

Comprehensive Analysis of Sentinel Events as a Strategic Approach to Enhancing Healthcare Safety Management

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INTRODUCTION

Ensuring patient safety and quality plays an integral role in delivering the highest level of healthcare to our patients. However, adverse events continue to remain a significant concern. Adverse events affect 1 in 10 patients during hospital admission¹. A sentinel event is a type of adverse event, defined by Joint Commission, as an untoward incident unrelated to the natural progression of disease leading to severe temporary harm, permanent harm or death². This study was carried out in a tertiary, specialty hospital in Malaysia.

AIM

The objective of this study was to examine whether aggregating the root causes of sentinel events and identifying trends and underlying common weaknesses could improve patient safety at an organizational level.

METHOD

Retrospective, cross-sectional review of 13 sentinel event reports from 2022-2023 were obtained from an electronic risk management system database. The identified root causes were then classified to the main categories and subcategories according to the Eindhoven Classification Model (ECM) of system failure (Table 1). A descriptive analysis and frequency tables were performed on the characteristics, variables derived and root causes from the sentinel events.

RESULTS

- A total of 13 patients were involved in 13 sentinel events (SE); 46.2% (6/13) resulted in death.
- 53.8% (7/13) events occurred in the younger population < 20 years of age (Figure 1).
- 84.6% (11/13) events involved more than 2 healthcare professionals (HCP). A total of 52 HCP were involved, comprising doctors (57.7%) and nurses (32.7%) as the highest category of HCP (Figure 2).
- 76.9%** (10/13) of SEs occurred during **office hours**, **92.3%** (12/13) occurring during **weekdays** and **61.5%** (8/13) occurring on **Monday and Tuesday** (Figure 3).
- SEs were mainly **surgical** (53.8%) and **procedural** (30.8%).
- Out of 40 root causes identified, majority were attributed to **human factors** (45%) followed by **organizational factors** (35%) and technical factors (20%), with no contributory patient factors (Figure 4).
- The majority of human factors were due to **knowledge-based behaviour** and **task coordination**.
- Knowledge-based behavior correlated significantly with death-related SEs (p<0.021).**
- The highest subcategory identified from **organizational factors** was from **organization protocols (64.3%)**, which were failures relating to the quality and availability of the protocols within the department. Further analysis showed 50% of technical factors were attributed to the design subcategory (TD), which are failures due to poor design of equipment, software, labels or forms.

