

Full Length Research Paper

Nursing related safety incidents reported in Abu Dhabi Health Services Company (SEHA) during COVID-19 pandemic: Mixed method approach

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Safety incidents in healthcare may be inevitable, especially during a pandemic of highly infectious diseases. However, their frequency can be decreased with a focused study and mitigation strategies. A limited number of studies have been conducted to explore safety incidents during COVID-19. This study is a retrospective analytical and descriptive discussion of the top 4 incident types that affected the safety environment in Abu Dhabi Health Services Company (SEHA). The identified areas are staff exposure, care coordination, lab-related issues, and staffing. Safety incident reports were reviewed from January to June 2020 to understand the contributing factors. Results showed that the majority of incidents that occurred during the COVID-19 pandemic did not cause significant harm to patients or individuals involved. More than half of the safety incidents reached individuals with infectious disease exposure as the highest number of incidents. Communication, infectious disease precautions, gaps in practice, and documentation were found to be the highest contributing factors to these incidents. The implemented improvement actions include amended or developed processes and staff education. This study can be used as a baseline for further exploration of the pandemic's effect on the patient care environment and to improve preparedness and handling of pandemics worldwide.

Key words: Safety incidents, harm, pandemic, healthcare, COVID 19.

INTRODUCTION

The UAE, like many other parts of the world, was affected by the spread of the COVID-19 pandemic. This crisis has

affected usual operations in healthcare facilities across the country, including the Abu Dhabi Health Services

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Company (SEHA), which is the leading healthcare system in the UAE and runs an integrated healthcare delivery system in the Emirate of Abu Dhabi. SEHA healthcare facilities are equipped with an Emergency Operation Plan that regulates different levels of actions during crisis situations. One of the usual activities that these facilities follow is incident reporting. The Agency for Healthcare Research and Quality (AHRQ) defines a safety incident as "any unusual action that actually or potentially compromises the safety of individuals in contact with the healthcare system" (AHRQ, 2016). AHRQ developed a comprehensive safety incident reporting system known as Safety Intelligence to capture safety issues that arise in the healthcare system and track action planning to mitigate these issues. SEHA is contracted with AHRQ to use the Safety Intelligence system in its facilities.

During the COVID-19 pandemic, safety incident reporting continued in all SEHA facilities, and the usual process was followed. Hence, there emerged a need to cross-learn from other sister facilities about strategies and challenges faced during this time. The SEHA Corporate Nursing Division created a task force to carry the responsibility of following, analyzing, and mitigating safety incidents across SEHA facilities. The task force was formed by the nursing performance and clinical practice teams and meets on a daily basis to discuss incidents from the previous day. Over 1911 incidents were discussed, and actions were taken based on the nature of each individual incident. The team found that this activity is very helpful in improving patient safety, and a need emerged to conduct a collective analysis of all nursing-related safety incidents during the COVID-19 pandemic.

The use of safety incident reporting systems to identify and mitigate risks in healthcare has been a priority for decades (Pham et al., 2013). Yet, most reporting systems are still new and focus mainly on reporting events without finding ways to mitigate these safety issues (Leistikow et al., 2017). This study aims to analyze the high volume of incidents that occurred during the COVID-19 pandemic. This is the first SEHA study of its kind and the first in the country to measure pandemic-related incidents across an integrated healthcare delivery system. Furthermore, literature showed a very limited number of studies to uncover such phenomena. Therefore, this study will be a valuable addition to the body of knowledge on how to deal with the pandemic in the country and globally.

LITERATURE REVIEW

The literature review discusses four themes related to incidents during the COVID-19 pandemic: Exposure, Care Coordination, Lab, and Staff.

Exposure

Exposure is one of the significant themes related to

COVID-19 and healthcare providers. The World Health Organization (WHO) reported that the virus is transmitted through close contact and droplets, and airborne transmission can occur during aerosol generating procedures and support treatments (WHO, 2020). These different modes of transmission have led to a high number of healthcare staff becoming infected with the virus. Studies conducted by Jackson et al. (2020) in the USA and Ehrlich et al. (2020) in Italy have reported an increase in healthcare providers confirmed with COVID-19.

One of the reasons for the increase in staff exposure is the frequent and rapid updating of policies and guidelines by the CDC and WHO. This has caused confusion for nurses as to which infection control guidelines to follow (Fernandez et al., 2020). To address this, some countries have classified healthcare providers' jobs into categories to limit exposure. The Occupational Safety and Health Administration of USA Government has divided job tasks into four risk exposure levels: very high, high, medium, and lower risk (OSH USAGov, 2020).

Studies by Mahmood and Mahmood (2020) and Daly et al. (2020) have focused on the protection of frontline health workers dealing with COVID-19. Mahmood and Mahmood (2020) found that healthcare staff believe that personal protective equipment (PPE), including medical masks, respirators, gloves, gowns, and eye protection, must be prioritized for healthcare workers and others caring for COVID-19 patients. However, healthcare organizations are affected by the global PPE shortage, and strategies need to be implemented to ensure optimal PPE availability, including minimizing the need for PPE in healthcare settings. Daly et al. (2020) concluded that the lack of access to PPE, lack of training, and workforce shortages have contributed to healthcare workers' exposure. In order to address this, the CDC and WHO have published guidelines on cleaning and disinfection protocols, social distancing, and wellness screenings (WHO, 2020).

Care coordination

The COVID-19 pandemic has brought about significant challenges in care coordination, as stated in a report by Relias Media. One of the major issues is the difficulty of finding community resources for elderly patients who are struggling, especially in areas where services have been closed down or access to services is restricted due to the pandemic. Dichter (2014) identified that system-level planning is crucial in providing care for critically ill patients during a disaster or pandemic, which confirms the findings of the report.

Kang et al. (2020) suggested that government and healthcare systems should sustain response strategies for care coordination during the pandemic, including tracking cases, finding exposed individuals, coordinating case assignments with healthcare facilities, and selective clinic screenings for visitors entering hospitals with

mandatory mask wearing. Zou et al. (2020) added that multi- sectoral coordination, proactive contact tracing and testing, timely isolation and treatment, hospital infection control, effective community management, and prompt information dissemination are key actions towards containing the epidemic and reassuring citizens.

Nacoti et al. (2020) highlighted that patient-centered care is inadequate during a pandemic and should be replaced by community-centered care, with solutions required for the entire population and not just hospitals. Hick and Biddinger (2020) suggested that major disasters and pandemics require more sustained and systematic decisions, and hospitals should develop a process for decision making, anticipate resource shortages, and involve clinical staff in developing strategies to address a wide range of impacts.

Lab

Additionally, the pandemic has placed a significant strain on the laboratory supply chain, with shortages of reagents, swabs, and other materials required for testing. This has led to delays in testing and challenges in maintaining an adequate supply of testing materials (Pfefferbaum and North, 2020).

