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Adverse events among pediatric inpatients in Babylon maternity and children teaching hospital

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Abstract

The rate of adverse events (AEs) are an important cause of morbidity and mortality among patients in pediatric hospital. The magnitude of injury to pediatric inpatients due to AEs has not been reliably quantified but can only be estimated. Several factors are sharing for the emergence of the errors in healthcare systems. The healthcare system nature which is covered by complexity of the function and organization in addition the medical science is characterized by multifaceted and uncertain nature, and lastly the imperfections of human nature. This prospective study was conducted among children admitted to the teaching hospital for Maternity and Pediatrics in Babil province, at the period started from 1st January to the end of June 2020. Data were collected by direct interview and by using questionnaire. The 1st part included the sociodemographic characteristic of the patients and the 2nd part included the duration of hospitalization, and the degree of harm at discharge. The admission or diagnosis on admission, and medical history, complex chronic conditions is addressed. Resident doctors and nurses were participated in the study. They were well-informed through lectures from time to time about the adverse events. Among total 8965 patients in the sample 894 (9.97%) of them had adverse events. 73 (8.1%) , 293 (32.7%) , 528 (59%) patients were admitted for up to 5, 6 - 10, and for > 10 days (p value=0.001) respectively. Neonates admitted to NICU or aseptic nursery care unit had higher rate of adverse events. 446 (49.8%) patients aged 0-28 days and 22.1% of the patients aged 29days -1 year had adverse effect (p value=0.001). AEs had occurred in 243(27.2%), 210 (23.4%), 191 (21.3%), 125 (13.9%), 55 (6.1%), 25 (2.7%), and 45 (5.0%), patients in Pediatric medical wards, Patients in neonatal intensive care unit, patients in Aseptic nursery care unit, patients in nursery care unit, patients in pediatric intensive care unit, patients in infectious ward and patients in the surgical ward respectively. Also the sex and residence have statistical significance to (female and rural area) with (p-value =0.001 and 0.0363) respectively. No significance was found regarding distribution of adverse events according to provisional diagnosis, and past medical history. Two thirds of the patients who required just intervention, and (30.7%) of the patients required intervention and prolonged hospitalization and (0.78%) of the patients had disability at time of discharge, and (1.0%) of the patients died because of adverse events. The rates of adverse events in this study were high but nearly equal to that in other studies around the world. Neonates admitted to NICU or aseptic nursery care unit had higher rate of adverse events, and 27. 2% of the adverse events had occurred in Pediatric medical wards, followed by the neonatal intensive care unit. Patients with longer duration of hospitalization were females. Patients who lived in the rural area had higher risk of events. Specific provisional diagnosis, or past medical history were not significantly associated with an increased rate of adverse events. The most common adverse events were fluid extravasation, dehydration, fluid overload, nosocomial diarrhea and IV line infection. Two thirds of the patients required just intervention, and about one third of the patients required intervention and prolonged hospitalization about 2% of the patients had either disability or died because of adverse events

Keywords: Pediatric inpatients, Babylon maternity, Children teaching

Introduction

An Adverse Events refer to an unintended injury or complication that results from health care management rather than by the patient's underlying disease process and results in a prolonged hospitalization of at least 24 hours, temporary or permanent disability on discharge, or death. Over the past 2 decades, starting from the 1999 IOM report "*To Err is Human*," dramatic efforts have been made to detect and reduce harm to patients, and to improve the quality of health care [1,2]. In developed countries, one in 10 patients experiences adverse events during hospitalization, according to World Health Organization (WHO). These events could have been predicted and prevented. Moreover, the risk in developing countries is 20 times higher, compared to developed countries [2,3]. Patient safety has received a growing attention in the world and has become a key priority for health care systems. Patient safety is 1 of the 6 domains of quality of health care defined by the Institute of Medicine (IOM) [4,5]. Medical Errors is a health care professional's act of omission, or commission that unreasonably makes the patient at risk of an unwanted outcome. It occurs during

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planning and implementation of the health care management and causes or could cause an additional impairment of the health status of a patient on one hand and on the health care system on the other. Health care provision includes the acts of individual hospital professionals in addition to the broader systems and health care processes and includes both acts of omission (failure of diagnosis or treatment) and acts of commission (wrong diagnosis or treatment, or poor performance) [6,7]. Adverse Events can be designated as preventable (or avoidable) when the patient harm is caused by a medical error such as diagnosis error, or unpreventable (or unavoidable) when the patient harm happens without a medical error such as the expected side effects of a drug (e.g. chemotherapy may induce febrile neutropenia) [6, 7].