Figure 1: Age Distribution

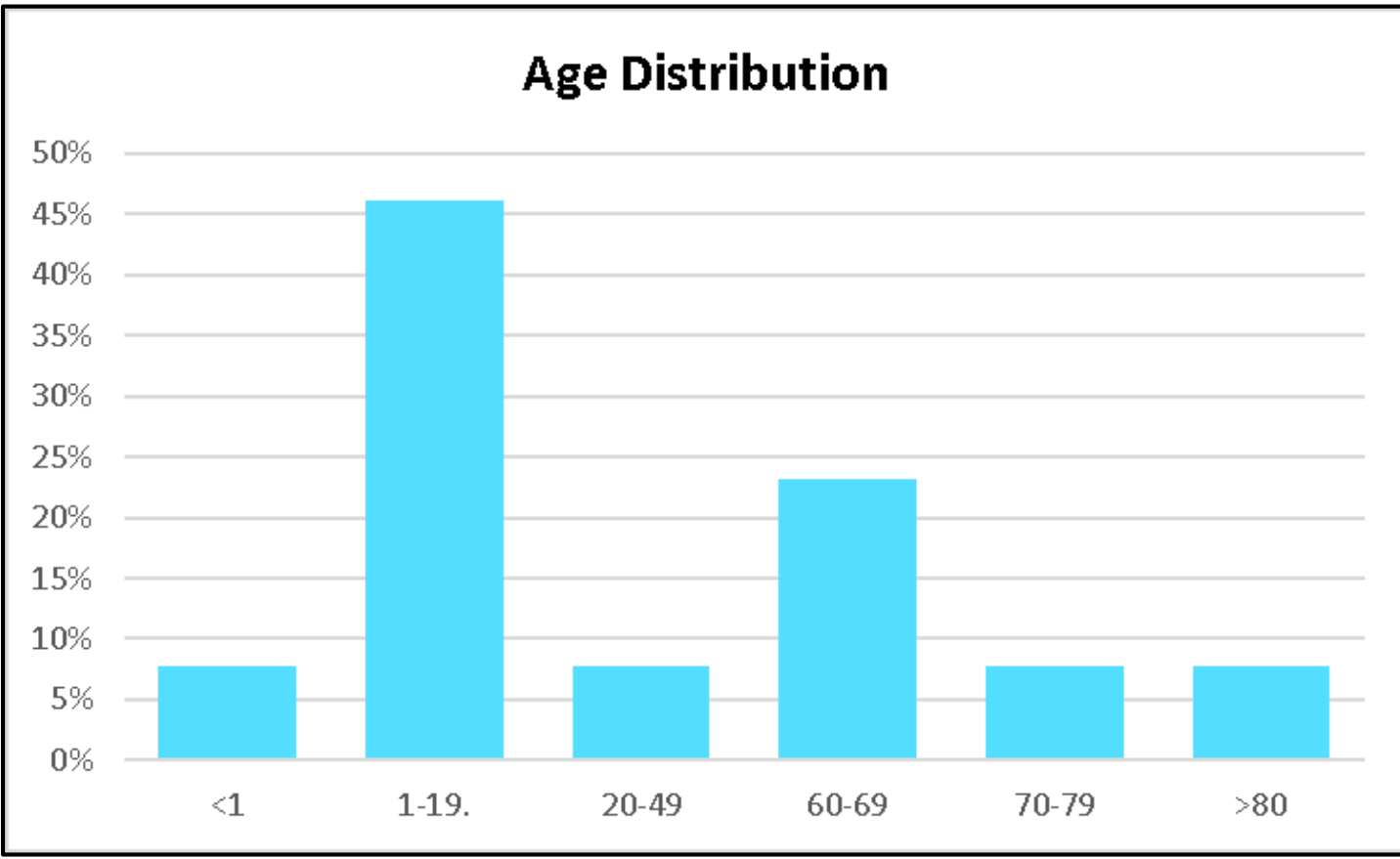


Figure 2: Healthcare