

A study on the prevalence of shock among the paediatric age group in and around west Godavari district, Andhra Pradesh

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Introduction: Shock is one of the most common paediatric emergencies with significant mortality. Death is due to associated complications and multisystem organ dysfunction. With these, a study was conducted to find the prevalence of shock among the paediatric age group. **Materials and methods:** The study was conducted in the department of paediatrics, ASRAM, Eluru, Andhra Pradesh, for over 18 months. Random sampling was considered in this study. Children aged one month to 12 years admitted with a clinical diagnosis of shock were included. Neonates and parents of those who didn't submit the informed consent were excluded. Among the participants, the shock was diagnosed by the standard protocol such as blood smear examination, inflammatory markers, blood pressure. A Chi-square test was used to find the association between the variables, and $P < 0.05$ was considered statistically significant. **Results:** Shock was diagnosed in 75 (7.96%), maximum (39%) were detected in 1 month to 1 year age group. Gender wise, 41 (54.6) members were male, and 34 (45.3) members were female. The male-female ratio was 1.2:1. Total 56 (74.6) were survivors, and 19 (26.4%) were non-survivors; statistically, there was no significant difference. **Conclusion:** The majority of shock cases were in cases were in the age group of >1month to 5 years age group.

Keywords: Shock prevalence, Age, survivors

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Introduction

Shock is a state of impaired tissue perfusion resulting in an imbalance between oxygen demand and supply. It is one of the most common paediatric emergencies with significant mortality if not recognised and treated early. [1]. This widespread reduction in effective tissue perfusion causes insufficient or improper delivery and distribution of oxygen and nutrients, resulting in an altered cellular and subcellular function. This leads to anaerobic metabolism and accumulation of lactic acid, and consequently cellular damage; these finally ends up with multiple organ dysfunction and finally cardiovascular collapse.[2]. Inadequate oxygen delivery to organs and tissues is one of the commonest pathologies of shock. These responses lead to an initial state of compensated shock, in which the blood pressure (BP) is being maintained. In this situation, if the treatment is not initiated or inadequate, it causes decompensated shock. At this condition, hypotension and tissue damage will occur, leading to multisystem organ dysfunction (MODS) and death. [2,3,4]. Most patients who do not survive do not die due to the acute hypotensive phase of shock but rather due to associated complications and MODS. [3]. With these, a study was conducted to find the prevalence of shock among the paediatric age group.

Materials and methods

Settings: The study was conducted in the department of paediatrics, ASRAM, Eluru, Andhra Pradesh.

Duration and type of study: This was prospective observational research. This was conducted over 18 months, from December 2014 to June 2016.

Sampling method: Random sampling was considered in this study.

Sample size calculation: All the eligible members who satisfy the inclusion criteria were considered in this study.

Inclusion criteria: Children aged one month to 12 years who were admitted with a clinical diagnosis of shock were included in this research.

Exclusion criteria: Neonates who were not cooperative and parents who didn't submit the informed consent were excluded from the study.

Data collection, procedure:

Among the participants, the shock was diagnosed by the standard protocol as given. [1- 3].

A single test for the diagnosis of the shock does not yet exist. Hence a combination of Doctors and healthcare professionals use tests to piece together a complete picture of the infection. They will likely order blood and urine tests, as well as tests for specific bacterial infections or inflammation. A spinal fluid test, X-ray, or ultrasound may also be needed. Presence of fever for patients three months of age and older, hypothermia, tachycardia, tachypnea, abnormal pulse, hypotensive. Decreased peripheral pulses, cool extremities, prolonged capillary refill time (>2 sec), tachycardia and Oliguria. The recorded blood pressure was <2 standard deviations (SD) below the mean for age and a state in which at least any three of the criteria such as decreased peripheral pulses, mottled or cool extremities, prolonged capillary refill time was >2 sec, tachycardia and Oliguria. Mean heart rate was >2 SD above normal for age in the absence of external stimuli, chronic drugs or painful stimuli was considered as tachycardia and a urine output of <0.5 mL/kg/hr was categorised to be Oliguria.

Ethical consideration and permission: The study protocol was approved by the institutional ethics committee. This study is on the paediatric age group. Hence an informed consent was taken from the parents of the participants.

Statistical analysis: SPSS 21.0 was used for the analysis of the data. Microsoft Word and Excel were used to generate tables. A Chi-square test was used to find the association between categorical variables, and $P < 0.05$ was considered statistically significant.

Results

In this study, a total of 942 members were included. This shock was diagnosed in 75 (7.96%). In this study, 39% (29) were in 1 month to 1 year age group. Next to this 1 – 5 years group, 26 (35%) members were fell in this group. The remaining were categorised in 5 – 12 years, number wise it was 20 (27%) (Table 1).

