Analysis (RCA), which aided in reducing incident recurrence. Additionally, IRS aided in implementing Corrective and Preventive Actions (CAPA), which contributed to the decrease in incident recurrence.

## **7. Conclusion**

Healthcare workers are supposed to give patients the best possible care without making any errors. However, achieving error-free performance is challenging. IRS can assist in determining the causes and preventing such errors that may result in patient harm.

In a nutshell, IRS can play a significant role in incident reporting and patient safety improvement. It can provide healthcare providers with timely information regarding the causes of incidents and useful insight into the processes that prevent their recurrence. IRS can identify and address issues with incident reporting, hence minimizing the risk to patient safety. This will help the healthcare providers to improve patients' faith and confidence (including privacy concerns) (Singh, 2018) and enhance their satisfaction with technology solutions (Singh, 2016; Singh & Grover, 2011).

Staff training can be critical in reducing incident recurrence. Similarly, practical demonstrations, awareness lectures for all levels of staff, and continuing nursing education (CNE) in IRS all contribute to reducing incident recurrence. Developed countries such as the USA have been implementing the IRS for a long period and continually enhancing them to ensure patient safety. IRS implementation in hospitals in developing nations such as India is still in nascent stage. They must widely implement technology such as IRS to explore new dimensions of patient safety.

## **8.0 References**

1. Alhamad, I. A., & Singh, H. P. (2021a). Predicting Key Factors Impacting Online Hotel Ratings Using Data Mining Approach: A Case Study of the Makkah City of Saudi Arabia. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies*, 12(2), 12A2N, 1-12. <https://doi.org/10.14456/ITJEMAST.2021.35>
2. Alhamad, I. A., & Singh, H. P. (2021b). Decoding Significant and Trivial Factors Influencing Online Hotel Ratings: The Case of Saudi Arabia's Makkah City. *International Transaction Journal of Engineering,*



*Management, & Applied Sciences & Technologies*, 12(7), 12A7H, 1-11.