Professionals Involvement

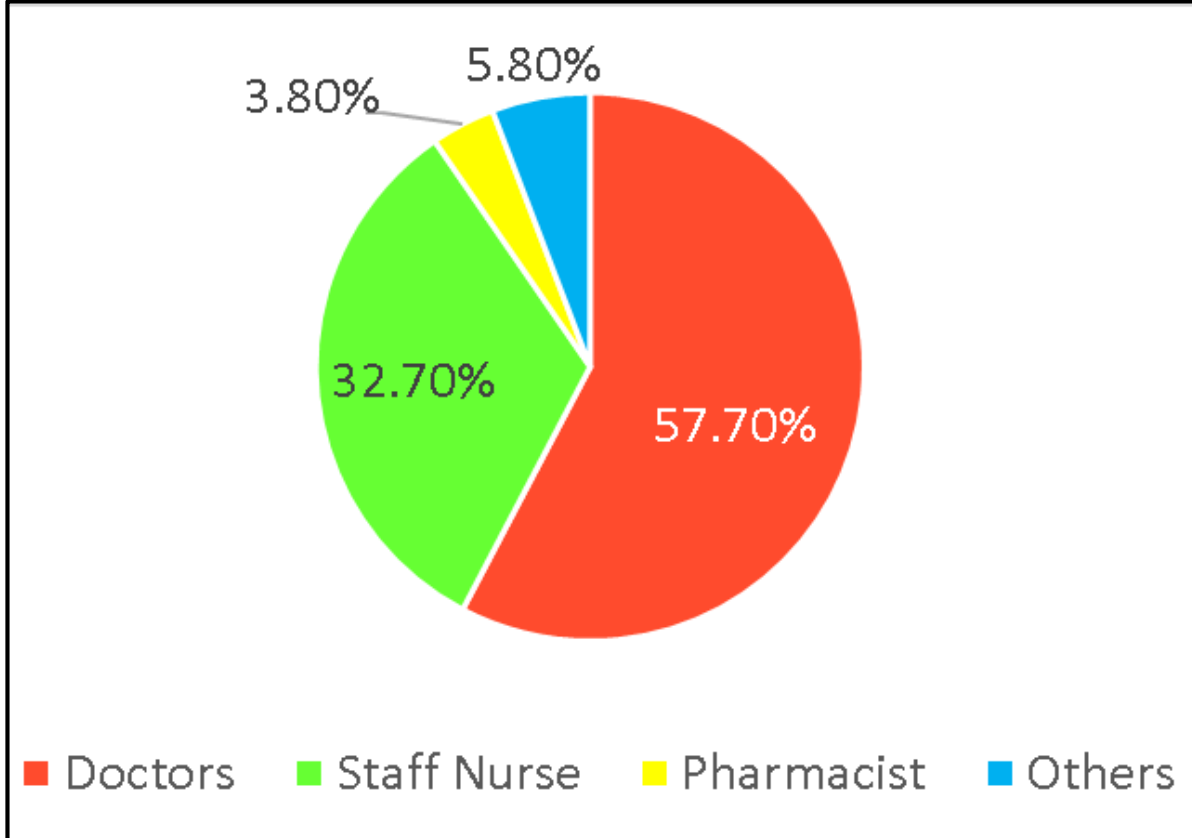


Figure 3: Distribution of SE through the Week

