

## DEMOGRAPHIC CRITERIA, CLINICAL PROFILE AND OUTCOME IN PICU OF EL-HUSSEIN UNIVERSITY HOSPITAL

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### **ABSTRACT**

**Background:** *Demographic criteria, clinical profile and outcome of pediatric intensive care unit (PICU) patients are significantly different from center to center and from country to country. Outcome assessment is of considerable importance to parents, intensive care staff, and Ministries of health.*

**Objectives:** *The aim of this study was to analyze demographic criteria, clinical profile and outcome in El-Hussein University Hospital PICU.*

**Methods:** *Data of El Hussein University hospital PICU patients had been collected prospectively through 18 months from 1/7/2011 to 31/12/2012. Collected data include: demographic profile; admission source and diagnosis at admission; length of stay (LOS) and discharge outcome. Data were expressed as mean  $\pm$  SD, p value: Student's t-test;  $\chi^2$ .*

**Results:** *286 patients (190 boys/ 96 girls), Their ages ranged from one month to fifteen years, were admitted due to respiratory disorders (43%), cardio vascular disorders (20.9%), CNS disorders (12.2%) and surgical disorders (11.1%), Endocrine\ Metabolic (7.6%), and other causes (5.2%). The overall outcome of the patients showed a cure rate of 81.8% while the morbidity rate was 5.3% and the mortality rate was 12.9%. The main causes of mortality are Accidents (8patients) followed by renal failure, CNS infections, and pneumonia by (4patients) for each of them. There were no significant statistical differences between survivors and died cases regarding age, gender or consanguinity, while there was a highly significant statistical difference between them regarding the length of hospital stay. There was no significant difference between survivors and died cases in relation to the admission source except patients admitted from the neurosurgery department (P value was 0.0182).*

**Conclusions:** *Demographic profile was similar to other relevant studies while there were major differences in the pattern of diseases and the severity of the illness. Mortality rate (12.9 %) was relatively high. Accidents and infections presented as a main causes of death among our patients.*

**Key words:** *pediatric intensive care unit, mortality, morbidity, and outcome.*

## **INTRODUCTION**

One pediatric population of special interest is critically ill children, since these children are at an increased risk of death. A pediatric intensive care unit is an area within a hospital specializing in the care of critically ill infants, children, and teenagers<sup>1,2</sup>.

From the historical point of view, pediatric intensive care dates from the polio epidemic in Copenhagen in 1952. Doctors reduced the 90% mortality in patients receiving respiratory support with the cuirass ventilator to 40% by a combination of manual positive pressure ventilation provided by medical students and by caring for patients in a specific area of the hospital instead of across different wards<sup>3</sup>.

Complex technologies and equipments are often in use in PICU, particularly mechanical ventilators and patient monitoring systems. Consequently, PICUs have a larger operating budget than many other departments within the hospital<sup>4,5</sup>.

Advances in knowledge and technology of medical science dramatically improve the prognosis for the critically-ill children. Numerous conditions that were previously fatal are now treatable<sup>6</sup>.

Demographic profile and outcome of PICU patients can vary widely in different studies. PICU outcome assessment is of considerable importance to parents, intensive care staff, and health ministrations. The increasing availability and capacity of mechanical and artificial organ support systems and the resultant low mortality rates in most pediatric intensive care units (PICUs) have meant that survival after admission to ICU is no longer the only outcome of interest. Thus, increasingly functional outcome and quality of life are seen as very important<sup>7,8</sup>.

The outcome of any child depends on different factors including; diagnosis, pre-existing health problems, severity of illness, standards within the ICU and another factors such as available treatments, social cultural attitudes towards complex patients and complex treatments, attitudes towards prolonged care and withdrawal of care, and overall hospital and public health care system<sup>9</sup>.

The Department of Pediatric Intensive Care in El-Hussein University Hospital, Cairo, Egypt is a multidisciplinary 8-bed PICU of a tertiary hospital. It has a 24hours/7days full coverage of a pediatric intensivist and provides

admission to infants with age of > 30 days to children up to 18 years, in all diagnostic categories, except postoperative congenital heart diseases patients. Laboratory, radiological and operational facilities are 24hrs available, while there is on call coverage of all pediatric subspecialties.

The aim of the present study was to find out the PICU outcomes in El-Hussein University Hospital, including mortalities, morbidities and causes of death also, to evaluate possible risk factors in relation to diagnostic categories, admission source, length of hospital stay, recurrent PICU admission and other demographic factors.

