

A Systematic Audit of the Management of severe pneumonia in children admitted to Nonga General Hospital: A prospective study

D. Namor-Pomat

Diploma in Child Health

Introduction

- Pneumonia is the single largest infectious cause of death in children worldwide.
- Accounts for 16% of deaths in children under 5 years old (WHO Pneumonia.2016)
- Worldwide - 920 136 children died from Pneumonia in 2015 (WHO Pneumonia. 2016)

Introduction

- Papua New Guinea – Pneumonia remains the most common cause of admission (21.2%) with a CFR of 9.62% for severe pneumonia (Annual Child Morbidity and Mortality report. 2018)
- PNG – has had a standard classification of pneumonia
- Nonga General Hospital – highest CFR of 33.3% in 2018 for severe Pneumonia across 18 hospitals in 2018. (Annual Child Morbidity and Mortality report. 2018)

Research Purpose

AIM:

To identify where care is adequate and where it is lacking and needs improvement in the current management of severe pneumonia in Nonga General Hospital, East New Britain Province.

OBJECTIVE:

To audit the clinical standard of practice of the management of severe pneumonia in children aged 1 to 59 months at Nonga General Hospital, East New Britain Province.

METHODOLOGY

CHARACTERISTICS

DETAILS

LOCATION

Nonga General Hospital. Patients recruited via Paediatric Ward, Children's Outpatient Department and Emergency Department.

STUDY DESIGN

Prospective descriptive study

PERIOD

February 2019 – August 2019

POPULATION

Children ages 1 month (> 28 days) – 59 months

DATA COLLECTION

Checklist form containing clinical standards and scores, demographic details of patients and outcome.

DATA ANALYSIS

Microsoft Excel

ETHICAL CONSIDERATION

There is no formal Ethics committee in Nonga General Hospital. Therefore approved by the Nonga General Hospital Patient Care Committee, chaired by the Director of Medical Services

Selection criteria

INCLUSION

- Ages 1 month – 59 months
- Severe Pneumonia PNG classification (WHO = very severe)
 - Hypoxia: SpO₂ < 90%
 - Tachycardia: Pulse >160 bpm
 - Hepatomegaly: liver span >2 cm below right costal margin
 - Tachypnoea in age ranges (WHO)
 - Lower chest wall in-drawing