In spite of their limitations (dependence on information noted in medical records and only fair reliability of the reviewer judgment), retrospective records reviews remain a comprehensive and commonly used method for assessing the nature, incidence and impact of in patients AE. Although prospective observation of patient care could offer better accuracy of the detection of AE, higher effectiveness of identifying those preventable and better analysis of causes leading to AE, heavy workload and costs constitute strong limitation to such surveys [8]. Some AEs are unavoidable injuries or complications of health care provision, such as unanticipated allergic reaction to antibiotic that cannot before seen. A ME that results in a harm to the patient becomes a preventable adverse event. A ME with the potential to result in a patient harm but does not do so is said to be a potential adverse event or near misses [9-12,49]

Adverse Events are an important cause of morbidity and mortality for pediatric inpatients, making up more than 4400 deaths annually in the United States [13-15]. The incidence rate of AEs among admitted patients to the pediatric hospital is considered an important indicator for their safety, although

The awareness for the safety of pediatric patient, the incidence rate of AEs remained unchanged [16]. According to chart reviews of the patients who were admitted to the pediatric hospitals in many countries informed that about 2.9% - 16.6% of patients had AEs [17-19]. These studies have submitted an important data information on a crucial aspect of hospital performance and provided a stimulus for the development of patient's safety. The overall incidence rate of AEs was 9.2% among Canadian pediatric inpatients AEs, with those due to surgery being the most common [20]. Adverse Events may be associated with severe sequelae on the safety of the patients [21], and a significant economic burden on health care system. An increased incidence rate of AEs results in an increase in care costs for management of injured patient, mainly because of prolonged hospitalization and use of additional treatments [22].

AEs may cause harms for patients and their families, emotional stresses, feeling of guilt, shame, and isolation by health caregivers due to subsequent litigation of health care malpractice are considered other problem may be experienced by affected clinicians [23]. Defects in health care systems rather than individuals are the cause of the majority of MEs as mentioned by the IOM.

The IOM exclaimed that a dramatic action must be implemented to improve the reliability and safety of the health care process [2]. AEs must initially be detected and paid attention to realize their preventable causes and to consider systematic improvements in patient safety. Other group of studies have showed age, race, obesity and insurance status are possibly connected to patients' safety, unsurprisingly socioeconomic status and race and ethnicity would increase the AEs because of multiple health care disparities associated with these factors [24-27]. Several factors associated with increased risk of AE in the emergency word including the large numbers of the patients, individual patient complexity, variation in the level of physician training ,high-risk diagnostic and therapeutic interventions, in addition to some other factors related to the work environment and lastly multiple interruptions and sleep disruption of the health caregivers. (9, 28,29,30)

Over the past few years, actions have been made to create "trigger tools," as a means of identification of AEs. Triggers are not AEs but are screening criteria or clues in medical records that potentially suggest an AE and help identify them. When a trigger is present, review of the whole medical record is required to

confirm whether an AE is or is not present. [31, 47] The incidence rate of AEs varies with the methodology used for their identification. [32] The best tool to detect AEs is the Global Trigger Tool (GTT) which has high sensitivity and specificity. [33] Further studies with heavy work load and costs are needed to get better and accurate detection of AE [34,48]

Aim of the study

This study aimed to identify the frequency and types of AEs among the patients who were admitted to Teaching Hospital of Maternity and Children of Babylon

Population and methods

Study design

A prospective study was conducted among all the children who were admitted to the Babylon Maternity and Children Teaching Hospital, from the 1st of January to the end of June, 2020

Study sample and data collection

The admissions under observation corresponded to the use of all wards during a 6-month period. Re-admission of the same patient during the study period was considered as other separated admission when there is a period of full recovery between the two admissions. Resident doctors and nurses were all participating by contact with me about any adverse event.

