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Research Article

Patient safety with reference to the occurrence of adverse events in admitted patients on the basis of incident reporting in a tertiary care hospital in North India

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ABSTRACT

Background: A good quality report should lend itself for detailed analysis of the chain of events that lead to the incident. This knowledge can then be used to consider what interventions, and at what level in the chain, can prevent the incident from occurring again. Aim was to study the occurrence of adverse events on the basis of incident reporting.
Methods: Critical analysis of incident reporting of adverse events taking place in admitted patients for one year by using WHO Structured questionnaire on patient safety (RF-1 & RF-2 forms) along with their record review and interview to the concerned staff.
Results: 253 incidents of adverse events were reported during the study period of one year. Most common screening criteria being, Patient/family dissatisfaction with care received, documented or expressed during the current (221 incidents i.e. 87.35%), followed by hospital acquired infection/sepsis (29 incidents i.e. 11.46%). 13 incidents (5.13%) were reported for unexpected deaths due to adverse events. 38.9% of reported adverse events studied showed signs of health care team responsible for causing adverse events. 39% of adverse events were found preventable and 61% of adverse event was found non-preventable.
Conclusions: Incident reporting of adverse events should be encouraged in all hospitals.

Keywords: Incident reporting, Adverse events, Patient safety, Preventable

INTRODUCTION

Preventable harm to patients resulting from their healthcare is unacceptable at any time. Patient safety is first and foremost a clinical problem, but it is also an important cause of wasted resources.[1]

One of the key features of the patient safety 'movement' is the belief that safety can be improved by learning from incidents and near misses, rather than pretending they have not happened.[2] A good quality report should lend itself for detailed analysis of the chain of events that lead to the incident. This knowledge can then be used to consider what interventions, and at what level in the chain, can prevent the incident from occurring again.[3]

The objective is to study the occurrence of adverse events on the basis of incident reporting.

METHODS

A study for a period of one year in 2013 was done for incidents and complaints about adverse events happening anywhere in Sheri Kashmir Institute of Medical Sciences (SKIMS), reported by the patients themselves, or by the attendants or staff to control room SKIMS, medical superintendent office or director's office. Only inpatients were subjected to the study. The researcher visited the control room, medical superintendent office and director's office on daily basis to get the details of the patients and the adverse events reported there. The patient for whom complaint was lodged was taken as screened for having an adverse event present. To study the adverse events, a WHO structured questionnaire on patient safety consisting of Review form-1 (RF-1) and review form-2 (RF-2) was used. Medical records of the concerned patient were reviewed for all the incidents reported, along with the patient or staff interview when required. RF-1 was filled for all the incidents reported to know the number of adverse event present. A separate RF-2 form was filled for every adverse event screened.

RESULTS

A total of 253 incidents of adverse events were reported, which mainly came from general medicine (62 i.e. 24.5%) (With respect to total admission in general medicine specialty during the study period i.e. 3145, incident reported constitutes 1.97%) followed by Neurosurgery (45 i.e. 17.8%) (With respect to total admission in Neurosurgery specialty during the study period i.e. 7978, incident reported constitutes 0.56%). Incidents reported in surgical gastroenterology were 10 i.e. 4.0% of all incidents reported (With respect to total admission in surgical gastroenterology specialty during the study period i.e. 374, incident reported constitutes 2.60%). Most common age group involved was 61 & above (38.3%) with female dominance (58.1%) who came from emergency care (70.4%) and the duration of stay was 0-10 days (52.9%) (Figure 1, Table 1 & 2).