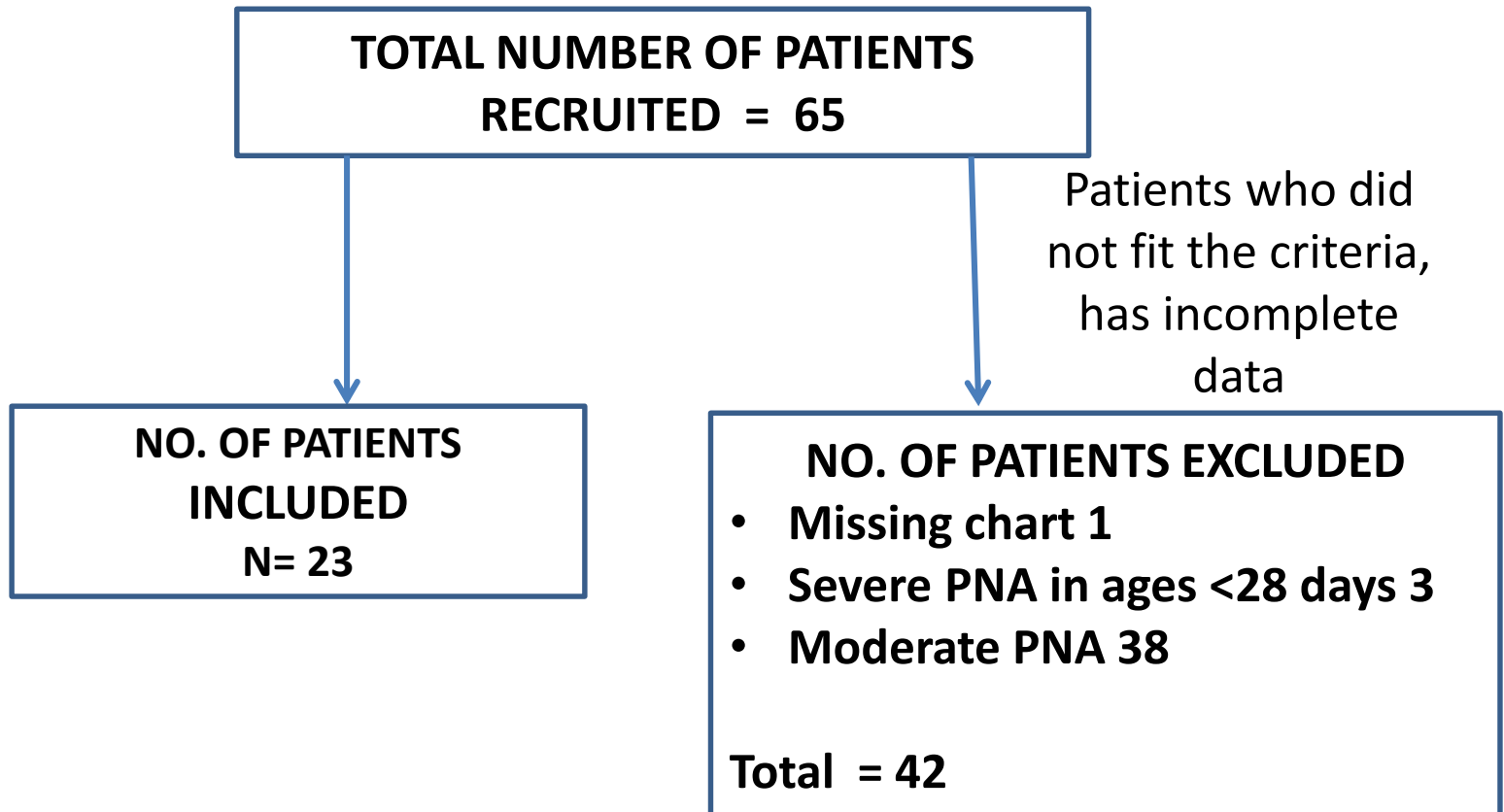
EXCLUSION

- Diarrhoea with acidotic breathing without chest signs
- Later diagnosed as pulmonary tuberculosis

Study method

- Clinical standards of managing severe pneumonia by medical practitioners and nursing officers were audited against a scoring system.
- There were 13 clinical standards and 4 hospital acquired complications.
- A standard that was:
 - ✓ Fully considered / done = 2 points
 - ✓ Partially considered / done = 1 point
 - ✓ Not considered / not done = 0 point
- Any serious hospital acquired complication resulted in a -2 score

RESULTS



DEMOGRAPHIC CHARACTERISTICS N=23

Characteristics	Frequency	Percentage (%)
Sex (male : female)	14 : 9	60.9 : 30.1
Age (months)		
1-11	20	87
12 – 23	2	9
24 – 59	1	4
Residence		
Rural	17	74
Semi-rural (<less than 15 min from town	3	13
Urban	3	13

CLINICAL STANDARDS AUDIT RESULTS

Clinical standards <ul style="list-style-type: none"> • Fully considered/done = 2 • Partially considered/done =1 • Not considered/done = 0 N = 23	Fully done		Partially done		Not done		Total
	No.	score	No.	score	No.	Score	Score %
1. Prompt triage: early detection of danger signs, hypoxia (SpO₂ <90%), administering oxygen therapy within 30 minutes of arrival	12 52%	24	7 30%	7	4 17%	0	32 70%
2. Proper history and examination including respiratory distress symptoms and documentation	21 91%	42	2 9%	2	0 0%	0	44 96%
3. Correct classification of pneumonia severity according to STM WHO	19 83%	38	4 17%	4	0 0%	0	42 91%
4. Correct antibiotics according to pneumonia severity. Prompt treatment within 1 hour following admission	16 70%	32	7 30%	7	0 0%	0	39 85%
5. Correct use and recording of SpO₂ and oxygen therapy in the wards	12 52%	24	11 48%	11	0 0%	0	35 76%
6. Presence of functioning equipment at bedside	22 96%	44	1 4%	1	0 0%	0	45 98%