In response to these challenges, laboratory professionals have been working to adapt and develop new testing methods to increase the availability and accuracy of testing. This includes the use of rapid antigen tests, which can provide results in a matter of minutes, and the development of new PCR-based tests that can detect multiple viruses simultaneously (Broughton et al., 2020).

Furthermore, laboratory staff have had to adapt to new safety protocols and procedures to minimize the risk of COVID-19 transmission. This includes the use of appropriate personal protective equipment (PPE), regular cleaning and disinfection of laboratory surfaces, and adherence to social distancing guidelines within the laboratory setting (CDC, 2020).

Overall, the COVID-19 pandemic has highlighted the importance of laboratory safety and the critical role that laboratory professionals play in detecting and responding to infectious disease outbreaks. It has also highlighted the need for ongoing investment in laboratory infrastructure and supply chain management to ensure that laboratory testing remains a reliable and effective tool for disease surveillance and control.

Staff

The wellness and safety of healthcare workers have been extensively studied in the literature. It is a priority for healthcare organizations to ensure these aspects. Dewey et al. (2020) recommended emphasizing clinician

wellness during the COVID-19 pandemic to enable them to provide high-quality care. They proposed some preliminary, common-sense steps towards this goal and encouraged colleagues to share successful strategies. This recommendation is complemented by another conclusion of Bielicki et al. (2020), stating that meeting the wellness needs of clinicians may determine how well we survive the COVID-19 pandemic and future public health crises.

One of the first impacts that healthcare staff may face is physical and psychological. De Pabloa et al. (2020) highlighted that SARS/MERS/COVID-19 has a substantial impact on the physical and mental health of healthcare staff. Healthcare staff may not recognize the risk in the middle of the battle with the pandemic. Furthermore, factors such as lack of personal protective equipment, high working pressure, and suboptimal training/confidence when working in extreme circumstances affect healthcare staff exposure realization (Zaka et al., 2020).

Kisely et al. (2020) conducted a study to compare healthcare staff at high and low risk of exposure in contact with affected patients. They found that staff who are exposed have greater levels of both acute or post-traumatic stress and psychological distress. They recommended effective interventions to help mitigate the psychological distress experienced by staff caring for patients in an emerging disease outbreak. Zaka et al. (2020) reported that this effect on healthcare staff would affect the care quality and safety provided to patients. They also highlighted that newly recruited healthcare workers involved in the reorganization of healthcare systems require specific psychological support to manage stressful situations that may occur to improve patient care and safety.

Nursing staff are in direct contact with patients at all levels. Recently, some studies have focused on creating a safe work environment for nurses during the pandemic. Ahmed et al. (2020) suggested that leaders should work to create a more open and engaging environment for nurses.

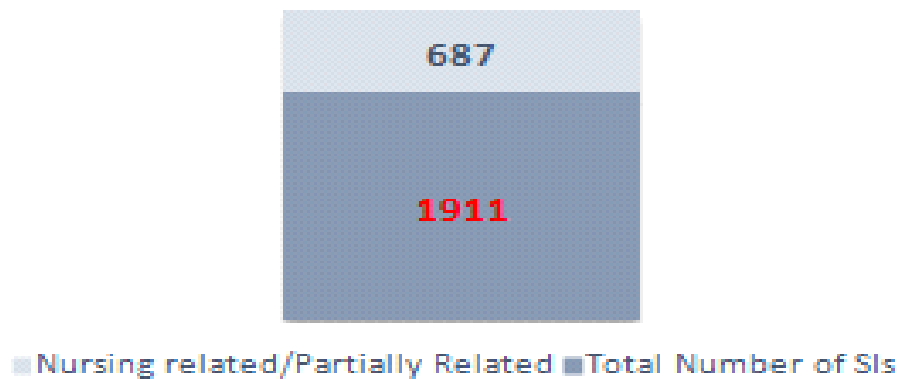
This, in turn, helps improve employees' focus and engagement while reducing psychological distress. These results affirm past research on the influence of positive leadership styles in reducing the psychological distress of respondents who experienced traumatic events.

RESULTS

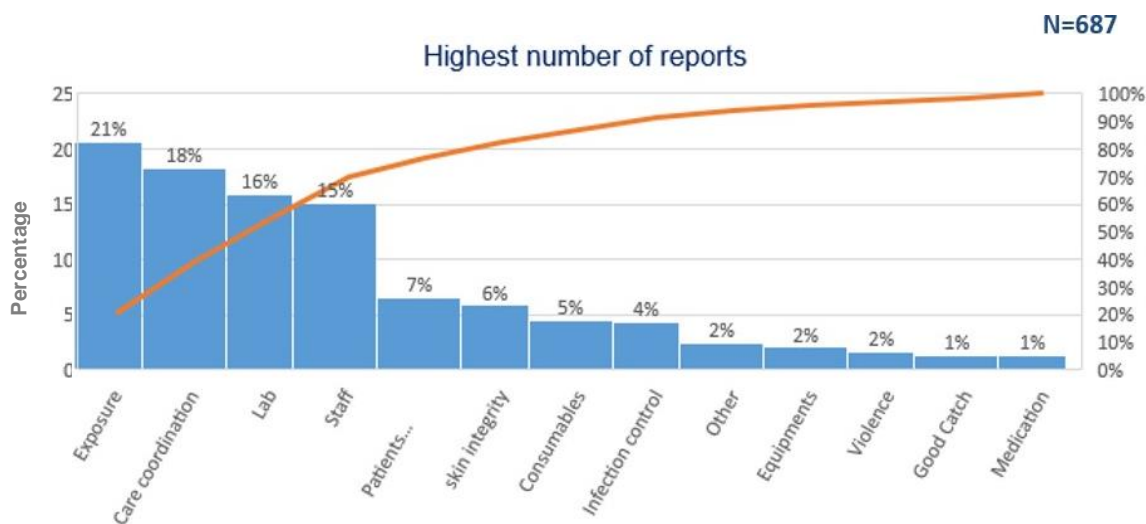
For the period from January to June 2020 when the COVID-19 Pandemic hit UAE, 1911 incident reports were filed in all Abu Dhabi Health Services Company (SEHA) Health Care Facilities. There were 687 (63%) of these reports nursing related shown in Graph 1.

The Pareto principle was used to analyze the nursing-related incident reports, and it was found that the highest

COVID-19 related Incident Reports in SEHA Facilities (Jan-Jun 2020)



Graph 1. COVID-19 related incident reports in SEHA facilities (Jan-Jun 2020).



Graph 2. Top 4 types of incidents under study.

number of reports was related to exposure to COVID-19, with 142 reports (21%), while the lowest number of reports was related to medication, with only 9 reports (1%). The top four categories of incident reports were Exposure (142 reports, 21%), Care Coordination (126 reports, 18%), Lab related (109 reports, 16%), and Staff related (104 reports, 15%). In total, these categories accounted for 481 incident reports shown in Graph 2.