<https://doi.org/10.14456/ITJEMAST.2021.134>

3. Alshammari, T. S., & Singh, H. P. (2018). Preparedness of Saudi Arabia to Defend Against Cyber Crimes: An Assessment with Reference to Anti-Cyber Crime Law and GCI Index. *Archives of Business Research*, 6(12), 131–146. <https://doi.org/10.14738/abr.612.5771>
4. Bustillo, J. C. M., Patrimonio, G. A., & Mateo, T. I. (2020). Automated Incident Reporting Management System Using Mobile Technology. *International Journal of Innovation, Management and Technology*, 11(1), 18–26. <https://doi.org/10.18178/ijimt.2020.11.1.870>
5. Hwang, J. I., Lee, S. I., & Park, H. A. (2012). Barriers to the Operation of Patient Safety Incident Reporting Systems in Korean General Hospitals. *Healthcare Informatics Research*, 18(4), 279. <https://doi.org/10.4258/hir.2012.18.4.279>
6. JCI. (2022). Joint Commission International. Retrieved February 2, 2022, from <https://www.jointcommissioninternational.org/>
7. Kepner, S., & Jones, R. (2021). 2020 Pennsylvania Patient Safety Reporting: An Analysis of Serious Events and Incidents From the Nation's Largest Event Reporting Database. *Patient Safety*, 3(2), 6–21. <https://doi.org/10.33940/data/2021.6.1>
8. NABH. (2022). National Accreditation Board for Hospitals & Healthcare Providers (NABH). Retrieved February 2, 2022, from <https://www.nabh.co/>
9. Nuckols, T. K., Bell, D. S., Liu, H., Paddock, S. M., & Hilborne, L. H. (2007). Rates and types of events reported to established incident reporting systems in two US hospitals. *Quality and Safety in Health Care*, 16(3), 164–168. <https://doi.org/10.1136/qshc.2006.019901>
10. Padilla, E. A. (2019). Sentinel Event (1st ed.). Bowker.
11. Pfeiffer, Y., Manser, T., & Wehner, T. (2010). Conceptualising barriers to incident reporting: a psychological framework. *BMJ Quality & Safety*, 19(6), e60. <https://doi.org/10.1136/qshc.2008.030445>
12. Ramírez, E., Martín, A., Villán, Y., Lorente, M., Ojeda, J., Moro, M., Vara, C., Avenza, M., Domingo, M. J., Alonso, P., Asensio, M. J., Blázquez, J. A., Hernández, R., Frías, J., & Frank, A. (2018). Effectiveness and limitations of an incident-reporting system analyzed by local clinical safety leaders in a tertiary hospital. *Medicine*, 97(38), e12509. <https://doi.org/10.1097/md.00000000000012509>
13. Roehr, B. (2012). US hospital incident reporting systems do not capture most adverse events. *BMJ*, 344(jan13 2), e386. <https://doi.org/10.1136/bmj.e386>
14. Singh, H. P. (2013). Innovative ICT Through Cloud Computing. *The IUP Journal of Computer Sciences*, 7(1), 37–52.
15. Singh, H. P. (2016). E-Commerce Security: Legal and Policy Aspects of Technology Solutions in India. *Mumukshu Journal of Humanities*, 8(1), 1–7.
16. Singh, H. P. (2017). Strategic Analysis and Security Issues of Social Media Services: A Study of Facebook. *International Journal of Information Movement*, 11(V), 134–139.
17. Singh, H. P. (2018). Data Protection and Privacy Legal-Policy Framework in India: A Comparative Study vis-à-vis China and Australia. *Amity Journal of Computational Sciences*, 2(2), 24–29.
18. Singh, H. P. (2019). Exploiting RFID for Business Transformation: A Strategic Analysis vis-à-vis Agricultural Bank of China. *International Education and Research Journal*, 5(1), 19–23. <http://ierj.in/journal/index.php/ierj/article/view/1813/1722>
19. Singh, H. P., & Alhulail, H. N. (2022). Predicting Student-Teachers Dropout Risk and Early Identification: A Four-Step Logistic Regression Approach. *IEEE Access*, 10, 6470–6482. <https://doi.org/10.1109/access.2022.3141992>
20. Singh, H. P., & Alshammari, T. S. (2020). An Institutional Theory Perspective on Developing a Cyber Security Legal Framework: A Case of Saudi Arabia. *Beijing Law Review*, 11(03), 637–650. <https://doi.org/10.4236/blr.2020.113039>
21. Singh, H. P., & Grover, S. T. (2011). Marketing of E-banking Services: A Critical Analysis on Lifecycle Demographics, Enabling and Disabling Factors. *Zenith International Journal of Multidisciplinary Research*, 1(7), 20–38.
22. Singh, H. P. & Alhamad, I. A. (2021). Deciphering Key Factors Impacting Online Hotel Ratings Through the Lens of Two-Factor Theory: A Case of Hotels in Makkah City of Saudi Arabia. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies*, 12(8), 12A8M, 1-12. <https://doi.org/10.14456/ITJEMAST.2021.160>

23. Stavropoulou, C., Doherty, C., & Tosey, P. (2015). How Effective Are Incident-Reporting Systems for Improving Patient Safety? A Systematic Literature Review. *The Milbank Quarterly*, 93(4), 826–866. <https://doi.org/10.1111/1468-0009.12166>
24. Uyob, R. (2020). Application of Technology Acceptance Model (TAM) in predicting user intention to use Malaysian Business Reporting System (MBRS): A Conceptual Paper. *International Journal of Business and Management*, 4(4), 21–30. <https://doi.org/10.26666/rmp.ijbm.2020.4.4>
25. Wu, J. H., Shen, W. S., Lin, L. M., Greenes, R. A., & Bates, D. W. (2007). Testing the technology acceptance model for evaluating healthcare professionals' intention to use an adverse event reporting system. *International Journal for Quality in Health Care*, 20(2), 123–129. <https://doi.org/10.1093/intqhc/mzm074>