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Validity of home-based sonographic diagnosis of obstetric risk factors by auxiliary nurse midwives in rural Nepal

Naoko Kozuki, Luke C Mullany, Subarna K Khatry, Ram K Ghimire, Sharma Paudel, Karin Blakemore, Christine Bird, James M Tielsch, Steven C LeClerq, Joanne Katz

Abstract

Background Approximately 2·3 million fetal, neonatal, or maternal deaths occur annually during the intrapartum period or on the day of birth. Several risk factors for intrapartum-related complications require ultrasonography for accurate diagnosis, but sonographic services are scarce in low-resource settings. In this study, we aimed to assess the feasibility of community-based ultrasonography conducted by auxiliary nurse midwives to identify basic obstetric risk factors, in rural Sarlahi District, Nepal. We aimed to assess the validity at which these health workers can detect non-cephalic position, multiple gestation, and placenta previa and to explore whether sonographic diagnosis could improve outcomes for women with these high-risk conditions.

Methods Three auxiliary nurse midwives (ANM) received two 1-week ultrasound trainings at Tribhuvan University Teaching Hospital in Kathmandu, Nepal. Women at 32 weeks' or more gestation were enrolled in the study, and received ultrasonography from the ANMs during home visits. ANMs used ultrasonography to identify non-cephalic position, multiple gestation, and placenta previa. Images were saved and later reassessed by gold standard ultrasonographers to determine the validity of the ANM assessment. We also compared adverse outcomes in non-cephalic or multiple gestation births from the study group with those in a comparison group of women who did not receive ultrasonography from our study, but the study was not powered to detect a difference.

Findings We collected data from 815 women. The kappa statistics for diagnosis of non-cephalic position were 0·92, 0·98, and 0·94, respectively, for the three ANMs against the gold standard. Sensitivity, specificity, positive predictive value, and negative predictive value were between 90% and 100% for all ANMs. For multiple gestation pregnancies (n=6), the ANMs were in perfect agreement with both the gold standard reading and maternal postpartum self-report. Two cases of placenta previa were detected, and the gold standard was in agreement with both. There were 4 adverse outcomes out of 19 women (21%) with non-cephalic or multiple gestation pregnancies in the study group compared with 10 out of 36 (28%) in the comparison grroup. This difference was not significant (p=0·586).

Interpretation Our findings suggest that it is feasible for ANMs to conduct ultrasonography to identify basic obstetric risk factors in low-income settings. The difference in birth outcomes in non-cephalic and multiple births, comparing those antenatally diagnosed by ultrasound and those who were not, was not significant; the sample size was too small to detect a difference. Further investigation is warranted to determine whether sonographic diagnosis of selected obstetric factors could contribute to improved care-seeking and health outcomes in low-income settings.

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Declaration of interests
We declare no competing interests.

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