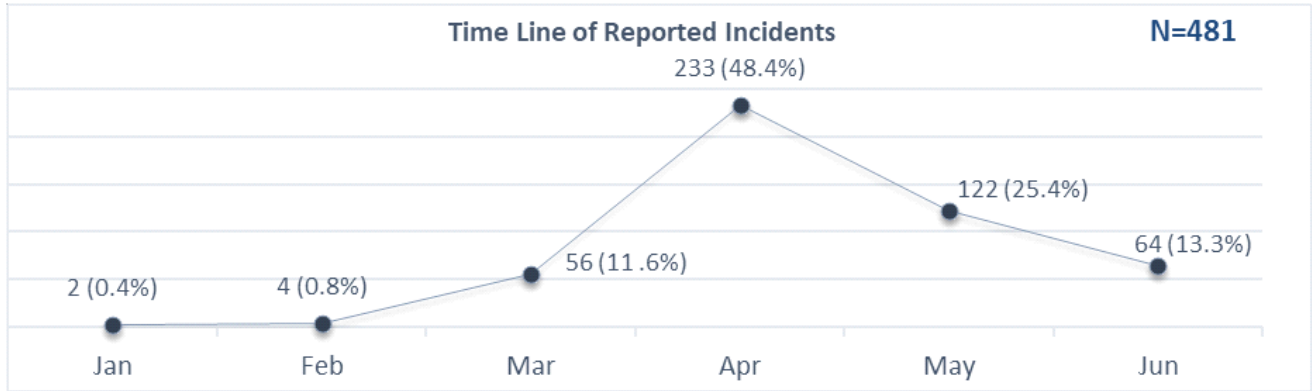
The top four incident numbers are 481. These incidents occurred between January 2020 (2 incidents, representing 0.4% of the total) and June 2020 (64 reports, representing 13.3% of the total). The peak of these incidents happened in April 2020, with 233 reports (48.8%

of the total). A timeline of the highest incidents is shown in Graph 3.

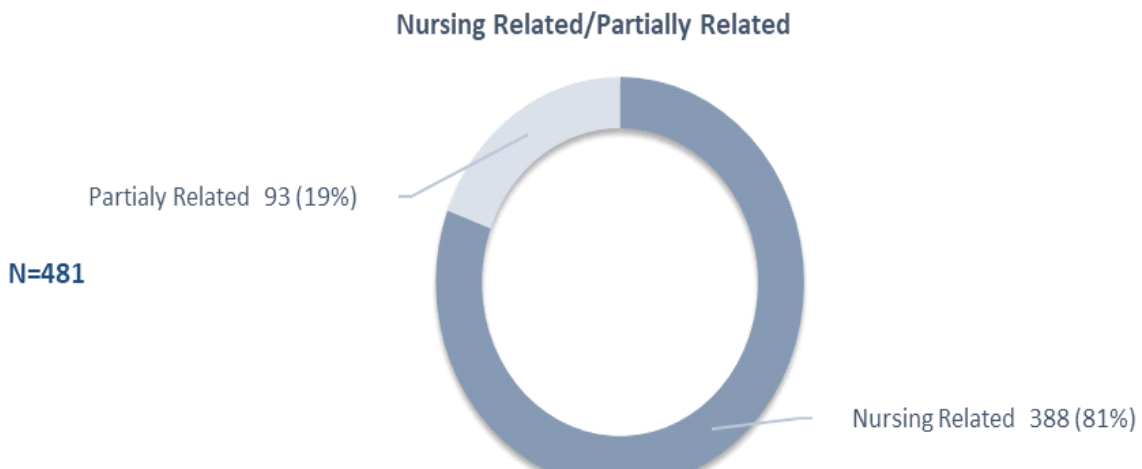
The highest number of reports was studied to determine their nursing-related and partially related causes. Out of 481 reports, 388 (81%) were found to be directly related to nursing practices, while the remaining 93 (19%) were found to be partially related. This information is illustrated in Graph 4.

The 481 incidents occurred within 9 healthcare facilities as shown in Graph 5.

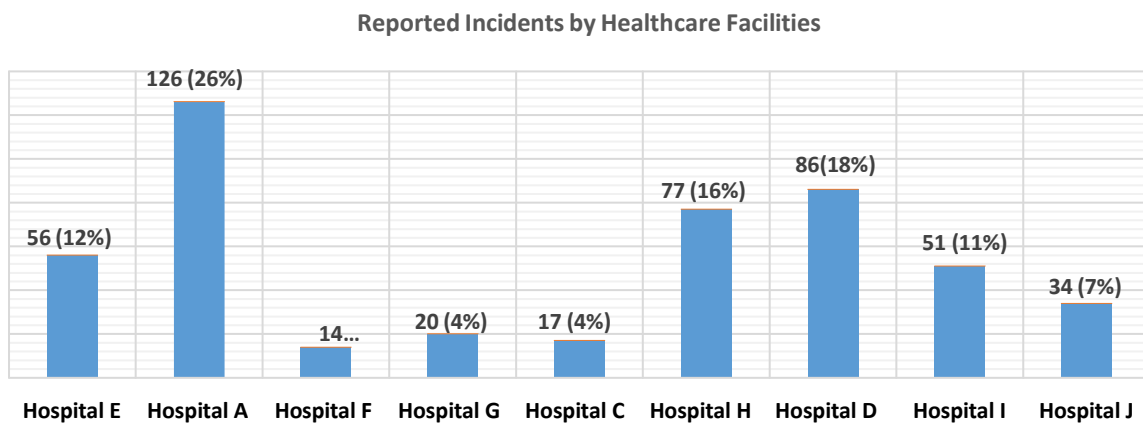
The extent of harm varied from Near Miss to Harm Caused. 216 (44.9%) incidents were near misses, 263 (54.7%) reached the individual and 2 (0.4%) only caused



Graph 3. Time line of reported incidents.



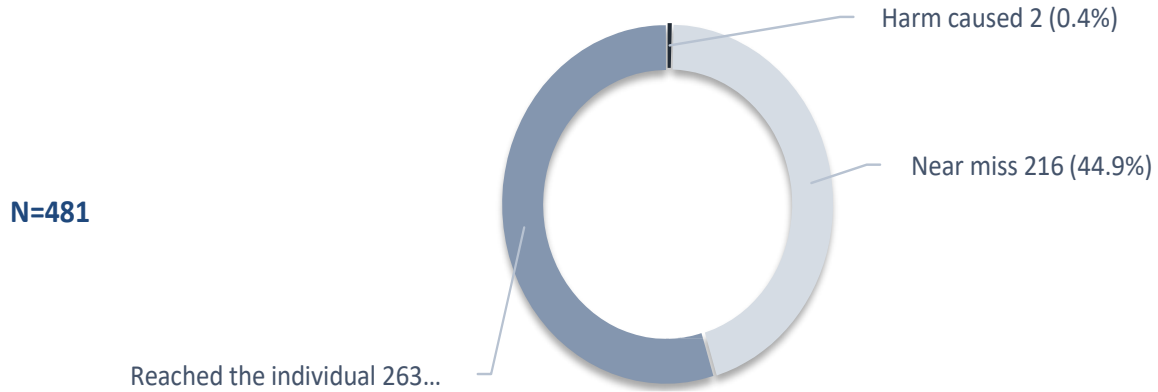
Graph 4. Nursing related/partially related.