CLINICAL STANDARDS AUDIT RESULTS

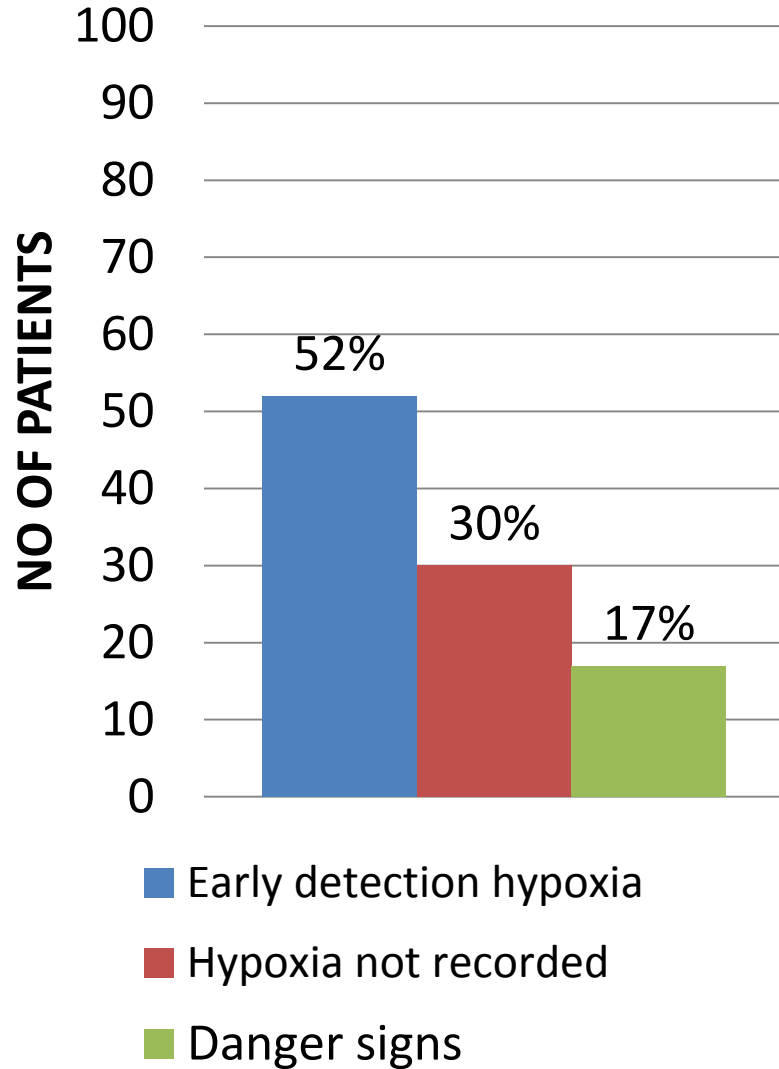
Clinical standards <ul style="list-style-type: none"> • Fully considered/done = 2 • Partially considered/done =1 • Not considered/done = 0 N = 23	Fully done		Partially done		Not done		Total score (46)
	No.	Scores	No.	score	No.	Score	
7. CXR: indicated on day 1 following admission	10 43%	20	9 39%	9	4 17%	0	29 63%
8. Safe use of IVF; not >2/3 of maintenance requirement	23 100%	46	0 0%	0	0 0%	0	46 100%
9. Early initiation of enteral feeding within 24-48hrs	19 83%	38	2 9%	2	2 9%	0	40 87%
10. 2-4 hourly vital observation with prompt responses by nurse	10 43%	20	13 57%	13	0 0%	0	33 72%
11. Doctors' review within first 4 and 8 hours following admission	0 0%	0	5 22%	5	17 74%	0	5 11%
12. Daily review by care team	23 100%	46	0 0%	0	0 0%	0	46 100%
13. Discharge planning and parental education	7 30%	14	8 35%	8	8 35%	0	22 48%