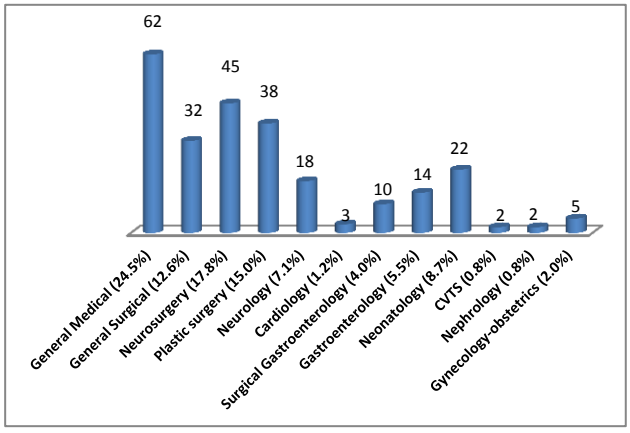

Figure 1: Percentage of incidents reported in different specialties.

Table 1: Specialty-wise incidents reported with respect to total admissions.

Specialty	Incidents reported	Specialty-wise total admissions	%
General medicine	62	3145	1.97
General surgery	32	1994	1.60
Neurosurgery	45	7978	0.56
Plastic surgery	38	2014	1.89
Neurology	18	3054	0.59
Cardiology	3	2273	0.13
Surgical gastroenterology	10	374	2.60
Gastroenterology	14	3335	0.42
Neonatology	22	2979	0.74
CVTS	2	1027	0.19
Nephrology	2	3370	0.05
Gyne-Obs	5	3243	0.15

Table 2: Profile of patients with Adverse Events by incidents reporting.

Characteristic	Variable	Frequency (n)	Percentage (%)
Age (years)	0-20	40	15.8
	21-40	47	18.6
	41-60	69	27.3
	61-above	97	38.3
Gender	Male	106	41.9
	Female	147	58.1
Type of admission	Elective admission	75	29.6
	Emergency admission	178	70.4
Duration of stay	0-10 Days	134	52.9
	11-20 days	75	29.6
	21 & above days	44	17.4

Among the total 253 incidents reported, Patient/family dissatisfaction with care received, documented or expressed during the current admission was the most common incident reported (221 incidents i.e. 87.35%). It was followed by hospital acquired infection/sepsis (29 incidents i.e. 11.46%). 13 incidents (5.13%) were reported for unexpected deaths due to adverse events (Table 3 and 4).

One screening criteria for adverse events in RF1 form was positive in 140 (55.3%) patients, two screening criteria were positive in 84 (33.2%) patients and three and more positive screening criteria for adverse events were reported in 29 (11.5%) patients (Figure 2, Table 3 & 4).

Table 3: Frequency of adverse events in incidents reported.

Questions	No.	(%)
Q1. During the last 12 months, any unplanned ward admission related to any given healthcare for the same health condition?	28	11.06
Q2. Hospital-incurred patient accident or injury?	6	2.37
Q3. Adverse drug reaction/drug error or related to administration of fluids or blood?	11	4.35
Q4. Hospital acquired infection/sepsis?	29	11.46
Q5. Unplanned removal, injury or repair of organ or structure during surgery, invasive procedure or vaginal delivery?	11	4.35
Q6. Unplanned return or visit to the operating theatre during this admission?	3	1.16
Q7. Unplanned open surgery following closed or laparoscopic surgery?	0	0
Q8. Cardiac/respiratory arrest, low APGAR score?	14	5.53
Q9. Development of neurological deficit not present on admission?	0	0
Q10. Injury or complications related to termination of pregnancy or labour and delivery including neonatal complications?	0	0
Q11. Other patient complications including MI, DVT, PE, CVA etc?	18	7.11
Q12. Patient/family dissatisfaction with care received documented or expressed during the current admission?	221	87.35
Q13. Unplanned transfer from general care to intensive care higher dependency?	3	1.16
Q14. Unplanned transfer to another acute care hospital?	0	0
Q15. Unexpected death (i.e. not an expected outcome of the disease during hospitalization)?	13	5.13
Q16. Patients care delayed or lesser treatment given because the patient was unable to pay?	21	8.3
Q17. Admission significantly prolonged compared to the expected length for this clinical condition?	5	1.98
Q18. Any other undesirable outcomes (not covered by any of the above)?	18	7.11