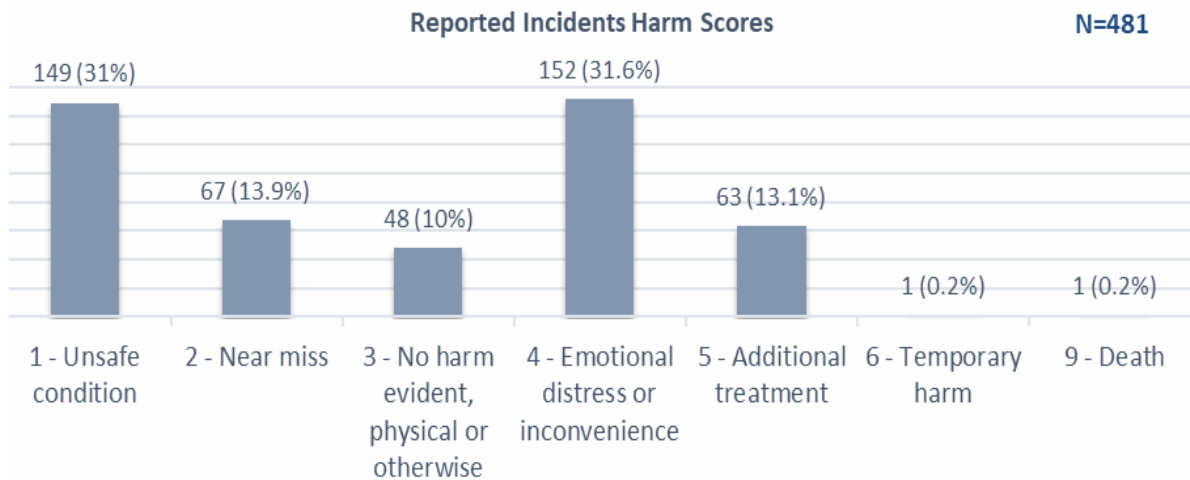
Graph 5. Reported incidents by healthcare facility.

harm (Graph 6).
 Incidents scored classification is shown in Graph 7. The

481 incidents affected patients (202 (42%), staff 168 (34.9%) and 111 incidents (23.1%) labeled as unsafe



Graph 6. Extend of harm caused.



Graph 7. Reported incidents harm scores.

condition or improvement (Graph 8).

Number of incidents based on categories was distributed as per their reflection on the extent of the harm as shown in Graph 9.

A distribution of healthcare facilities reports by who is affected by the incident as detailed in Graph 12.

The 481 incident reports were analyzed by studying the write-up of each report. The highest five themes identified in these descriptions were related to staff COVID-19 positive (104 incidents), communication (103 incidents), infection precautions (72 incidents), improper sample handling (49 incidents), and uncoordinated patient admission (46 incidents), as shown in Graph 13.

Details of all themes identified in the analysis of incidents description are illustrated in Table 1.

Analysis of the 620 actions taken showed that 85 of them focused on process flow improvement, 73 on staff education, 66 on stress management strategies, 65 on communication improvement, and 61 on improving staff

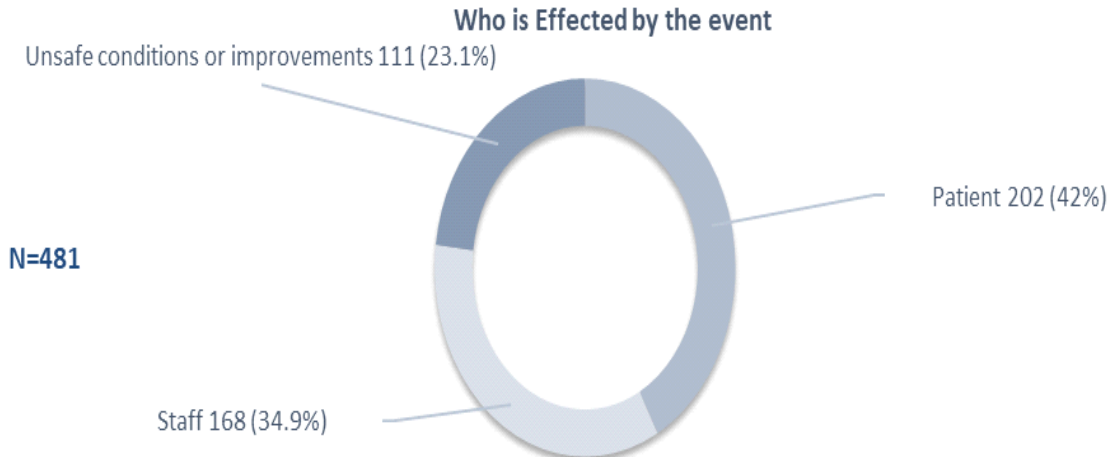
compliance.

Details of all actions taken in response of these incidents reports illustrated in Table 2.

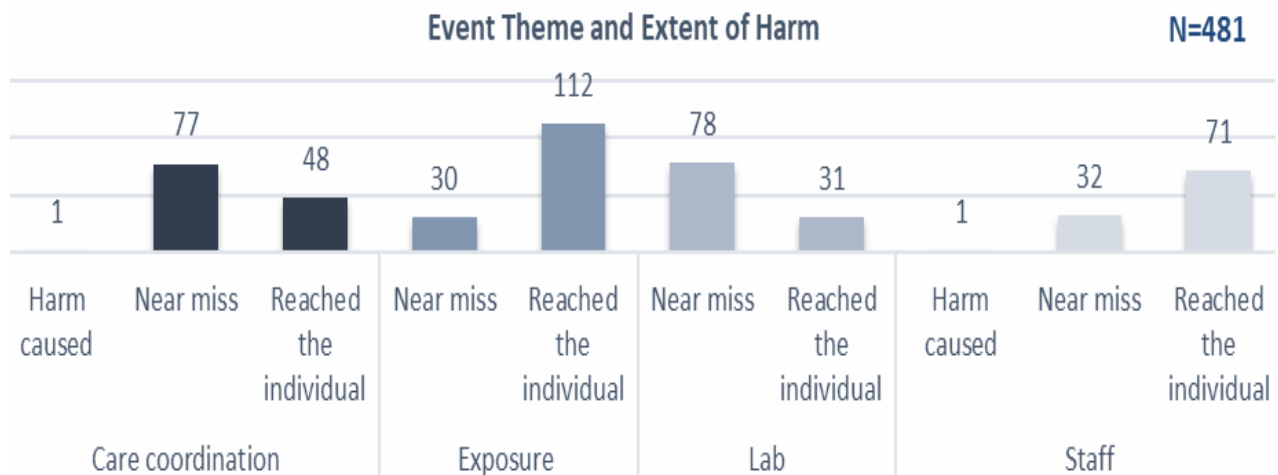
DISCUSSION

The number of COVID-19-related incidents reported during the peak of the pandemic in SEHA healthcare facilities was 1911. When compared with the number of reports before the pandemic, there was an increase in incident reporting. Although there is limited literature to support an increase in incident reporting during pandemics, SEHA facilities showed improvement in reporting in the previous three years, reflecting an enhancement in the safety culture of these facilities.

