ISSN No:-2456-2165

Early Hospital Mortality of Children Aged 1 to 59 Months in the Emergency Room in the City of Kinshasa

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Abstract:-

- ***Introduction:*** **Mortality is very high in pediatric wards in many low-income countries. About 30% of children die in hospital and the majority within 24 hours.**
- ***Objective:*** **To determine the frequency and factors associated with early deaths of children under 60 months admitted to pediatric emergency units in the city of Kinshasa.**
- ***Methodology:*** **Cross-sectional study with an analytical aim which took place in 5 hospitals in Kinshasa researching the early mortality of children aged 1-59 months admitted in vital distress during the study period (August-October 2021). The parameters of interest were collected by interview and observation. Descriptive and analytical statistics were performed.**
- ***Results:*** **of the 210 patients included in the study, 123 were female (58.6%) with a sex ratio of 1.4. There were 31 deaths or 14.8%, respiratory distress was the main reason for admission . Infants were the most concerned and most came from families with a low socio-economic level. The majority of deaths occurred between 24-48 hours and while on call. No factors were associated with the deaths of these children.**
- ***Conclusion:*** **Small infants are the most vulnerable to death. Unfortunately, they die more of respiratory pathologies. Delay in care or late transfer worsens the prognosis of children in life-threatening emergencies. The low socio-economic status of the parents exposes them to a fatal outcome.**

Keywords: *Early Deaths, Pediatric Emergencies.*

I. INTRODUCTION

The study of infant and child mortality, the best classic indicator of the sustainable socio-economic development of a country, makes it possible to evaluate the level of health development of a population and to judge the functioning of the health system of a country (1,2). In developing countries , pediatric morbidity and mortality is very high (3, 4, 5).

Globally, among the population under 25, there were 5.2 million deaths (70%) among children under 5 in 2019 (6). Sub-Saharan Africa and Central and South-East Asia alone account for around 80% of these deaths. (7) Nearly half of these deaths (49%) occurred mainly in 5 countries (Nigeria, India, Pakistan, Democratic Republic of Congo and Ethiopia); Nigeria and India alone account for almost a third (6). The DRC is one of these 5 countries where 77% of the population live in extreme poverty with less than $1.9/day (8).

The international community, through the Sustainable Development Goals (SDGs), maintains its objective of reducing neonatal mortality to at least 12 deaths per 1,000 live births and to at least 25 deaths per 1,000 live births for those under 5. years by 2030. This reduction remains one of the most important objectives in the national plans and programs of each country (9).

Hospital mortality remains very worrying in developing countries, especially in Africa because of the precariousness of the reception structures, the insufficiency of the diagnostic and therapeutic means necessary for these children in a state of vital distress. (10, 11, 12).

In several studies, the low socio-economic level of households (13,14,15) , the delay in diagnosis (16,17), the sex of the child (18,19), the level of education of the parents (14.20), previous loss of other children (21), multiple births (22), sibling size (23), self-medication (24

ISSN No:-2456-2165

), use of natural medicine (25.26), place of residence were some factors frequently associated with under-5 mortality (13,14,20).

Although the DRC occupies 4 th place among the 5 countries cited(6), there are very few studies reporting this early hospital mortality and analyzing its associated factors.

In order to determine the frequency of early deaths of patients aged 1-59 months admitted in vital distress to pediatric emergency units in the city of Kinshasa, we initiated this pilot study.

II. PATIENTS AND METHOD

This is a cross-sectional study with an analytical aim, including 210 children aged 1 to 59 months admitted to pediatric emergencies in vital distress in 5 health facilities (FOSA) in the city of Kinshasa. It extends over a period from August 01 to October 31, 2020, i.e. a duration of 3 months.

Were included in the study, any child aged 1-59 months admitted to the pediatric emergency room in a situation of vital distress during the study period.

