

Evaluation of a Pediatric High-Flow Nasal Cannula Training Program for Providers at Moi Teaching and Referral Hospital in Eldoret, Kenya

Kaitlyn A. Roberts¹, Emaan G. Bhutta², Adnan Bhutta³, Megan S. McHenry^{2,4}, Polycarp Mandi⁵, Eric Ngetich⁵, Faith Sila⁵, Hellen Jemeli⁵, Sarah Kimetto⁵, Laura J. Ruhl^{4,6}, Joram Nyandat^{5*}, Julika Kaplan^{2,4*}

¹Indiana University School of Medicine; ²Indiana University School of Medicine, Department of Pediatrics; ³Indiana University School of Medicine, Pediatric Critical Care Medicine, Department of Pediatrics; ⁴Academic Model Providing Access to Healthcare, Eldoret, Kenya; ⁵Moi Teaching and Referral Hospital, Eldoret, Kenya; ⁶Indiana University School of Medicine, Department of Medicine; *=Co-senior authors

Background: High-flow nasal cannula (HFNC) is a relatively safe, effective, and well-tolerated form of non-invasive ventilation for children with respiratory distress and is regularly used in resource-rich settings. Pediatric HFNC has been successfully implemented in resource-limited settings; however, little is known about the training process required to integrate HFNC into care. The present study evaluates a pediatric HFNC training program conducted at Moi Teaching and Referral Hospital (MTRH) in Eldoret, Kenya prior to HFNC implementation at Shoe4Africa Children's Hospital.

Methods: This study took place within the Academic Model Providing Access to Healthcare (AMPATH) program, a partnership among MTRH, Moi University, and a consortium of North American universities led by Indiana University. The training program curriculum included information about HFNC; clinical signs of respiratory distress; a demonstration and hands-on practice with HFNC machines; a locally adapted protocol for pediatric HFNC implementation; and a sample patient case. Fifty-nine acute care providers (nurses, clinical officers, medical officers, and registrars) participated in training. Participants completed pre-tests and post-tests (immediate and 3-month follow-up) containing open-ended questions to assess HFNC knowledge and five-point Likert scale questions to assess HFNC comfort and attitudes. Data were analyzed using descriptive statistics and two-proportion Z-tests ($\alpha=0.05$).

Results: Average knowledge assessment scores significantly increased from pre-test (2.19/6) to post-test (5.59/6; $p<0.001$). While scores decreased slightly at the 3-month follow-up, they remained increased from pre-test levels (4.53/6; $p<0.001$). The percentage of respondents who answered each knowledge assessment question correctly on the post-test and 3-month follow-up were significantly increased from the pre-test. Participant comfort using HFNC was increased on both the post-test ($p<0.001$) and 3-month follow-up ($p=0.038$).

Conclusions: This program successfully trained providers in pediatric HFNC use at MTRH and could inform future HFNC training in resource-limited settings. Future studies should evaluate pediatric outcomes at Shoe4Africa after HFNC implementation.