The majority of the safety incidents reported were by nursing staff, indicating a strong reporting culture among this profession. Previous studies have highlighted that the



Graph 8. Who is affected by the event.



Graph 9. Details of events themes harm score study and themes distributed by healthcare facility.

reporting culture among nurses still needs improvement (Chiang et al., 2019; Gurková et al., 2020; Harsul et al., 2020). SEHA nurses were found to be the highest reporters of safety incidents according to the data analysis in this study.

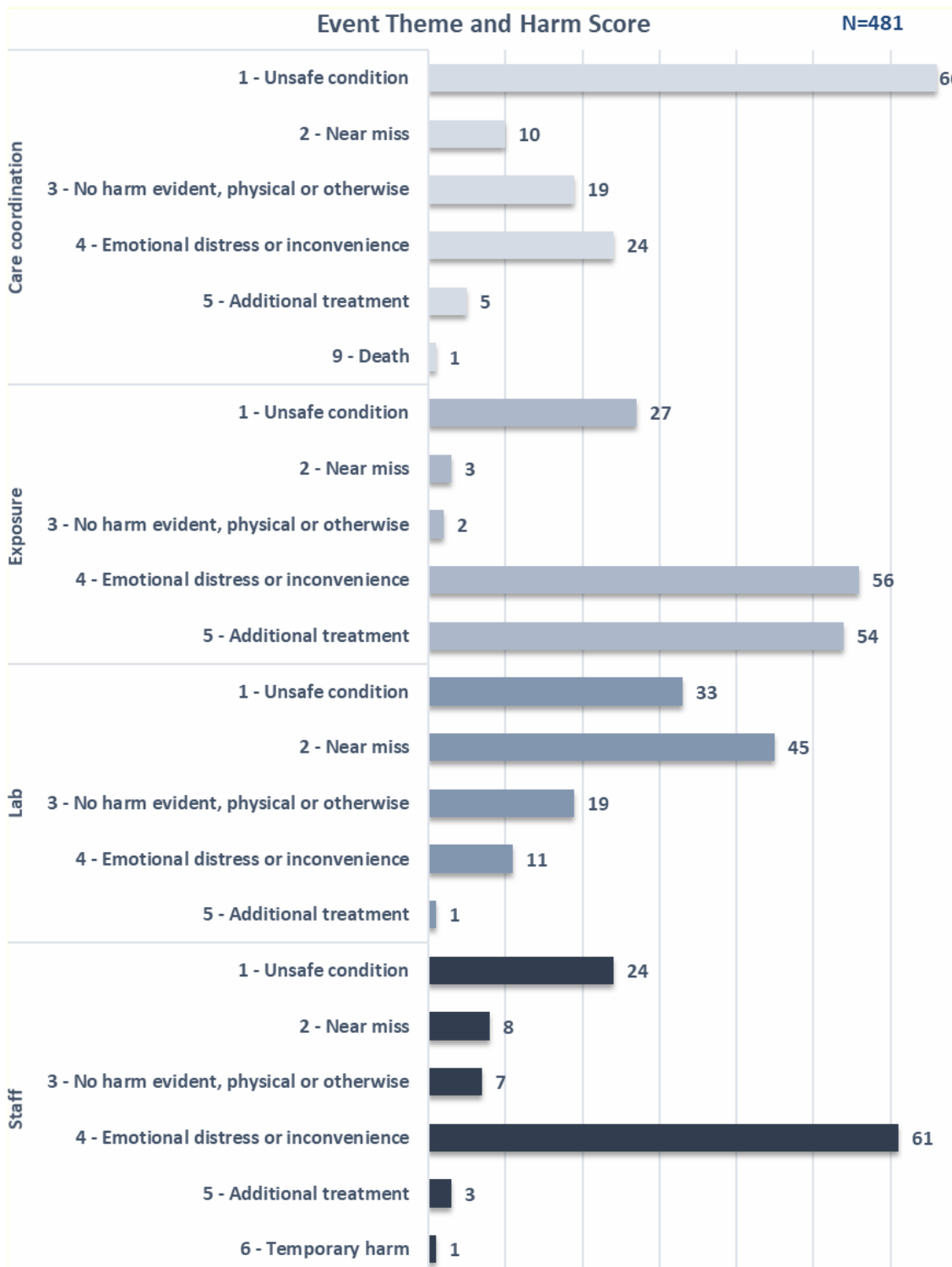
Further research on this topic can explore the factors behind nurses' strong engagement in patient safety in SEHA healthcare facilities.

The final report shows that 63% of the safety incidents reported are related or partially related to nursing practices. This number may be high due to the amount of time nurses spend in direct care. Nurses spend the lowest hours per patient day in direct patient care in general wards (6.5 h) and the highest in intensive care units (22 h). It is reasonable to assume that nurses are the highest reporters of safety incidents due to their time spent in direct patient care, which is supported by evidence (Min and Scott, 2016; Chang et al., 2017;

Giannasi and Rudman, 2018).

Staff exposure was the highest safety incident reported among SEHA facilities (21% of the nursing-related incidents). Despite the fact that the literature review showed that exposure is highly likely to occur during a pandemic, an intensive analysis of the exposure incidents revealed that a good proportion of these incidents were not actual exposures. This finding indicates a need for intensive education on pandemic exposure. Since COVID-19 is a new phenomenon that hospital staff have not experienced before, it is expected to have incident reports that are not actual exposures. An area for improvement has been identified for line managers and quality professionals to match the description and event type with the latest recommendations to rename these reports to the appropriate type (Graph 10,11).