Individual patient score distribution

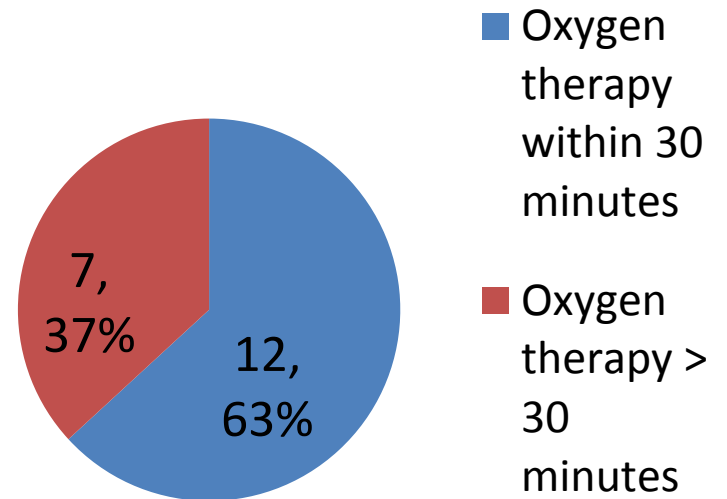
Total individual composite score = 26

Ranges		Frequency
0 – 10		0 (0%)
11 – 15		4 (17%)
16 – 20		13 (57%)
21 – 25		6 (26%)
Median	Range	IQR
19	12 – 23	16.5 – 20.5

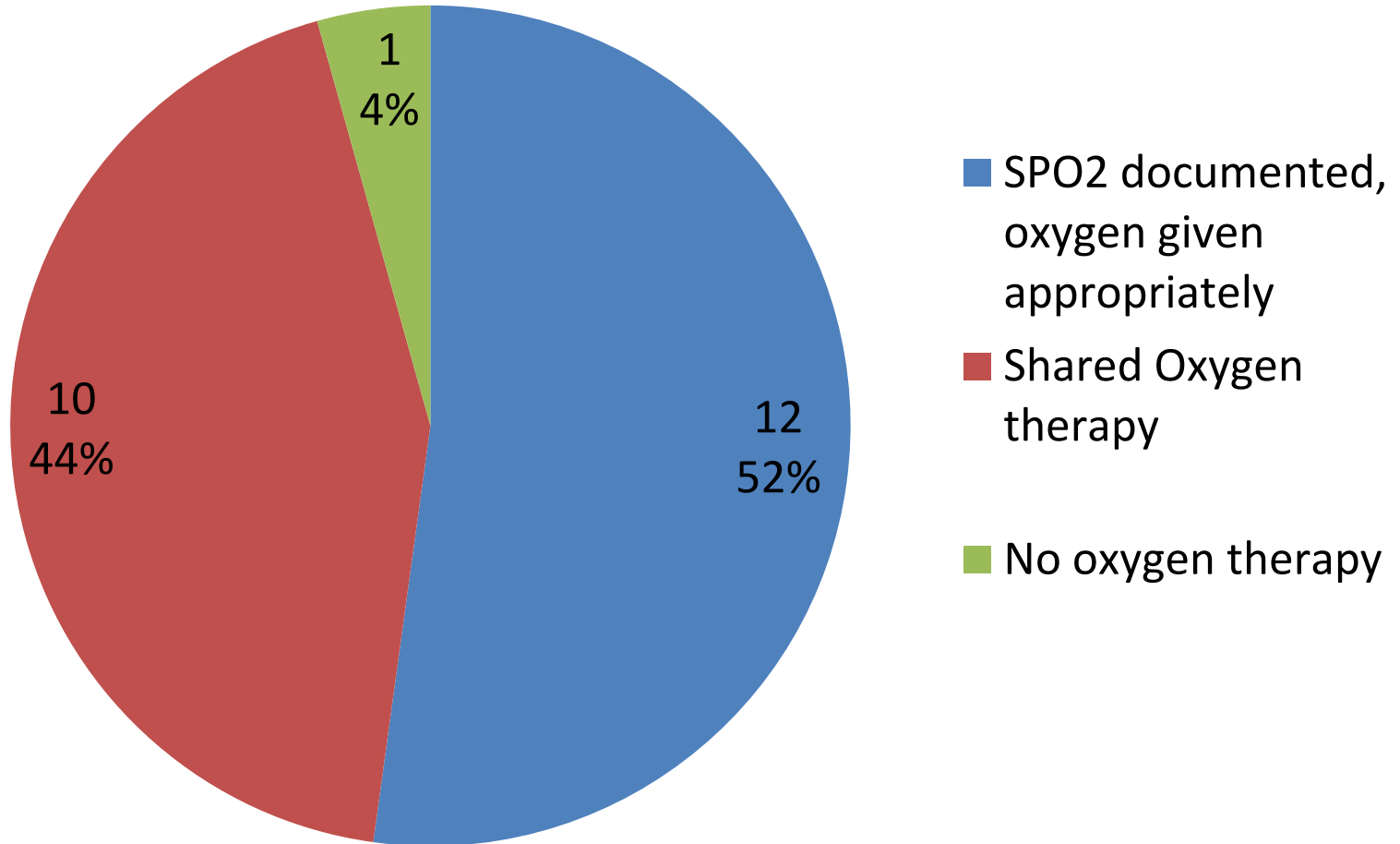
1. Early detection of hypoxia at triage ($S_pO_2 < 90\%$)



