# Paediatrics and Child Health

# University of the Witwatersrand Research Day

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28/09/2023

# VENTILATORY SUPPORT AND SURFACTANT USE IN EXTREMELY LOW BIRTH WEIGHT INFANTS OVER A DECADE, JOHANNESBURG

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# Introduction

- Extremely low birth weight infants (ELBWI) are a major contributor to neonatal mortality and morbidity.
- Respiratory distress syndrome (RDS) is primarily the disorder of pulmonary surfactant deficiency in immature lungs.[1]
- The immature lungs have decreased compliance which is likely to cause atelectasis.[2,3]

# Introduction cont..

- Once the infant is born and has features of RDS clinically and radiologically, exogenous surfactant can be administered.
- NCPAP  helps to recruit collapsed alveoli, thus improving perfusion ventilation mismatch and increasing the functional residual capacity thereby improving oxygenation in the neonate.[1,3,4]
- Due to limited resources, for many years the weight cut-off for conventional mechanical ventilation was 1 000g.

# AIMS AND OBJECTIVES

# Aims and Objectives

- To determine the effects of ventilatory support (conventional mechanical ventilation and NCPAP) and surfactant replacement therapy on the outcomes of ELBWI, as there were policy changes regarding weight cut off in the unit

-SRT and NCPAP were introduced for ELBWI weighing ≥ 750g around 2006/2007

-Weight cut off for CMV was decreased from 900g to 800g in 2014

# METHODOLOGY

# Methodology

- Secondary analysis of an existing database of ELBWI admitted at CMJAH neonatal unit.

**Inclusion criteria**:

- All ELBWI admitted at CMJAH within 48 hours of life from 01st January 2008 to 31st December 2017

**Exclusion criteria**:

- Infants who died in the delivery room

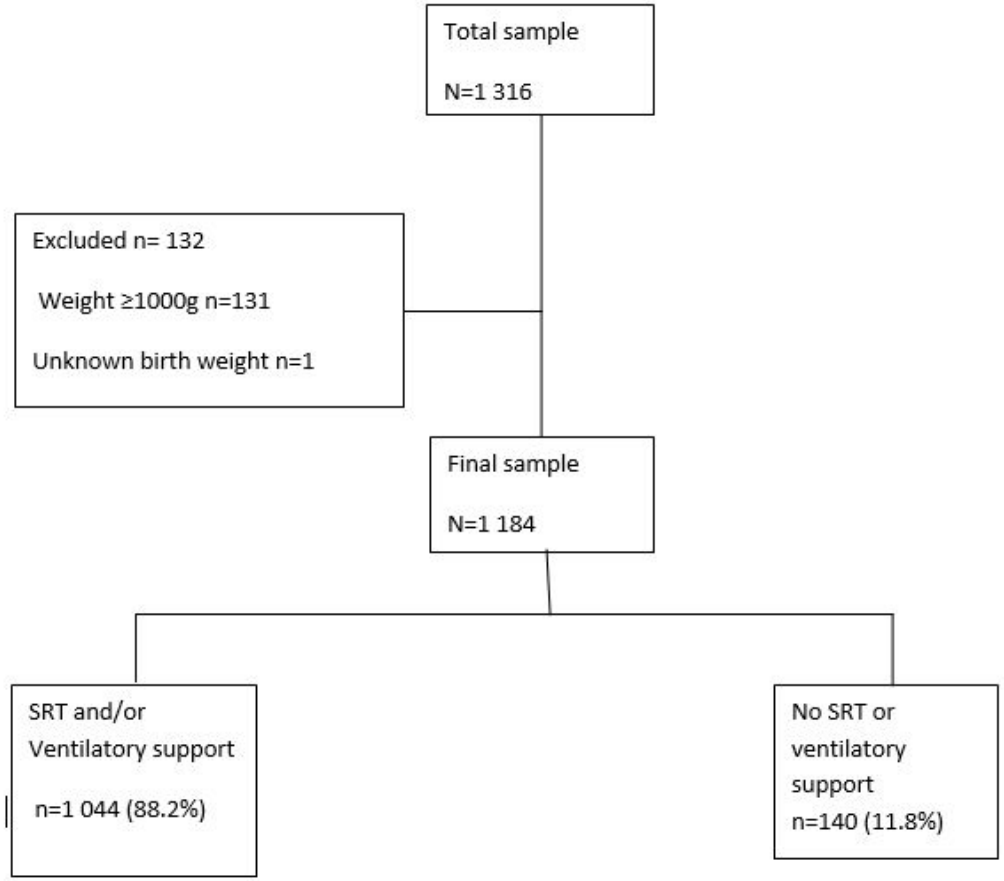
# Methodology cont..

