

BENHAZI UNIVERSITY – FACULTY OF MEDICINE
DEPARTMENT OF PEDIATRIC



**Admission Patterns and Outcome in a Pediatric Intensive
Care Unit at Ejdabia General Hospital 2014-2015**

دراسة نمط الدخول والنتائج للاطفال بوحددة العناية المركزة بقسم الاطفال
بمستشفى اجدابيا العام.

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In the name of God most Gracious and most merciful

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1- Abstract

Objective: To describe the admission pattern and outcome of patients in the pediatric intensive care unit (PICU).

Patient and method: A retrospective cross sectional descriptive study all children aged from 1month -15 years presenting with critical illnesses to the PICU at pediatric department of Ejdabia General Hospital, from November 2014 to august 2015.

Results: A total of 405 children admitted to PICU at Ejdabia General Hospital, of the total children, 58% were male and 42% were female with ratio male to female ratio 1.4:1. Age distribution showed that 64% were infant (1month -1 year), 92% of admitted children were form Ejdabia. Majority of admission during cold months (December, January, and February) had highest admission rate (58, 51, 50) respectively. Of total 351 (86.7%) stayed in PICU 1-7 days. Respiratory system, central nervous system, and gastrointestinal diseases (47.2%, 14.8 %, 10.8 %) respectively were the most diseases requiring PICU admission, followed by cardiovascular disease 9.9%, Endocrine disease 4.7%, and least common presentation were renal, hematological ,surgical (each 2.5%) , Others (2%) and infection (0.7%). Respiratory system diseases 13/29 (44.8%) of total death and pneumonia was the most common cause of total death 6/29 (20.7%). Three hundred and eleven (76.8%) patients improved and were transferred to pediatric ward for further management and discharged in satisfactory condition, 16 (4%) patient left against medical advice, 49 (12%) patient transferred to more specified hospital and 29 patient died, the overall mortality was (8.5%). and the observed difference in the mortality with respect to age, length of stay and the involved systems were statistically significant ($P<0.05$).

Conclusion:

Infection remains a major problem for patients in intensive care units and associated with considerable morbidity and mortality. Pneumonia was the major cause of death. Early care seeking and management can lead to reduction in number of serious cases requiring ICU care and thus can reduce morbidity and mortality in children.

2-INTRODUCTION

Intensive care is predominantly concerned with the management of patients with acute life threatening conditions in a specialized unit. Caring of critically ill children remains one of the most demanding and challenging aspects of the field of pediatrics (1).

Patients are admitted to a pediatric intensive care unit because they require a very high level of monitoring of vital signs and other body functions. These patients may need mechanical ventilation invasive intravascular procedures and frequent attention by both the nursing and medical staffs (2).

Children having acute neurological deterioration, respiratory distress, cardiovascular compromise, severe infections and accidental poisoning constitute the major admission to a pediatric intensive care unit (3).

Patients may be discharged or ambulated from pediatric intensive care unit once the disease process has reversed itself and care can be provided in less intense environment (2, 4).

Disease pattern in pediatric intensive care unit particularly in early age group is a sensitive indicator of the availability, utilization and effectiveness of mother and child health services in the community. Disease pattern changes between different places and time to time even at the same place (5).

Therefore regular review of the disease pattern in any particular setting is important for providing better services to the patients. In the past two decades, improvement in life-sustaining technologies resulted in an increase in the number of ICUs. Care of the critically ill patients is resource- intensive, and

15-20% of hospital budgets are spent in the ICUs. The focus on the quality and safety of medical care is increasing because of the high cost of healthcare and potential for harm .There are many evaluation of mortality and incidence of complications, such as nosocomial infection in the ICUs, with an increased emphasis on the quality improvement efforts and evaluation of outcome (6, 7, 8, 9).

In 1991, a survey conducted in the USA revealed that 8% of the hospital beds are ICU beds, 10-12 beds per unit for adult ICU and 21 beds per unit for neonatal ICU. The occupancy rate was 84% and the category of ICU was either medical ICU (36%) or mixed (22%) (10).

The aim of this study was to establish a profile for patients admitted to PICU in pediatric department at Ejdabia General Hospital (Ejdabia town is located 165 Km west of Benghazi city, the population of this town are (160.000) describing the demographics of patients, diagnosis, and outcome. This would allow identifying the magnitude of each illness that needed intensive care and redistribution of resources.

3-LITERATURE REVIEW

According to the World Health Organization, the major causes of death in under-five-year-old children in developing countries are preventable and curable. Improving outcome is possible by well-equipped and well-staffed intensive care units, since dramatic decreases in mortality and morbidity have been documented by such measures (11, 12, 13).

Intensive care could reduce mortality rates by 15% to 60% and many studies have demonstrated its unquestionable benefit (13, 14, 15).

Well-equipped intensive care units staffed with intensivists have shown better outcomes (16, 17). There is no organized database in Africa concerning children admitted to critical care. In developed countries, death before discharge is a rare outcome. In least developing countries there are few data on children's critical care, and this makes the provision of aid and improvement of outcome difficult. Moreover, in Africa, deficiencies in children's critical care are related to drugs, oxygen, blood products, and monitoring equipment.

As a result, the quality of critical care provided in low-income countries is of a very low order and mortality as high as 40% has been reported (18, 19, 20, 21).

Pneumonia is the single largest infectious cause of death in children worldwide. Pneumonia killed an estimated 935 000 children under the age of five in 2013. Accounting for 15% of all deaths of children under five years old. Pneumonia affects children and families everywhere, but is most prevalent in South Asia and sub-Saharan Africa. Children can be protected from pneumonia; it can be prevented with simple interventions, and treated with low-cost, low-tech medication and care.

Acute gastroenteritis accounts for millions of deaths each year in young children, mostly in developing communities. In developed countries it is a common reason for presentation to general practice or emergency departments and for admission to hospital. Dehydration, which may be associated with electrolyte disturbance and metabolic acidosis, is the most frequent and dangerous complication. Optimal management with oral or intravenous fluids minimizes the risk of dehydration and its adverse outcomes. Routine use of antibiotics, antidiarrhoeal agents, and antiemetics is not recommended and may cause harm. Prevention is the key to controlling gastroenteritis, and recently licensed, highly effective rotavirus vaccines will have a major effect on public health (22,23).

A study had been done in Jimma, Ethiopia 2015:

On The epidemiological profile of pediatric patients admitted to the general intensive care unit in an Ethiopian university hospital in 2015, in this study a total of 170 pediatric patients were admitted to the ICU of JUSH over the study period. A greater share was taken by the male children (54.7%), with a male-to-female ratio of 1.2:1. The overall mortality rate was 40%. The majority of the pediatric patients (38.8%) were found in the range of 10-14 years. Only ten patients (5.9%) were admitted in the age group of 1–6 months, of the total number of patients admitted, 34.7% were trauma cases, 45.8% of who died after admission. The highest number of trauma patients was admitted (69.5%) due to head injuries. Burns and polytraumas were the second and third leading causes of admission in 15.3% of the cases. Among the study Subjects, traumas and postoperative admission are common in children aged 6 to 14 years, with associated mortality rates of 45.8% and 50% respectively. Medical cases are also notable, particularly in the younger age group (1–5 years). Age and mortality showed no correlation at 95% confidence interval (P - value is 0.22066). Postoperative patients and medical patients made up the rest of the

admissions (28.2% and 27.6% of the cases respectively). Shock is the leading cause of medical admission (17%), followed by Guillain–Barré Syndrome (14.8%), pneumonia (10.6%), tuberculosis (4.3%), asthma (4.3%), and renal failure (8.5%). Children’s length of stay in critical care has shown a significant association with outcome (P -value =0.0000). The highest number of deaths is documented in those patients who stayed for less than a day and more than 28 days. Those who stayed in the ICU between 7 and 14 days had relatively low mortality (about 8.3%) (24).