They were well-informed through lectures from time to time about the adverse events. A list of adverse events obtained from previous studies was explained to resident doctors and nurses. Data was collected by questionnaire.

It was including some demographic information, cause of admission or diagnosis on admission, past medical history or history of complex chronic conditions on admission, ward, type of intervention (if any invasive diagnostic or therapeutic intervention), duration of hospital stay which classified into 3 groups (up to 5 days, 6 – 10ays, > 10 days), type of adverse event, and the degree of harm from adverse event (just intervention, intervention with prolonged hospital stay, disability, and death). Patients were divided into 6 groups according to the age : (since birth – 28) days, (29 days - 1 y), (1 - 3 y), (3 - 5 y), (5 - 10 y), and (10 - 15 y). Some adverse events were confusing and required judgment by a senior doctor. To judge as an adverse event, all patients having the adverse events were visited daily and followed-up until they discharged home to assess the degree of harm at discharge and calculate the duration of hospitalization, and. this method was in place until the study period of time was ended, achieving a total of (9320) patients' medical records being evaluated after excluding medical records that meet the exclusion criteria of this study and those patients withadverse events (already reported by the questionnaire). Statistical Package for Social Sciences version 22 (SPSS -22) was used for data statistical analysis. suitable tables and figures were used for The frequency. Statistical association by chi-square test of independence, p-value less than 0.05 was considered statistically significant.

Exclusion criteria

The following patients were excluded from our study:

- 15 years' old patients
- Patients, who were discharged, transferred, died within 24 hours.
- Patient who had an adverse event occurring outside the hospital.

Ethical Consideration: A written informed consent from the parents of the children . Official approval was obtained from Directorate of Health in Babylon . Data was held and kept for research purpose only in a computer protected by password.

Results

Among total 9320 patients who were admitted to the hospital during study period, 8965 met inclusion criteria, only 894 (9.9%) had *adverse events*. Figure 2.

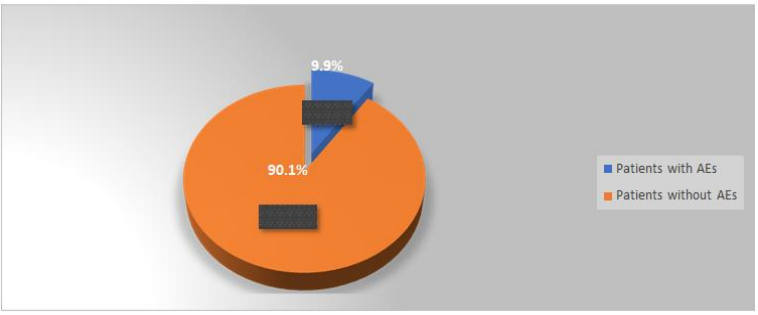

Figure 1. Percentage patients with AEs.

Table 1 revealed that 16.2%, 10.9%, 10% and 6.5% of the patients with acute gastroenteritis, pneumonia, respiratory distress syndrome and asthma respectively had more adverse events than the other patients with other reasons for admission.

Table 1. Distribution of study sample by causes of admission and percentage of adverse events.

causes of admission	Frequency	% , from all patients with AEs
Gastroenteritis	145	16.2
Sever Pneumonia	97	10.9
Respiratory distress syndrome (R.D.S.)	89	10
Acute Asthma	58	6.5
Premature babies	56	6.3
Bronchiolitis	43	4.8
Heart disease (congenital)	31	3.5
Jaundice (neonatal)	29	3.2
Febrile convulsion	29	3.2
Meningitis	25	2.8
Neonatal sepsis	22	2.5
Infant of diabetic mother	20	2.2
Inguinal hernia	17	1.9
Acute appendicitis	17	1.9
Hypoxic-ischemic encephalopathy	16	1.8
Encephalitis	16	1.8
Transient tachypnea of the newborn	15	1.6
Neural tube defect	13	1.5
Enteric fever	13	1.5
Croup	10	1.1
Chronic diarrhea	9	1
PUO	9	1
Apnea of prematurity	7	0.8
Hypo calcemic fit	7	0.8
Neonatal seizure	7	0.8

