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Clinical Profile of Patients Admitted to the PICU in a Tertiary Care Teaching Hospital in Bangladesh

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Abstract **Original Research Article**

Background: Care of critically ill children remains one of the most demanding and challenging aspects in the field of pediatrics. PICU aims at promoting early intervention with an objective of achieving good results and better prognosis. This study was undertaken to know about the clinical profile and outcome of patients admitted in pediatric ICU in a tertiary care teaching Hospital. ***Objective:*** To find out the Clinical profile of patients admitted to the PICU of a tertiary care teaching hospital in Bangladesh. ***Methods:*** This is a hospital based, retrospective, descriptive study, done on patients admitted to pediatric ICU of Dhaka medical College Hospital from October 2019 -June 2022 (2 years and 9 months). ***Results:*** Total 437 patients were admitted in pediatric ICU. According to the age distribution of patients, most 172(39.36%) respondents were aged <1 year. The mean age was 3.55±3.52 years SD. There was a male preponderance 299(68%), females were 138(32%). Patients from rural area were 308(70%) and 129(30%) from urban area. Clinical profile showed that meningoencephalitis was the most common diagnosis 85(19.45%) for admission in PICU. This was followed by pneumonia 75(17.16%), septicemia 39(8.92%), and neurosurgical patient 34(7.78%). Although few percentages, some other diseases were significantly important like GBS, AGN with complication, hepatic encephalopathies, accidental emergencies, dengue shock syndrome, diabetic ketoacidosis needed PICU support. The outcome revealed, overall mortality was 92(21.05%), 330(75.52%) were discharged, 9(2.06%) patients went against medical advice, 6(1.37%) patients were referred for specific comorbidities. Use of inotropes, need for mechanical ventilation, and presence of co morbid illness and low level of Glasgow coma scale less than seven were independent predictors of mortality. ***Conclusions:*** Mortality is moderate in our PICU. We conclude that a well-equipped intensive care unit with modern and innovative intensive care and appropriate training greatly facilitates the care of critically ill patients giving desirable outcome.

Keywords: Pediatric Intensive Care Unit (PICU), Clinical Profile, Outcome Pattern.

INTRODUCTION

The Pediatric Intensive Care Unit (PICU) is known as one of the most important part of the hospital where critically sick children are frequently admitted. The pediatric patients requiring progressive airway, respiratory and hemodynamic care are referred in PICU with the aim of accomplishing an outcome better than if the patients were admitted into other parts of the hospital [1]. In the field of pediatrics, care for critically sick children has become one of the most difficult and challenging issue [2]. The main objectives of Pediatric critical care are to reduce mortality, to treat the child suffering from a life threatening health condition, to ensure minimum pain uneasiness, to reduce complications and to provide comfort and proper guidance to the child's family [3]. A report of World Health Organization (WHO) mentioned the main causes

of death among under-five children in developing countries are mostly preventable and curable diseases, if the treatment procedure is improved and given in a proper way [4]. It is a matter of satisfaction that, with the advancements in intensive care facilities, there has been a remarkable increase in the survival of critically ill children. This can be achieved by well-equipped and well-staffed intensive care facilities. But in spite of the availability of guidance for all the processes, it becomes difficult for the country like Bangladesh to provide intensive care to the patients. Shortage of intensive care centers, lake of training to the health professionals, lack of skills requiring for proper intensive care and most remarkably the lack of wide research in this field prevents to provide appropriate intensive care. In critical care medicine, intensive care unit (ICU) results can be measured on the basis of outcomes like mortality rate or survival rate among the study patients [5]. It becomes vital to inspect admissions and their outcome, as this may help to improve performance [6]. The main emphasis of critical care is to save lives by proper monitoring and maintaining physiological status by giving greater importance on the prevention of secondary injuries and preserving purpose [7]. However, collection, analysis, and interpretation of relevant data on the utilization of ICU beds can help in reducing the length of ICU stay and ensure covering more patients with care [8-10]. The aim of the present study was to find out the clinical profile of patients admitted to the PICU of a tertiary care teaching hospital in Bangladesh.

METHOD

This is a hospital based, retrospective, descriptive study, done on patients admitted to pediatric ICU of Dhaka medical College Hospital from October 2019 -June 2022 (2 years and 9 months). The total sample size for this study was 437.

Inclusion Criteria

- Children less than 13 years who were admitted to PICU with complete patient information and investigation reports in the medical records were included in the study.

Exclusion Criteria

- Patients with incomplete medical records were excluded.
- The patients who were died on arrival (within 2 hour of admission).
- Inappropriate time to give optimal care in the ICU
- The outcome of those patients was related to emergency or other ward care.