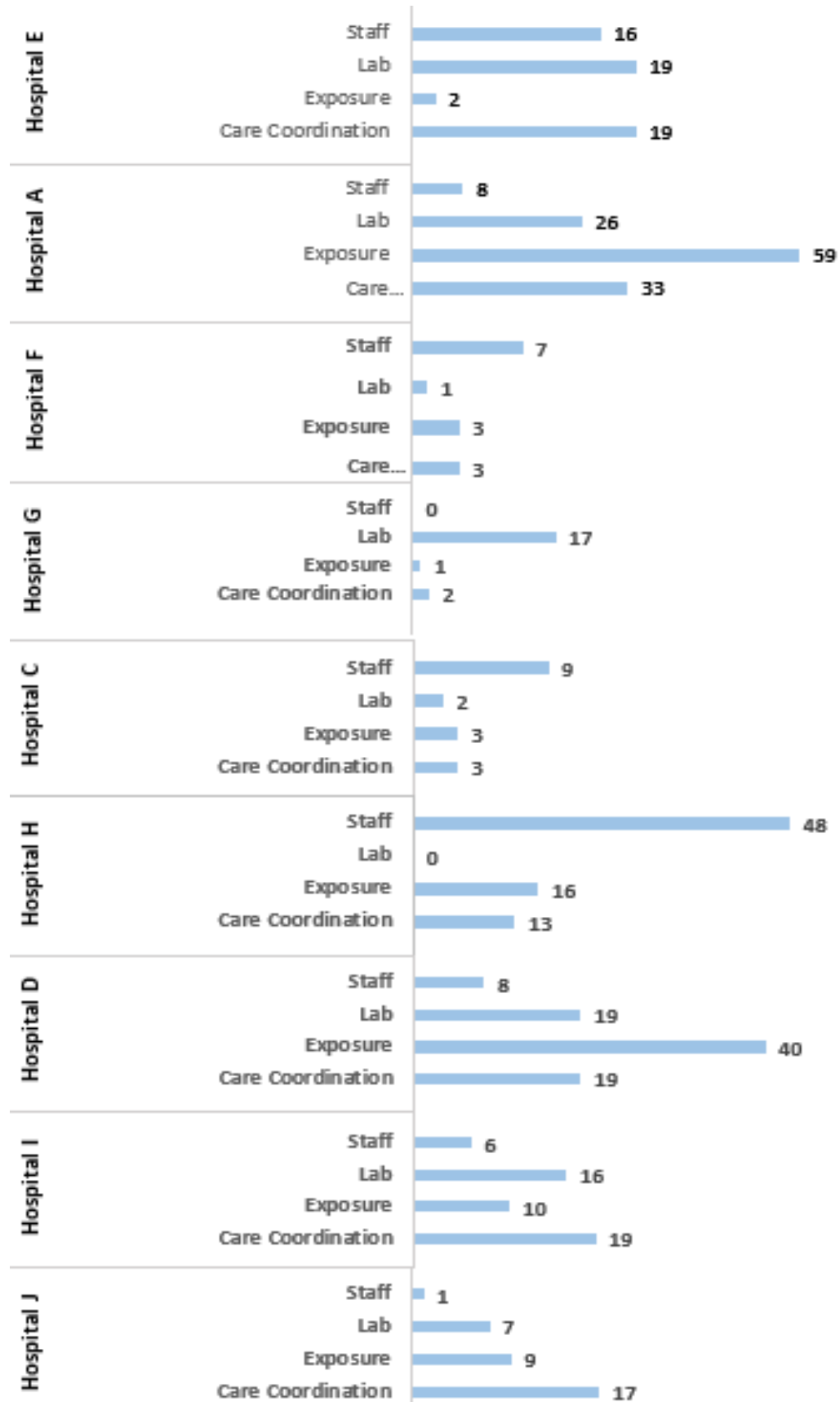
The second-highest number of incidents reported is care coordination (18% of the incidents shortlisted). Care



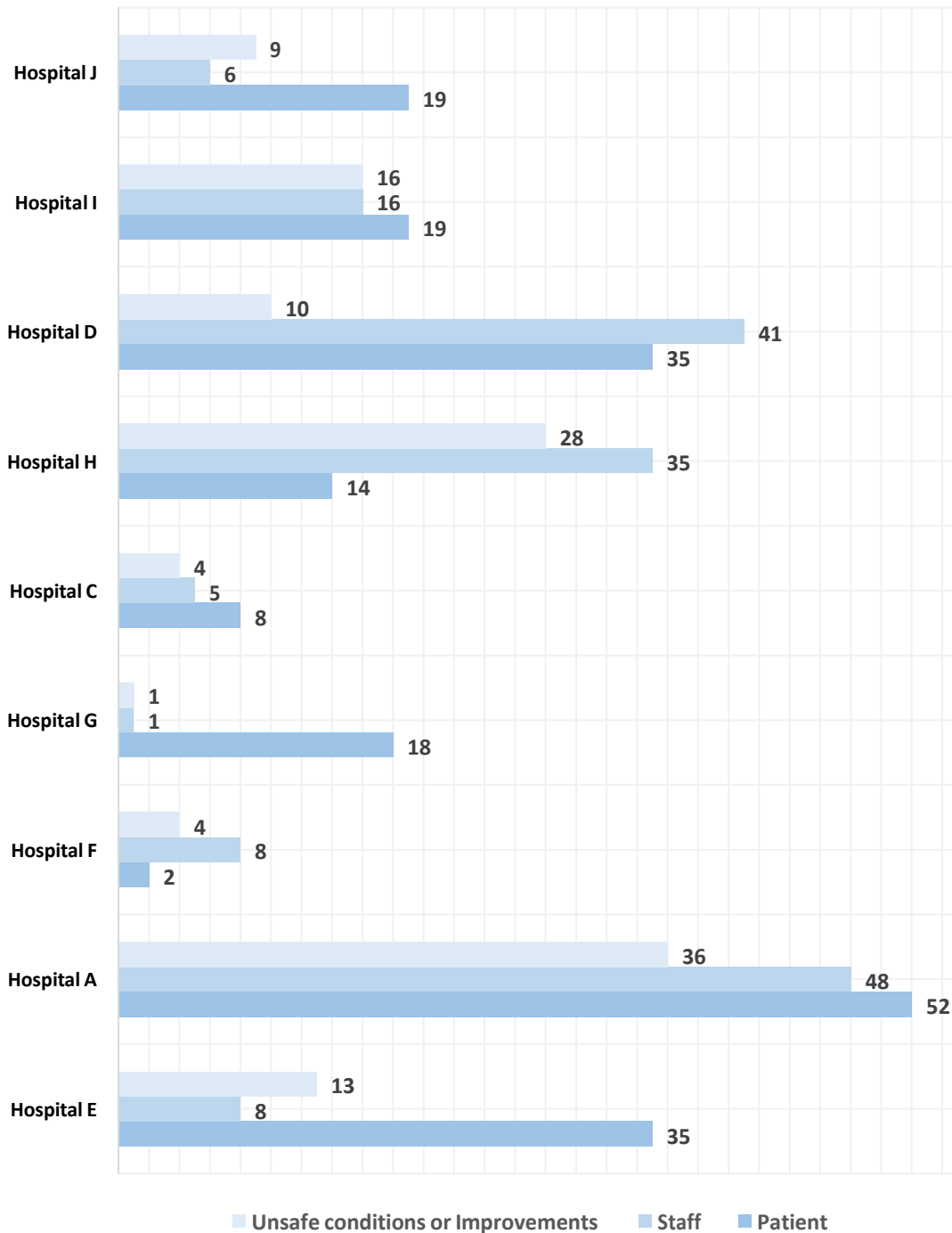
Graph 10. Event theme and harm score.

coordination incidents are divided into two major categories: patient transfer to the healthcare facility and inter-facility patient transfer. This large number of incidents prompts SEHA facilities to find strategies to

facilitate the patient journey in a more effective way. An intensive analysis of the action plans of the care coordination incidents resulted in identifying surge capacity and rapid constant changes as the most contributing



Graph 11. Event theme and healthcare facility.