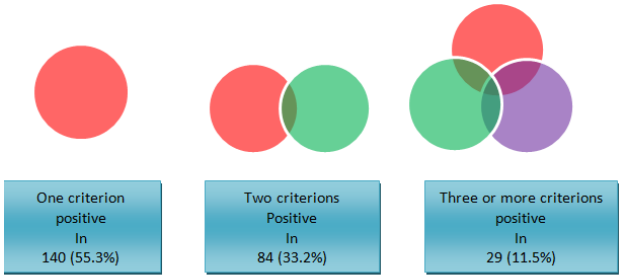

Figure 2: Number of criteria positive among incidents reported.

A total of 396 RF2 forms were filled for adverse event reported in which 103 (26.0%) were filled for general medicine and 58 (14.6%) for plastic surgery (14.6%) (Figure 3).

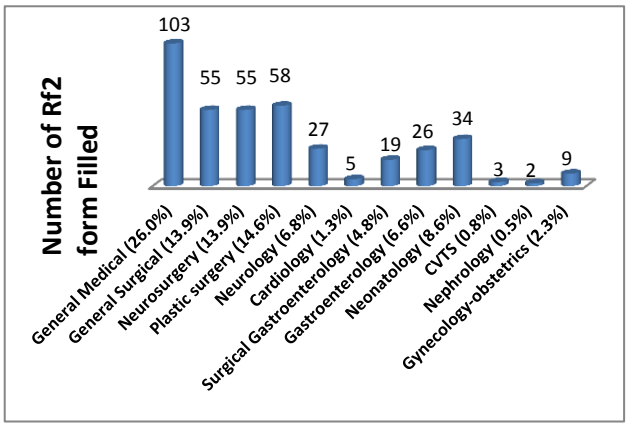

Figure 3: Specialty wise adverse events studied among incidents reported.

86.4% of incidents were reported by patient and there attendants. Only 9.1% of incidents were reported by treating physician and 7.8% incidents were reported by the nursing staff. These incidents were further studied by reviewing their medical and nursing records (Figure 4).

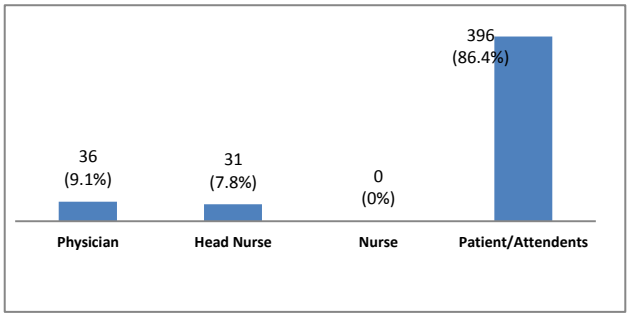

Figure 4: Source of information of incidents reported.

Table 4: Spectrum of adverse events among incidents report.

