

Intervention Improved Health Workers' Neonatal Resuscitation Skills and Knowledge, but Not Neonatal Mortality

Health care workers who participated in a mobile phone-based safe delivery intervention had greater skills and knowledge regarding neonatal resuscitation than control workers, according to a cluster-randomized clinical trial conducted at 70 health care facilities in rural Ethiopia.¹ Neonatal resuscitation skills scores six months and 12 months after implementation of the safe delivery app intervention were higher among intervention health care workers than among controls (mean differences, 6.0 and 8.8 points, respectively); neonatal resuscitation knowledge was higher among intervention health care workers than among controls at six months postimplementation (mean difference, 1.7 points), but not at 12 months. The intervention was not associated with a significant change in perinatal mortality of infants delivered at study health care facilities.

The safe delivery app was designed to provide health care workers in low-income countries with the knowledge and skills to manage obstetric and neonatal emergencies; the app consisted of videos on topics such as neonatal resuscitation, as well as a catalog of essential obstetric drugs and equipment. To examine whether use of the app was associated with changes in perinatal mortality rates and in health care workers' knowledge and skill levels, researchers conducted a cluster-randomized clinical trial of health care facilities in five rural districts of Ethiopia's Oromiya region. Of the 131 facilities that were screened, 70 met the study's eligibility criteria (i.e., having a midwife or health extension worker on staff and having been the site of deliveries in the previous year) and were included in the study sample. Half of eligible facilities were randomly selected to the intervention group and were supplied with smartphones loaded with the safe delivery app; health care workers at intervention facilities received a one-day training session on how to use the phones and app. The other half of facilities were selected to the control group, and did not receive phones or additional training; the researchers ensured that

both intervention and control facilities had an adequate package of drugs and equipment.

Between September 2013 and February 2015, data were collected on women delivering at study facilities and on their birth outcomes; women were contacted in person or by phone seven days after delivery to follow up about perinatal mortality. In addition, facility health care workers' knowledge and skills regarding neonatal resuscitation were assessed by questionnaire and structured assessment tools (e.g., simulated scenarios using mannequins) before implementation of the intervention and at six and 12 months afterward. Descriptive and logistic regression analyses were used to compare perinatal mortality rates at intervention and control facilities, and to compare health care workers' neonatal resuscitation knowledge and skills index scores over time.

The analysis sample included 1,474 women in the intervention group and 1,665 in the control group. Most women in each group (>85%) reported being younger than 29, having a primary or lower education and being a housewife; more than one-third of women in each group were pregnant for the first time. Of the 1,478 infants born to women in the intervention group, 15 were stillborn and 21 died within seven days of birth; of the 1,665 infants born to women in the control group, 26 were stillborn and 39 died within a week. The stillbirth rates for the intervention and control groups were 10 and 16 per 1,000 births, respectively, and the perinatal mortality rates for the two groups were 14 and 23 per 1,000 births, respectively. In regression analysis, the intervention was not associated with a significant change in perinatal mortality.

Overall, 130 health care workers participated in the study—65 from intervention facilities and 65 from control facilities. Most health care workers in each group (70–75%) were health extension workers, and the remainder were clinical nurses or midwives. Of intervention health care workers, 16% reported having been involved in more than five deliveries in the past month and 23% reported having

ever used a smartphone; the corresponding proportions of control workers were 21% and 40%, respectively. Prior to the intervention, health care workers in the two groups had similar mean scores for neonatal resuscitation skills (7.1–7.2 of 24 possible points); however, the intervention group's score was 12.9 six months after the intervention and 16.2 one year after, whereas the control group's score was 7.5 six months after the intervention and 8.2 at 12 months afterward. Similarly, both groups had similar preintervention neonatal resuscitation skills scores (means, 4.3–4.4 of 12 possible points); however, the intervention group's score was 5.9 six months after the intervention and 5.5 at 12 months afterward, whereas the control group's score was 4.3 six months postintervention and 4.1 at 12 months postintervention. The adjusted mean difference in skills scores of intervention and control groups was significant at six- and 12-months postintervention (6.0 and 8.8 points, respectively); the adjusted mean difference in knowledge scores was significant at six months (1.7 points), but not at 12 months.

The researchers note that randomization occurred at the facility level rather than at the individual level, and that it was impossible to blind study participants to their group selection, which increased the possibility of bias. Nonetheless, they conclude that the safe delivery app was “an effective method to improve and sustain health care workers' knowledge and skills in neonatal resuscitation as long as 12 months after introduction.” They suggest that more research is needed on the app's effectiveness in terms of clinical outcomes and on large-scale implementation of the intervention in resource-limited settings.

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REFERENCE

1. Lund S et al., Association between the safe delivery app and quality of care and perinatal survival in Ethiopia, *JAMA Pediatrics*, 2016, 170(8):765–771.