Another study had been done in India 2014:

On morbidity pattern and outcome of patients admitted into pediatric intensive care unit, in this study a total of 341 patients were admitted into PICU. Of them, 173 (50.7%) were infants and 247 (72.4%) patients aged younger than 5 years (infants included). Their ages ranged from one month to 15 years with the mean age being 40.01 ± 45.79 months. There were 204 (59.8%) male and 137 (40.2%) female patients giving an M: F ratio of 1.49:1. The three most common disease categories admitted were cardiovascular disease (41.1%), neurological disorders (12.0%), and respiratory disease (10.0%), “Miscellaneous” include drowning, diabetic ketoacidosis, and poisoning. The mean length of stay (LOS) in the PICU was 3.2 ± 4.5 days (range, 0–28 days). The majority of the patients (60.7%) were admitted for up to two days. Cardiovascular disorder was the commonest condition in children of all age groups ($P < 0.001$). A higher proportion of both females (53.3%) and males (32.8%) presented with cardiovascular diseases. This relationship was, however, not statistically significant ($P < 0.096$). Two hundred and thirty-nine (70.1%) patients improved and were transferred to the pediatric wards for further management, 84 (24.6%) were discharged, and 11 (3.2%) left against medical advice. Seven (2.1%) patients died during the period, consisting of five (71.4%) males and two (28.6%) females, with their mean age being 53.71 months (range, one month to 10 years). Two (28.6%) patients died of cardiovascular diseases, two (28.6%) of renal disorders, one (14.3%) of neurological problem, one (14.3%) of

respiratory disease, and one (14.3%) of hematologic concerns. The overall mortality rate was 2.1%. A higher proportion of males, 5 (2.5%), died following admission compared to females, 2 (1.5%). This relationship was not statistically significant ($P < 0.706$) The children in the age group 12–59 months had no deaths while those less than 12 months and those ≥ 60 months had higher proportion of deaths, 4 (3.1%) and 3 (3.2%), respectively. This relationship was not statistically significant ($P < 0.101$) Mortality among patients who stayed for one day or less was 1.8%, while it was 7.4% for those who stayed for more than seven days. A higher proportion of the children who stayed more than seven days in the PICU died. This relationship was also not statistically significant ($P < 0.168$) (25).

The third study was done in Nepal, India 2014:

On Admission patterns and outcome in a pediatric intensive care unit in Nepal, a total of 230 children were admitted during the one year period. There were 145 (63%) males and 85 (37%) females. Maximum number of patients belonged to the age group of 1 month–1 year (31.3%) followed by age group of 1-5 year (21.7%). Maximum deaths 12 (5.2%) occurred in the age group 1 month to 1 year. Respiratory illness (n=76, 33%), central nervous system disease (n=43, 18.6%) and infectious diseases (n=26, 11.3%) were the common diseases requiring PICU admissions in this analysis Admissions also included surgical (n=18, 7.8%), gastrointestinal (n=17, 7.4%), cardiovascular (n=15, 6.7%), poisonings (n=11, 4.8%), renal (n=9, 3.9%), hematological (n=3, 1.3%) and other diseases (n=12, 5.4%). Twenty nine (12.6%) out of the 230 admitted children died and maximum deaths (7.8%) occurred in the age group 1 month to 5 years. Nineteen (8.2%) children left against medical advice and 5 (2.1%) children were referred to other centers for treatment. Pneumonia (n=7), infections (n=5, staphylococcal sepsis and late onset sepsis), acute gastroenteritis with severe dehydration (n=4) and a cyanotic congenital heart diseases (n=4) were the major causes of death in this study. Common respiratory illnesses included pneumonia (n=44, 57.9%), bronchial asthma

(n=12, 15.7%) and acute bronchiolitis (n=11, 14.45%). Acute febrile encephalopathy (n=24, 55.7%) followed by seizure disorders (n=6, 13.9%) and tubercular meningitis (n=4, 9.3%) were the common central nervous system diseases requiring PICU care. Other conditions requiring PICU admissions included acute gastroenteritis (n=13, 76.4%), a cyanotic congenital heart diseases (n=8, 53.3%), and organophosphorous poisoning (n=4, 36.3%). Forty one children (17.8%) received mechanical ventilation, of which 23 (56%) survived, 14(34.1%) died and 4 (9.75) left against medical advice. Out of 189 non-ventilated children, 154 (81.4%) improved, 15 (7.9%) died and 15 (7.9%) left against medical advice (26).

The Fourth study had been done in 2014 in Cairo university hospital:

On profile of patients admitted to pediatric intensive care unit, in this study there were 532 critically ill children admitted to the pediatric ICU. Children (1–5 years of age) were the largest age group admitted to PICU ($n = 238$). November and December were the most common months of admission ($n = 58$ and 57 respectively). Mortality rate was 33.1% and half the patients (53%) stayed an average of 1 week in ICU, Children representing with pneumonias ($n = 264$) and foreign body (FB) inhalation ($n = 63$) represented the highest admission etiology, followed by encephalopathy ($n = 61$). All patients with stridor were discharged followed by FB inhalation (95.2%) and Guillain–Barré syndrome (94.4%). All patients who presented with post arrest died, followed by liver cell failure (66.7%) and heart failure with pneumonia (61.5%) Pneumonias and encephalopathy were more prevalent in Infants below 1 year of age ($n = 129$ and 32 , respectively); FB inhalation was more common among children 1–5 years of age ($n = 45$), whereas uncontrolled hypertension was more common among age group 1–5 years and above 5 years ($n = 3$ for both groups). Regarding LOS, 282 patients stayed around 7 days. Those who stayed less than 1 day were mostly the post bronchoscope FB removal ($n = 26$) regarding the relationship between the different age groups and the LOS, 50%

(8/16) of those who stayed more than 30 days were aged below 1 year. Children aged 1–5 years stayed on an average 1–7 days ($P = 0.69$). Mortality rate was the highest in infants below 1 year of age (43.9%), and survival was nearly similar in those aged 1–5 years and above 5 years, 76.4 and 70.3% (27).

The fifth study had been done in Bangladesh 2012:

On admission pattern and outcome in a pediatric intensive care unit. Total admissions in the pediatric intensive care unit were 594; 475 were neonates and 119 beyond neonatal age group publication.⁶ Among the 119 cases, 69 (58%) were male and 50 (42%) female, male babies outnumbered their female counterpart with a ratio of 1.4:1. Age on admission ranged from 1 month to 11 years with a mean of 17.4 ± 26.5 months and median of 7 months. Thirty-one cases (26.1%) were below 60 days, 47 (39.5%) between 61 days to 12 months, 33 (27.7%) between 13 months to 5 years and 8 (6.7%) were above 5 years of age. Bronchopneumonia was the major cause of admission (25, 21%), followed by acute bacterial meningitis (19, 16%), surgical conditions (18, 15.1%), Guillain-Barré syndrome (14, 11.8%), septicemia (12, 10.1%), congenital heart diseases (10, 8.4%), encephalitis (5, 4.2%), and others (16, 13.4%) including diarrhea with dyselectrolytaemia and metabolic acidosis, dengue hemorrhagic fever, status epilepticus and hepatic encephalopathy. The surgical conditions included diaphragmatic hernia ($n=10$), eventration of diaphragm ($n=5$), head injury ($n=2$) and complication of post-operative burst appendicitis ($n=1$). Length of stay in the ICU ranged from a few hours to 45 days, with a mean of 9.7 ± 8.0 days and median of 7 days; 8 days for survivors and 5 days for non survivors. Analysis of outcome showed that out of 119 patients, 81 cases (68.1%) were improved and transferred to the ward or discharged to home. Six cases (5.0%) were transferred to other specialized centre for cardiac and neurosurgical management, 6 cases (5.0%) left the hospital against medical advice (LAMA),

and 25 (21.0%) expired . Of the discharged cases, most children (93.0%) were shifted to the respective ward/cabin when they were not in need of intensive care and 7.0% were directly discharged from pediatric intensive care unit with satisfactory condition. The Case fatality was highest for septicemia (33.3%) followed by pneumonia (24.0%), surgical conditions (16.7%), meningitis (15.8%) and Guillian Barré syndrome 14.3% (28).