	Age (in years)				Gender		Type of admission		Duration of stay (in days)			Total
	0-20	21-40	41-60	≥61	Male	Female	Elective	Emergency	0-10	11-20	≥21	
Q1. Unplanned ward re-admission	6 (2.34%)	9 (3.51%)	7 (2.73%)	6 (2.34%)	10 (3.9%)	18 (7.02%)	12 (4.68%)	16 (6.24%)	15 (5.85%)	9 (3.51%)	4 (1.56%)	28
Q2. Hospital-incurred injury	0 (0%)	1 (0.39%)	5 (1.95%)	0 (0%)	2 (0.78%)	4 (1.56%)	2 (0.78%)	4 (1.56%)	5 (1.95 %)	1 (0.39 %)	0 (0%)	6
Q3. Adverse drug /blood reaction	6 (2.34%)	1 (0.39%)	0 (0%)	4 (1.56%)	3 (1.17%)	8 (3.12%)	2 (0.78%)	9 (3.51%)	4 (1.56%)	4 (1.56%)	3 (1.17%)	11
Q4. Hospital acquired infection	5 (1.95%)	1 (0.39%)	9 (3.51%)	14 (5.46%)	12 (4.68%)	17 (6.63%)	17 (6.63%)	12 (4.68%)	5 (1.95%)	9 (3.51%)	15 (5.85%)	29
Q5. Unplanned injury during surgery	1 (0.39%)	0 (0%)	5 (1.95%)	5 (1.95%)	6 (2.34%)	5 (1.95%)	5 (1.95%)	6 (2.34%)	4 (1.56%)	3 (1.17%)	4 (1.56%)	11
Q6. Unplanned return to the OT during this admission?	0 (0%)	3 (1.17%)	0 (0%)	0 (0%)	1 (0.39%)	2 (0.78%)	2 (0.78%)	1 (0.39%)	2 (0.78%)	1 (0.39%)	0 (0%)	3
Q7. Unplanned open surgery following closed or laparoscopic surgery	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0
Q8. Cardiac/respiratory arrest or low APGAR?	0 (0%)	5 (1.95%)	3 (1.17%)	6 (2.34%)	6 (2.34%)	8 (3.12%)	2 (0.78%)	12 (4.68%)	7 (2.73%)	5 (1.95%)	2 (0.78%)	14
Q9. Development of neurological deficit?	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0
Q10. Injury or complications related to termination of pregnancy	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0
Q11. Other complications including MI, DVT, etc	4 (1.56%)	2 (0.78%)	8 (3.12%)	4 (1.56%)	7 (2.73%)	11 (4.29%)	3 (1.17%)	15 (5.85%)	7 (2.73%)	6 (2.34%)	5 (1.95%)	18
Q12. Patient/family dissatisfaction?	33 (12.9%)	41 (15.9%)	60 (23.4%)	87 (33.9%)	93 (36.3%)	128 (49.9%)	66 (25.7%)	155 (60.4%)	116 (45.2%)	68 (26.5%)	37 (14.4%)	221
Q13. Unplanned transfer from general care to ICU	1 (0.39%)	0 (0%)	0 (0%)	2 (0.78%)	2 (0.78%)	1 (0.39%)	0 (0%)	3 (1.17%)	1 (0.39%)	1 (0.39%)	1 (0.39%)	3
Q14. Unplanned transfer to another hospital?	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0
Q15. Unexpected death	0 (0%)	4 (1.56%)	3 (1.17%)	6 (2.34%)	4 (1.56%)	9 (3.51%)	4 (1.56%)	9 (3.51%)	6 (2.34%)	5 (1.95%)	2 (0.78%)	13
Q16. Patients care delayed as unable to pay?	5 (1.95%)	3 (1.17%)	4 (1.56%)	9 (3.51%)	9 (3.51%)	12 (4.68%)	4 (1.56%)	17 (6.63%)	17 (6.63%)	3 (1.17%)	1 (0.39%)	21

Q17. Admission significantly prolonged	1 (0.39%)	2 (0.78%)	1 (0.39%)	1 (0.39%)	1 (0.39%)	4 (1.56%)	4 (1.56%)	1 (0.39%)	1 (0.39%)	1 (0.39%)	3 (1.17%)	5
Q18. Any other undesirable outcomes	2 (0.78 %)	2 (0.78 %)	6 (0.78 %)	8 (3.12 %)	3 (1.17 %)	15 (5.85 %)	4 (1.56 %)	14 (5.46%)	14 (5.46 %)	3 (1.17 %)	1 (0.39 %)	18

Out of total 396 adverse events studied through RF2 only 224 (56.6%) presented with untoward outcome with 78 (34.8%) causing admission in wards, 55 (24.6%) causing unexpected death, 64 (28.6%) causing disability at the time of discharge and 109 (48.7%) causing prolonged stay (Figure 5 and Table 5).

