

Adoption and Completeness of Documentation Using a Structured Delivery Record in Secondary Care, Subdistrict Government Hospitals of Karnataka State, India

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Abstract

Objective: Poor medical record documentation remains a pervasive problem in hospital delivery rooms, hampering efforts aimed at improving the quality of maternal and neonatal care in resource-limited settings. We evaluated the feasibility and completeness of labor room documentation within a quasi-experimental study aimed at improving emergency preparedness for obstetric and neonatal emergencies in 8 nonteaching, subdistrict, secondary care hospitals of Karnataka state, India.

Methods: We redesigned the existing open-ended case sheet into a structured, delivery record cum job aide adhering to principles of local clinical relevance, parsimony, and computerizability. Skills and emergency drills training along with supportive supervision were introduced in 4 “intervention arm” hospitals while the new delivery records were used in eight intervention and control hospitals.

Results: Introduction of the new delivery record was feasible over a “run-in” period of 4 months. About 92% (6103 of 6634) of women in intervention facilities and 80% (6205 of 7756) in control facilities had their delivery records filled in during the 1-year study period. Completeness of delivery record documentation fell into one of two subsets with one set of parameters being documented with minimal inputs (in both intervention and control sites) and another set of parameters requiring more intensive training efforts (and seen more in intervention than in control sites; $P < .05$).

Conclusion: Under the stewardship of the local government, it was possible to institute a robust, reliable, and valid medical record documentation system as part of efforts to improve intrapartum and postpartum maternal and newborn care in hospitals.

Keywords

delivery room, documentation, medical records, obstetric delivery, maternal care, neonatal care, quality of health care

Introduction

Over the last decade, institutional deliveries have increased substantially in India,¹ and current efforts are on improving the quality of care provided in these facilities. Accurate, timely, and complete documentation of medical records is critical from patient care, human rights, and legal perspectives.^{2,3} Suboptimal medical record documentation, however, remains a pervasive problem hampering efforts to improve quality of care offered in resource-limited settings,^{4,5} with only a minority of parturient women in India having their clinical parameters being documented currently.⁶ These are due to several issues: a “culture of nondocumentation,” gaps in knowledge/skills of

attending doctors/nurses, inadequacies in the labor room case sheet (open-ended and user nonfriendly), and deficiencies in

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the health systems (lack of medical records departments, inadequate supply of paper records, etc).^{2,7} Documentation improvement efforts in other developing countries appear to be promising.⁸ We report here on the adoption and completeness of labor room delivery record documentation within a quality-of-care improvement initiative in southern India.

Methods

Study Setting

The study facilities were in Bagalkot and Koppal districts of Karnataka state with the following health indicators: crude birth rate of 18.3/1000 population, maternal mortality ratio of 133:100 000 live births, and infant mortality ratio of 31:1000 live births.^{1,9} Institutional deliveries were 85% and 70% in Bagalkot and Koppal, respectively.¹⁰ Nearly, one-third of these deliveries occurred in the non-teaching, subdistrict hospitals. A special maternal and child health survey in 2010 had revealed inadequate maternal and neonatal care service coverage^{11,12} as well as suboptimal quality of care due to staffing shortages and knowledge/practice gaps in essential and emergency obstetric and newborn care.^{13,14}

Study Design and Intervention

We hypothesized that within the context of a quality improvement initiative using a “nonrandomized, controlled, post-only intervention study design,”¹⁵ it would be opportune to evaluate the adoption and completeness of labor room documentation. Re-design of the delivery record was undertaken as a first step by a panel of clinicians, epidemiologists, nurses, and program managers (Figure 1). From an open-ended, unstructured case sheet that had no suggested answers and was therefore associated with low response rates, it was redesigned into a 4-page, structured delivery record guided by principles of clinical relevance, parsimony, computerizability, simplicity, and professional accountability.^{8,16,17} It had preprinted sections relating to context (document identifier, facility details, and patient demographics), components of clinical obstetric and neonatal care, and space for authentication by the signing-off doctor/nurse.¹⁸ It was also designed to function as a *job aide* through the inclusion of pointers to clinical management and linkage to a complementary set of case sheets for common obstetric and neonatal complications seen in the country.¹⁹ This redesigned delivery record was introduced in a 3-hour session during a 3-day Skilled Birth Attendance refresher training in intervention and control sites in July 2013.