Measles	6	0.6
Nephrotic syndrome	6	0.6
Thalassemia	5	0.5
Urinary tract infection	5	0.5
G6PD deficiency	5	0.5
Anemia of chronic disease	4	0.4
Pertussis	4	0.4
Leukemia	4	0.4
Acute renal failure	4	0.4
Meconium aspiration syndrome	4	0.4
Anemia (iron deficiency)	3	0.3
Acute hepatitis	3	0.3
Epilepsy	3	0.3
Newly diagnosed DM	3	0.3
Diabetic ketoacidosis	3	0.3
Perforation of the viscus	2	0.2
Poisoning (drug)	2	0.2
Volvulus	2	0.2
Acute heart failure	2	0.2
Hydrocephalus	2	0.2
Idiopathic thrombocytopenic purpura	2	0.2
Imperforate anus	1	0.1
Kawasaki disease	1	0.1
Arthritis (Septic)	1	0.1
Genetic blood disorder (hemophilia)	1	0.1
Glanzmann thromboasthenia	1	0.1
von Will brand disease	1	0.1
Intussusception	1	0.1
Electrical shock	1	0.1
Near-drowning	1	0.1
Atresia in duodenum	1	0.1
Cleft palate and cleft lip	1	0.1
Scorpion sting	1	0.1
Lobar emphysema(Congenital).	1	0.1
Anemia (Sickle cell)	1	0.1
Deficiency of factor VII	1	0.1
Hypothyroidism(Congenital)	1	0.1
Ichthyosis	1	0.1
Tachycardia (Supraventricular)	1	0.1

Hemorrhagic disease	1	0.1
Atresia in biliary system	1	0.1
Total	**894**	**100.0**

Adverse events of our patients were categorized into many *types*, Nosocomial Infections represented about 25% of total patients with AEs followed by Fluid extravasation 14.8% , Dehydration 12.1% Fluid overload 9.5%, Hypoglycemia 7%, Events related to respiratory system 4.9%, Allergic reaction to blood 3.8% and Events related to cardiovascular system3.8%, Table 2.

Table 2. Types of adverse events with their frequency and percentage.

Type of adverse event	**No.**	**% , from AEs**	**% , from all study sample**
Nosocomial Infections			
Diarrhea	98	11	1.1
IV line infection	87	9.7	0.9
Unrelated to catheter Sepsis	21	2.3	0.2
infection of the surgical site	9	1	0.1
Catheter-related sepsis	4	0.5	0.04
Pertussis	2	0.2	0.02
Ventilator-associated pneumonia	5	0.6	0.06
	226	25.3	2.5
Events related to respiratory system			
Tube obstruction	13	1.5	0.2
Aspiration pneumonia	11	1.2	0.1
Unplanned/accidental ex-tubation	8	0.9	0.09
Pneumothorax	12	1.3	0.1
	44	4.9	0.5
Events related to gastrointestinal system			
Ileus	6	0.7	0.07
Biliary sludge	1	0.1	0.01
	7	0.8	0.08
Events related to delivery room events, or Resuscitation			
Erb's palsy	9	1	0.1
Wounds during delivery of the newborn	5	0.6	0.05
	14	1.6	0.15
Events related to Surgery			
Post-operative hemorrhage	3	0.3	0.05
Events related to cardiovascular system			
Sinus tachycardia	34	3.8	0.4