In this study, the patients were selected by reviewing the hospital's PICU nominal register. The quantitative variable for this study was clinical profile and outcome pattern of the study patients. The data required for the purpose of this study (gender, age, address, a provisional and final diagnosis of the patient, date of admission, the average length of the PICU stay, and duration of mechanical ventilation of the study patients) were collected from the medical records department (MRD). The outcome was defined as death/discharge/against medical advice/referred. History, examination details, and investigations done were defined as CBC, CRP, serum bilirubin, chest x-ray, USG abdomen, neuroimaging, EEG, ABG, CSF analysis, urine routine, microscopy, stool for occult blood, LFT, RFT. The course in the hospital and treatment given were recorded properly. The statistical analysis was done using the statistical tool SPSS version 21.

RESULT

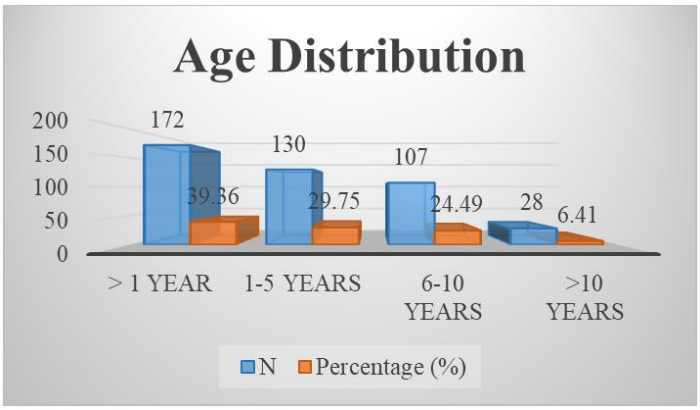

Figure I: Age Distribution of the Respondents

Figure I show the age distribution of the respondents. The most 172(39.36%) respondents were aged <1 year and followed by 130(29.75%) were aged between 1-5 years, 107(24.49%) aged 6-10 years and the rest 28(6.41%) aged more than 10 years. The mean ±SD age was 3.55±3.52 years.

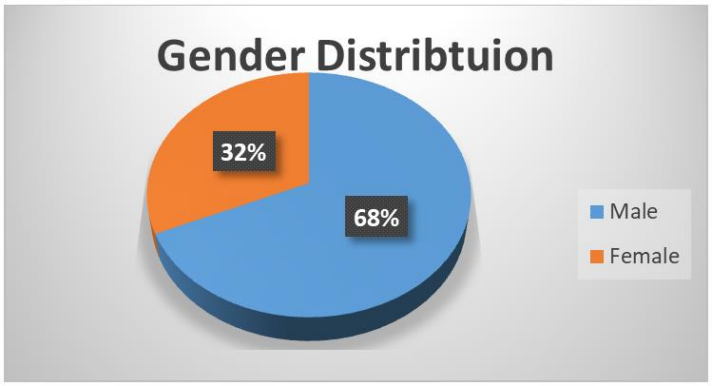

Figure II: Age Distribution of the Study Patients

Figure II shows the gender distribution of the respondents where most of the patients 299(68%) were male and 138(32%) were female.

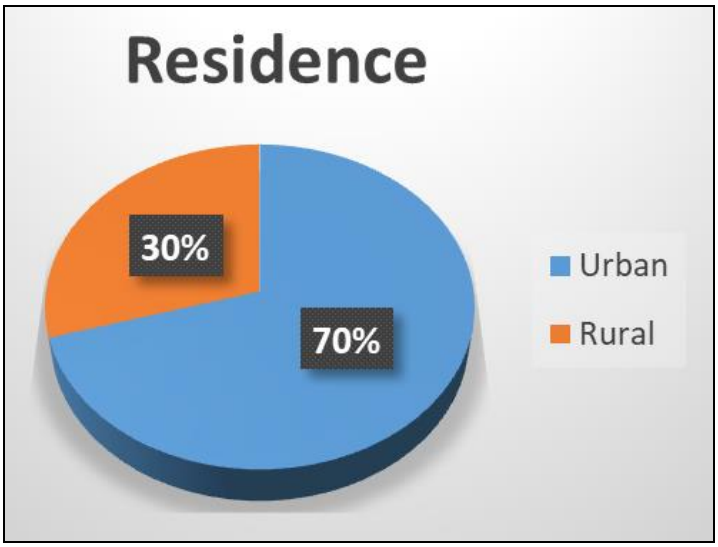

Figure III: Residential Status

Figure III denotes the residential status of the study patients. Most of the patients 308(70%) were from urban area and 129(30%) were from rural area.

Table I: Monthly Family Income of the Study Patients

Family Income in Tk. (Monthly)	N	Percentage (%)
5000-10000	221	50.6
11000-20000	128	29.3
21000-30000	62	14.2
>30000	26	5.9

Table I shows the monthly family income of the study patients. Most families 221(50.6%) had monthly income between 5000-10000 tk. and followed by 128(29.3%) family's monthly income was between 11000-20000 tk., 62(14.2%) family's monthly income was between 21000-30000 tk., and only 26(5.9%) family's monthly income was >30000 tk.