It took place in 5 hospital institutions in the city of Kinshasa. These hospitals were chosen on the basis of the existence of a pediatric emergency department, their attendance and their accessibility. We have chosen the following institutions (University Clinics of Kinshasa (Mont Amba District), Kalembe-lembe Pediatric Hospital (Lukunga District), Kingasani Hospital Center (Tshangu District), Saint Joseph (Mont Amba District), Kimbondo Pediatric Hospital (Lukunga District)). This was done in order to obtain a much more representative sample.

We carried out non-probability convenience sampling. We considered 3.7% as the prevalence of early pediatric hospital mortality (Chelo) (48), and calculated the minimum size of our sample with the formula: $\mathbf{N = Z^2.pq/ d^2}$

We used a pre-established data collection form which allowed us to collect our parameters of interest.

We used patient files and registers. Age , gender, delay in seeking treatment, notion of self-medication, notion of traditional therapy , vital outcome, time of death in service, causes of death, level of education of parents, parental occupation and socio-economic level of parents, were our main variables of interest.

We conducted a briefing of the collection team; to the identification of all patients aged 1-59 months admitted to pediatric emergencies in vital distress, we then interviewed the parents or guardians and collected certain information in the files and registers of the patients, finally we proceeded to sighting . Our data were entered using the EPI INFO 2011 software, processed using Excel 2010 software and analyzed using SPSS 21 software;

The usual descriptive statistics were used to summarize the qualitative and quantitative variables. Quantitative variables were summarized, either as mean and standard deviation, or as median and interquartile range depending on the normality of the distribution. Qualitative variables were summarized as proportions.

Analytical statistics were performed using Pearson's chi-square test to look for associations between the dependent (qualitative) variable and the independent (qualitative) variables. Binary logistic regression was used to identify factors associated with death in patients aged 1-59 months admitted in vital distress. We have received approval from the Kinshasa School of Public Health under number ESP/CE/75B/2021.

III. RESULTS

In this study we recruited 210 patients aged 1-59 months admitted to the five health facilities (FOSA) chosen and among whom 123 were female (58.6%) and 87 were male (41.4%). . The sex ratio was 1.4.

- *Sociodemographic, Clinical, Therapeutic and Evolutionary Characteristics of Patients Aged 1-59 Months Admitted to Pediatric Emergencies.*

Table 1 Distribution of Patients According to their Socio-Demographic Characteristics

Variables	Numbers (n=210)	%
Age of children (Median, EIQ)	10 months (5 months; 24 months)	
Children age range		
small infants	122	58.1
large infants	71	33.8
Children	17	8.1
Gender of the child		
Male	87	41.4
Feminine	123	58.6
Socio-economic level of parents		
Pupil	64	30.5

ISSN No:-2456-2165

Down	146	69.5
Place of origin		
Residence	86	41.0
Transfer	124	59.0
Self-medication concept		
Yes	175	83.3
No	35	16.7
Concept of traditional therapy		
Yes	80	38.1
No	130	61.9
Time to seek care (Median; EIQ)	3 days (2 days; 4 days)	
Vital Issue		
Favorable	179	85.2
Unfavorable	31	14.8
In-Service Death Schedule *(N=31)		
Ordinary service	7	22.6
Guard	24	77.4

Table 1 shows us that the median age of the children was 10 months. Small infants were in the majority (58%) with a female predominance. The average time taken to seek medical care was 3 days, more than 80% had benefited from self-medication and 38% had used traditional healers. In their evolution, note 31 deaths or 14.8% and the majority of these deaths were observed during the guards.

