

A STUDY OF THE CAUSES OF READMISSIONS IN ALEXANDRIA UNIVERSITY PEDIATRIC INTENSIVE CARE UNIT WITHIN THE LAST 5 YEARS

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Introduction

Pediatric Intensive Care Unit (PICU) readmissions can pose challenges to hospital efficiency, potentially causing delays in admitting other critically ill patients or those requiring major elective surgeries.

Overall, studies done to identify the causes of PICU readmissions have shown that the rates of readmissions have ranged from 1.6% to 60%.(2,18,28-30). Factors such as complex chronic conditions (CCCs), increased severity of illness, source of admission, longer PICU length of stay, need for mechanical ventilation, age less than 6 months, and a diagnosis of delirium have been associated with subsequent readmission.

Regardless of its underlying cause, unplanned readmissions among pediatric patients impose significant financial strains on the healthcare system, and result in unwarranted disruptions for both patients and their caregivers, impeding an optimal patient experience.(5,6)

Aim of the work

This study was done to identify the incidence and causes of readmission to PICU as well as compares the clinical outcome among readmitted and non-readmitted patients.

Patients and Methods

This retrospective single-site study took place at Alexandria University PICU. Data was collected from 1234 patients who were admitted from January 2018 to December 2022. 399 patients did not survive to discharge and were excluded from the study while 835 were enrolled into the study.

On index admission data including age, sex, primary diagnosis, presence of chronic co morbid conditions, disease severity based on PIM3 and PELOD2 score, length of stay, need for mechanical ventilation, inotropes, blood product transfusions, surgical interventions and renal replacement therapy was collected.

Early readmission was defined as readmission happening within 48 hours of discharge while late readmissions were defined as readmissions happening after 48 hours of initial discharge. Risk factors were analyzed by univariate and multivariate analyses.

Results

Among the 835 patients included in the study 44 (5.27%) patients experienced a total of 47 readmissions within the study period. 41 (93.18%) were readmitted once while 3 (6.82%) patients were readmitted twice. Out of the 44 patients, 7 (15.90%) patients were readmitted during the first 48 hours of discharge, while 37 (84.10%) were readmitted after 48 hours after discharge.

In the univariate analysis the characteristics on index admission significantly associated readmission were having a primary cardiac diagnosis, acute kidney injury, chronic cardiac condition, chronic immunological condition, Down’s syndrome, having 1 or more complex chronic conditions and requiring dialysis.

In the multivariate analysis factors during index admission independently associated with readmission to PICU were a primary diagnosis of acute kidney injury, complex immunological conditions, having Down’s syndrome and having 1 complex chronic condition.

Mortality rate for readmitted patients was 11/44 (25.00%), while overall PICU mortality was 410/1234 (33.23%).

Table (1): Univariate and Multivariate Logistic Regression for readmission

	Univariate OR (LL – UL 95%CI)	p-value	Multivariate OR (LL – UL 95%CI)	p-value
Cardiac diagnosis on admission	٣.٦٢٦ (1.825-٧.٢٠٦*)	p<.001*		p=1.00 NS
Acute kidney injury diagnosis on admission	٤.٤٨١ (1.611-12.464*)	p=.00٤*	4.441 (1.057-18.661*)	p=.042*
Heart failure diagnosis on admission	3.064 (1.295 – 7.248*)	p=.011*	0.00 (0.000-0.00)	p=1.00 NS
Other cardiac conditions diagnosis on admission	3.218 (1.280 – 8.091*)	p=.013*	0.00 (0.000-0.00)	p=1.00 NS
Chronic Cardiovascular condition	4.739 (2.318–9.691*)	p<.001*	2.574 (0.876-7.564 NS)	p=.086 NS
Chronic Immunology Condition	13.083 (3.550 – 48.220*)	p<.001*	18.126 (4.257-77.176*)	p<.001*
Chronic Genetics condition (Downs syndrome)	10.500 (3.999 – 27.570*)	p<.001*	11.853 (3.017-46.565*)	p<.001*
Dialysis	4.646 (1.805 – 11.959*)	p=.001*	3.252 (0.895-11.814 NS)	p=.073 NS
Number of Chronic conditions				
- No	١		١	
- One	4.211 (1.968 – 9.013*)	p<.001*	2.667 (1.150-6.187*)	p=.022*
- Two	8.840 (2.550-30.6٤٧*)	p=.001*	0.690 (0.092-5.160 NS)	p=.718 NS
- Three	0.00 (0.00-0.00)	p=1.00 NS	0.00 (0.000-0.00)	p=1.00 NS

Conclusion

The study highlighted risk factors that may prove to be significantly associated with PICU readmission. Identifying high-risk patients can aid in developing risk-adjusted strategies and predictive scoring systems for PICU readmissions. This knowledge is essential for designing targeted interventions to reduce readmissions