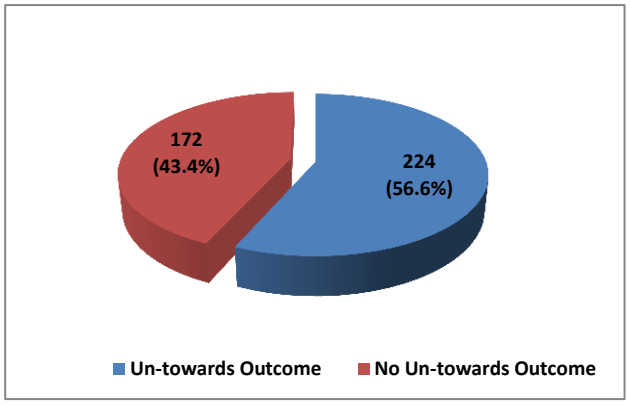

Figure 5: Adverse event presenting with untoward outcome among incidents reported.

154 (38.9%) of reported adverse events studied through RF2 form showed signs of health care team responsible for causing adverse events which could have been prevented. 102 (66.2%) of preventable events after index admission and 52 (33.8%) of preventable adverse event occurred before the index admission (Figure 6, Figure 7, Figure 8, Figure 9 & Figure 10).

Out of 154 Adverse Event showing signs of health care team responsible for causing adverse events which could have been prevented among incidents reported, 86 (55.8%) of adverse events were related to therapeutic care of patient mainly involving plastic surgery patients, followed by the 65 (42.2%) diagnostic care involving general medicine mainly (Figure 6 & Table 6).

154 (39%) of adverse events studies were found preventable and 242 (61%) of adverse event was found non-preventable. Preventability more likely than 50-50 was seen in 16.4% of adverse events. Definite certain evidence for preventability was seen in 7.6% of adverse events and virtually no evidence for preventability was seen in 24.0% of adverse events occurred. The most common confidence score of preventability came to be 1 i.e. virtually no evidence for preventability (Figure 11 & Table 7).

Table 5: Table showing implication of adverse event on untoward outcome among incidents reported.

Outcome	No.
Adverse event causing admission in ward	78 (34.8%)
Adverse event associated with death	55 (24.6%)
Adverse event associated with disability at discharge	64 (28.6%)
Adverse event associated with prolonged stay	109 (48.7%)
Total untoward out come	224

Table 6: Table showing type of care related to adverse event among incidents reported.

	Preventive & prophylaxis	Diagnostic	Therapeutic	Rehabilitation
General medical	0	16	18	0
General surgical	2	9	12	0
Neurosurgery	0	2	11	0
Plastic surgery	0	2	20	0
Neurology	1	8	3	0
Cardiology	0	2	0	0
Surgical gastroenterology	0	8	8	0
Gastroenterology	0	7	6	0
Neonatology	0	6	1	0
CVTS	0	0	3	0
Nephrology	0	0	1	0
Gynecology-obstetrics	0	5	3	0
Total	3 (1.9%)	65 (42.2%)	86 (55.8%)	0

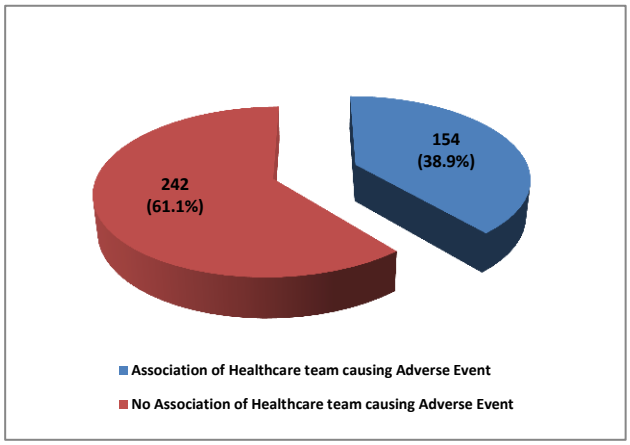

Figure 6: Cases having evidence that healthcare team caused adverse event in incidents reported.