The sixth study had been done in India2012:

On epidemiological study of morbidity pattern of critically ill children admitted in child intensive therapy unit, Out of 201 children brought to child Intensive Therapy Unit in the critical stage, 68.7% were males and 31.3% were females. Maximum numbers of critically ill children were between 0-3 years57.8% male children outnumbered female children and this was observed in all age groups of children studied. Children from rural population were more than urban population and this difference were statistically significant (p value < .05). Maximum numbers of critically ill children were from the age group of 0-3 years in both rural and urban areas respectively. This is in accordance with the ignorance of the rural parents regarding the illness behavior of the children. Congenital malformations are 10.9%. This favors the fact that congenitally malformed children are more susceptible to critical illness than children of general population. In this study out of these congenitally malformed children females were more than males which was statistically significant. Diarrheal diseases were the commonest cause of morbidity (26.8%) followed by acute Respiratory tract population illnesses (19.9%), severe malnutrition (15.9%), meningitis (9.96%) and encephalitis in (4.98%) amongst critically ill children. Only 11.94% of children were admitted due to other reasons like septicemia, typhoid fever, congestive cardiac failure, measles and bleeding disorder (29).

The seventh study was done in Hippokratia, Greece in2011:

About Demographic profile and outcome of pediatric intensive care unit, Among 382 consecutive patients admitted in the above time period, 300 (196

boys and 104 girls), aged 54.26 ± 49.93 months. The vast majority were admitted due to medical pediatric emergencies (210pts, 69.8%) and trauma (67pts, 22.5%), where two thirds of them (204pts, 68%) were admitted from referral hospitals, either in town (81pts, 27%) or from remote geographical areas (123pts, 41%). Most patients had an excellent health prior PICU admission, but quite a lot suffered from instead of co morbidities, mechanical ventilator duration 6.54 ± 14.15 days. Patients stayed in the PICU for 8.85 ± 23.28 days until death or discharge. Twenty nine patients died in the PICU given a mortality rate of 9.7%. Patients admitted from hospital pediatric wards as internal patients had higher mortality rate (12/96pts, 12.5%) compared to referral patients (17/204pts, 8.3%), but without statistical significance ($p=0.273$). Mortality across diagnostic categories the majority (18/29pts, 62%) died from brain death due to head trauma (7), central nervous system (CNS) infection (4), stroke (3), status epilepticus (2), inborn error of metabolism (1) and hypoxic- ischemic encephalopathy (1). Nine patients (31%) died from multiple organ failure syndromes (MOFS); 6 of them were admitted with MOFS, while 3 developed MOFS during their stay. Two patients (6.9%) died from MOFS during their stay. Two patients (6.9%) died from intractable cardiac arrest and failed cardiopulmonary resuscitation (CPR) (30).

The eighth study was done in Islamabad, Pakistan2015:

About mortality patterns among critically ill children in a pediatric intensive care unit of a developing country, a total of 1919 children were admitted to PICU over the 6 years period, of which 248 died with mortality rate of 12.9% most of the children who died were male 60.5%(n=150) with a median age of 2.8 years (interquartile 0.4-8 years), and 65% of children who died were under 5 years old, All the children had initially aggressive supportive care including mechanical ventilation. Overall, the incidence of admission was highest from the ER (57.7%, n=143). Most of the children died with sepsis or sepsis –related diagnosis (17.3%, n=43), followed by central nervous system (CNS) involvement. In 63.7% (n=158) children, death was followed by some kind of

limitation of LST (life support treatment), which involved DNR (do-not-resuscitate) and WLST (withdrawal of LST) with DNR being more prevalent while in 28.2% of children (n=70) full resuscitative procedures were carried out. Brain death occurred in 8.1% of children (n=20). We also found an increasing trend of limitation of LST (DNR) over the period of 6 years (31).

The ninth had been done in Islamabad, Pakistan 2010:

On analysis of pediatric medical admission pattern to a tertiary care hospital, this study shows a total of 2124 patients were admitted. Out of these, 1284 (60.4%) were boys with male to female ratio of 1.5:1. Admissions were greatest among infant and children under the age of five years. Seventy percent of patients were below 5 years of age and 37% less than 1 year. Out of that 869 (40.9%) patients were admitted through outpatient department and 1255 (59.1%) through Accident and Emergency. Similarly looking at referral source 1584 (74.6%) patients came by self, 317 (14.9%) by other hospitals and 233 (10.5%) were referred by General Practitioner. Respiratory, Neurological and Oncological conditions were the most common reasons for admission. Other prominent diagnostic categories are non specified infection, Hematological and renal diseases. Among 188 deaths significant number of patients, 64 (34%) had non specific infection, 29 (15.4%) had neurological problems, 20 (10.6%) had respiratory diseases and 19 (10.1%) had renal pathology. Among 188 deaths significant number of patients, 64 (34%) had non specific infection, 29 (15.4%) had neurological problems, 20 (10.6%) had respiratory diseases and 19 (10.1%) had renal pathologies (32).

The tenth study had been done in Pakistan 2011:

On pediatric admissions and outcome in a general intensive care unit, total of 1364 patients were admitted to the ICU out of which 302 (22.1%) were children. There were 179 males and 123 females giving a male: female ratio of 1.5:1. The age range was from a few hours old to 15 years old with a mean of 4.9 ± 2.5 years. The peaks in admissions occurred in patients < 1 month and in

the age groups 3-8 years and 9-15 years. Postoperative admissions made up 51.7% of the admission of these the pediatric surgical unit had 108 (35.8%), neurosurgical unit 19 (6.3%), cardiothoracic unit 5(1.7%). Among the pediatric surgical cases 88 (81.5%) had gastrointestinal pathologies (congenital or acquired). Trauma cases made up 31.6% of admissions of which 59 (19.5%) were burn and 14 (4.6%) were polytrauma cases. Cases of respiratory failure were mostly due to pneumonia and the GuillianBarre syndrome while airway obstructions were mostly due to foreign body aspiration. Of the 302 children admitted to the ICU during the period, 193 were transferred from the ICU to other wards or in some cases other hospitals while 109 patient died, giving a mortality rate of 36.1%. Burn alone accounted for 29.4% of the total deaths and 82.1% of deaths from trauma. Mortality was highest in the age group 9 to 15 years with 32.7%, 3 to 8 years and < 1 month had 20.2% mortality each, 1 month to 6 months had 12.5% and the least mortality was in the age group 7 months to 1 year with 6.7%. There was no statistical correlation between age and mortality. The total mortality rate in the ICU within the same period was 35.7% (487 patients died out of 1364 admissions). Of the pediatric surgical cases, 15 deaths (i.e. 44.2%) were from respiratory failure, mostly post tracheo-oesophageal fistula repair, six (17.6%) were due to hypovolaemic shock, seven (20.6%) from sepsis and six (17.6%) from multiple organ dysfunction (MODS). Among the burn patients eight (25%) deaths were due to sepsis, 14 (43.8%) due to hypovolaemic shock, six (18.7%) due to MODS, and four (12.5%) from airway compromise as result of inhalational burns The LOS in the ICU ranged from < 1 day to 56 days with a mean of 5.5 day. Eighty-six deaths i.e. 78.9% of the mortalities occurred in patients with LOS of seven days and below, while LOS< 24 h and three to seven days was statistically related with mortalities (33).

4- OBJECTIVES OF THE STUDY

- To describe the demographic profile for disease pattern in PICU.
- To determine the magnitude of each illness that needed intensive care unit.
- To find the outcome in relation to the observed variable.

5- PATIENTS AND METHODS

Study design: This retrospective descriptive cross sectional study, the study was conducted from November 2014 to August 2015.

Study sitting: This PICU is part of pediatric department (34 beds capacity), it contains 7 beds and equipped with central oxygen supply and suction lines , infusion pumps, conventional mechanical ventilator, portable x-ray machine, patients care monitor and ECG machine, however we don't have facilities for cardiac surgery bronchoscope, PICU is staffed by 2 residence doctor on duty supported by 2 trained nurse ,the residence in duty are also responsible for looking after the 34 beds at the pediatric department .

Source of data: Data were extracted from patient's files filled by resident doctors. Extracted data included the following:

- 1- Demographic characteristic: age, sex, residence, nationality, date of admission, and discharge.
- 2- Clinical characteristic: provisional diagnosis, interventions of any, and treatment received.
- 3- Relevant investigations including CBC and differential blood count, blood gas, CSF analysis for cell count and culture, blood sugar, serum calcium.
- 4- Length of stay (LOS), discharge, LAMA, referral to other hospital for treatment and deaths with increase emphasis on the quality improvement efforts and evaluation of outcome.

Study period: the study period 9 months for data collection and for literature review, and 2 months for data analysis and thesis writing.

