

Low Cost Pulse Oximeter in Outpatient Department to Detect Severity of Respiratory Infection: Retrospective Study

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Abstract

Background: On an average, children below 5 years of age suffer about 5 episodes of ARI per child per year, thus accounting for about 238 million attacks. ARI is responsible for about 30-50% of visits to hospital under 5-mortality rate, pneumonia consists 19% of deaths as compared to diarrhea (17%), measles (4%). This reduction in death rate in diarrhea is due to cheap and effective oral rehydration therapy diseases. **Subjects and Methods:** The study was conducted over period of one year from feb 2017 to feb 2018, overall hospitalized children with age group from 2months-60 months were included in the present study. Children who were with respiratory complaints like fever, cough, breathing difficulty were included. **Results:** In present study, all the children presenting with respiratory symptoms were analyzed and pulse oximeter were used when clinical findings were in conclusive for hospitalization. **Conclusion:** It was found that hypoxemia was common in patients with ALRI more show in infants then in children.

Keywords: Pulse Oximeter, Respiratory Infection, Hospitalized Children.

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Introduction

In developing nation like India outpatient department cater majority of illness particularly in our area which is considered to be backward region. Most among in pediatric outpatient department being diarrhea respiratory illness both (URI&LRI), fever and malnutrition. Diarrhea cases with severe dehydration are always referred to inpatient department and less severe are advised oral rehydration solution whereas respiratory illness are usually treated with oral medications with introduction of low cost pulse oximeters, accurate measurement of saturation in younger patient and direct assessment of hypoxemia helped many practitioners to identify early and refer to center where it can be treated better.

Acute lower respiratory infection (ALRI) are leading cause of mortality and morbidity among children, causing about 1/3rd of all deaths in childhood.^[1] Reliance on single clinical signs may not be optimal, as some clinical signs like lower chest in drawing or fast breathing may be sensitive but not very specific for identification of the hypoxemia. Whereas, other signs like cyanosis, unable to drink, grunting or lethargy, etc., may be very specific, but not very sensitive.^[2] No single clinical sign, or combination of signs, accurately predict hypoxemia in has been found to be a reliable predictor of hypoxemia. In all children.^[3-6] Oxygen saturation which is regarded as fifth vital sign 12,13 and measuring arterial oxygen saturation, often obviates the need

for arterial blood samples. Pulse oximetry is non invasive and accurate method of measuring arterial oxygen saturation, is far the best method.^[3-6]

On an average, children below 5 years of age suffer about 5 episodes of ARI per child per year, thus accounting for about 238 million attacks. ARI is responsible for about 30-50% of visits to hospital under 5-mortality rate, pneumonia consists 19% of deaths as compared to diarrhea (17%), measles (4%). This reduction in death rate in diarrhea is due to cheap and effective oral rehydration therapy diseases. In measles it is due to proper immunization. pulse oximeter usage decreases the hospitalization and mortality.

Subjects and Methods

The current study on low cost pulse oximeter was done at outpatient department of KBNIMS ; one year data analysed from the on duty pediatricians at outpatient department The study was conducted over period of one year from feb 2017 to feb 2018 , overall hospitalized children with age group from 2months-60 months were included in the present study. Children who were with respiratory complaints like fever, cough, breathing difficulty were included. All the children were examined for clinical signs and pulse oximeter was applied for 30 seconds to 1 minutes and reading were recorded in outpatient form. Brief history ,duration of illness ,fever ,breathlessness ,refusal to feeds or intolerance were recorded in the op form

.critical patient with poor pulses ,shock and central cyanosis were directly referred to in patient department and were excluded from present study

The child was examined and the following signs were recorded: appearance, weight, height, pulse rate, respiratory rate, (counted for 60 seconds when child is quiet and at rest) Cyanosis, chest in drawing, grunting, nasal flaring, pallor, air entry, abnormal breath sounds crepitation or rhonchi on auscultation.

Results

Total number of OPD patients analyzed with pulse oximeter were 2000,among them 850 patient s were admitted to in patient subsequently for monitoring and treatment.