The intervention was a “Skills-and-Drills” program covering clinical skills training at baseline (August 2013), bimonthly emergency drills, and supportive supervision of health facility doctors and nurses during September 2013 to August 2014; the control arm continued with usual care. This was designed based on 3 considerations: first, there were substantial gaps in clinical skills at the individual level and in emergency preparedness at the facility level;^{13,14} second, there were time constraints for

staff attending off-site training courses; and third, there was an unmet need for ongoing mentoring to institutionalize good practices.²⁰ All 3 components (skills, drills, and supportive supervision) were delivered by an external team of obstetricians, pediatricians, and nurses.

Skills training was a 2-day training program using skills stations (with case studies and mannequins) to cover important intrapartum/postnatal topics. Physical examination of a woman in labor, monitoring the progress of labor, active management of third stage of labor (AMTSL), and emergency preparedness for complications such as postpartum hemorrhage and eclampsia were covered by the obstetrician. Immediate newborn care, warm chain and feeding of newborn, neonatal resuscitation, and supportive care for a sick newborn were covered by the pediatrician.

Emergency drills were conducted by a triad of “director, patient-actor, and patient relative” with the health facility staff as respondents to simulate a scene with fidelity as close to the local context as possible. On each alternate month, 1 obstetric complication (either postpartum hemorrhage or eclampsia) and 1 neonatal complication (birth asphyxia) were simulated using a prewritten script. Each drill, lasting about 45 minutes, was videotaped and played back in a “debriefing” session.

Supportive supervision visits were aimed at conducting audits on a subset of case sheets and for direct observation of key activities/components (such as deliveries, newborn feeding, infection control practices, and critical drugs/supplies inventories) followed by a team meeting to draft an action plan for each facility.¹⁵

Eight nonteaching subdistrict hospitals (*taluk* hospitals and community health centers) were the study sites—4 each in intervention and control arms. These hospitals were at the middle level of India’s 3-tier health-care system, catering to populations of 400 000 and 100 000, respectively. The study facilities were matched to be roughly comparable in terms of delivery load, health-care personnel (doctors and nurses), and facilities during the previous 3 months (Table 1). After the introduction of the new delivery record in July 2013, there was a “run-in” period of 4 months for staff to gain familiarity. During the subsequent 12-month study period (November 2013–October 2014), nonmedical research assistants visited all hospitals to collect the case sheets and provide feedback on improving completion rates (missing fields, plausible values, etc).²¹

Outcomes, Analysis, and Ethics

Intervention outcomes measured for this study were adoption and completeness of documentation for 5 domains of maternal care—history taking, physical examination, labor monitoring, third and fourth stages of labor, and 1 domain of essential care for newborns.²² Denominator was all the deliveries for all variables except the following: AMTSL and time of initiation of breast-feeding were for the subset of vaginal deliveries only, and identification of need for resuscitation was only among the subset of newborns who did not cry at birth.

Validation of documentation was undertaken through a combination of strategies: checking accuracy of calculations