- *The Main Diagnoses made in the Emergency Room:*

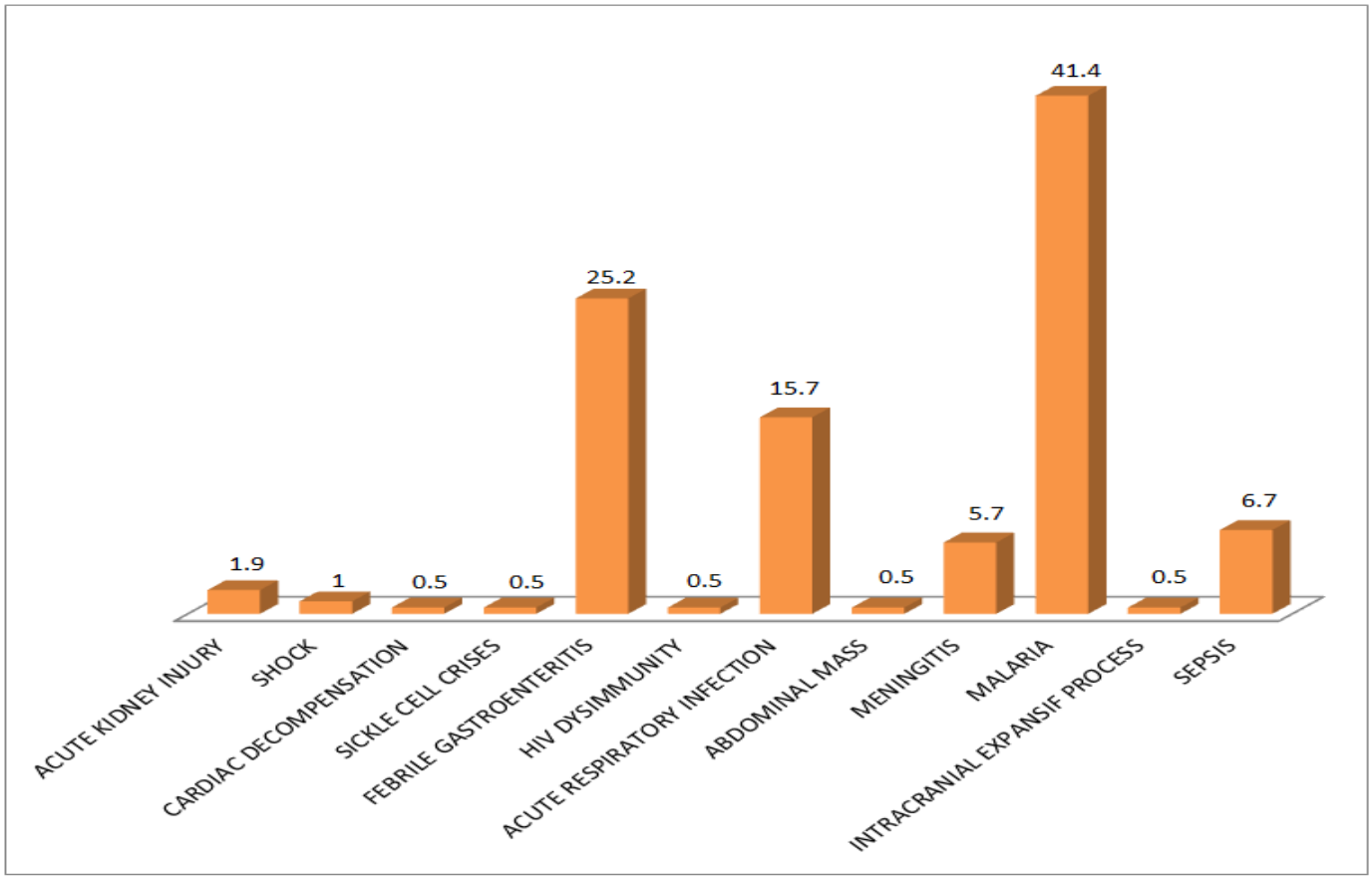

Fig 1 Diagnoses made in Pediatric Emergencies in Kinshasa

Fig 1 shows that malaria was the first diagnosis made in the emergency room, followed by acute febrile gastroenteritis and acute respiratory infections.