1. Early oxygen therapy at triage



5. Use of Oxygen therapy in the ward



7. Chest radiograph

No indication
n = 5 (12%)

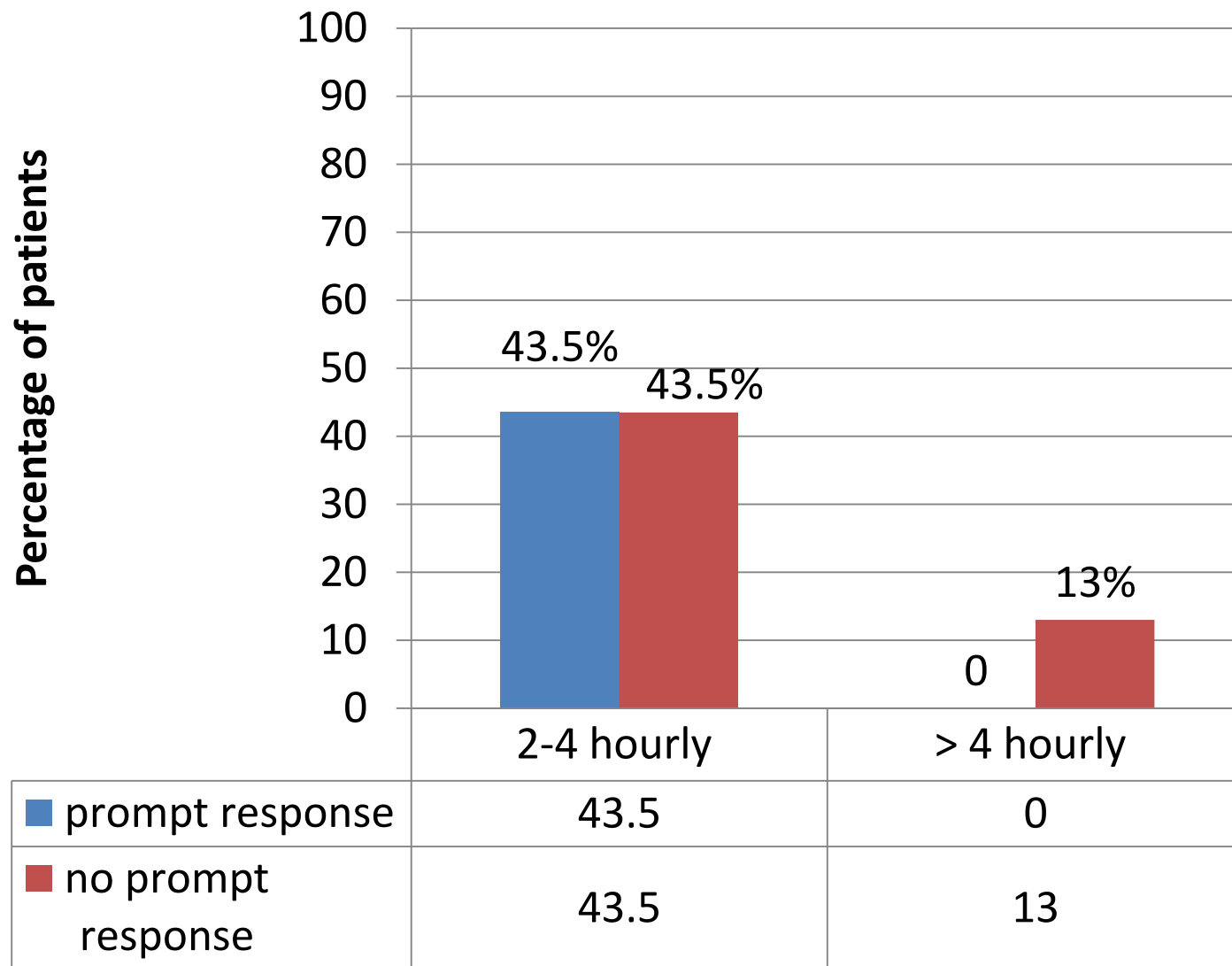
Indicated
n = 18 (44%)

