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Featured Article

Video Monitoring a Simulation-Based Quality Improvement Program in Bihar, India

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KEYWORDS

maternal and child health;
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quality improvement;
video monitoring

Abstract

Background: Simulation-based training has become an accepted clinical training andragogy in high-resource settings with its use increasing in low-resource settings. Video recordings of simulated scenarios are commonly used by facilitators. Beyond using the videos during debrief sessions, researchers can also analyze the simulation videos to quantify technical and nontechnical skills during simulated scenarios over time. Little is known about the feasibility and use of large-scale systems to video record and analyze simulation and debriefing data for monitoring and evaluation in low-resource settings.

Methods: This manuscript describes the process of designing and implementing a large-scale video monitoring system. Mentees and Mentors were consented and all simulations and debriefs conducted at 320 Primary Health Centers (PHCs) were video recorded. The system design, number of video recordings, and inter-rater reliability of the coded videos were assessed.

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Results: The final dataset included a total of 11,278 videos. Overall, a total of 2,124 simulation videos were coded and 183 (12%) were blindly double-coded. For the double-coded sample, the average inter-rater reliability (IRR) scores were 80% for nontechnical skills, and 94% for clinical technical skills. Among 4,450 long debrief videos received, 216 were selected for coding and all were double-coded. Data quality of simulation videos was found to be very good in terms of recorded instances of “unable to see” and “unable to hear” in Phases 1 and 2.

Conclusion: This study demonstrates that video monitoring systems can be effectively implemented at scale in resource limited settings. Further, video monitoring systems can play several vital roles within program implementation, including monitoring and evaluation, provision of actionable feedback to program implementers, and assurance of program fidelity.

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Simulation-based training has become an accepted clinical training andragogy in high-resource settings, providing trainees the opportunity to practice skills necessary to effectively manage rare but serious emergencies. Simulation effectively improves technical and nontechnical skills of health care providers in a variety of disciplines (Bragard et al., 2016; Davis et al., 1999; Kim & Shin, 2016; Walker et al., 2016). As innovations continue, simulation now reaches areas with limited resources and equal if not greater needs for improved quality of care. In recent years, the use of high-fidelity simulation has increased in low-resource settings with promising results (Walker et al., 2014, 2016).

Video recordings of simulated scenarios are commonly used by facilitators during debriefing sessions to provide factual documentation of the simulation, guide conversation, and stimulate reflection and self-guided learning (Sawyer, Eppich, Brett-Fleegler, Grant, & Cheng, 2016). Video playback reduces recall bias by providing evidence of actions during the simulated scenario, thus allowing participants to see how they performed rather than how they thought they performed (Levett-Jones et al., 2014). Beyond using the videos during debrief sessions, for large-scale projects, researchers can also analyze the simulation videos to quantify technical and nontechnical skills during simulated scenarios over time. Systems to video record simulations for use in both video-guided debriefing and implementation research are useful for monitoring and evaluating simulation-based programs. Furthermore, video recordings of debriefing sessions also assist programs in monitoring debriefing quality and facilitator performance progressively.

Little is known, however, about the feasibility and use of large-scale systems to video record and analyze simulation and debriefing data for monitoring and evaluation in low-resource settings. Ongoing collection of video data to monitor and evaluate maternal and child health simulation-based training programs is needed to ensure

program fidelity, show efficacy, and target limited resources. Low-resource settings present unique challenges when using video-based monitoring and evaluation systems at scale because of poor Internet connectivity, remote locations, and infrastructure issues. Direct observation of deliveries, considered the gold standard for showing changes in clinical practice from training, is expensive and often does not capture data on clinical performance during emergency scenarios because of their relative rarity (Tripathi et al., 2015).

To provide facilitators the ability to conduct video-guided debriefs and measure changes in technical and nontechnical skills of mentees, we developed a large-scale video monitoring system that evaluates both simulations and debriefs in Bihar, India. The aim of the overall study was to examine changes in technical and nontechnical skills in simulated clinical scenarios in a large-scale quality improvement project. This article describes the feasibility and design of the video monitoring system and the coding process.

Methods

Setting

The project was implemented in 320 primary health centers (PHCs) in Bihar, India, from January 2015 to January 2017. Bihar’s approximate population of 115 million makes it the third largest state in India (Primary Census Abstract Data Highlights - 2011 India & States, 2011), with approximately 524 PHCs statewide (District Level Household and Facility Survey (DLHS-4), 2012-2013, 2014). In 2012 to 2013, the state reported a maternal mortality ratio of 208 (163-253) maternal deaths per 100,000 live births (MMR Bulletin Sample Registration System, 2013) and a neonatal mortality rate of 34 neonatal deaths per 1,000

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