Other adverse events			
Fluid extravasation	132	14.8	1.5
Dehydration	109	12.1	1.2
Fluid overload	85	9.5	0.9
Hypoglycemia	63	7	0.7
Reaction to vancomycin	35	4	0.4
Allergic reaction to blood	34	3.8	0.4
Hypothermia (neonate)	28	3.1	0.3
Allergic reaction to ceftriaxone	26	3	0.3
Allergic reaction to penicillin	18	2	0.2
Hyperthermia (neonate)	17	2	0.2
Catheter-associated hematuria	8	0.9	0.1
Positional head deformity of the neonate	3	0.3	0.03
Anaphylaxis to ceftriaxone	2	0.2	0.02
Pressure ulcer (bed sore)	2	0.2	0.02
Pulmonary hemorrhage after surfactant use	2	0.2	0.02
Anaphylaxis to scorpion anti-venin	1	0.1	0.01
Fit after aminophylline use	1	0.1	0.01
Total	894		9.6

Among patients with adverse events, 325 Patients (36.4%) had history of chronic diseases. Congenital heart disease, failure to thrive, and asthma were the most common chronic conditions affecting the study population. There was no significance difference in the occurrence of adverse events among patients in the sample in relation to the presence or absence of chronic diseases. table (3).

Table 3. The distribution of adverse events according to comorbidities.

Past medical history	**No.**	**%**	**Adverse events** **No.**	**%**	**p-value**
Congenital heart disease	89	19.3	57	6.4	0.147
Failure to thrive	66	14.3	48	5.4	0.647
Asthma	59	12.8	42	4.7	0.880
Cerebral palsy	48	10.4	38	4.2	0.158
Diabetes mellitus	46	9.9	37	4.1	0.114
Epilepsy	40	8.7	32	3.6	0.162
Chronic renal failure	19	4.1	15	1.7	0.402
Down syndrome	16	3.5	13	1.4	0.331
Heart failure	15	3.2	11	1.2	0.797
Thalassemia	12	2.6	9	1	0.721

Celiac disease	10	2.2	7	0.8	0.981
Hydrocephalus	10	2.2	7	0.8	0.981
Leukemia	7	1.5	4	0.4	0.441
Chronic liver failure	5	1.1	3	0.3	0.611
Sickle cell anemia	5	1.1	2	0.2	0.135
Hemophilia	4	0.9	2	0.2	0.871
Spinal muscular atrophy	2	0.4	2	0.2	0.357
Biliary atresia	2	0.4	1	0.1	0.528
Job syndrome	2	0.4	1	0.1	0.528
Mucopolysaccharidosis	2	0.4	2	0.2	0.357
Pelvic rhabdomyosarcoma	1	0.2	1	0.1	0.516
Congenitaladrenal hyperplasia	1	0.2	1	0.1	0.516
Multicystic dysplastic kidney	1	0.2	1	0.1	0.516
Total	462	100.0	325	36.4	

† Chronic condition

Adverse events occurred in 243 (27.2%) patients in Pediatric medical wards, 210 (23.5%) patients in NICU, 191(21.4%) patients in Aseptic NCU, 125 (14.0%) patients in NCU, 55 (6.1%) patients in PICU 45(5.0%) patients in surgical ward and 25 (2.8%) patients in infectious ward. table 4

Table 4. Association between the Adverse events and the wards of admission .

Ward of admission	**No.**	**Percentage (%)**	**Adverse events**		**Chi-square**	**p- value**
			No.	%		
Neonatal intensive care unit	1156	12.9%	210	23.5%	99.252	0.001*
Nursery care unit	1420	15.8%	125	14.0%	2.570	0.109
Pediatric medical wards	2627	29.3%	243	27.2%	2.158	0.142
Pediatric intensive care unit	1080	12.1%	55	6.1%	32.566	0.001*
Infectious ward	929	10.4%	25	2.8%	61.200	0.001*
Aseptic nursery care unit	1016	11.3%	191	21.4%	99.450	0.001*
Pediatric surgical ward	737	8.2%	45	5.0%	13.370	0.001*
Total	8965	100%	894		d.f.=1	

* Significant (p value < 0.05)

According to the duration of hospitalization, 5752 (64.2%) , 2110 (23.5) and 1103 (12.3%).of the patients were admitted for 5, 6-10 and for > 10 days duration respectively , as shown in figure 3

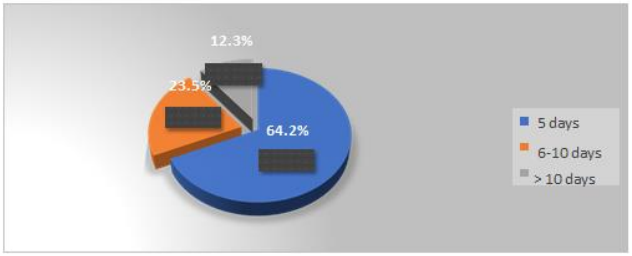

Figure 2. The percentage of patients according to the duration of admission to the hospital.

