

ABSTRAK

Latar Belakang: Tatalaksana dini dan efektif pada *Pediatric Acute Respiratory Distress Syndrome* (PARDS) menggunakan *Non-Invasive Respiratory Support* (NIRS) memiliki peran yang penting. Perburukan PARDS meningkatkan risiko admisi *Pediatric Intensive Care Unit* (PICU), kebutuhan ventilasi mekanik, dan beban ekonomi. *High-Flow Nasal Cannula* (HFNC) semakin banyak digunakan karena lebih nyaman dan berpotensi lebih efektif dibandingkan *Standard Oxygen Therapy* (SOT). Penelitian ini diperlukan untuk membandingkan biaya dan manfaat HFNC dibandingkan SOT untuk PARDS di bangsal umum di Indonesia.

Metode: *Cost-Utility Analysis* (CUA) dilakukan menggunakan pemodelan pohon keputusan dengan *Length of Stay* (LoS) sebagai horizon waktu, mencerminkan keberhasilan terapi di bangsal umum dan kegagalan yang berujung admisi PICU. Parameter efektivitas (kegagalan terapi, LoS, dan durasi oksigenase) diperoleh melalui *literature review*. Biaya bangsal umum diestimasi melalui dua skenario menggunakan data klaim BPJS Kesehatan dan *micro-costing*, sedangkan biaya PICU diperoleh dari data klaim. Studi mengadopsi perspektif *payer* dan *provider*, dengan uji sensitivitas deterministik dan probabilistik.

Hasil: HFNC memperlihatkan efektivitas klinis lebih baik pada kegagalan terapi (RR: 0,59; CI 95% 0,16-2,14), LoS (MD: -0,34; CI 95% 0,16-2,14), dan durasi oksigenase (MD: -0,03; CI 95% -0,63-0,58) meskipun tidak signifikan. HFNC bersifat *cost-effective* dibandingkan SOT pada kedua skenario *costing* (ICER: -Rp109.987.563.880,58/QALY *gained* dan -Rp99.829.739.892,83/QALY *gained*). Probabilitas hidup dan biaya PICU, serta utilitas di bangsal umum menjadi parameter yang paling sensitif dengan probabilitas HFNC *cost-effective* ~84%.

Kesimpulan: HFNC menunjukkan nilai ekonomi yang menjanjikan untuk PARDS di Indonesia. Biaya yang tinggi di bangsal umum dapat menghambat adopsi di RS, mengindikasikan kebutuhan dukungan kebijakan.

Kata Kunci: *Acute Respiratory Distress Syndrome; Cost-Utility Analysis; Health Technology Assessment; Pediatrics*

ABSTRACT

Background: Early and effective treatment of Pediatric Acute Respiratory Distress Syndrome (PARDS) using Non-Invasive Respiratory Support (NIRS) plays a crucial role. PARDS progression increases risk of Pediatric Intensive Care Unit (PICU) admission, the need for mechanical ventilation, and a substantial economic burden. High Flow Nasal Cannula (HFNC) has been increasingly utilized due to better comfortability and potential higher effectiveness than Standard Oxygen Therapy (SOT). Therefore, a research was needed to compare the cost and benefit of HFNC compared to SOT for PARDS in a general ward in Indonesia.

Methods: A Cost-Utility Analysis (CUA) used decision tree model with Length of Stay (LoS) as the time horizon, reflecting treatment success in the general ward and treatment failure leading to PICU admission. Effectiveness parameters (treatment failure, LoS, and duration of oxygenation) was obtained from literature review. General ward costs were estimated under two scenarios through Indonesia National Health Insurance claims and micro-costing, while PICU costs were obtained from claims data. This study adopted payer and provider perspectives, alongside performing deterministic and probabilistic sensitivity analysis.

Results: HFNC showed favorable clinical outcomes in treatment failure (RR: 0.59; CI 95% 0.16-2.14), LoS (MD: -0.34; CI 95% 0.16-2.14), and duration of oxygen (MD: -0.03; CI 95% -0.63-0.58) although without significance. HFNC demonstrated cost-effectiveness to SOT in both costing scenarios (ICER: -IDR109,987,563,880.58/QALY gained and -IDR99,829,739,892.83/QALY gained). Survival probability and cost in PICU, along with general ward utility were the most sensitive parameters with HFNC cost-effectiveness probability ~84%.

Conclusion: HFNC demonstrated promising economic value for PARDS in Indonesia. The higher upfront general ward cost may hinder adoption in hospitals, indicating the need for policy support.

Keywords: *Acute Respiratory Distress Syndrome; Cost-Utility Analysis; Health Technology Assessment; Pediatrics*