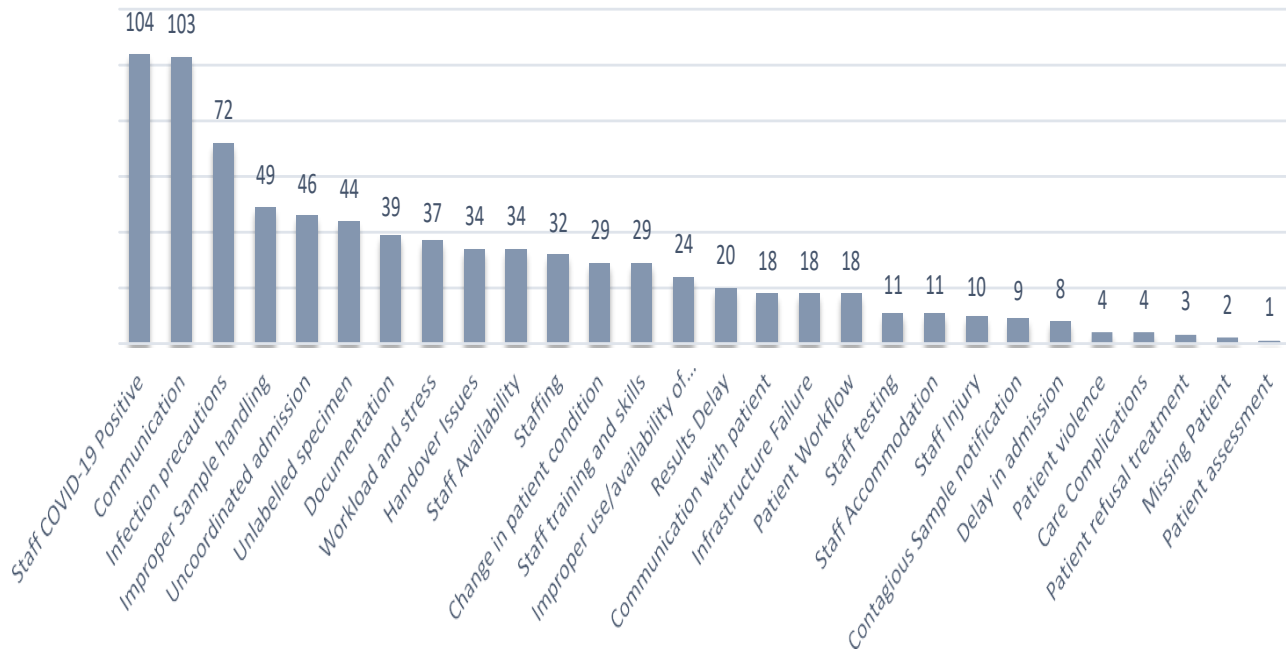
Graph 12. Who is affected by the event in healthcare facilities.

factors to the breakdown in communication during this process.

Lab-related safety incidents are the third-highest type of reports shortlisted to be studied in this study (16%). Despite the fact that SEHA facilities have solid guidelines and procedures to handle lab testing starting from sample collection to results review, a big number of errors were

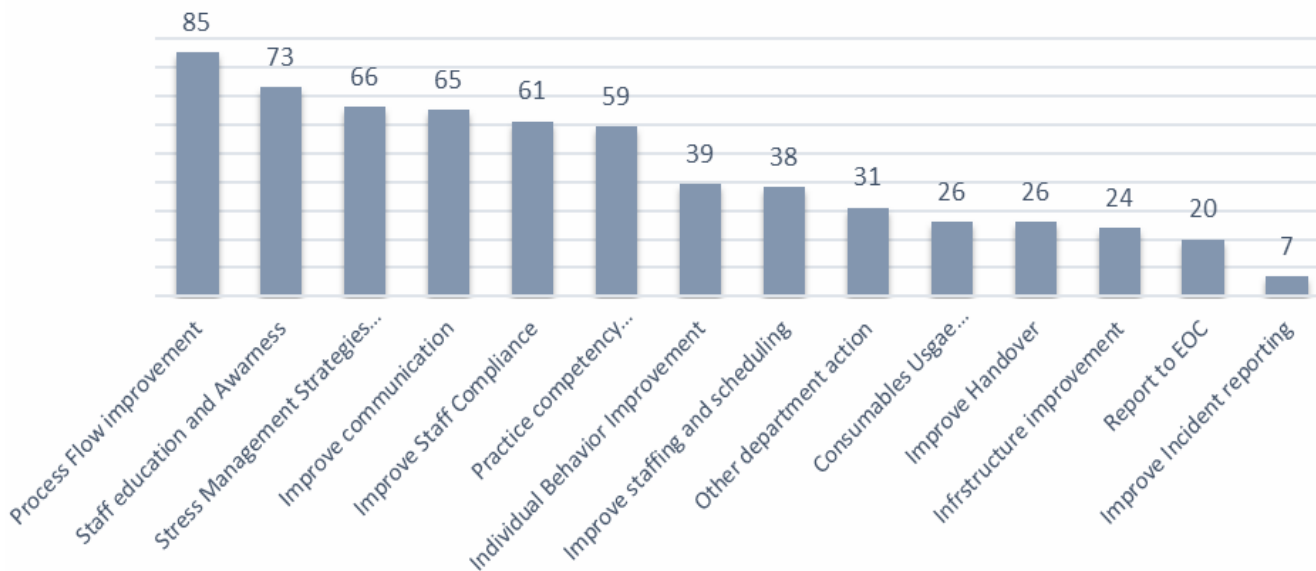
reported in this practice. Wrong labeling, mislabeling, and mishandling of specimens are the highest event categories reported. Intensive analysis of contributing factors resulted in identifying workload and staff stress as the major factors that led to these errors. SEHA facilities are recommended to take this opportunity to include lab processes as an important part of surge planning for

Themes in Reports Description



Graph 13. Themes in reports description.

Themes in Reports Action Plans



Graph 14. Themes in reports action plans

pandemics, as it is one of the vital functions that need to be the most accurate Graph 14.

Staff safety incidents are the fourth-highest studied (15%). These incidents overlapped with the exposure

events type as some of the contents in this type of incidents are related to the exposure category. Knowing this fact, line managers and quality professionals are advised to review report types more thoroughly. Staffing

Table 1. Analysis of incidents description.

Theme	Number of times it is mentioned
Staff COVID-19 positive	104
Communication	103
Infection precautions	72
Improper sample handling	49
Uncoordinated admission	46
Unlabelled specimen	44
Documentation	39
Workload and stress	37
Handover Issues	34
Staff availability	34
Staffing	32
Change in patient condition	29
Staff training and skills	29
Improper use/availability of consumables	24
Results delay	20
Communication with patient	18
Infrastructure failure	18
Patient workflow	18
Staff testing	11
Staff accommodation	11
Staff Injury	10
Contagious sample notification	9
Delay in admission	8
Patient violence	4
Care complications	4
Patient refusal treatment	3
Missing patient	2
Patient assessment	1

Table 2. Action taken analysis.