Table II: Clinical Profile of the Study Patients

Clinical Profile	N	Percentage (%)
Pneumonia	75	17.16
Meningoencephalitis	85	19.45
Septicemia	39	8.92
Neouro-surgical patient	34	7.78
GBS	26	5.95

Clinical Profile	N	Percentage (%)
AGN with complication	13	2.97
Hepatic encephalopathies	9	2.06
Accidental emergencies	11	2.52
Dengue shock syndrome	10	2.29
Others	135	30.89

Table II defines the clinical profile of the study patients. Meningoencephalitis was the most common diagnosis 85(19.45%) for admission in PICU. This was followed by pneumonia 75(17.16%), septicemia 39(8.92%), and neurosurgical patient 34(7.78%). Although few percentages, some other diseases were significantly important like GBS 26(5.95%), AGN with complication 13(2.97%), Hepatic encephalopathies 9(2.06%), accidental emergencies 11(2.52%), dengue shock syndrome 10(2.29%), diabetic acidosis 7(1.6%) and other chronic diseases needed PICU support. Mortality was 10 times more probable among patients with comorbid illnesses than those without other related comorbidities [AOR=9.5 (1.2–38), CI=95%].

Table III: Independent Risk Factors among Patients Admitted to PICU

Independent risk factor	N	Percentage (%)
Patients on Ventilator	60	13.7
Extubated	6	1.4
Patients on ionotrophs	230	52.6
GCS <7	250	57.2

Table III shows the independent risk factors among patients admitted to PICU. Among the 437 patients, 60(13.7%) were on ventilator, 6(1.4%) were extubated, 230(52.6%) were on ionotrophs and 250(57.2%) had GCS less than 7. GCS less than 7 accounts for 7.8 times increase of mortality rate [AOR=6.2 (1.1–44), CI=95%]. Besides, ventilated patients had increased risk of mortality up to 17.6 times than those who were not ventilated [AOR=15.5 (2.1–13.1), CI=95%]. Moreover, the patients who were on ionotrophs also had 10 times more risk of mortality comparing to those who were not on ionotrophs [AOR=9.4 (2.9–23), CI=95%].

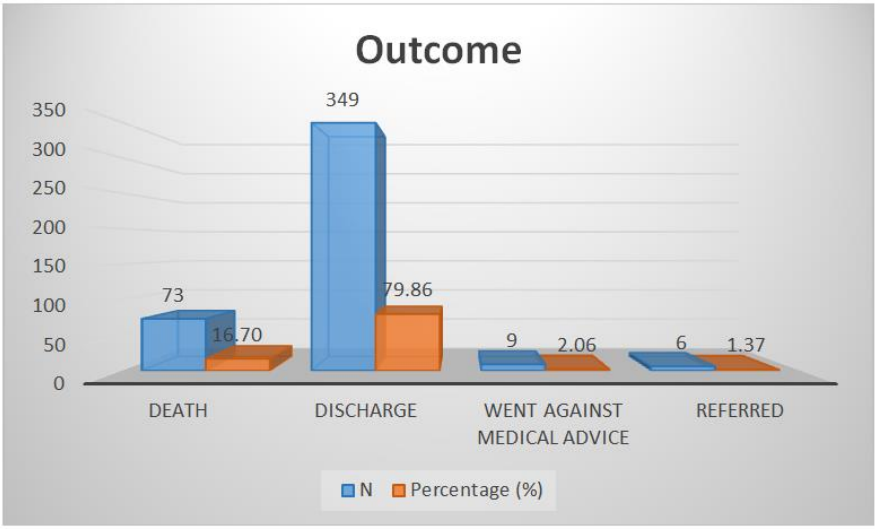

Figure IV: Outcome Pattern of the Study Patients

Figure IV shows the outcome pattern of the study patients. The outcome revealed, overall mortality was 92(21.05%), 330(75.52%) were discharged, 9(2.06 %) patients went against medical advice, 6(1.37%) patients were referred for specific comorbidities. Use of inotropes, need for mechanical ventilation, and presence of co morbid illness and low level of Glasgow coma scale less than eight were independent predictors of mortality.