- Unilateral chest signs
 - Heart murmur
- Severe hypoxemia ($S_pO_2 < 80\%$)
- Persistent hypoxia ($S_pO_2 < 90\%$) after 48h
- Chronic cough > 2w

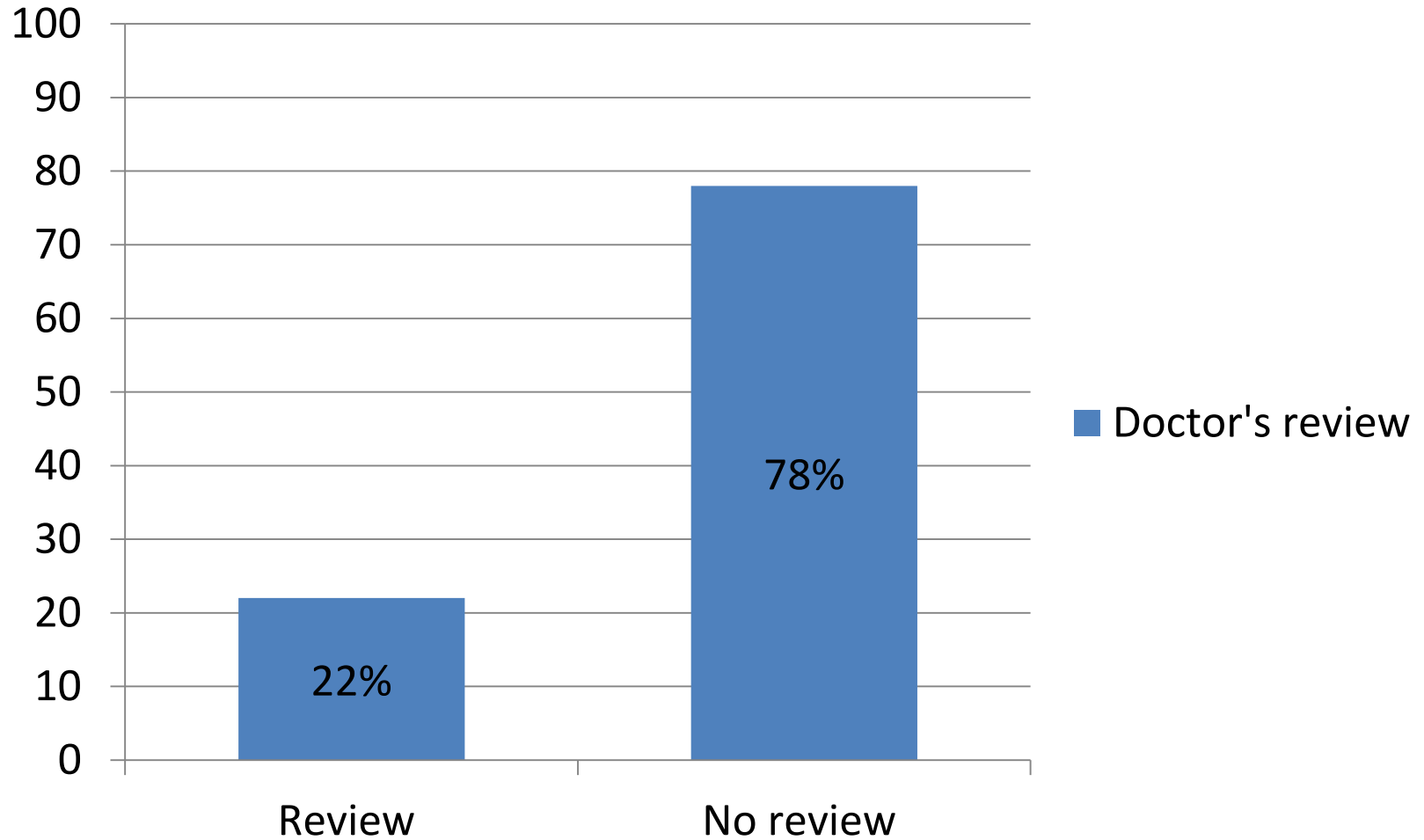
Not done n= 13 (32%)