Data analysis:- Data were entered and analyzed using SPSS Version 18, statistic like mean ,median, standard deviation were computed Results presented as frequency tables and figures. T test was used to find the significance of observed difference between outcome and the studied variable. P value <0.05 was taken as level of significance.

6 - RESULTS

A total of 17407 patients, from them 1180 child admitted to pediatric department at Ejdabia General Hospital, and 405 were admitted to pediatric intensive care unit(PICU) .

6 .1:- Demographic Characteristics

6.1.1. Gender:

- Males were 234 (58 %).
- Females were 171 (42%).
- Male to female ratio1.4:1 (**Figure 1**).

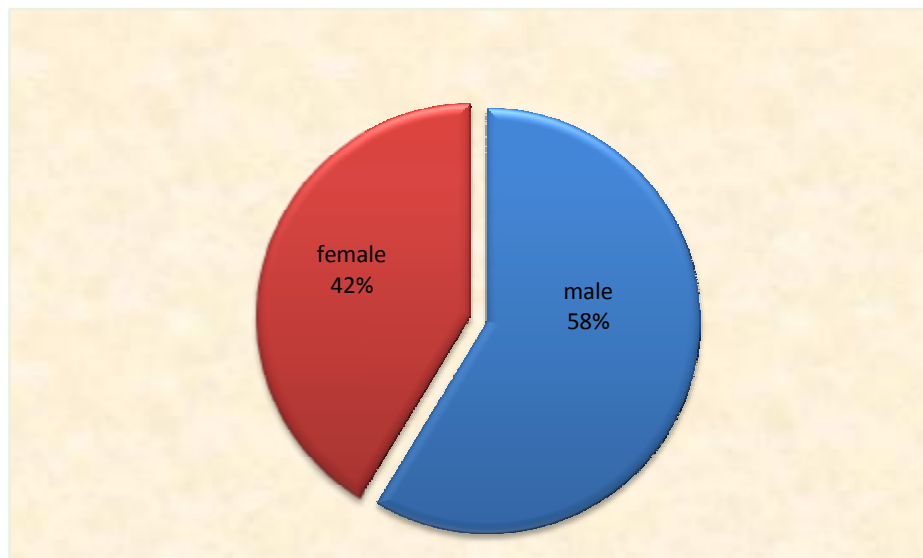


Figure (1): Distribution of patients according to gender

6.1.2:- Age:

- Their age ranged from 1 month to 15 years with mean 20.9 months (SD \pm 5.9).
- Of total admitted children 64.4% of them were between 1month -1 year, followed by > 1-5 years (24%), while children aged >5-10, and >10 years were (6.7%) and (5%) respectively **Table (1)**.

Table (1): Distribution of patients according to age

Age group	No .of patients	%
1month-1 year	261	64.4%
>1 -5 years	97	24%
>5 – 10 years	24	6%
>10 years	23	5.6%
Total	405	100%

6.1. 3:- Nationality:

- Out of 405, 398 (98%) were Libyan.
- Non Libyan children were 7 (2%).

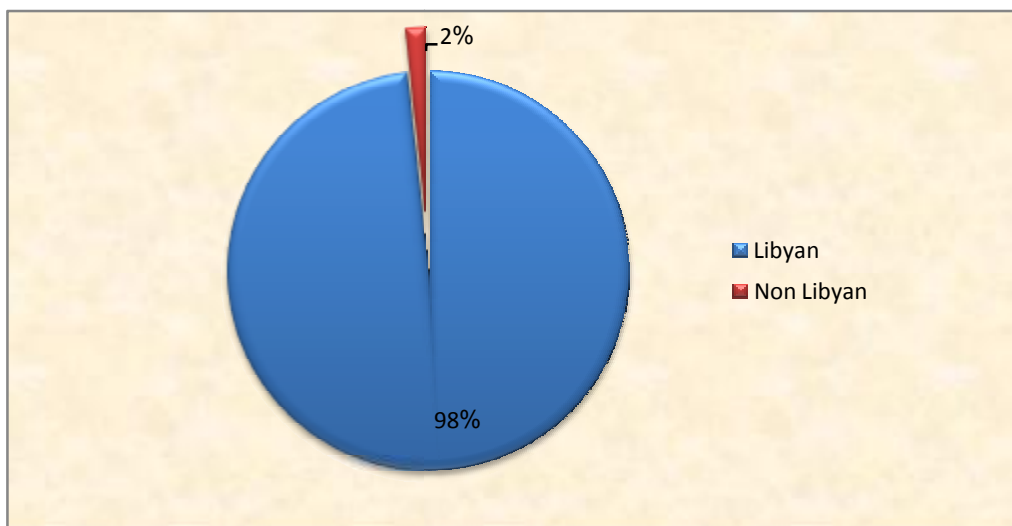


Figure (2): Distribution of patients according to Nationality

6.1.4:- Residence:

- Out of 405 , 378 (93%) were form Ejdabia
- And twenty-seven child (7%) were outside Ejdabia

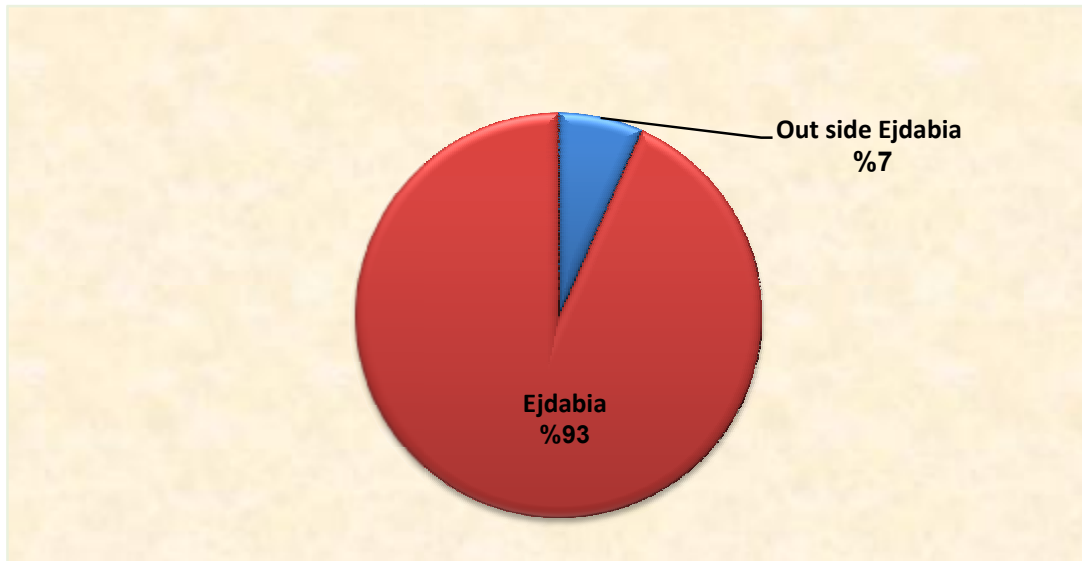


Figure (3): Distribution of patients according to Residence

6.2:- Analysis of admission:

6.2.1:- according to length of stay:

- The mean length of stay (LOS) in PICU was 6.8 (± 2.1) days (Range from 6hrs-25days).
- Majority of the patients 351 (86.6%) were admitted for 1- 7 days.
- Those who stayed less than one day were mostly cases of febrile convulsions (n=18 pts), and cases of foreign body aspiration (n=5 pts).
- Fifty percent (8/16 pts) of those who stayed for 8-15 days were below 1 year of age.
- One child 1 year old who died of acute epiglottitis who stayed for 25days on mechanical ventilator.
- Most children aged 1 month-1year 250/351(71.2%) stayed around 1-7days.

Table (2): Distribution of patients according to LOS in ICU

Length of stay in ICU (days)	No. of patients	%
<1 day	38	9.4%
1-7 days	351	86.6%
8-15 days	15	4%
Total	404	100

Note: only one child 1 year old with acute epiglottitis stayed 25 days on mechanical ventilator.

6.2.2:- According to Months of admission:

We noticed that December, January and February had the highest admission rates (58, 51, 50) respectively.