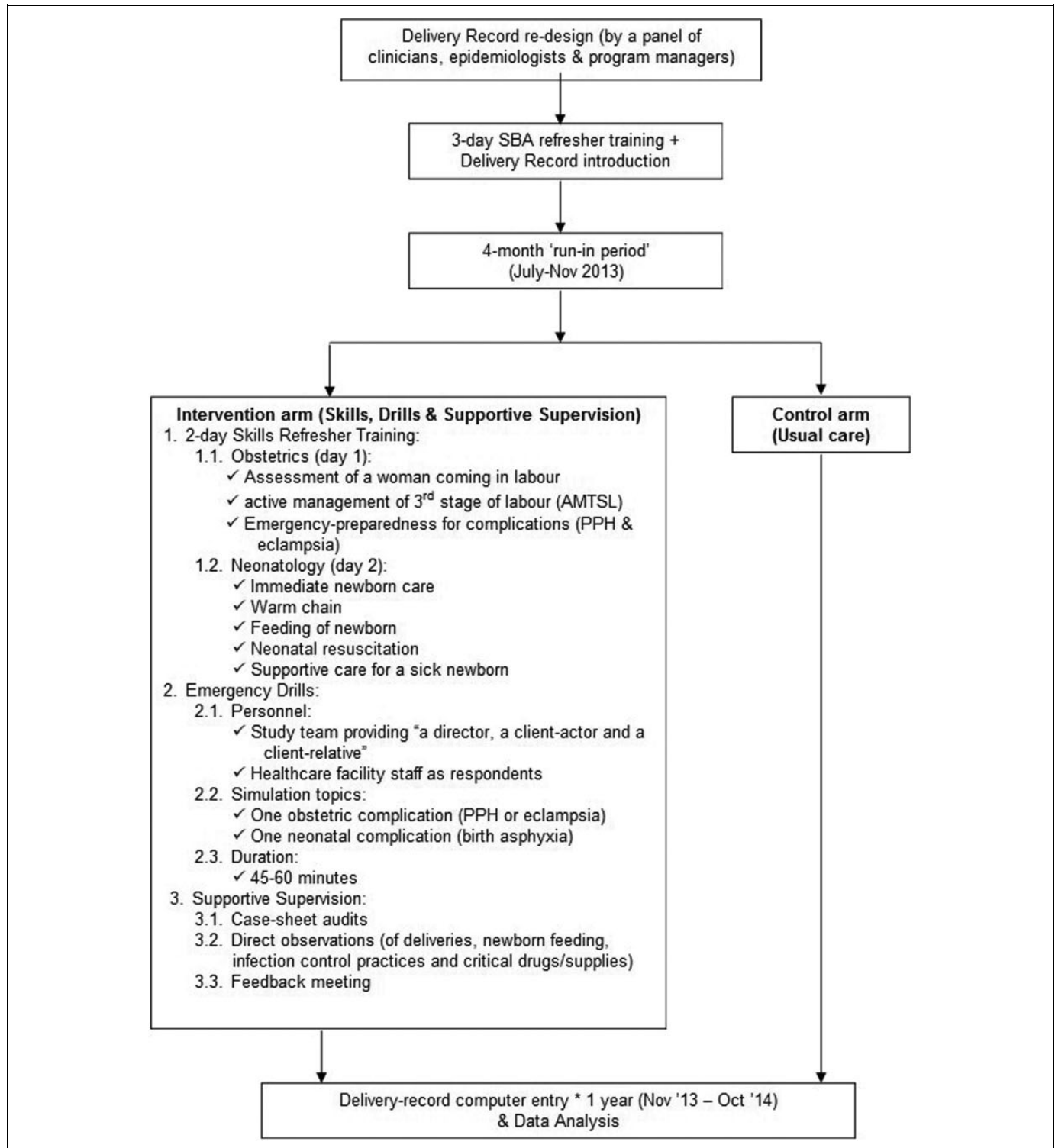


Figure 1. Flowchart of activities during the study period.

(eg, gestational age [GA] from reported last menstrual period [LMP]), qualitative feedback from health facility staff (eg, on fourth stage of labor reporting), and interpretation of trends in reporting across the 4 quarters of the reporting period.^{2,7,22} Simple descriptive analysis and test of significance between proportions

were undertaken using SPSS. Ethics approval for the study was obtained from the St John's Medical College Institutional Ethical Review Board (Ref No. 59/2013). Anonymous delinked data were used for the chart review, and informed consent was obtained from health workers for the qualitative feedback.

Table 1. Comparison of Intervention and Control Facilities at Baseline.

Parameter	Study Arm	
	Intervention	Control
1. Type of health facility	TH = 3; CHC = 1	TH = 3; CHC = 1
2. Number of deliveries (in last 3 months)	1417	1240
3. Service availability		
✓ Cesarean section (in last 3 months)	4 of 4 facilities	3 of 4 facilities
✓ Blood transfusion facility	3 of 4 facilities	4 of 4 facilities
4. Human resources		
✓ Nurses	74	63
✓ Generalist medical officers	10	7
✓ Specialists ^a	15	13

Abbreviations: TH, taluk (subdistrict) hospital; CHC, community health center.

^aObstetricians, pediatricians, or generalists with emergency obstetric care (EmOC) training.

Results

Coverage of eligible staff (doctors and nurses) in the skills refresher training was 98%. About 90% of staff had participated in at least 1 emergency drill during the project period.

Adoption of Documentation

During the study period, a total of 12 308 women (intervention = 6103; control = 6205) delivered in the study facilities. About 92% of women in intervention facilities and 80% in control facilities had their delivery records filled in.

Completeness of Documentation

Completeness of documentation is depicted in Figure 2 in two ways: (1) for the subset of parameters that had two-thirds or more of records with documentation, it is shown for both arms combined (blue) and (2) for those with less than two-thirds of records with documentation, it is shown separately for intervention (green) and control (red) arms. Of the 12 308 women, $\geq 67\%$ had their care documented for the following parameters: expected date of delivery (EDD); fetal heart rate per abdominal examination; per vaginal examination findings on cervical dilatation and presence/absence of amniotic membranes; third-stage parameters such as date, time and mode of delivery, components of AMTSL for vaginal deliveries; and baby details such as sex and outcome of birth (live birth/stillbirth), cry at birth, breast-feeding initiation timing, and birth weight.