### **PATIENTS AND METHODS**

#### **Patients:**

The present study is a prospective study, where all PICU patients (except those were excluded According to the exclusion criteria) who had been admitted from 1/7/2011 to 31/12/2012 were included in the study and their data were recorded. Exclusion criteria were: patients with missing data and patients who died during the first two hrs of admission, because their PICU stay was too short to be connected to the outcome. We follow admission and discharge criteria of

American academy of pediatrics (AAP)<sup>10</sup>. Because this study is an observational study, which didn't require any deviation from routine medical care, informed consent was not required.

#### **Data collection:**

After history taking, complete general and systemic examination for all patients, the following data were collected prospectively: age; gender; admission diagnosis; admission source (ED, pediatric ward, surgical wards in El-Hussein University Hospital); previous neonatal or pediatric intensive care admission; PICU length of stay (LOS) and the outcome (includes follow up until death in the PICU, or discharge with or without morbidity). Withdrawal of life support doesn't occur in our unit because of absence of legal laws that regulate this issue in our country.

#### **Statistical Analysis**

Data were expressed as Median, mean  $\pm$  SD (standard deviation), minimum-maximum and/or percentage as appropriate using SPSS (Statistical Package for Social Science) software for windows version 10. Statistical analysis was performed using (Student's t-test,  $X^2$  -Chi square test and Mann Whitney test). The criterion of significance was a value of  $P < 0.05$ .

**RESULTS****Table (1): Patients' age, sex and overall outcome.**

<b>Age</b>	<b>n=286</b>		<b>Percentage</b>
<1yr	128		44.8 %
1 – 6 yrs	111		38.8%
6 -12 yrs	35		12.2%
≥ 12 yrs	12		4.2%
Total	286		100%
	<b>Range</b>	1 month – 15 years	
	<b>Mean ± SD</b>	2.66 ± 3.11years	
	<b>Median</b>	1 year	
<b>Sex</b>	<b>n =286</b>		<b>Percentage</b>
Males	190		66.4%
females	96		33.6%
Total	286		100%
<b>Outcome</b>	<b>n =286</b>		<b>Percentage</b>
Survivors	249		87.1 %
	completely Cured	234	81.8%
	Discharged with Morbidity	15	5.3%
Mortality	37		12.9 %

Among total 312 PICU admitted patients in the previously mentioned time period, only 286 (190 males and 96 females), aged from 1month – to 15years, were eligible for the study. One hundred twenty eight patients (44.8%) of them were below 12 Months old.

Concerning the overall outcome, (37patients, 12.9%) died, (15 patients, 5.3%) discharged with Morbidity and (234patients, 81.8%) completely cured. Patients' age, sex and overall outcome are shown in Table 1.

**Table (2): Causes of admission in PICU.**

<b>Cause of admission</b>	<b>(n=286)</b>	<b>Percentage</b>
<b>Respiratory system</b>	<b>123</b>	<b>43%</b>
Pneumonia	83	29.02%
Acute bronchiolitis	20	6.9%
Status athmaticus	14	4.8%
Acute respiratory distress syndrome	3	1.04%
Pertussus	2	0.6%
Stridor (croup )	1	0.3%
<b>Cardio vascular system</b>	<b>60</b>	<b>20.9%</b>
Heart failure (HF)	21	7.3%
Hypovolemic shock	26	9.1%
Septic shock	7	2.4%
Post arrest	3	1%
Life-threatening dysrhythmias	3	1%
<b>Hematology</b>	<b>1</b>	<b>0.3%</b>
Idiopathic thrombocytopenic purpra	1	0.3%
<b>Endocrine \ Metabolic</b>	<b>22</b>	<b>7.6%</b>
DKA	16	5.5%
Hypocalcaemia	1	0.3%
Hypernatremia	4	1.3%
Hypoglycemia	1	0.3%
<b>Central nervous system</b>	<b>35</b>	<b>12.2%</b>
C N S infection	22	7.6%
Intra cranial hemorrhage	5	1.7%
Status epilepticus	4	1.3%
Acute disseminating encephalomyelitis	2	0.6%
Brain tumor	1	0.3%
Stroke	1	0.3%
<b>Gastro intestinal tract</b>	<b>3</b>	<b>1%</b>
Fulminant hepatic failure	3	1%
<b>Renal system</b>	<b>8</b>	<b>2.7%</b>
Renal failure	8	2.7%
<b>Surgical</b>	<b>32</b>	<b>11.1%</b>
Accidents (road traffic,head trauma,.....etc)	21	7.3%
Post operative care	11	3.8%
<b>Multi organs dysfunction</b>	<b>2</b>	<b>0.6%</b>

The main cause of admission to PICU were respiratory disorders which represented (43%) followed by cardio vascular disorders which

represented (20.6%). Causes of admission in PICU are shown in table 2.