CXR done
n = 5 (12%)

10. Monitoring of vital signs



11. Doctor's review within 4 & 8 hours following admission



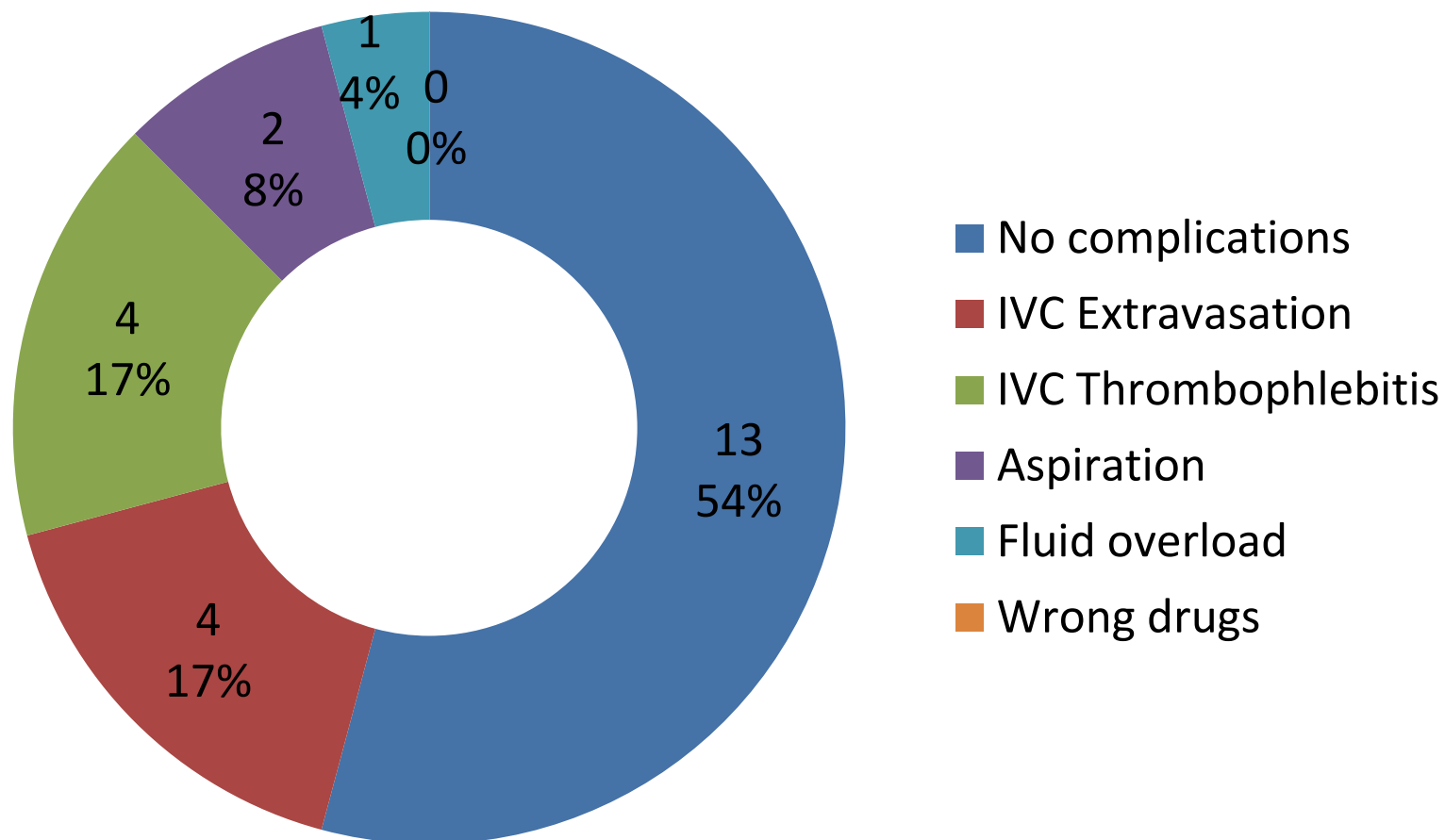
13. DISCHARGE PLANNING AND PARENTAL EDUCATION