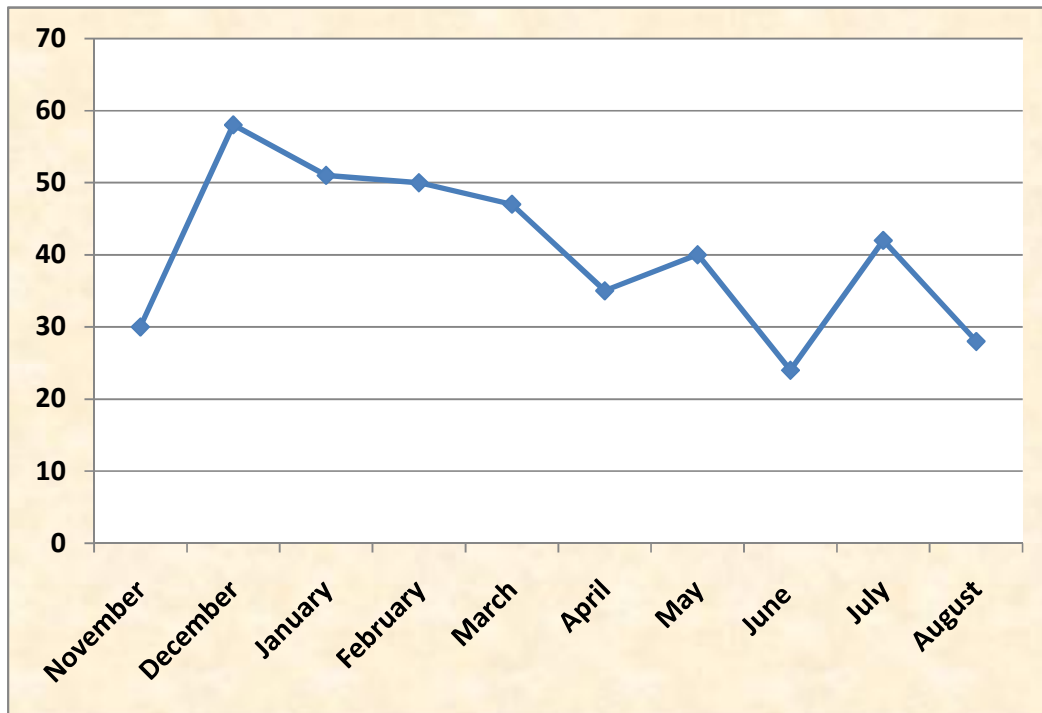


Figure (4): Distribution of patients by months of admission.

6.2.3:- Analysis of causes of admission

6.2.3.1:- According to system involved:

Respiratory illnesses (n=191, 47%), central nervous system diseases (60, 14.7%) and gastrointestinal (44, 10.8%) were the commonest diseases requiring ICU admissions in this analysis. Admissions also include cardiovascular (40, 9.9%), endocrine (19, 4.7%), hematological (10, 2.5%), renal (10, 2.5%), surgical (10, 2.5%), poisoning (10, 2.5%), others (8, 2%) and infections (3, 0.7%).

Table (3): Distribution of age groups according to systems involved

System	Age Group in year n (%)				
	1month-1 yr	>1 -5 yrs	>5-10yrs	>10 yrs	Total
Respiratory	153 (58.6%)	27(27.8%)	6 (25%)	5(21.7%)	191(47.2%)
Neurological	23(8.8%)	26(26.8%)	4(16.7%)	7(30.4%)	60(14.8%)
Gastrointestinal	30(11.5%)	12(12.4%)	2(8.3%)	0	44(10.9%)
Cardiovascular	33(12.6%)	7(7.2%)	0	0	40(9.8%)
Endocrine	4(1.5%)	6(6.2%)	5(20.8%)	4(17.4%)	19(4.7%)
Renal	0	5(5.2%)	1(4.2%)	4(17.4)%	10(2.5%)
Surgical	8(3%)	2(2%)	0	0	10(2.5%)
Poisoning	0	9(9.3%)	0	1(4.3%)	10(2.5%)
Hematologic	7(2.7%)	0	3(12.5%)	0	10(2.5%)
Others	1(0.4%)	2(2%)	3(12.5%)	2(8.7%)	8(2%)
Infection	2(0.8%)	1(1%)	0	0	3(0.7%)
Total	261(64.4%)	97(24%)	24(5.9%)	23(5.7%)	405(100%)

6.2.3.2:- According to disease in each system:

- Commonest respiratory diseases required ICU admission were pneumonia (n=100/191 pts, 52 %), aspiration pneumonia (n=36/191 pts, 18.8%), acute bronchiolitis (n=28/191, 14.7%), Figure (5) illustrates other respiratory diseases admitted.

Pneumonia was more prevalent in infants up to 1 year of age (n=74/100 pts), where as aspiration pneumonia was more common among children 1-4 months of age (n=30/36 pts).

There were (n= 5 pts) of foreign body aspiration tow of them were 3 months of age and the others were (7, 10, 24 months of age).

One child with acute laryngotracheobronchitis (ALT) (1 year old) discharged in good condition.

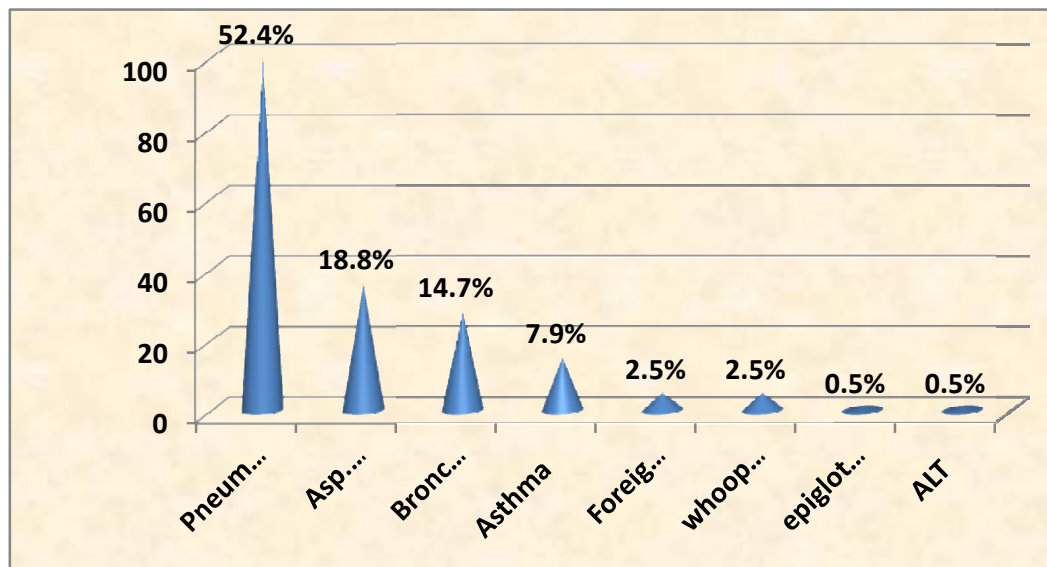


Figure (5): Distribution of patients according to respiratory diseases.

- Cardiac cases admitted include: congenital heart disease (n=37 pts), myocarditis (n=2pts) and supraventricular tachycardia (n=1 pt).
- Whereas central nervous system diseases requiring ICU care were febrile convulsion (n=18/60 pts), epilepsy (n=14/60 pts), cerebral palsy (n=11/60 pts), meningitis (7/60 pts), encephalitis (6/60 pts), Brain tumor (4/60 pts) (**Figure 6**).