**Table (3): The morbidity outcome in relation to the system affected**

System Affected	Type of Morbidity	(n=15)	Percentage
CNS	11		73.3%
	Epilepsy	6	40%
	Motor disability (Hemiplegia 2 ) (diplegia 1 )	3	20%
	Post meningitic spastic cerebral palsy	1	6.7%
	Hydrocephalus	1	6.7%
Respiratory System	Pleural thickening (fibrosis)	2	13.3%
Renal System	Chronic dialysis	1	6.6%
GIT System	Colostomy	1	6.7%

As regard the type of morbidity, CNS morbidities come first by (11/15, 73.3%). The morbidity

outcome in relation to the system affected is shown in table 3.

**Table (4): Leading causes of death in PICU patients.**

Cause of mortality		(n=37)	Percentage
Accidents		8	21.6%
	Road traffic accidents	4	
	Falling from a height	3	
	Drowning	1	
Renal failure		4	10.8%
CNS infections		4	10.8%
	Meningitis	1	2.7%
	Encephalitis	1	2.7%
	Brain abscesses	2	5.4%
Pneumonia		4	10.8%
	Bronchopneumonia	3	8.1%
	Lobar Pneumonia	1	2.7%
Acute Respiratory Distress Syndrome		3	8.1%
Fulminant hepatic failure		3	8.1%
Cardiomyopathy		2	5.4%
Post arrest		2	5.4%
Multi-organ dysfunction syndrome		2	5.4%
Sepsis-septic shock		2	5.4%
Myocarditis		1	2.7%
Brain tumor		1	2.7%
Acute Disseminating Encephalomyelitis		1	2.7%

Accidents comes first as a leading cause of death in PICU by (8 patients, 21.6%), followed by renal failure, CNS infections, and

pneumonia by 4 patients for each of them. Leading causes of death in PICU patients are shown in table 4.

**Table (5): Patients' outcome in relation to the system involved**

System	Total (n.=286)		Survivors (No.=249)		Mortality (No.=37)		X <sup>2</sup>	P value
	N	%	No.	%	No.	%		
Respiratory	123	(43.1)	116	46.6	7	18.9	10.03	<b>0.0015</b>
CNS	56	(19.5)	42	16.8	14	37.8	8.96	<b>0.0027</b>
CVS	45	(15.7)	39	15.6	6	16.2	0.08	0.7779
GIT	28	(9.7)	24	9.6	4	10.8	0.02	0.8847
Endocrine	18	6.2	18	7.2	0	0	1.76	0.1846
Renal	9	3.1	5	2	4	10.8	5.56	<b>0.0184</b>
Metabolic	4	1.3	4	1.6	0	0	0.60	0.4383
Hematologic	1	0.3	1	0.4	0	0	0.15	0.6993
MODS	2	0.6	0	0	2	5.4	6.89	<b>0.0086</b>

Concerning the difference between survivors and dead cases in relation to the involved system there were significant statistical differences between survivors and

dead cases in relation to respiratory system in CNS, renal, and MODS disorders. Patients' outcome in relation to the system involved is shown in table 5.

**Table (6): Comparison between survivors and dead cases in relation to risk factors.**

Variables	Survivors (n=249)	Mortality (n=37)	Test of sig.	P value
Age /year Mean ± SD Range. Median	2.55 ± 2.93 1 month – 13 years 1 year	3.45 ± 4.07 1 month – 15 years 1 year	t=1.65	0.0998
Gender: Males Females	165 (66.3%) 84 (33.7%)	25 (67.5%) 12 (32.5%)	X <sup>2</sup> =0.02	0.8756
Consanguinity: Yes No	51 (20.5%) 198 (79.5%)	7 (18.9%) 30 (81.1%)	X <sup>2</sup> =0.05	0.8253
Length of hospital stay/ days Mean±SD Range Median	9.58 ± 6.72 2 - 33 8	15.08 ± 13.46 1 – 50 10	t = 3.94	<b>0.0001</b>
Recurrent PICU Admission No Yes	243 (95.5%) 6 (4.5%)	37 (100%) 0 (0%)	X <sup>2</sup> =0.91	0.3399



There was no significant statistical difference between survivors and dead cases regarding the age, gender, consanguinity or recurrent PICU admission, while there was highly statistical

difference between them in relation to duration of hospital stay. Comparison between survivors and dead cases in relation to many variables is shown in table 6.