DISCUSSION

In this study, most 39.36% respondents were aged <1 year and followed by 29.75% were aged between 1-5 years, 24.49% aged 6-10 years and the rest 6.41% aged more than 10 years. The mean ±SD age was 3.55±3.52 years. [Figure I]. A study conducted in Israel found almost similar results [9]. El Halal MG *et al.*, also reported their majority of patients 78.3% aged under 5 years [11]. Abhulimhen-Iyoha *BI et al.*, in their

study found that 72.4% patients were <5 years old [12]. Haque A *et al.,* in their study reported, most children 62.5% were <5 years [13]. Most of the patients 68% were male and 32% were female. [Figure II] In a study conducted by Praveen *et al.,* and in some African studies it was seen that males outnumbered female patients similar to the present study [11, 14]. Haque A *et al.,* also reported majority of the patients 60.9% were male [13]. Most of the patients 70% were from urban area and 30% were from rural area [Figure III]. Maheswari K *et al.,* in their study also found most patients 70.4% were from rural area and 29.5% form urban area [15]. Most families 50.6% had monthly income between 5000-10000 tk. and followed by 29.3% family's monthly income was between 11000-20000 tk., 14.2% family's monthly income was between 21000-30000 tk., and only 5.9% family's monthly income was >30000 tk [table I]. Hasan MZ, *et al.,* in their study showed Most families 50.61% had monthly income between 5000-10000 tk. and followed by 29.44% family's monthly income was between 10000-30000 tk., 5.84% family's monthly income was between 50000-50000 tk., and 14.11% family's monthly income was >50000 tk [16]. Meningoencephalitis was the most common diagnosis 19.45%) for admission in PICU. This was followed by pneumonia 17.16%, septicemia 8.92%, and neurosurgical patient 7.78%. Although few percentages, some other diseases were significantly important like GBS 5.95%, AGN with complication 2.97%, hepatic encephalopathies 2.06%, accidental emergencies 2.52%, dengue shock syndrome 2.29% , diabetic ketoacidosis 1.6% and other chronic diseases needed PICU support. Mortality was 10 times more probable among patients with comorbid illnesses than those without other related comorbidities [AOR=9.5 (1.2–38), CI=95%] [Table II]. Haftu *et al.,* also supported this result [AOR=10.2 (2.4–44), CI=95%] [4]. But Maheswari K *et al.,* in their study found pneumonia was the most common diagnosis 8.4% for admission in PICU and followed by dengue 3.7%, traumatic head injury 2.8% [15]. Similar findings were seen in a study conducted in Coimbatore where respiratory illness was the most common reason for PICU admission [17]. A similar study conducted in Bihar by Kumar R *et al.,* reported that neurological diseases followed by respiratory illness was the most common reason for PICU admission [18]. Among the 437 patients, 13.7% were on ventilator, 1.4% was extubated, 52.6% were on ionotrophs and 57.2% had GCS less than 7. GCS less than 7 accounts for 7.8 times increase of mortality rate [AOR=6.2 (1.1–44), CI=95%]. Besides, ventilated patients had increased risk of mortality up to 17.6 times than those who were not ventilated [AOR=15.5 (2.1–13.1), CI=95%]. Shafiul Hoque *et al.,* in their study reported 144 patients were on ventilator [19]. Moreover, the patients who were on ionotrophs also had 10 times more risk of mortality comparing to those who were not on ionotrophs [AOR=9.4 (2.9–23), CI=95%] [table III]. Similar findings were reported in the study of Haftu *et al.,* where they claimed that GCS<8 increase mortality upto 7.8 times [AOR=7.75 (1.1–54), CI=95%], ventilated patients were at 17.6 times increased risk of mortality [AOR=17.6 (2.2–14.3), CI=95%] and inotropes were at increased risk of mortality by 10 times [AOR=10.4 (3.7–29), CI=95%] [4]. The outcome revealed, overall mortality was 92(21.05%), 330(75.52%) were discharged, 2.06 % patients went against medical advice, 1.37% patients were referred for specific comorbidities. Use of inotropes, need for mechanical ventilation, and presence of co morbid illness and low level of Glasgow coma scale less than eight were independent predictors of mortality [Figure IV]. Maheswari K *et al.,* noted the outcome where they showed 87.8% were discharged, 10.7% went against medical advice and 1.4% were referred to another ward at parents request [15]. But a study conducted by Jyothi AK showed that only 52.5% improved and 19.5% were referred/went against medical advice [20]. Some related study in this field reported the mortality rate varied from 2.1 to 41% where the highest mortality was found in developing countries due to lack of resources [21-30].

CONCLUSION

In this study, we included the children below 14 years admitted to PICU with complete patient information and the investigation reports in the medical records. Most of the children admitted to the PICU were male. Respiratory disorders, infectious diseases, neurological problems, and poisoning are primarily responsible for PICU admissions. Central nervous system disorders were mainly responsible for the patients who were admitted to the PICU. But for future studies, it is suggested that additional detailed potential studies should be conducted as this is a surveying study using small proportions of the sample, emphasizing the awareness of the most common and emerging rare etiology of patients admitted to PICU. The statistically significant predictors of mortality in this study were: the presence of comorbid illness, need for MV, and need for inotropes, low GCS level, infectious disease, and duration of ICU stay. The need for ventilation and inotropes indicates that these patients were in an advanced stage of disease.

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