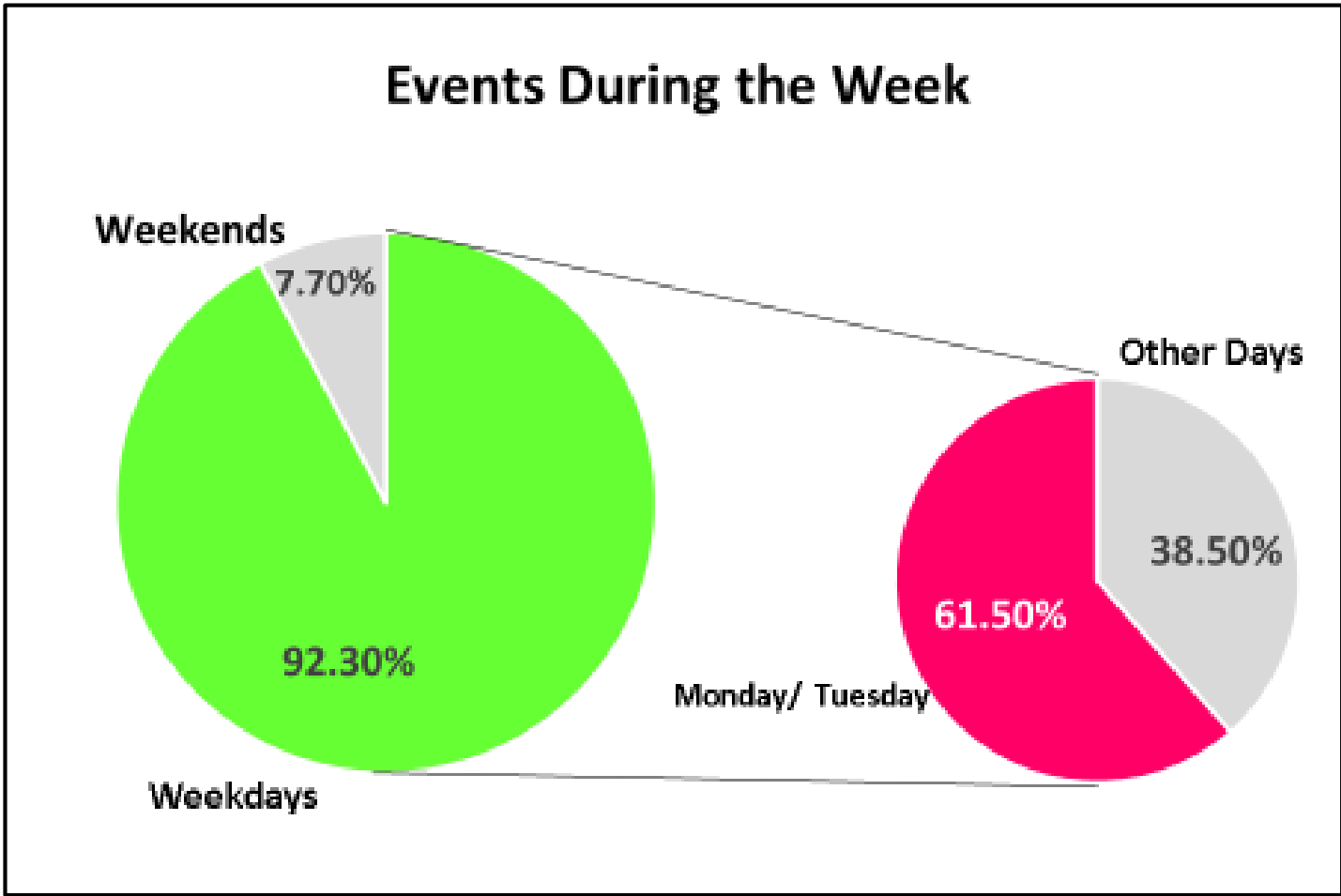
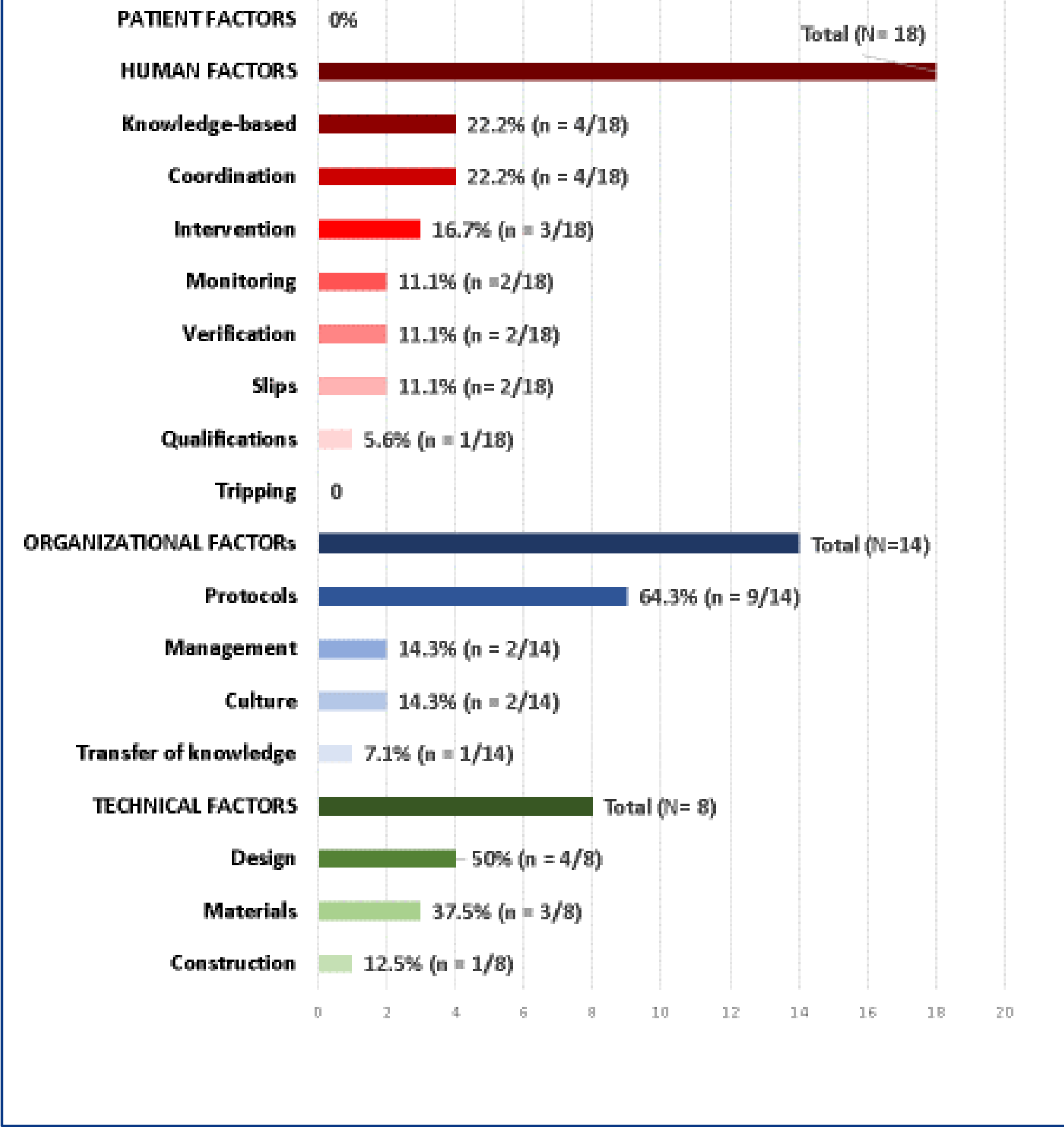


