

Validating a Tool for an Instructional Video Curriculum for Identifying Pediatric Respiratory Distress

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I. Specific education aims:

1. Validate a tool to assess the knowledge, self-efficacy, and attitudes about a novel, online, and open-access video curriculum about the identification of pediatric respiratory distress
2. Pilot the instructional video curriculum about identifying pediatric respiratory distress
3. Disseminate an open-source library of instructional videos

II. Project rationale:

Pediatric respiratory distress is the top cause of pediatric emergency department visits in the U.S¹, especially among black and infants of color.² Pediatric pneumonia, presenting as respiratory distress, is the leading cause of child mortality in low-resourced areas worldwide.³ Deaths from respiratory distress occur in communities with few skilled health workers.⁴ Many providers are not identifying children in respiratory distress.^{5,6} Parental skepticism about providers' ability to identify pediatric respiratory distress contributes to the problem.⁷ Early identification of children in respiratory distress saves lives.⁸

No scalable and sustainable online curricula exist for teaching providers how to identify pediatric respiratory distress. Current methods, such as lectures⁹ and simulations¹⁰, lack scalability. OPENPediatrics' videos use animations that do not replicate real-life complexity.

Following Kern's six-step approach¹¹, the PI led a team of undergraduates and pediatricians at Stanford University and collaborated with experts from various medical fields and global health practitioners in Ethiopia to create an instructional video curriculum on pediatric respiratory distress using real cases. Six videos were created: overview, fast breathing, retractions, nasal flaring/head bobbing/cyanosis, grunting, and airway obstruction. Content from the World Health Organization, OPENPediatrics, and crowdsourced videos (with permission) were included. The videos are being uploaded to the Digital Medic platform, offering open-source content available for free global use. Our hypothesis is that the videos will enhance the knowledge, self-efficacy, and attitudes of healthcare workers and medical professionals in identifying children in respiratory distress.

III. Approach:

We will collaborate with psychometrics and biostatistics experts to build validity evidence for a scale that assesses knowledge, self-efficacy, and attitudes about the identification of pediatric respiratory distress via a multi-center study. We will use Artino's seven-step process for creating a high-quality scale: 1) Preliminary literature review, 2) Conduct focus groups, 3) Synthesize the literature review and focus groups, 4) Develop survey items, 5) Conduct expert validation, 6) Conduct cognitive interviews for item interpretation, and 7) Conduct pilot testing.¹² We have assembled a group of experts in the fields of pediatrics, emergency medicine, pulmonology, otolaryngology, and respiratory therapy at Stanford University, the World Health Organization, Emory University, and the University of Gondar to conduct expert validation of the survey. Cognitive interviews and the pilot survey among nursing students, nurses, residents, and physicians at three institutions will be conducted. We aim to recruit at least 40 individuals at each institution. Construct validity will be determined by analysis of variance for linear trends for mean scores. Internal reliability will be determined by item-total correlation, and internal consistency will be measured via Cronbach's alpha. Scores from providers of varying degrees of clinical experience will be compared. Sensitivity to change will be computed before and after the pediatric respiratory distress video curriculum.

Our project initiates a collaboration between pediatric educators, psychometricians, biostatisticians, trainees, and global health practitioners. By generating face, context, and construct validity among different types of providers in the U.S. and globally, the project promotes an inclusive learning setting. By helping providers identify clinical signs and symptoms that occur frequently among minority infants domestically and worldwide, we confront racial inequities in medical education. After watching the instructional videos, providers should be better equipped to identify pediatric respiratory distress and teach parents to recognize it too. Validating a tool about knowledge, self-efficacy, and attitudes will support the dissemination of our curriculum. The online, open-access, and realistic cases included in our videos contribute to the impact and sustainability of our project. The PI's experience in conducting global health projects and established relationships with teaching hospitals worldwide will facilitate the evaluation plan. His past work in Ethiopia and other countries adds credibility to the project's feasibility within the grant period.

IV. Timeline and plan for implementation

Aug 2023- Sept 2023: publish videos on Digital Medic's platform; multi-site IRB; research assistant recruitment; create survey items

Oct 2023: recruit and train research assistant; conduct expert validation

Nov 2023- Feb 2024: conduct cognitive interviews; pilot surveys; analyze data

Mar 2024 – July 2024: disseminate open-source instructional videos; prepare manuscript

V. Anticipated work product:

- We will produce a validated survey of knowledge, self-efficacy, and attitudes about a pediatric respiratory distress instructional video curriculum that can be disseminated locally and globally.
- The validated knowledge, self-efficacy, and attitudes survey will be available for use among nurses, nursing students, residents, and attendings.

VI. Evaluation plan:

Nurses, nursing students, residents, and attendings will complete pre- and post-surveys to assess knowledge, self-efficacy, and attitudes about identifying pediatric respiratory distress. Success means the survey differentiates novices from experts in identifying respiratory distress. The adoption and sustainability of the pediatric respiratory distress instructional video curriculum will be assessed when the videos are disseminated globally.

VII. Dissemination of results:

We hope to present the results at Stanford's Annual Medical and Bioscience Education Day and the Pediatric Academic Societies conference. We will seek funding from USAID's Development Innovation Ventures and AAP's International Community Access to Child Health Grant to translate our videos into multiple languages and scale the curriculum globally. We will submit manuscripts to peer-reviewed journals and MedEdPORTAL. This innovation is adaptable and scalable and will be disseminated to practitioners who assess children in respiratory distress beyond Stanford through the AAP's SOGH's Subcommittee on Global Health.

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