**Table (7): Patients' outcome in Relation to the Source of Admission.**

Source of admission	Total (n=286)	Survivors (n=249)	Mortality (n=37)	X <sup>2</sup>	P value
<b>Emergency Department (ED)</b>	191 (66.8%)	169 (67.8%)	22 (59.5%)	1.02	0.3115
<b>Pediatric Department</b>	64 (22.4%)	56 (22.5%)	8 (21.6%)	0.01	0.9060
<b>Surgical Departments</b>	31 (10.8%)	24 (9.7%)	7 (18.9%)	2.87	0.0902
Pediatric surgery	12 (4.1%)	10 (4%)	2 (5.4%)	0.15	0.6940
Neuro-surgery	11 (3.8%)	7 (2.8%)	4 (10.8%)	5.57	<b>0.0182</b>
Plastic surgery	3 (1.3%)	3 (1.2%)	0 (0%)	0.45	0.5020
Uro-surgery	4 (1.3%)	3 (1.2%)	1 (2.7%)	0.52	0.4961
ENT department	1 (0.3%)	1 (0.4%)	0 (0%)	0.15	0.6993

The highest percentage of admitted patients was from emergency department ED (66.8%) followed by pediatrics department (22.4%). There was a significant relation between the source of admission and mortality outcome regarding patients admitted from the neurosurgery department (P value was 0.0182), but other sources of admission had no significant relations to the mortality outcome. Patients' outcome of the patients in relation to the source of admission is shown in table 7.

## **DISCUSSION**

This prospective single center study described the demographic criteria, clinical profiles and outcomes of patients admitted in the pediatric intensive care unit at El-Hussein University Hospital, AL-Azhar University, Cairo, Egypt from 1/7/2011 to 31/12/2012.

The mean age of our patients (2.66 ± 3.11 years), as well as the proportion of infants (44.8 %), were within the reference values of PICU patients in Haque and

Bano study in Pakistan who reported that (37%) of patients admitted to the PICU, were less than one-year old and Patients' mean age was 24 months, while Volakli E et al. in their study in Greece reported a lower proportion of infants (28%)<sup>7,11</sup>. This can be explained by liability of this age group to severe infections or undiagnosed hereditary and congenital disorders especially in the developing countries.

The male sex predominance (66.4%) was for some extent higher than the relevant values of (54-61.1%) in many studies<sup>1,12-16</sup>. While others reported values that came in concordance with ours, like Haque and Bano study and Volakli E et al. study who reported that (66%) and (64.6%) respectively were males<sup>7,11</sup>.

Mortality rate of our patients was (12.9 %), within the reference values of (4.2-13%) that given by many reviewers, but relatively high compared to the most recent ones<sup>1,12,13,17-24</sup>. Despite PICU's main goal is the reduction of mortality, but special consideration should not be given to mortality rates alone, without other factors assessment (e.g. severity of illness and the patient population) because this might

make misinterpretation of the data<sup>25</sup>.

The surgical causes of admission represented a minority of our cases (11.1%) while the majority of admissions were medical disorders (respiratory disorders 43%, cardiovascular disorders 20.6%, and central nervous system disorders 12.6%). Our results seems to follow El Halal et al., who stated that the nonsurgical indications for ICU admission were respiratory dysfunction 43.9%, hemodynamic instability 19.5%, central nervous system disorders 17.3% and other causes 8.2%, also Volakli E et al. reported that only 7.7% were admitted for surgical causes<sup>7,16</sup>. This is opposite to associated studies where surgical patients represent a big proportion of PICU patients ranged from (16-60%)<sup>12,17,22,26</sup>.

Of respiratory disorders, pneumonia was the major cause of admission (20.2%), Which considered analogous to Khan et al., who reported that pneumonia was the major cause of admission (29.05%)<sup>27</sup>. This can be explained by infections remain one of the major problems in pediatric intensive care units and are the leading cause not only of admissions but also mortality in developing countries. Also, WHO

reported that the most common cause of death below five years is pneumonia.