DISCHARGE PLANS			PARENTAL EDUCATION	
N = 19	Documented	Not documented	Parental education given	Parental education not given/documentated
Frequency	13 (68%)	6 (32%)	6 (32%)	13 (68%)

ULTIMATE OUTCOME

Discharged	19 (83%)	Died	4 (17%)
------------	----------	------	---------

Hospital acquired complications



10 patients had 1 complication & 1 patient had 2 complications

Summary and conclusions

- High CFR 17%
- Can monitor quality of pneumonia management using a standardised assessment
- Some standards of management of severe pneumonia are poorly done
- Lack of manpower, equipment, supply of oxygen, lack of training in oxygen therapy

Recommendations

- Triage nurses and medical officers to improve their triaging skills and approach
- Petition the Nonga hospital to purchase simple, non-invasive tools such as pulse oximeters to detect hypoxia in children.
- Training and Encourage the use of IMCI checklist at triage
- Petition Nonga Hospital to improve oxygen therapy for high dependency units.
- Encourage Nurses to use easy to follow vital observations charts to detect vital signs abnormalities and ensure prompt appropriate responses.
- Frequent medical reviews of critically ill patients
- Standard Audit criteria for auditing the morbidities in childhood
- Suggest future studies with bigger audit population to assess management of severe pneumonia in PNG.

Acknowledgments

1. All study participants and care givers
2. Immediate supervisors, Dr Beryl Vetuna & Dr Kalit
3. Professor Trevor Duke, School of Medicine and Health Sciences
4. Dr Anna Toti, Paediatric resident MOs & HEOs
5. Nursing staff of Paediatric ward
6. Dr David Pomat, HEOs and nursing staff of Children's outpatient department and Emergency Department

References

1. WHO (2014), Revised WHO classification and treatment of childhood pneumonia at health facilities. WHO Press. Geneva
2. WHO (2007), Hospital care for children. Guidelines for the management of common illnesses with limited resources. WHO Press. Geneva
3. National Department of Health (2016), Standard Treatment for Common Illnesses of Children in Papua New Guinea. A manual for nurses, community health workers, health extension officers, and doctors. 10th edition.
4. National Department of Health (2015). Child health policy and plan. Paediatric Society
5. National Department of Health (2018). Annual Child Health Mortality Report. Paediatric Society
6. Tiewsoh K, et al. (2009). Factors determining the outcome of children hospitalized with severe pneumonia. BMC Pediatrics; 9:15
7. Duke T et al. (2001). Hypoxemia in children with severe pneumonia in Papua New Guinea. INT J TUBER LUNG DIS 2001; 5(6):511-519
8. Duke T et al. (2008). Improved oxygen systems for childhood pneumonia: a multihospital effectiveness study in Papua New Guinea. Lancet

Thankyou