- *The Causes of Death of Children Aged 1 to 59 Months:*

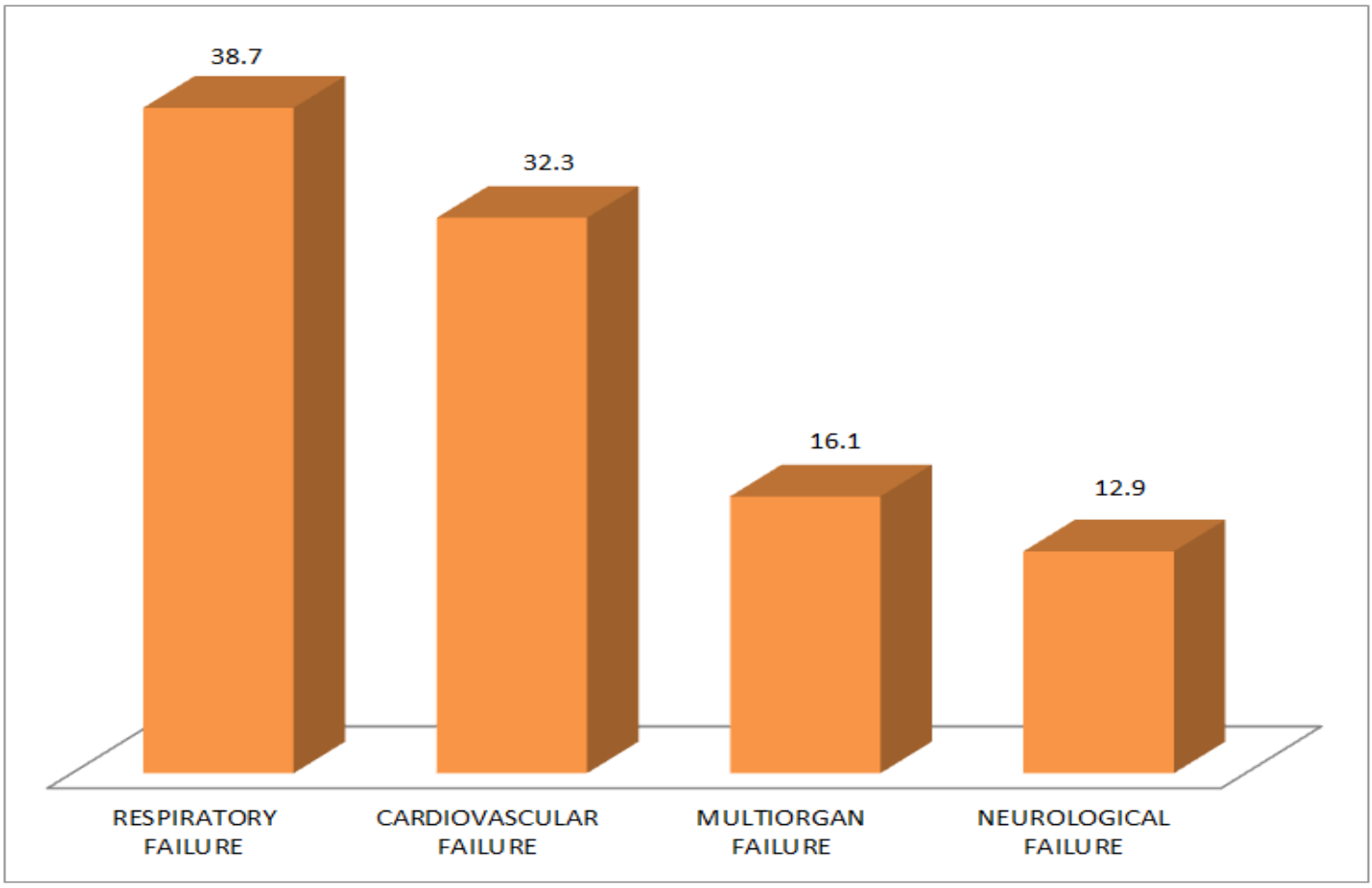

Fig 2 Causes of Death of Pediatric Emergency Patients in Kinshasa

This fig 2 shows that respiratory failure was the major cause of death of children seen in pediatric emergencies in Kinshasa 38.