Maximum shock cases were detected in 1 month – 1 year age group.

Statistically, there was no significant difference between survivors and non-survivors.

Table 1: Age-wise distribution of the study patients

Age	Number	%
1month – 1 year	29	38.666
1 – 5 year	26	34.666
5 – 12 year	20	26.666
Total	75	100

Among the 75 (100%) patients diagnosed with shock, gender-wise, 41 members were male, and 34 members were female. Percentage-wise, there was 54.66 and 45.33 respectively for males and females. Gender wise, the male-female ratio was 1.2:1.

Total 56 (74.6%) members were survivors, and 19 (26.4%) were non-survivors. In 1 month to 1 year age group, 20 (26.6%) members were the survivors, and 9 (12%) were non-survivors. In the 1 – 5 years group, 19 (25.3%) members are the survivors, and 7 (9.3%) were non-survivors, and in the 5 – 12 years group, 17 (22.6%) members are the survivors, and 3 (4%) were non-survivors; statistically, there was no significant difference (Table 2).

Table 2: Outcome of Shock in various age groups among the study members; n (%)

Age	Survivors	Non-survivors
1month – 1 year	20 (26.6)	9 (12)
1 – 5 year	19 (25.3)	7 (9.3)
5 – 12 year	17 (22.6)	3 (4)
Total	56 (74.6)	19 (26.4)
	75 (100)	
Statistical analysis	Chi square: 0.456; no statistical significance.	

Discussion

Shock is one of the most common emergencies in paediatrics. Early detection and aggressive management of shock, along with constant monitoring was associated with better outcomes. Hence a thorough knowledge regarding its causative factors, clinical signs and its treatment modalities are required to ensure a better result in children with shock. It is not a problem of blood pressure or blood volume, but whatever the causative factor, it is always a problem of inadequate cellular sustenance. [5 – 7].

In the present study, 942 pediatric intensive care unit (PICU) patients were considered. This shock was diagnosed in 75 (7.96%) of total admissions in

The PICU. In a study done by Ravikanth et al. [8] at Indira Gandhi Institute of Child Health (IGICH) Bangalore, Shock accounted for 12.7% of total PICU admissions; the investigators enrolled 784 subjects and shock was diagnosed in 100 (12.7%). In another Indian study, the shock was detected in 4.3%; this study was reported by Daljit Singh et al. [9].

In the present study, the most common age group affected was between 1 month to 1 year (38.6%), followed by 1 – 5 years (34.6%) and 5 – 12 years (26.6%). In a study done by El-Nawawy A et al. [10], less than one year is the most commonly affected age group (39%) followed by 1 – 5 years (38%). Similar results were reported by Derek S et al. [11]. These authors also noted that children < 1 year are more prone to shock and the reported incidence was 39.8% in this age group.

In the research, out of 75 cases, survivors were 56 (74.66%), and non-survivors were 19 (25.33%), which was in concordance with the literature. [26]. Statistically, there was no significant difference between the survivors and non-survivors in this study (Table 2). Kana ram Jat et al. [12] also reported that statistically, there was no significant difference among the survivors and non-survivors with shock.

De Freitas and Aragao et al. [13] found that in children admitted to PICU, mortality was higher in children less than two years of age and in another study done by Chang P et al. [14]. In non-traumatic shock cases, age less than two years tend to have a poor outcome in a study done by Kumar et al. [15]. The mortality was reported to be increased with decreasing age. Mortality was 26.4% by Hochman Hi et al. [16] and 29% by Butt W et al. [17]. The reasons for the decreased mortality was not given. But the lower death rate in this report could be better patient care due to the availability of sufficient human resources.

Out of 75 diagnosed shock patients in this research, 54.66% were male members, and 45.33% were female participants in a study done by Praveen Khilani et al. [18]. Males constitute 60% of cases, in another study done by Ravikanth et al. [8]. Male patients included about 61% of cases and female patients 39% of cases, in another study done by Daljit Singh et al. [9]. The male to female ratio was 1.6:1. In a report by Watson

Et al. [19]. The investigators reported that the incidence was 15% higher in boys than in girls. On the contrary, studies were done by Carvallo et al. [20] and Sheetal Ganjoo et al. [21] showed no gender difference in the incidence of shock. However, in the literature also, the reasons for higher incidence among the boys was not reported.

Conclusion

Shock is common among the male paediatric age group, ≤ 5 years age. Survivors can be improved with proper medical attention and care.

What this study adds to the existing knowledge

Shock is common among the male paediatric age group, ≤ 5 years age.

Limitations of the study: Small number of cases is the major limitation of this research.

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