Table 1: Age wise Distribution.

Age Group	Number of Patients	Percentage
2 – 5 months	480	24.0
6 – 11 months	428	21.4
12 – 23 months	326	16.3
24 – 35 months	378	18.9
36 – 60 months	388	19.4
Total	2000	100

Above table displays increase in respiratory infections at younger age group with more Severity

Table 2: Age group of Patients enrolled for inpatient care.

Age Group	Number of Patients	Percentage
2 – 5 months	300	37.5
6 – 11 months	160	20.0
12 – 23 months	140	17.5
24 – 35 months	120	15.0
36 – 60 months	080	10.0
Total	800	100

Table shows increase in the severity of illness in younger age group of 2month – 11months compared to older age group.

Table 3: Mean SPO2 Values

Age Group	SPO2 values
2 – 5 months	82.33-2.99*
6 – 11 months	83.12-3.04*
12 – 23 months	83.8-3.28
24 – 35 months	90.1-2.73
36 – 60 months	89.3-3.88

As a group, Infants 2-11mo of age had a significant lower mean spo2 levels than the older children p <0.001 by t –test

Discussion

Respiratory illness accounts for major turnover in outpatient department of any medical college hospital. Severity

assessment of this respiratory illness at the level of outpatient with simple hand held device like pulse oximeter helps not only for hospitalization but also to analyze the level of severity and need for intensive ward care.

Hypoxemia is the most serious manifestation of severe respiratory illness in children and strong risk factors for mortality. The case fatality rate is inversely proportional to the oxygen saturation of arterial blood.

Pulse oximetry objectively measures the severity of disease, accurately determines whether oxygen is needed, and permits. Maximal benefit from pulse oximetry requires easy and cheap access to oxygen therapy. Pulse oximetry can reliably detect hypoxemia at all altitudes.

Therefore pulse oximetry should be considered a routine adjunct in clinical assessment of children presenting with respiratory illness. And can be included as fifth vital

Pulse oximetry was used to the know the need for in patient care in the following study. At what level of SpO2 should oxygen be supplemented to patients with ARI is of major concern.

In present study, all the children presenting with respiratory symptoms were analyzed and pulse oximeter were used when clinical findings were in conclusive for hospitalization

.It was found that hypoxemia was common in patients with ALRI more show in infants then in children. Early recognition of hypoxemia and its prevalence is studied.

Table 4: Comparative Study

Name of worker	Observed high incidence of LRTI age group	Incidence
Singhi et al.6	2-11 months	16.1%
	12-60 months	8.5%
Present study	2-12 months	85.45%
	12-60 months	52.54%

When our study compared with singhi et al similar results were obtained Prevalence of severity is similar, young age group having more severity when compared to older age So early hospitalization decreases the mortality in this age group.

Conclusion

Pulse oximetry should be considered a routine adjunct in clinical assessment of children presenting with respiratory illness. And can be included as fifth vital.

References

1. Garenne M, Ronsamans C, Campbell H. The magnitude of mortality countries. World health statistics Quarterly 1992; 45: 180-191
2. American association for resp care AARC clinical practice Guideline; pulse oximetry. Respir care 1991; 361(12): 1406-1409.
3. Wang EE, Milner RA, Navas L- American review of respiratory disease-1992.
4. T dyke, N .Brown Hypoxia in Childhood Pneumonia: better detection

and more oxygen needed in developing countries. British medical journal 1994; 308; 119-120.

5. Rakesh Lodha, Prateek Singh Bhaduria, Anoop Verghu. Can clinical signs predict hypoxemia in Papua New Guinea children with moderate and severe pneumonia .
6. Singhi, Deep A Kaur. Prevalence and predictions of hypoxemia in

acute respiratory infections presenting to pediatric emergency department, PGIMER.

7. Rakesh Lodha, Prakash Singh Bhaduria, SK Kabra Can clinical symptoms and signs accurately predict Hypoxemia in children with Acute Lower respiratory tract infections?

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