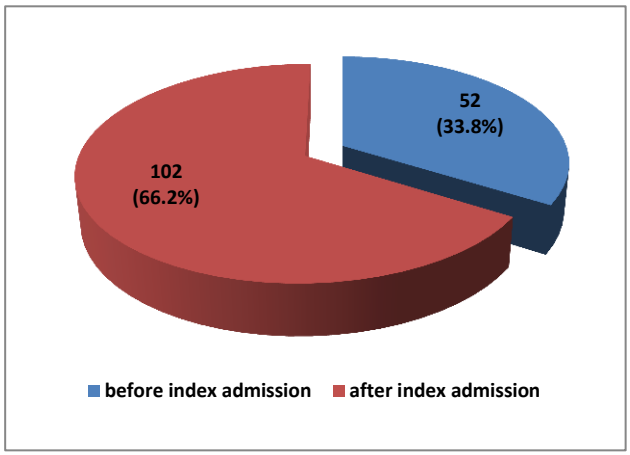

Figure 7: Location of adverse event among incidents reported.

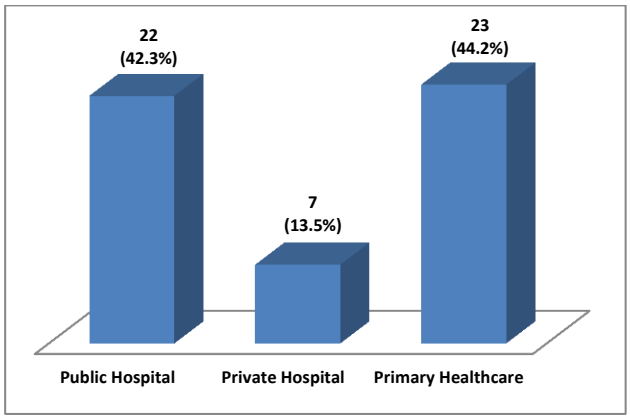

Figure 8: Location of adverse event taking place outside SKIMS among the incidents reported.

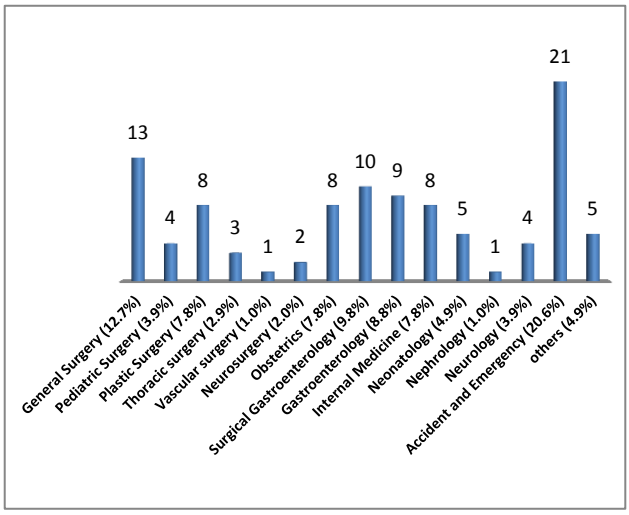

Figure 9: Location of adverse event taking place at SKIMS among incidents reported.