Theme	Number of times it is mentioned
Process flow improvement	85
Staff education and awareness	73
Stress management strategies and staff support	66
Improve communication	65
Improve staff compliance	61
Practice competency improvement	59
Individual behavior improvement	39
Improve staffing and scheduling	38
Other department action	31
Consumables usage improvement	26
Improve handover	26
Infrastructure improvement	24
Report to EOC	20
Improve incident reporting	7

and workload are the highest categories of this type of reports. This finding is in line with the huge influx of

healthcare during the pandemic. SEHA facilities used outsourced staff to cover some of the shortages in patient

care areas. However, this was not enough to handle the workload resulting from opening new units, running field hospitals, opening quarantine facilities, and community screening.

The timeline of reported incidents reflected peak incidents during April 2020, which is the time when the biggest number of infections occurred in the UAE. The number started to decline to half in May and to a quarter during July. During this time, tertiary hospital A reported the highest number of incidents (26%), followed by tertiary hospital D (18%), and secondary hospital H (12%). This finding is very interesting as tertiary hospital A received the lowest number of COVID-19 patients among the other facilities. It is a true reflection of the strength of the culture of safety in these hospitals. Despite the fact that Hospital H was opened as a surge plan and most of the structure was made as an emergency, staff reported the third-highest number. Tertiary hospital D received the highest number of patients among SEHA facilities, yet incidents reported in this facility are in second place. Further study is recommended to explore the relation between the culture of safety, patient volumes, and the number of safety incidents reports.

The concerning results in this study are that 54% of the safety incidents reached the individual where it is expected that this number is much less (Armitage et al., 2018; Ramírez et al., 2018). A strong safety screening system is designed to capture incidents before they reach the individual, and the number of near misses should be the highest to be reported. This is not the case for the incidents reported during the COVID-19 time in SEHA. One possible explanation for this increase in the number of incidents that reached individuals is the highest number of exposure incidents, which is not the case before the pandemic. Despite the fact that a big number of incidents reached the individual, there are only two incidents out of 481 that caused harm. This result is a clear reflection that incidents that reached individuals are not serious enough to cause harm and supports the argument above of an increase in the number of exposure incidents.

These results are supported by the harm score classification of the incidents. Sixty-three incidents (13%) required additional treatment (harm score of 5 according to the incident reporting system scoring). This additional treatment ranged from simple isolation or a change in medication for the affected person to being hospitalized. The majority of the incidents were scored as either an unsafe condition or emotional distress. These results support the assumption that incident severity was very low and that there was a good culture of reporting among SEHA facilities.

Patients were the most affected population by the safety incidents, followed by staff. Staff reported 111 (23%) unsafe conditions, which is a good number of a proactive approach to identifying gaps before they become safety issues.

Looking at the distribution of incidents by healthcare facility, the results reflect that Hospital E, H, and J

reported care coordination and lab issues as the highest. Exposure was the highest to report in A, D, F, H, and C hospitals, and these hospitals reported more issues with staffing. Lab issues were the highest in Hospital G. The distribution of individuals affected by the incidents shows that F, H, and D hospitals reported staff affected the most, whereas other hospitals reported patients as being the highest affected group. Further study is needed to explore contributing factors to this type of distribution.

The correlation between the theme of the incident and the harm score showed that 48 incidents reached the individual in care coordination. Incident descriptions showed that these incidents reached the individual because of wrong patient placement and communication breakdown. The majority of exposure incidents reached the individual, which is expected. The other expected result is that the majority of lab incidents did not reach the individual. The highest number of staff-related incidents reached the individual, which is unexpected, as the majority of these reports are related to workload.

The description of the incident reports reflected that the highest theme was staff getting COVID-19 positive results. This finding is in line with the international increase of staff exposure to the pandemic. However, more work should be done as part of actions to improve infection precaution protocols. The communication theme was the next highest mentioned in the description of incidents. This finding is compatible with literature reviews that confirm communication as one of the highest reasons for healthcare incidents. Infection precautions were the third-highest theme mentioned in the incident description. This finding supports the recommendation of having more attention to infection precautions.

SEHA healthcare facilities took corrective actions in response to the incidents reported. The highest number of actions taken was to improve process flows. This is a very positive and promising approach to dealing with safety issues in organizations. It reflects the maturity of dealing with errors on a system level and improving processes rather than targeting individuals. The next positive approach used as the highest number of actions was staff education and awareness. This approach reflects the healthcare facilities' commitment to improvement through enabling staff to perform better. As staff workload and stress are among the highest reasons for incidents, the third-highest action taken by SEHA is to provide stress management programs.

Improving communication strategies is the fourth highest action taken by SEHA facilities, which is compatible with the number of incidents reported. However, there are no clear pathways or approaches to define how this should be done.

Conclusion

SEHA healthcare facilities reported a higher number of safety incidents during the peak period of the COVID-19

pandemic in the UAE. The study found that the safety culture is strong among these facilities and a majority of the safety incidents were reported by nursing staff, reflecting a strong reporting culture within the profession. Staff exposure was the most commonly reported safety incident among SEHA facilities. An area for improvement was identified for line managers and quality professionals to match the description and event type with the latest recommendations to rename these reports appropriately.

The study identified a concern that a high number of safety incidents reached the individual, where it was expected that this number would be much less. However, only 2 incidents resulted in harm. This result is a clear reflection that incidents that reach individuals are not serious enough to cause harm and supports the argument above of an increase in the number of exposure incidents.

Patients were the most affected population by the safety incidents, followed by staff. The highest number of corrective actions taken was to improve process flows, which is a positive and promising approach to deal with safety issues in organizations. It reflects maturity in dealing with errors at a system level and improving processes rather than targeting individuals. The second highest corrective action was staff education and awareness, which reflects the healthcare facilities' commitment to improvement by enabling staff to perform better.

Recommendations

- (1) SEHA facilities may benefit from intensive education of the pandemic exposure.
- (2) SEHA facilities are recommended to take this opportunity to include lab processes as important part of surge planning for pandemics, as it is one of the vital functions that need to be the most accurate.
- (3) SEHA facilities may benefit from refresher training about safety incidents' classification, type, harm scoring and action planning.

Limitations

One of the limitations of this study is that it is solely dependent on the safety incidents reported by frontline staff. This may result in variance in reporting based on staff understanding of the situation. Another limitation of this study is the reliance on information provided by the facilities about action planning through the electronic system. The information provided does not give a complete picture of the contributing factors as not all incidents are documented properly. The third limitation is the availability of literature about the COVID-19 pandemic, as there are a limited number of studies available to explore it.

Future studies

- (1) Further study can help explore the factors behind nurses' strong engagement in patient safety in SEHA healthcare facilities.
- (2) Further study is recommended to explore the correlation between safety incident types and their relation to different healthcare facilities.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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