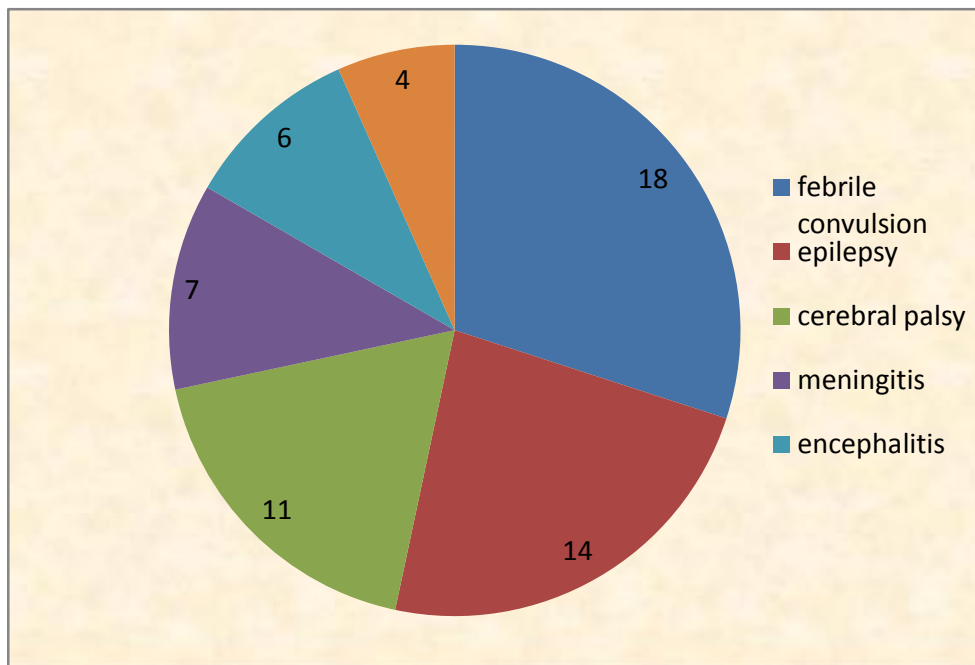


Figure (6): Distribution of patients according to CNS diseases

- The renal illnesses admitted were chronic renal failure (n=4 pts), nephrotic syndrome (n=6 pts).
- Endocrine diseases in this study were: diabetic ketoacidosis (n= 13pts) and hyperinsulinemia with hypoglycemic attack (n=1 pt), adrenal insufficiency with hypoglycemic attack (n=1 pts), Hypocalcaemia (n=3 pts) two of them had rickets and one case pseudohypoparathyroidism and hypothyroidism, they presented with convulsions and their serum calcium was (4.5, 5, 5mg/dl respectively).
- Infection like sepsis (n=2 pts) and meningococemia (n=1pt) were the common infectious disease requiring PICU in this study.
- Regarding children with AGE with severe dehydration (n=40 pts), 3 of them were hypernatremic dehydration, (2 pts) were hyponatremic, and (35 pts) were isonatremic dehydration.
- Others include : drowning (n =3 pts), snake bite , head trauma with convulsion , electric shock ,and isovolemic acidemia , child abuse with multiple Trauma (one case each). Poisoning include: drug ingestions (n =8 pts) and corrosive ingestion (n=2 pts).
- Surgical cases include (hypertrophic pyloric stenosis (n=1 pt), intestinal obstruction (n=4 pts), lower gastro intestinal bleeding (n=1 pt), irreducible inguinal hernia (n=3 pts) operated esophageal Arteria with gastrostomy tube (n=1pt).

6.3:- outcome:

- Most of the patients 311(76.8%) improved and transferred to the ward when they were not in need intensive care or discharged home from ICU with satisfactory condition.
- Forty nine (12%) patients were referred to other specialized hospital for further management including:-

Surgical cases (n=10pts) because there is no specialized pediatric surgical department, Children with foreign body aspiration (n=5pts) for bronchoscopy. Four cases of congenital heart disease for cardiac surgery, Three patients of gastrointestinal disease (liver cirrhosis with portal hypertension, autoimmune hepatitis, ulcerative colitis.), One case of corrosive poisoning, and one with head trauma and convulsion for neurosurgical evaluation and Some referred cases (n=8 pts) were referred upon family request in spite of unnecessary referral.

- Sixteen patients (4%) were left against medical advice (LAMA), most of them (11/16) had respiratory diseases.
- Twenty-nine patients (7.2%) child died **Figure (7)**.

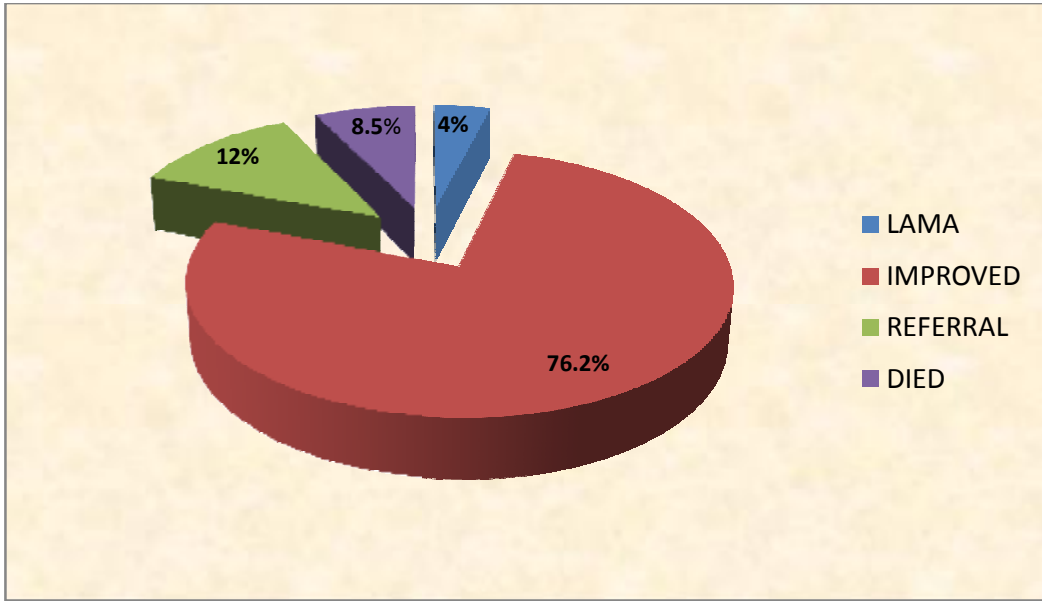


Figure (7): Distribution of patients according to outcome

The commonest diseases requiring PICU admission were respiratory system diseases 191/405 pts (47.2%) of which 38.8% improved, 3.2% died, 2.7% LAMA, 2.5% referred Followed by central nervous system diseases 60/405(14.7%) of which 11.1% improved, 1% died, 0.2% LAMA, 2.5% referred. **Table (4)** shows the outcome of other systems involved.

Table (4): Distribution of patients according to outcome

System involved	Total n (%)	Improved n (%)	Died n (%)	LAMA n (%)	Referral n (%)
Respiratory	191(47.2%)	157(38.8%)	13(3.2%)	11 (2.7%)	10(2.5%)
Central nervous system	60(14.7%)	45(11.1%)	4(1%)	1(0.2%)	10(2.5%)
Gastrointestinal	44(10.8%)	36(8.9%)	1(0.2%)	1(0.2%)	6(1.5%)
Cardiovascular	40(9.9%)	32(7.9%)	4(1%)	-	4(1%)
Endocrine	19(4.7%)	17(4.2%)	1(0.2%)	-	1(0.2%)
Renal	10(2.5%)	4(1%)	2(0.5%)	2(0.5%)	2(0.5%)
Hematological	10(2.5%)	5(1.2%)	2(0.5%)	-	3(0.7%)
Surgical	10(2.5%)	-	-	-	10(2.5%)
Poisoning	10(2.5%)	9(2.2%)	--	-	1(0.2%)
Others	8(2%)	6(1.5%)	1(0.2%)	-	1(0.2%)
Infectious(sepsis meningococemia)	3(0.7%)	-	1(0.2%)	1(0.2%)	1(0.2)
Total	405(100%)	311(76.8%)	29(7.2%)	16(4%)	49(12%)

6.3.1:- Analysis of deaths:

- There was 29 children (8.5%) were died but death rate was underestimated, some cases received dead but not registered for medico legal causes.
- Out of 405 child, 30 (7.4%) of them received mechanical ventilation, of which one (3.3%) survived, 29 (96.7%) died .out of 375 non-ventilated children, 310 (82.7%) improved, 49 (13.1%) referred, 16 (4.3%) LAMA.

6.3.1.1:-According to gender, age, and LOS in ICU:

- A higher proportion of males 15/29 (51.7%) died following admission compared to females 14/29 (48.2%) **Table (5)**.
- Infants up to 1 year old had the highest proportion of deaths 13/29 (44.8%), followed by age group >1-5 years (37.9%) **Table (6)**.
- A higher proportion of children who stayed for up to 7 days (21/29 pts, 72.4%) in ICU died **Table (7)**.