- Continuous variables were compared using Mann-Whitney test and unpaired t-test depending on distribution.
- Categorical variables were compared using Pearson chi-square test.
- Missing information was not included in the analysis for each variable.
- The effect of SRT, NCPAP and CMV was compared for survivors and non survivors.

# RESULTS

# Results

Figure 1: Study participants in the study reviewing ventilatory support and surfactant use in extremely low birth weight infants at Charlotte Maxeke Johannesburg Academic Hospital between 2008 and 2017



# Results cont..

- The mean birth weight was 823.6g (SD 119.4), with the mean gestational age of 27 weeks (SD 2.1)
- Mean length of hospital stay was 30 days (SD 30.8)
- Ninety percent (1 103/1 184) of ELBWI were diagnosed with RDS.
- The overall survival of ELBWI was 46% (540/1 184).

# Results cont..

Table 1: The maternal and extremely low birth weight infants' characteristics at Charlotte Maxeke Johannesburg Academic Hospital between 01 January 2008 and 31 December 2017

| Variables | Total sample n/N (%) |
|---|---|
| Antenatal care (at least one visit) | 757/1 184 (64) |
| Antenatal steroids | 481/1 184 (41) |
| Resuscitation in the delivery room | 698/1 184 (59) |
| Surfactant replacement therapy | 733/902 (81) |
| NCPAP | 706/1 146 (62) |
| Conventional mechanical ventilation | 225/1 135 (20) |
| Pneumothorax | 10/1 171 (1) |
| Chronic lung disease | 271/1 164(23) |