Adverse events occurred more significally in patients who were admitted to the hospital for period longer than 10 days than those who were admitted for shorter duration. The longer the duration of hospitalization the higher is the risk of adverse events as shown in table 5.

Table 5. The correlation between adverse events and duration of hospitalization.

		Patients with AEs		Total		p-value
		No.	%	No.	%	
Hospitalization duration	5 days	73	8.1	5752	64.2	0.001*
	6 – 10 days	293	32.7	2110	23.5	
	> 10 days	528	59	1103	12.3	
Total		894	100.0	8965	100.0	

* Significant (p value < 0.05)

In this study adverse events were more in females (*p* value = 0.001) than males more in those participants who lived in rural (*p* value =0.036) area than urban area. . *Neonates* (birth – 28 days), who were admitted to NICU and aseptic NCU, had more adverse events than the other age groups in this study. Table (6).

Table 6. The distribution of adverse events by sociodemographic characteristics.

sociodemographic characteristics		Adverse events		p-value
		No.	%	
Sex	male	429	47.9%	0.001*
	female	465	52.1%	
Residence	urban	405	45.3%	0.0363
	rural	489	54.7%	
Age	0 – 28 days	446	49.8%	0.001
	29 days – 1 year	198	22.1%	
	> 1 - 3 years	153	17.1%	
	> 3 – 5 years	71	7.9%	
	> 5 - 10 years	18	2.0%	
	> 10 -15 years	8	0.9%	
Total		894	100	

Four classes of patients with AEs were identified as a result of the *degree of harm* by adverse events: about two thirds of the patients required just intervention, in front of (30.8%) required intervention and prolonged staying in the hospital, 0.8% of them were disabled at time of discharge, and 1% of the patients were died because of adverse events . figure 3

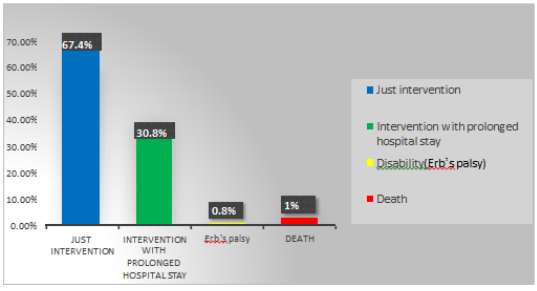

Figure 3. The percentage of patients classified according to the degree of harm

Eight patients in the sample were died due to either nosocomial sepsis , or endotracheal tube obstruction, , while only one person in the sample died because of aspiration pneumonia.

Table 7. Contributing factors causing death in patients with adverse events

Death causes	No.	%
Nosocomial Infections not related to catheter	3	0.3
Endotracheal tube obstruction	3	0.3
Catheter-associated neonatal sepsis	2	0.2
Aspiration pneumonia.	1	0.1
Total	9	1

Discussion

This study described the rate of adverse events that occurred among patients who were admitted to the Teaching Hospital of Maternity and Children in Babylon governorate which offers services to an average of 15000 admissions per year, and compared the results to the global rate.

It also assessed factors associated with the increase the rate of adverse events in such as age, sex, residence, past medical history, wards (NICU, PICU, NCU, Aseptic NCU, infectious ward and Pediatric surgical ward, and lastly duration of staying of the patients in the hospital.