Morbidities outcome were (5.3%). The highest morbidity was reported among patients with CNS disorders (73.3%) followed by respiratory system disorders (13.3%), and Renal disorders system (6.6%). The most form of morbidity was post encephalitic epilepsy (6 cases). It is difficult to make comparisons across diagnostic categories, due to lack of this information in linked studies.

Accidents were the main cause of death (21.6%) in our study; all trauma patients that died did so because of severe traumatic brain injury. Rest brain dead patients could be related to the high proportion of CNS pathology in admission; if coma, seizures and metabolic patients that have CNS involvement are put together with trauma patients, they account for 37% of all deaths, and could explain the unfavorable progress of CNS damage to brain death. A remarkable note on these patients is that they didn't have previous health problems. From another point of view, infections were responsible for (32%) of deaths (4 CNS infections, 4 pneumonias, 2 MODS, and 2 septic shock). All patients that died from MODS (2

cases) did so despite maximal treatment due to terminal organ failure and refractory shock. Our findings on the causes of death are quite different from the literature where it is reported that approximately 28-65% of deaths in the PICU follow limitation or withdrawal of life sustaining treatment with a proportion of brain dead patients of (23-38%)<sup>29,30</sup>. The different death profile of our patients could be attributed to the differences in the pattern of diseases and the lack of guidelines on withdrawal of life-sustaining medical treatment in our country.

In our study, the mortality rate was higher in CNS disorders (37.8%), respiratory disorders (18.9%) and cardio vascular disorders (16.2%). This doesn't look similar to Volakli E et al. who reported that mortality was worse for patients with MODS, the majority of those patients suffered from co morbidities, mainly cancer, followed by patients with coma, sepsis-septic shock, trauma, metabolic diseases, cardiovascular failure, seizures and respiratory failure. On the other hand best prognosis was found in postoperative care, accidents and miscellaneous diseases patients<sup>7</sup>. This can be partially explained by no oncology unit in our hospital,

so all diagnosed cancer patients are referred to pediatric oncology hospitals.

In our study, the mortality outcome of the study group in relation to age, gender and consanguinity showed that there were no significant relations between the mortality outcome and age, gender or consanguinity. These data agree with Bilan et al.<sup>31</sup>. On the contrary to our results, El-Nawawy et al, 2003 in the PICU of El-Shatby Children's Hospital in Alexandria found that there were significant statistical difference between survivors (mean age was  $23 \pm 31$  months) and the dead patients (mean age was  $13 \pm 23$  months)<sup>32</sup>.

Concerning the mortality outcome among the study group in relation to the length of hospital stay, there was a high significant difference in hospital stay for survivors and expired patients. The mean length of hospital stay among survivors was ( $9.58 \pm 6.72$  days) and was ( $15.08 \pm 13.46$  days) among expired patients, and the median was (8 days) among survivors and (10 days) among expired patients.

These data did not comply with Volakli E et al. who reported that the mean duration of hospital stay among survivors was ( $8.5+22.1$  days) while for dead patients was

( $12.17 \pm 32.58$  days) and (p value was 0.4)<sup>7</sup>.

This can be explained by that prolonged hospital stay may point to complexity of disease, high incidence of nosocomial infections, particularly respiratory infections probably related to the common use of invasive mechanical ventilation. The prolonged use of central vascular accesses and bladder catheterization favor infections in these locations.

Our results showed no significant relation between mortality outcome and recurrent PICU admission. This can be explained by awareness of the family by the patients and early seek for treatment.

Most patients in our study were admitted from emergency department (66.8%). This result did not comply with El Halal et al., who reported that, only (21.5%) from emergency department and (34.7%) of patients were transferred from other facilities<sup>16</sup>.

Contrary to references<sup>26,33</sup> that attribute higher mortality to internal patients, mortality rate in the present study had no statistically significant difference with source of admission except for those admitted referred from the neurosurgery department (P

value was 0.0182), probably due to the small size of our sample.

In conclusion, our study is one of many studies try to provide thorough data on Egyptian PICU patients, and the first to evaluate the morbidities. The demographic profile of our patients showed that although age, sex, and source of admission follow the general pattern of PICU patients worldwide, there are major differences in the pattern of diseases and the severity of the illness. Outcome analysis showed that PICU mortality rate (12.9 %) was higher than in relevant recent studies but in accordance with the pattern of diseases and the severity of the illness.