# Results cont..

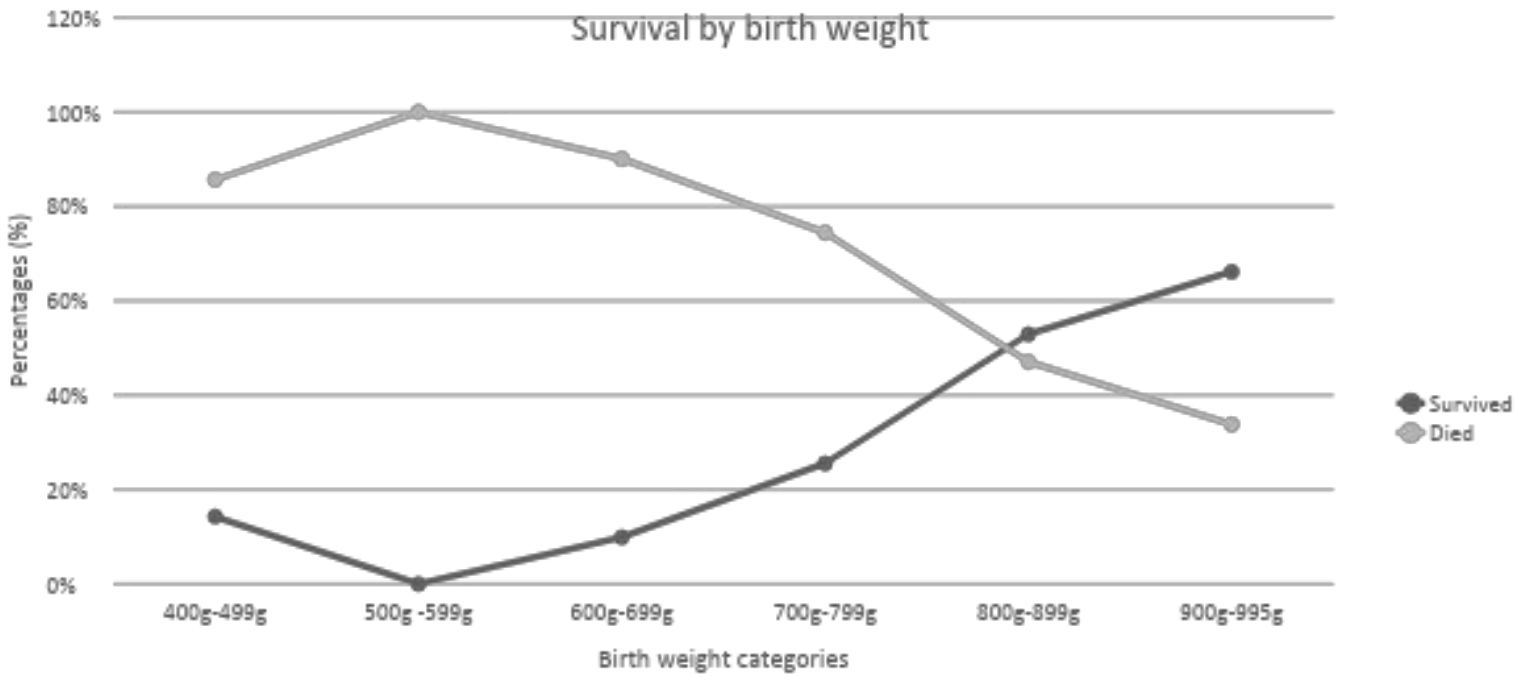
Table 2: The effects of surfactant replacement therapy and ventilatory support on survival of ELBWI at Charlotte Maxeke Johannesburg Academic Hospital between 01 January 2008 and 31 December 2017

| Intervention | Died n/N`* (%) | Survived n/N*(%) | P value |
|---|---|---|---|
| SRT | 377/499 (75.5%) | 356/403 (88.3%) | <0.001 |
| NCPAP | 359/614 (58.5%) | 347/532 (65.2%) | 0.019 |
| CMV | 124/611 (20.2%) | 101/524 (19.2%) | 0.677 |
| CMV>749g | 120/378 (31.7 %) | 97/490 (19.7%) | 0.001 |

*Denominators are different because of missing data
SRT= Surfactant replacement therapy; NCPAP= Nasal continuous positive airway pressure
CMV=Conventional mechanical ventilation

# Results cont..

Figure 2: Percentage survival by birth weight for Extremely low birth weight infants admitted at Charlotte Maxeke Johannesburg Academic Hospital from 01 January 2008 to 31 December 2017



# Discussion

# Discussion

- Respiratory distress syndrome was diagnosed in 93.2% of ELBWI with 88.2% receiving respiratory support.
- The study demonstrated improved survival with the use of surfactant replacement therapy ( 88.3%) and NCPAP ( 65.2%).

# Discussion cont..

- Two hundred and seventeen infants >749g received CMV, with 97 infants surviving to discharge.
- CMV was associated with an increased risk of mortality, probably due to selection bias (sickest infants were ventilated after deterioration on NCPAP).
- Similar findings as a study conducted at Steve Biko Academic Hospital. [5]

# Discussion cont..

- The overall survival in our study was 46%.
- A study conducted at TCH showed a higher survival rate of 75%, but that is probably due to selection bias. [6]

# STUDY LIMITATIONS

# Study Limitations

- Retrospective study of an already existing database.
- During the study period, the unit was not offering delivery room NCPAP, and the time spent in the transitional unit while awaiting NCPAP was not documented.
- Single centre tertiary referral, therefore cannot be generalized.

# CONCLUSION

# Conclusion

- Although the overall survival of ELBWI is still low, it has improved with the implementation of SRT and NCPAP.

# References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# Acknowledgement

Prof Ballot, Dr Ramdin, Rossella Bandini and CMJAH neonatal unit staff

# Thank you