In the current study, about 10% of the total patients who were admitted to the hospital had an adverse events. In agreement with other studies in the United States and Canada and Netherland in which the rate of adverse events was 10.9% and, [16] 11% [20] and 9.2% respectively[36]. And the rate was higher than the other results of Harvard [9] (1.3%) , Colorado and Utah (1%)[37] medical practice studies in 768 patients (85.9%) having adverse events that can be prevented in front of and **126** patients

(14.1%) who had unpreventable adverse events. Other studies in USA , found that 50.6% of the patients who had admission to the pediatric hospital had preventable adverse events. [16] Preventable adverse events were detected in about half of the Canadian pediatric inpatients [(37)], and 60% of adverse events were identified as preventable in Harvard medical practice study. [(9)] Unpreventable adverse events in the current study are related either to the blood or drugs allergic reactions such as penicillin and cftriaxone, and may be due to the anaphylaxis to ceftriaxone.

regarding the duration of staying in the pediatric hospital in this study and it's correlation with the adverse events , it was found that the higher is the risk of occurrence of adverse events in those with longer duration of hospitalization, and the association was significant. many factors were contributed to the occurrence of adverse events

among the inpatients who were admitted to teaching pediatric hospital of Babylon governorate including the history of other chronic diseases and using of multiple drugs. This significant association between the occurrence of adverse events and length of hospital stay may likely be due to a number of factors: the presence of a co-morbid condition, history of complex chronic conditions on admission, and the use of multiple drugs, this result was supported by other studies.[38,39] the commonest age group had adverse events in this study was the neonates who were admitted either to NICU or aseptic NCU (*p* value =0.001harek *et al*. [40] in 2006 and Agarwal *et al*. [41] in 2010 informed that there was a specific difference in the rate of adverse events according to the age of the patients and the ward where admitted, the rate was higher among neonates in the NICU and patients in the PICU. The explanation may be due to use of more invasive procedures in the diagnosis and treatment . The most common adverse events in our study were fluid extravasation 132 (14.8%), dehydration 109 (12.1%), fluid overload 85 (9.5%), nosocomial diarrhea 98 (11%), IV line infection 87(9.7%). Research in USA at 2018, Stockwell *et al.* [16] described that adverse events most frequently occurred as a result of nosocomial infection, complications of intravenous line, events related to there spiratory- and gastrointestinal systems. The most frequent AE was nosocomial infection in a study at 2017 in Argentina. [42,46] Other researches also informed that the infiltration of the venous catheter, low blood sugar , ulcers caused by pressure and the complications of the procedures. [43,44,45] In this study, there was no difference in the occurrence of adverse events according to the presence or absence of chronic diseases (*p* value >0.05), despite 36.4% of the patients with chronic conditions had adverse events. Not in agreement with other study conducted in Canadian hospitals that found the rate of events was more in those patients with chronic conditions.[20] Adverse events occur more in female than male (*p* value =0.001) and residence (p value =0.0363) and AEs occur more in patients who lived in rural area, this more likely due to the number of admissions to our hospital of females and the patients from rural area respectively .There is no single known study, from the limited studies available about the AEs in pediatrics, found to have a statistically significant correlation between AEs and their distribution according sex and address.

Conclusion

- The rates of adverse events in this study was high but nearly equal to that in other studies around the world. Neonates admitted to NICU or aseptic nursery care unit had higher rate of adverse events , and 27. 2% 0f the adverse events had occurred in Pediatric medical wards followed by the neonatal intensive care unit.
- Patients with longer duration of hospitalization, female and patients who lived in the rural area had higher risk of events. Specific provisional diagnosis, or past medical history were not significally associated with an increased rate of adverse events.
- The most common adverse events were fluid extravasation, dehydration , fluid overload , nosocomial diarrhea and IV line infection .
- Two thirds of the patients required just intervention , and about one third of the patients required intervention and prolonged hospitalization about 2% of the patients had either disability or died because of adverse events.

Recommendations

- The purpose of this study is not merely the detection of adverse events, but the prevention of such events, dramatic efforts are needed to improve the safety of our patients through:
- Increasing the educational level of health caregivers and families of the patients to implant a culture of safety .
- A committee in the hospital to detect ,report and therefore adopt plans to reduce the adverse events and following scientific guidelines in the duration of the admission and management .
- More researches are needed to help health policy makers to make discisions help in decrease the rate of adverse effects
- Health insurance system Establishment.

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