➢ *Associations Between Independent Variables and the Vital Outcome of Patients Aged 1-59 Months Admitted to Pediatric Emergency Departments:*

Table 2 Association between Independent Variables and Vital Outcome

	Vital issue		
Variables	**Died n=31 (%)**	**Alive n=179 (%)**	**P**
Children age range			
small infants	20 (64.5)	102 (56)	0.48
large infants	10 (32.3)	61 (34.1)	
Children	1 (3.2)	16 (8.9)	
Child's gender			
Male	15 (48.4)	108 (60.3)	0.24
Feminine	16 (51.6)	71 (39.7)	
Father's level of education			0.84
State diploma or less	21 (67.7)	117 (65.4)	
More than a state graduate	10 (32.3)	62 (34.6)	
Mother's level of education			0.47
State diploma or less	27 (87.1)	145 (81.0)	
More than a state graduate	4 (12.9)	34 (19.0)	
Fathers profession			
Unemployed	13 (41.9)	74 (41.3)	0.95
Worker	18 (58.1)	105 (58.7)	

Mother's occupation			
Unemployed	20 (64.5)	121 (67.6)	0.74
Worker	11 (35.5)	58 (32.4)	
Time to seek care			1.00
More than 24 hours	24 (77.4)	136 (76.0)	
Less than 24 hours	7 (22.6)	43 (24.0)	
Self-medication concept			0.79
Yes	25 (80.6)	150 (83.8)	
No	6 (19.4)	29 (16.2)	
Concept of traditional therapy			0.32
Yes	9 (29.0)	71 (39.7)	
No	22 (71.0)	108 (60.3)	
Socio-economic level			1.00
Low	22 (71.0)	124 (69.3)	
High	9 (29.0)	55 (30.7)	

Table 2 shows us that in bivariate analysis, no variable was associated with the vital outcomes of patients seen in pediatric emergencies in Kinshasa.

- *Factors Associated with Poor Outcome in Children Aged 1-59 Months Admitted to Pediatric Emergency Departments*

Table 3 Factors Associated with Poor Patient Outcome

Variables	ORa	(95% CI)	P
Age Range			
Infants	3.35	0.41 – 27.1	0.26
Children	1		
Gender of child			
Male	1.64	0.74 – 3.65	0.23
Female	1		
Father's level of education			
State diploma or less	1.08	0.37 – 3.20	0.89
More than a state graduate	1		
Mother's level of education			
State diploma or less	1.66	0.44 – 6.19	0.46
More than a state graduate	1		
Father's occupation			
Unemployed	1.04	0.41 – 2.65	0.93
Workers	1		
Mother's occupation			
Unemployed	0.69	0.28 – 1.87	0.44
Workers			
Time to seek care			
More than 24 hours	1.40	0.46 – 4.30	0.55
Less than 24 hours	1		
Notion of self-medication			
Yes	0.80	0.24 – 2.70	0.72
No	1		
Notion of traditional therapy			
Yes	0.58	0.23 – 1.43	0.24
No	1		
Socio-economic level			
Low	0.87	0.30 – 2.47	0.79
High	1		

Table 3 shows us that no factor is associated with the unfavorable outcomes of patients in pediatric emergencies in Kinshasa.

ISSN No:-2456-2165

IV. DISCUSSION

The general objective of our study was to determine the frequency of early deaths of children aged 1 – 59 months admitted to pediatric emergencies in Kinshasa in a situation of vital distress and to identify the associated factors.

To achieve this, we proceeded to the study of certain socio-demographic and economic, clinical and therapeutic parameters.

➢ *Demographic and Socio-Economic Characteristics:*

The median age of patients in our study was 10 months (with an IEQ of 5 months; 24 months). of the 31 patients who died, the 1-12 month age group was the most affected. Small infants have immature immunity compared to larger children and this fact makes them more vulnerable.

These results corroborate those of Mabiala in Congo Brazza in 2009 (15) and Chelo in Cameroon in 2016 (27) who found that children under the age of 1 were the most affected by deaths.