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# السمات الديموجرافية والتوصيفات الإكلينيكية ومآل الحالات المحجوزة بوحدة الرعاية المركزية للأطفال بمستشفى الحسين الجامعي علي محمد زعقوق، محمد عبد الملوك حسن، محمد فتحي حسن

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يحظى تقييم النتائج الخاصة بالرعايات المركزية للأطفال باهتمام بالغ بين الآباء والقائمين على وحدات الرعاية المركزية و وزارات الصحة. كما يتضح ان التشخيص المبدئي والاضطرابات الموجودة مسبقا تمثل مفتاحا مهما في تجديد مآل الحالات.

وتهدف هذه الدراسة الى تقييم السمات الديموجرافية والتوصيفات الإكلينيكية ومآل الحالات المحجوزة بوحدة الرعاية المركزية للأطفال بمستشفى الحسين الجامعي . و قد أجريت هذه الدراسة على جميع الأطفال الذين تم حجزهم بالوحدة على مدار عام ونصف العام فى الفترة من يوليو 2011 و حتى نهاية ديسمبر 2012 عدا أولئك الذين توفوا في غضون ساعتين من الحجز بالوحدة. .

وقد أظهرت الدراسة أن عدد الحالات الذين تم حجزهم فى الفترة المذكورة 286 حالة ، 190 ذكر و96 أنثى. كما تبين من الدراسة إن النسبة الغالبة من الحالات التي تم حجزها كانت تقع فى السنة الأولى من العمر بنسبة 44.8%. وبلغت نسبة حالات الذكور المحجوزة 66.4% بينما بلغت حالات الإناث 33.6%.

وقد بينت الدراسة أن النسبة الغالبة من الحالات التي تم حجزها كانت تعاني من اضطرابات فى الجهاز التنفسى حيث مثلت 43% من الحالات ،بينما مثلت الحالات التي تعاني من اضطرابات فى القلب و الجهاز الدورى نسبة 20.9% فى حين كانت نسبة الحالات التي تعاني من اضطرابات فى الجهاز العصبى 12.6% بينما بلغت حالات الجراحات 11.1%.



وقد بلغت نسبة الوفيات نتيجة لحوادث الأطفال 21.6% و نسبة الوفيات نتيجة لاضطرابات الجهاز التنفسي 19.4% و نسبة الوفيات نتيجة لاضطرابات الجهاز الدورى 19.4% و نسبة الوفيات نتيجة لاضطرابات الجهاز الهضمى 8.1% و نسبة الوفيات نتيجة لاضطرابات الجهاز البولى 10.8%.

كما أظهرت الدراسة أن مصدر دخول أغلب الحالات كان من الطوارئ بنسبة 66.8% يليها الحالات القادمة من القسم الداخلى للأطفال بنسبة 22% بينما 10.8% هى نسبة الحالات من باقى أقسام المستشفى.

وقد أظهرت الدراسة أن نسبة الوفيات نتيجة لاضطرابات الجهاز العصبى مقارنة بحالات الجهاز العصبى التى تم حجزها فى الرعاية هى 37.8% وان نسبة الوفيات نتيجة لاضطرابات الجهاز التنفسي مقارنة بحالات الجهاز التنفسي التى تم حجزها فى الرعاية هى 18.9% وان نسبة الوفيات نتيجة لاضطرابات الجهاز الدورى مقارنة بحالات الجهاز الدورى التى تم حجزها فى الرعاية هى 16.2%.

كما أظهرت الدراسة طول مدة المكث فى الرعاية المركزة بين الأطفال المتوفين مقارنة بالأطفال الذين خرجوا بدون وفيات أو مراضة.

كما تبين انه لا علاقة بين مآل الحالات والدخول المتكرر للرعاية المركزة.

وقد أظهرت الدراسة أن نسبة الأطفال الذين خرجوا من الرعاية وهم يعانون من إعاقات نتيجة اضطرابات الجهاز العصبى هى اعلى نسبة حيث بلغت 73.3% بينما اضطرابات الجهاز التنفسي هى 13.3% و اضطرابات الجهاز البولى هى 6.6%.

كما تبين إن نسبة الحالات التى خرجت دون وفيات أو مراضة كانت أعلى من نسبة الحالات التى تعرضت للوفيات أو المراضة حيث سجلت الأولى 81.8% بينما سجلت المجموعات الأخرى نسبة 18.2%. حيث بلغت نسبة الوفيات 12.9% والذين خرجوا يعانون من إعاقات 5.3%.