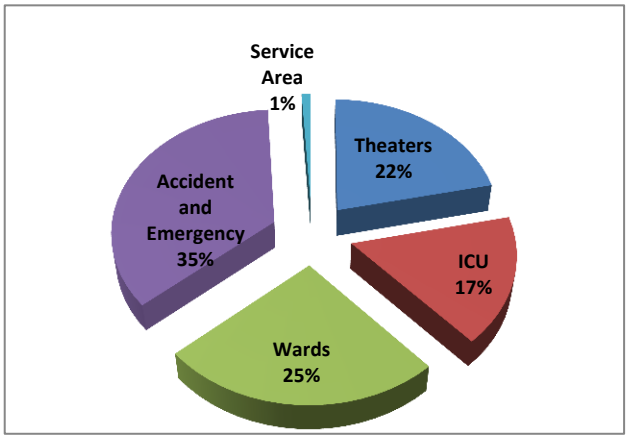

Figure 10: Exact location of adverse event at SKIMS among Incidents reported.

Table 7: Table showing confidence Score of preventability among adverse event in incidents reported.

Confidence Score	Frequency
Virtually no evidence for preventability	95 (24.0%)
Slight to modest evidence for reventability	77 (19.4%)
Preventability not really likely; less than 50-50	70 (17.7%)
Preventability more likely than not; more than 50-50	65 (16.4%)
Strong evidence for preventability	59 (14.9%)
Definite certain evidence for preventability	30 (7.60%)

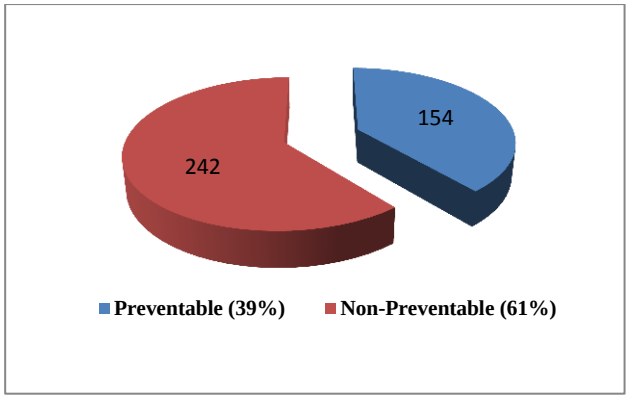

Figure 11: Overall preventability of adverse events among incidents reported.

DISCUSSION

In the reported incidents, general medicine followed by neurosurgery was the main specialties involved. Most common age group involved was 61 years & above with female dominance that came from emergency care and the duration of stay was 0-10 days. Number of studies showed a measurable percentage of adverse events reported with respect to the total admission taken place.[4,5]

In our study, the patient/family dissatisfaction with care received, documented or expressed during the current admission was the most common incident reported. Hospital acquired infection/sepsis being the second most common incident reported in admitted patients. In contrast to our study, hospital-incurred patient accident or fall, Medication errors, procedural variances, hospital-acquired infections and sepsis were most common incidents reported.[4-9]

In our study incidents were mainly reported by patient and their attendants, followed by the treating physician and nursing staff. In contrast to our study nurses, allied health professionals and doctors were the persons reporting any adverse event happening in a patient.[4,7,8,10,11]

In our study adverse events presented with untoward outcome, with 34.8% causing admission in wards, 24.6% causing unexpected death, 28.6% causing disability at the time of discharge and 48.7% causing prolonged stay. Similarly in other studies untoward outcome presented as death or permanent loss of function, permanent lessening of function, additional surgery or increased length of stay.[7,10]

In our study 38.9% of the adverse events showed signs of health care team responsible for causing adverse events which could have been prevented. 66.2% adverse events occurred after index admission and 33.8% adverse event occurred before the index admission. 55.8% adverse events were related to therapeutic care mainly involving plastic surgery patients, followed by the 42.2% for diagnostic care involving general medicine patients.

In our study, 39% of adverse events were found preventable and 61% of adverse event was found non-preventable. Other studies showed higher rate of preventability of adverse events as compared to our study.[4]

CONCLUSION

Incident reporting of adverse events by the staff of the hospital including doctors remains minimal as compared to that reported by attendants. Incident reporting of adverse events should be encouraged in all hospitals. Further studies should be done on developing a fool proof incident reporting system.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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