Among the deceased patients, there were more girls than boys with a sex ratio of 1.06.

Our results differ from those of Sountoura in Burkina-Faso in 2013(1), Chelo in Cameroon in 2016 (26) and Herrahoui in Morocco in 2018 (29) who found a male predominance among deceased children. This can be explained by the fact that our study population consisted of more girls than boys.

The majority of deceased patients came from families with low socioeconomic status. Herrahoui and Lasri in Morocco in 2018 (29) and 2015 (30), Doumbia et al. In Mali in 2016 (3) and Sountoura in Burkina-Faso in 2013 (1) also found that the majority of patients who died in their studies also came from families with a low socio-economic level. This can be explained by the fact that families with a low socio-economic level very often resort to self-medication and natural medicine for lack of sufficient financial means to go to a care structure, which means that the decision to going to consult is often postponed.

➢ *Clinical Features:*

In our study, the main reason for consultation was respiratory distress. Our results corroborate those of Herrahoui in Morocco in 2018 (29) who found that respiratory distress ranked first among emergencies at 39%. Respiratory pathologies are common in toddlers. Malaria, one of the most common pathologies in our environment, gives in its serious forms a respiratory expression. All of this may therefore explain the predominance of respiratory symptoms in our study population.

The majority of our patients had been referred and of the deceased patients, most were. Our results corroborate those of Sountoura in Burkina-Faso in 2013 (1) who found that the majority of patients were referred. This can be explained by the fact that the decision to transfer a patient from one FOSA to another is often taken late when the complications have already set in, putting the vital prognosis at stake and making it difficult to charge.

Most of the deceased patients had consulted more than 24 hours after the appearance of the first symptoms. These results are similar to those of Mapendo in the DRC in 2017 (31) and Asse in Côte d'Ivoire in 2011 (32).

This delayed decision to consult is often linked to ignorance by the parents or guardians of the seriousness of the symptoms presented by the sick child, the lack of sufficient financial resources to consult in a FOSA; this encourages the use of self-medication and natural medicine.

Most of the deceased patients had benefited from self-medication. Our results are similar to those of Chelo et al. In Cameroon in 2016 (27) and move away from those of Sountoura in Burkina-Faso in 2013 (1) which found that few deceased patients had benefited from it. This can be explained by the fact that, in this last study, many parents had more recourse to natural medicine rather than to modern medicine.

The majority of deaths occurred between 24 to 48 hours after admission and most of these deaths occurred while on call. Our results are similar to those of Asse in Côte d'Ivoire in 2011 (32) which found that the majority of patients had died more than 24 hours after their admission and those of Herrahoui in Morocco in 2018 (29) and Sountoura in Burkina -Faso in 2013 (1) who found a predominance of deaths during custody. This can be explained by the reduction of nursing staff during on-call hours, but also by a drop in reflexes in gestures and care related to fatigue.

➢ *Mortality:*

The frequency of early death in our study was 14.8%. This high frequency may be linked to the fact that the majority of our patients did not consult early after the onset of the disease and to the fact that most health facilities are not equipped with the equipment necessary for the effective management of emergency room. This is a factor limiting this support.

Our results are similar to those of Dabire in Burkina Faso in 2004 (28) who found an early hospital mortality of children in this age group of 14.02%.

They move away from those of Chelo in Cameroon in 2016 (27) who found a rate of 3.7%. This difference can be explained by the fact that Cameroon is an economically more advanced country than ours and has a much lower hospital mortality rate than ours.

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V. CONCLUSION

The small infants are the most vulnerable and the most exposed to death in the 1-59 month age group. The low socio-economic status of households worsens the prognosis of children admitted in emergency.

Most of the children had respiratory symptoms and had benefited from self-medication and even natural medicine.

Ignorance of the seriousness of their morbid condition, the delay or inadequacy of their emergency care and the belated decision to transfer them from one health training to another better equipped exposes them, inexorably, to a fatal outcome.

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