Table 1: Description of the main and subcategories of the Eindhoven Classification Model

Main Category	Subcategory	Description
Human	Knowledge-based behaviour	The inability of an individual to apply their existing knowledge to a novel situation. Example: a trained blood bank technologist who is unable to solve a complex antibody identification problem.
	Coordination	A lack of task coordination within a healthcare team in an organization. Example: an essential task not being performed because everyone thought that someone else had completed the task.
	Intervention	Failures that result from faulty task planning and execution. Example: washing red cells by the same protocol as platelets.
	Monitoring	Monitoring a process or patient status. Example: a trained technologist operating an automated instrument and not realizing that a pipette dispenses reagents is clogged.
	Verification	The correct and complete assessment of a situation including related conditions of the patient and materials to be used before starting the intervention. Example: failure to correctly identify a patient by checking the wristband.
	Slips	Failures in the performance of highly developed skills. Example: a technologist adding drops of reagents to a row of test tubes and then missing the tube or a computer entry error.
	Qualifications	The incorrect fit between an individual training or education and a particular task. Example: expecting a technician to solve the same type of difficult problems as a technologist.
	Tripping	Failures in whole body movements. These errors are often referred to as 'slipping, tripping, or falling'. Examples: a blood bag slipping out of one's hands and breaking or tripping over a loose tile on the floor.
Organizational	Protocols	Failures relating to the quality and availability of the protocols within the department (too complicated, inaccurate, unrealistic, absent, or poorly presented).
	Management priorities	Internal management decisions in which safety is relegated to an inferior position when faced with conflicting demands or objectives. This is a conflict between production needs and safety. Example: decisions that are made about staffing levels.
	Culture	Failures resulting from the collective approach and its attendant modes of behavior to risks in the investigating organization.
	Transfer of knowledge	Failures resulting from inadequate measures taken to ensure that situational or domain-specific knowledge or information is transferred to all new or inexperienced staff.
Technical	Design	Failures due to poor design of equipment, software, labels or forms
	Materials	Material defects not classified under TD or TC.
	Construction	Correct design, which was not constructed properly or was set up in inaccessible areas.
Patient-related	Patient-related factor	Failures related to patient characteristics or conditions, which are beyond the control of staff and influence treatment.

Figure 4: Aggregation of Root Cause



CONCLUSIONS

Based on this data, the organization focused its efforts on improving multidisciplinary care on surgical and procedural patients by focusing on Operating Theatre protocols, coordination of care and improving staff knowledge. The data also highlighted that high workload affects patient safety as reflected on the SEs occurring on the busiest times and days of the week. The organization can take proactive steps to improve access and availability of protocols to staff and focus on design improvement to reduce human factor related errors.

Grouping variables of SEs and factors contributing to failure via RCA, can provide a clearer understanding of the vulnerabilities in a healthcare system. Therefore, improvements can be specific on closing the gaps throughout the organization.

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