For the remaining components of care, less than 67% of women had their care documented. For these variables, there were statistically significant differences between intervention and control sites ($P < .05$); intervention was more than control for all elements except for fourth-stage monitoring (Figure 2). The intervention seemed to have contributed to increasing

documentation of different parameters in 3 different clusters. For some parameters, about 50% to 70% of women had their care documented—general examination (including blood pressure, pulse, and height), plotting a partograph, and estimation of volume of blood loss during delivery. For another set of parameters, there was only a modest increase such that about 25% to 50% of women had care documented on correct GA calculation, abdominal examination (including fundal height, fetal presentation, and duration/frequency of uterine contractions), per vaginal examination findings on cervical effacement and station, and fourth-stage monitoring (of maternal pulse, blood pressure, uterine tone, and bleeding). Identification of need for resuscitation was documented in less than 25% of case sheets even in the intervention sites.

Discussion

The present study has demonstrated the feasibility of using a structured delivery record to improve clinical documentation. Stewardship of the documentation program was provided by the regional government and physical ownership of the case sheets was the responsibility of the health centers.^{18,23} The uptake of delivery record usage was substantial. Documentation levels were higher than that observed elsewhere in a cross-sectional study in India⁶ and in a quality improvement interventional setting in Ecuador.⁸

Detailing deficits in documentation for the different clinical care elements can help unravel gaps in the pathway for efforts to reduce the unacceptably high levels of morbidity seen in resource-poor settings.^{10,19} Specific maternal complications can be linked to deficits in documentation: postpartum hemorrhage (fourth-stage monitoring elements), obstructed labor (abdominal/pelvic examinations and partogram use), pre-eclampsia/eclampsia (labor monitoring and fourth-stage monitoring), and maternal sepsis/endometritis (pelvic examination and partogram use). Similarly, specific early neonatal complications are also linked to gaps in documentation: prematurity/low birth weight (GA calculation) and birth asphyxia (identifying the need for resuscitation).

The strengths of this study include the large sample size, the prospective nature of data collection, the quasi-experimental study design, and data on a large number of parameters routinely used in clinical decision-making. Validation of some of these parameters also yielded valuable insights. Calculation of correct GA was low due to a failure of reconciliation of abdominal examination findings with LMPs reported by the women. The EDD documentation proportion was seen to be high owing to undue reliance on antenatal ultrasonogram reports, irrespective of their timing during pregnancy, instead of individual calculation.

During the run-in period of 4 months, we had noticed that $> 65\%$ of women in intervention sites had “examination of fourth stage” parameters being ticked off (without their actual performance). Subsequently, with the reiteration of the importance of documenting only on task completion, there was lower documentation rate during the study period, probably reflecting

