Flowchart for the Nurses' role in monitoring and targeting oxygen saturation levels in preterm neonates on nasal prongs

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This flow chart summarises nursing actions and is to be used in conjunction with the full evidence-based practice guideline (available from the author) and appropriate staff education and training.

Background

Hypoxia contributes to over a million preventable deaths in low resource settings annually 1 . Malawi has the highest rates of preterm births at 18.1 per 100 live births globally 2 , contributing to respiratory illnesses 3. Preterm is defined as babies born alive before 37 weeks of gestation are completed 2 . In context like Malawi or similar settings in Africa where gestational age is often not confirmed any infant born weighing less than 1500g may be considered as a preterm 4 .

Oxygen therapy is one of the most a common therapies used in the preterm neonates⁵. Continuous pulse oximetry allows the timely detection of hypoxia and hyperoxia, measures monitor oxygen saturation and aids in titration of oxygen to within target levels^{5,6}. Maintaining oxygen saturations between 90%-95% minimizes complications (neurodevelopmental, cerebral palsy respiratory and visual impairments)5 and reduces neonatal mortality².

In low resource settings, hypoxia and hyperoxia are not well recognized or managed due to lack of knowledge, missing guidelines, inappropriate equipment, shortage of staff and other resources⁵. Evidence globally indicates that implementation of guidelines on oxygen saturation targets in preterm neonates and small newborn reduces complications ⁷.

Purpose of this guideline

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The Evidence Based Practice Guideline (EBPG) aims to prevent hypoxia and avoid hyperoxia in preterm neonates who are receiving oxygen therapy via nasal prongs. Specific objectives are:

- To establish oxygen saturation target levels of between >90-95% to prevent complications for preterm neonates.
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Assess patient and Check O₂ saturations

Below and equal 90%

Increase O₂ therapy to 1L/min

- Target O₂ saturation levels >90-95%.
- Set alarm limits at 89-95%
- Explain to caregiver benefits and dangers of suboptimal O₂ therapy and what to observe/report
- Reassess patient along with O₂ saturation levels after 2 mins 5 mins, then every 15 mins for 1 hour then hourly for 4 hours
- If O₂ saturation >90% de-escalate to A1
- If O₂ saturation level <90% escalate to B2

• Trouble shoot(D1) within 1 min

- Promptly escalate to doctor
- Titrate the O₂ flow to maximum 1L/min
- Maintain O₂ target levels of >90-95%
- Reassess patient along with O₂ saturation levels at 2 min, at 5 min
- If >90% de-escalate to A1
- If <90% escalate to B3

Escalate

- Administer O₂2L/M via face mask.
- Explain to parent/caregiver dangers of hypoxia
- Prepare for CPAP

STOP

- Use CPAP/COIN/NEST Guidelines
- Use emergency nursing care

Maintain O₂ therapy at 0.5L/min

 Explain to caregiver benefits and dangers of O₂ therapy and what to observe/report

Within Therapeutic range: > 90-95%

- Set alarm limits at 89-95%
- Reassess patient along with O₂ saturation levels first 15 mins for 1 hour. Then 1 hourly first 4 hours then 4 hourly for24 hours
- If <90% escalate to B1
- If >95% de-escalate to C1
- Still >90-95% de-escalate to A2

Wean/de-escalate

- Disrupt O₂ for 15 min
- If O₂ saturation levels >95%, adjust alarm limits to 89-100%
- Keep on room air
- 4 hourly patient reassessments along with O₂ saturation levels for 24 hours
- If < 90% escalate to B1
- If >95% wean /de-escalate

STOP

- Continue essential nursing care on 0₂ (D2)
 Refer for O₂ therapy complications screening

ESSENTIAL NURSING CARE WHILE ON OXYGEN THERAPY

- 1. Saturation monitoring using pulse oximetry
- Ensure nasal prongs are secured
 Assess skin and perfusion under saturation
- Record DROP (desaturation, respiration, observations, patient assessment) and time
- & date for each step in the process5. Provide regular updates to caregivers

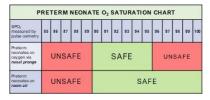
- **Reduce** O₂ therapy flow
- Target O₂ saturation levels >90-95%

Above 95%

- Educate caregiver on dangers of O₂ saturation levels >95%
- Reassess patient along with O₂
 saturation levels 4 hourly
- If >90-95% escalate to A1
- If <90% escalate to B1
- Still >95% keep on room air de-escalate and wean
- Set alarm limits to 100%

STOP

- Continue essential nursing care on 0₂(D2)
- Refer for O₂ therapy complications screening



HOW TO TROUBLE SHOOT

- Assess patient: for secretions, nasal prongs displacement, respiratory distress, abdominal distension, skin and perfusion under pulse oximetry probe.
- Check oxygen equipment: check oxygen flow, power source, oxygen level in cylinder, leaks in the tubes and connectors.
- Check pulse oximeter: Check appropriateness of probe size, position, light on the diode, battery life and wave pattern

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