The difference between gender and outcome not statistically significance with P value 0.157, but relationship between age, LOS in ICU and outcome was statistically significant with P value < 0.05.

Table (5): Distribution of patients according to gender and outcome

Sex	Outcome following admission		p-value
	Survival	Death	
Male	219 58.2%	15 51.7%	P=0.157
Female	157 41.8%	14 48.3%	
Total	376 100%	29 100%	

Table (6): Distribution of patients according to age and outcome

Age group	Outcome following admission				P- value
	Survival		Death		
	No	%	No	%	
1 month- 1 year	248	66%	13	44.8%	0.000
>1- 5 years	86	22.8%	11	37.9%	0.045
>5- 10 years	22	5.9%	2	7%	0.565
>10 years	20	5.3%	3	10.3%	0.070
Total	376	100%	29	100%	

Table (7): Distribution of patients according to LOS in PICU

Length of stay	Outcome following admission				P- value
	Survival		Death		
	No	%	No	%	
< 1 day	36	6.9%	2	6.9%	0.000
1-7 days	330	87.8%	21	72.4%	0.000
8- 25 days	10	2.6%	6	20.7%	0.171
Total	376	100%	29	100%	

6.3.1.2:- According to systems and diseases involved:

Out of 29 deaths:

- Thirteen (44%) patients died of respiratory disease (pneumonia was the major cause of death (6/13 pts, 46%), followed by 2/36 cases of aspiration pneumonia, 2/5 cases of foreign body aspiration, 1/15 cases of bronchial asthma, 1/1 pt of acute epiglottitis and 1/1 pt of whooping cough.
- Four patients (13.8%) of central nervous system diseases (brain tumor 2/4 pts, cerebral palsy 2/11 pts)
- Four patients (13.8%) of cardiovascular system (congenital heart disease 2/37 pts, acute myocarditis 2/2 pts).
- Two patients (6.9%) of renal disease (chronic renal failure 2/4 pts)
- Two patients (6.9%) of hematological problem (osteopetrosis with severe bleeding 2/7 pts)
- One patient (3.4%) of gastrointestinal disease (AGE with hypernatremic dehydration 1/3 pts).
- One patient (3.4%) of infectious (meningococemia 1/1 pts).
- One patient (3.4%) of endocrine disease (DKA 1/13 pts).
- One patient (3.4%) of others (drowning 1/3 pts).

Statistical analysis shows significant association between systems involved and outcome with P value 0.000 **Table (8).**

A total of 405 children included in this study, 385 children have diseases with mortality and we exclude children with surgical problems (10 pts) because all surgical cases referred to other centre. Also poisoning were observed in (10 pts) with no mortality among children with poisoning table (8).

Table (8): Distribution of patients according to systems involved and outcome

System involved	No of cases		Death n= 29		P-value
Respiratory	191	49.6%	13	44.8%	0.000
CNS	60	15.6%	4	13.8%	0.000
Gastrointestinal	44	11.4%	1	3.4%	0.000
Cardiovascular	40	10.4%	4	13.8%	0.000
Endocrine	19	4.9%	1	3.4%	0.000
Renal	10	2.6%	2	6.9%	0.000
Hematological	10	2.6%	2	6.9%	0.000
Others	8	2%	1	3.4%	0.000
Infectious	3	0.8%	1	3.4%	0.001
Total	385	100%	29	100%	

Out of 405 children admitted, 287/405 children had diseases with mortality in which 29 children were died and causes of death showed in details in table (9) 111/405 children, admitted with diseases in which no mortality which include the following : acute bronchiolitis (28 pts), acute laryngotrachio bronchiolitis(1 pt), febrile convulsion(18), epilepsy (14pts), meningitis (7pts), encephalitis (6 pts), nephrotic syndrome (6 pts), adrenal insufficiency with hypoglycemic attack (1pt), hypocalcaemia with convulsion (5 pts), surgical condition (10pts), poisoning (10pts), hemophilia (3 pts), others (5pts),liver cirrhosis (1pts),autoimmune hepatitis (1pts), ulcerative colitis (1pt) and supraventricular arrhythmia (1 pt).

Statistical analysis shows highly significant association between disease involved and outcome (death) with P value 0.000**Table (9)**.

Table (9): Distribution of patients according to diseases involved and outcome

Disease/condition	No.of patient		Deaths no	%	P-value
Pneumonia	100	34.8%	6	20.7%	0.000
A.G.E with dehydration	42	14.6%	1	3%	0.000
Congenital heart disease	38	13.2%	2	7%	0.000
Aspiration pneumonia	36	12.5%	2	7%	0.000
Bronchial asthma	15	5.2%	1	3%	0.000
DKA	13	4.5%	1	3%	0.000
Cerebral palsy	11	3.8%	2	7%	0.000
Osteopetrosis	7	2.4%	2	7%	0.000
Foreign body aspiration	5	1.7%	2	7%	0.000
Whooping cough	5	1.7%	1	3%	0.000
Chronic renal failure	4	1.4%	2	7%	0.000
Brain tumor	4	1.4%	2	7%	0.000
Drowning	3	1%	1	3%	0.000
Acute myocaraditis	2	0.7%	2	7%	-
Acute epiglottitis	1	0.3%	1	3%	-
Meningococemia	1	0.3%	1	3%	-
Total	287	100%	29	100%	

7- DISCUSSION

In various studies it has been shown that intensive care has a positive outcome for the vast majority of critically ill children. However, caring for the critically ill children is a challenge in developing countries, where health needs often outstrip available resources. Necessary equipment is scarce and often malfunctions, and trained manpower is limited. Management of critically ill patients requires significant human, infrastructural, and financial resources these resources are typically limited in low-income countries (34, 35, 36, 37, 38, 39).

A recent review highlighted the paucity of knowledge regarding critical care in the developing countries. Knowledge of the characteristics and outcomes of critically ill patients admitted to ICUs in low-income countries may help with the identification of priorities and the resources required for improvement of the care of critically ill patients in resource- limited regions of the world (40, 41).

This retrospective study was undertaken in order to document the most common type of diseases with which the children are admitted in the intensive care unit in pediatric department at Ejdbia General Hospital. The total number of admission during study period was 405, we noticed that infants (1 month-1 year) and children up to 5 years were the vulnerable age group representing the majority of admitted patients to PICU; this is consonance with study documented in Cairo (27). In study done in Bangladesh 93.3% were below 5 years of age (28). Another study in India found that 72.7% were below 5 years of age (25).

Male babies outnumbered their female counterpart with a ratio of 1.4:1 (234 vs. 171), it reflects a gender bias in parental health seeking behavior regarding their children or alternatively there may be epidemiological reason for male susceptibility to infection or other conditions requiring admission. The male predominance at admission is consistent with Indian study where infant represent 31% and 63% from them were male (26). Similarly in study done in Ethiopia, where they observed that admission of male children more than females children (93 vs. 77) with male to female ratio 1.2:1(24)and in another study done in India found that males more than females n= 150,60.5% (31) , as well as other studies (42, 43, 44, and 45).

Most of our patients were Libyan and from Ejdabia town.

We found December, January and February had highest admission rate, which is similar to a study from Egypt, they found November and December had highest admission rate (27) which reflecting a possibility of droplet infection predominance (respiratory manifestation) in winter season.

In this study, the mean duration of stay in PICU was 6.8 ± 2.1 days, which is near to that reported in other study from India, in which a mean duration of stay in PICU was 4.5 ± 2.6 days (46). Only one patient remained in the unit for as long as 25 days, because they required critical care for this period (he was child with acute epiglottitis complicated by aspiration pneumonia remained 25 days on mechanical ventilator until he died).

Respiratory illness which represent (47.2%) of total admission like pneumonia, aspiration pneumonia and acute bronchiolitis were the commonest indication for admission in our set and could be a reflection of disease prevalence under five years of age, this may be decreased by incorporating pneumococcal vaccine in national immunization program .