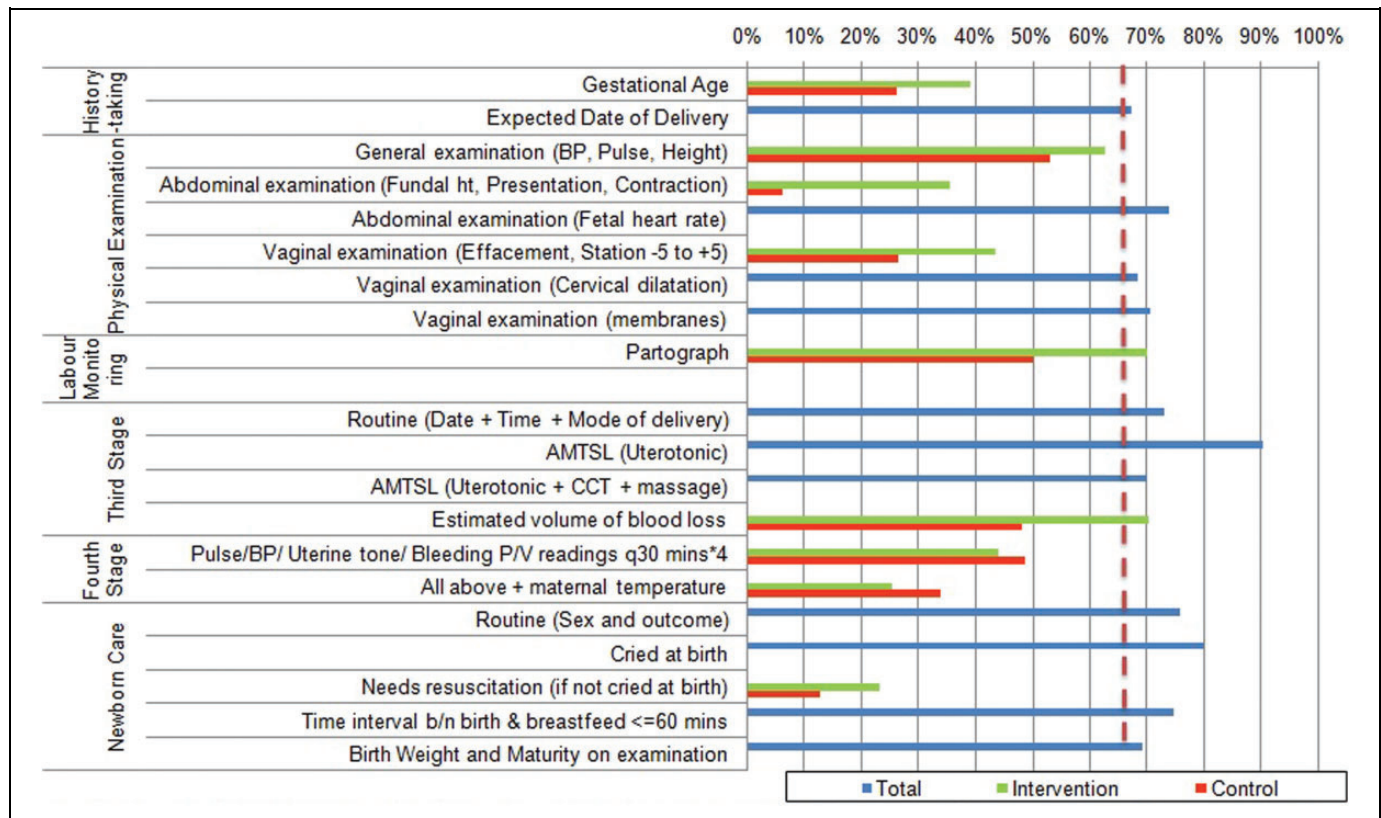


Figure 2. Completeness of delivery record documentation in 8 nonteaching subdistrict hospitals of northern Karnataka (2013-2014; n = 8 facilities and 12 308 records [total], 4 hospitals and 6 103 records [intervention], 4 hospitals and 6 205 records [control]).

actual practice patterns. There was also a corresponding diminishing difference between control and intervention sites observed from the first to the last quarters. In our study, plotting of partograph was observed to be higher than noted elsewhere²⁴ partly because of retrospective filling in, as reported by the nurses.

The proportion of case sheets with a correct GA calculation increased from 15% in the first quarter to 33% in the last quarter. Similarly, proportion with abdominal examination findings (comprising fundal height, presentation, and contraction) doubled from 10% in the first quarter to 20% in the last quarter. These findings offered some face validity of a dose-response relationship. Lack of substantial changes for some elements such as fourth-stage monitoring was attributed to staffing shortages in the delivery room; others such as failure to identify newborns eligible for resuscitation were attributed to difficulties in mastering neonatal asphyxia diagnosis and management.

Chart abstraction to study quality of care is not without limitations. It is possible that items recorded on charts may be false without never really having occurred or that only a proportion of activities actually performed may be captured in the records.⁷ It was also possible there was some “contamination” of the control arm owing to the use of a common set of research assistants. In addition, our study design of concurrent evaluation may not have provided sufficient time for a “culture

of documentation” to set in. There are also limitations to attribution that can arise from the use of a nonrandomized study design though we had matched facilities to minimize bias. Also, our choice of 67% as cutoff for studying completeness of charting was arbitrary. Further, information from record review would need to be complemented with other methods such as clinical vignettes, standardized patients, direct observations, and administrative data to better understand the process of delivery of care.^{7,25} In addition, our selection of study hospitals, though typical of mid-tier subdistrict hospitals in Karnataka, may not be fully representative for the entire state or country. The concurrent nature of the intervention rollout along with simultaneous data collection precluded the identification of the relative contribution of the baseline training component and the ongoing mentoring component of the intervention to the adoption and maintenance of the documentation system. And finally, information on the impact of the intervention on maternal and neonatal outcomes, not presented here, would be far more compelling.

In summary, it can be concluded that a structured delivery record can be introduced in nonteaching hospitals over a “run-in” period of a few months followed by collection of reliable and robust information for improving maternal and neonatal care. Such care offered by facility staff can be captured with varying levels of completeness that can help identify easy-to-achieve fields and those that require more sustained training

efforts. Further research should also help delineate the relative contribution of the different intervention components to the deployment and sustainability of such a documentation system. In the meantime, institution of a reliable and valid documentation system appears to be a critical prerequisite of plans to improve the quality of maternal and newborn care in health facilities.

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