The predominance of respiratory diseases at admission in our study is similar to studies from Egypt and India in which respiratory diseases were also the major

cause of admission in their studies (27, 28) and another study also showed respiratory diseases 40%, followed by neurological illness 27% as common cause of illness in their PICU (47) another similar results reported in study (26), While a study from Pakistan found post cardiac surgery 34% to be the most common condition (48), whereas study from India reported septicemia 14.8% as the commonest indication for admission in their series (49), two studies from India showed that diarrheal diseases 26.8% followed by respiratory tract illnesses 19.9% as commonest indication of admission , and the other one revealed that cardiovascular and neurological diseases were the major causes of admission into their PICU(29,25).

In our study aspiration pneumonia was more prevalent in age group 1-4 months and most of them had history of shocking in oil and traditional therapy like herbs given by their parents.

In present study, surprisingly most children of foreign body aspiration were infants below 1 year of age two of them were 3 months old, and the others were 7 and 10 months old and it was due parents' ignorance, while in study done in Cairo university Hospital they found it was more common among age group 1-5 years of age (27).

Neurological diseases (14.8%) and gastrointestinal diseases (10.9%) were the next two common diseases required PICU admissions in our study.

In the current study, cardiovascular diseases represent 9.8% of total admission, and 92.5% of them were congenital heart disease, where as in studies done in India , it represents 41.1% and 6.5 respectively(25,26).

In our study acute gastroenteritis represent 10% of total admission, this may be due to incorporating ROTA viral vaccine in national vaccination program where as in study done in India diarrheal diseases were the commonest cause of admission 26.8% (29).

The PICU is a special unit primarily concerned with the care of patients with critical illness prevents mortality and demands a broad based knowledge to cater for all aspects of management of these patients to achieve good outcome (50, 51, 52).

Out of 405 child admitted, 311 child were improved and transferred to the ward or discharged home in satisfactory condition, 49 child were referred to other specialized hospitals, the referred patients include: children with surgical problems, children of foreign body aspiration for bronchoscopy and foreign body removal, cardiac patients for cardiac surgery, some patients also referred because they need special investigation like bone marrow aspiration and MRI and some patients referred on family request in spite of unnecessary referral because lack of confidence of care provided to their children.

Sixteen out of 405 patients 4% left against medical advice (LAMA) the main reason was domestic reason including lack of person for caring of other children, and lack of confidence on the level of care provided to these children where as in study done in Bangladesh found six out of 119, 5% left against medical advice for same reasons (28).

Deaths use more resources in terms of bed days and diagnostic tests than survivors (53).

Twenty nine patients died during the course of admission, giving an ICU mortality rate of 8.5%, and this mortality rate was underestimated because some of referred children were very sick and we don't know their fate, and some case received dead but not registered for medico-legal causes, this value is near to result documented in Hong Kong 6.7% and more than an overall the mortality rate 2.6% reported in India (54, 46).

It is however, less than an overall mortality of 16.7% recorded in other parts of India, and 15% mortality rate documented in Brazil in 2010, and also less than showed in Greece 9.7% (55, 56, 30).

ICU mortality rate varies depending on the case mix, age, gender LOS and organizational aspects of the unit (57).

Mortality rate in our study was highest among infants up to 1 year old 44.8%, this is similar to associated studies in which mortality rate also were high among infants (25, 27) and in our study we found percentage of males 51.7% died were more than females 48.2%, this comparable to a similar study that was reported from India in which a higher proportion of males 2.5% died following admission compared to females 1.5%(25).

The present study shows statistical significance between death and LOS in ICU ,and other studies also revealed that there is correlation between LOS and outcome of pediatric patients others show no relationship (58, 59). Among those with significant relationship, there are contradictory findings as to how LOS affects outcome in their study documented that patients who died stayed approximately twice as long as survivors (60,61,62) .

The mortality in our study among those who stayed for up to seven days 72.1% and this more than those recorded in other studies done in Pakistan and India in which mortality rate were 14% and 11.9% respectively (48, 63).

However, study from India recorded lower mortality 9.8% in long-stay patients (more than 13 days) than in short stay patients 24.6 % (49).

There was significant relationship between LOS and outcome as was documented in study done in India in the year 2013 (62). The duration of stay in the PICU is an index of severity of morbidity, although this cannot be interpreted in isolation (53).

The commonest conditions leading to death in our study was pneumonia 20.7% followed by aspiration pneumonia 7% and congenital heart disease 7% and this is similar to studies done in Cairo and India, in which pneumonia also was the commonest condition leading to death (26, 27), A study done in Bangladesh reported bronchopneumonia as major cause of death (28).

Aspiration pneumonia represent 7% of total deaths in our study, while in study done in Nepal it was represent 3.4% of their total deaths (26).

And in the current study, we found that diabetic ketoacidosis represent (3%) where as in study done in India it was (6.9%) of their total deaths (26).

This study is a little effort to determine the pattern of admission and outcome of critically ill children and to help these angles by making the critical care more and feasible (64).

8- C O N C L U S I O N

- Epidemiologic analysis of the pattern of patients admitted to our PICU shows different etiologies for admission: On the top were respiratory system diseases.
- Infection remains a major problem for patients in intensive care units and associated with considerable morbidity and mortality.
- Pneumonia was the major cause of death.
- Foreign body aspiration and drowning in young age group were due to parent's ignorance.
- Aspiration pneumonia was in young infants and mostly due to shocking in oil and traditional therapy.
- The absence of a high-dependency unit at our hospital led to the admission of some patients who were not ill enough to require ICU admission.
- The high referral rate to special units, especially pediatric surgery, ENT unit for bronchoscopy, may provide an argument for establishing pediatric surgical and ENT department.
- Death rate underestimated because some patients were referred in serious condition and we don't know their fate and some cases received dead but not registered for medico legal causes.

9- R E C O M M E N D A T I O N S

- we need a high-dependency unit to enhance cost-effective management of patients and avoid unnecessary stretch of the ICU facilities
- Early care seeking and management can lead to reduction in number of serious cases requiring ICU care and thus can reduce morbidity and mortality in children.
- Well-equipped ICU with modern and innovative intensive care greatly facilitates the care of critically ill patients giving desirable outcome.
- Proper and effective community awareness about traditional therapy hazards.
- Appropriate referral of cases.

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ملخص الدراسة

اهداف الدراسة: الهدف من الدراسة وصف اشكال الدخول والنتائج للمرضي في وحدة عناية الاطفال في قسم الاطفال بمستشفى اجدابيا العام.

المرضي واسلوب البحث: عبارة عن دراسة وصفية لكل الاطفال الذين تتراوح اعمارهم من شهر الي 15 سنة زوالذين ادخلو بوحدة عناية الاطفال بمستشفى اجدابيا العام من شهر 11 سنة 2014 الي شهر 8 سنة 2015. كل المرضي الذين ادخلو الي وحدة العناية شملتهم الدراسة دون تحيز.

نتائج الدراسة: 405 طفل ادخل الي وحدة عناية الاطفال, كانت 58.2% من الذكور, 42.8% من الاناث, 97% من اجدابيا, حالات الدخول تشمل: امراض الجهاز التنفسي 191 (47%), امراض الجهاز العصبي 60 (14.8%), امراض الجهاز الهضمي 44 (10.9%), امراض الجهاز القلبي الوعائي 40 (9.9%), امراض الغدد 19 (4.7%), امراض الكلي 10 (2.5%) وامراض الدم 10 (2.5%) حالات الجراحة 10 (2.5%), وحالات السموم 10 (2.5%), والحالات الاخرى 8 (2%). وجدنا ان امراض الجهاز التنفسي والجهاز العصبي والجهاز الهضمي هي اكثر الامراض التي احتاجت دخول وحدة عناية الاطفال. معظم الاطفال 351 (64.4%) اقامو من يوم الي 7 ايام بوحدة العناية. الالتهاب الرئوي كان السبب الاكبر للوفاة في هذه الدراسة. 29 من 405 طفل (6.5%) توفو, 16 (4%) غادرو بدون استشارة طبية, 49 (11%) تم تحويلهم الي مستشفى اخر. الاطفال الذين اعمارهم سنة كانت لديهم اعلي نسبة وفيات, ومعدل الوفيات كان اعلي لدي الاطفال الذين اقامو من يوم الي سبعة ايام في وحدة العناية.

و الخلاصة: العدوي تبقي مشكلة رئيسية للمرضي بوحدة العناية المركزة. الالتهاب الرئوي كان من اهم اسباب الوفيات.