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## **Immediate postpartum care in low- and middle-income countries: a gap in health care quality research and practice**

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### **Abstract**

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The immediate postpartum period carries significant risks of complications such as postpartum hemorrhage and sepsis. Postpartum monitoring, including taking vital signs and monitoring blood loss, is important for early identification and management of complications, but many women in low- and middle-income countries (LMICs) receive minimal attention between childbirth and facility discharge. The World Health Organization (WHO) recently released new

guidelines on postnatal care, which include recommendations for immediate postpartum monitoring.

In light of the new guidelines, this is an opportune moment to address gaps in postpartum monitoring in LMICs. In this commentary, we bring attention to the importance of immediate postpartum monitoring. We identify opportunities for strengthening this often over-looked aspect of maternity care through improvements in quality measurement and data availability, research into barriers to high quality care, and innovations in service delivery design.

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## Introduction

In the 24 hours after childbirth, women face a heightened risk of morbidity and mortality from postpartum complications such as hemorrhage and sepsis. An estimated 60% of maternal deaths occur in the postpartum period, and 45% of these deaths occur in the first 24 hours after delivery (1). While some complications are unavoidable, early identification and prompt management can reduce the chances of severe morbidity and mortality (2–4). This requires high quality immediate postpartum care, including monitoring patients for signs of complications after delivery and until discharge.

Despite the importance of immediate postpartum monitoring in averting morbidity and mortality, there is substantially less attention to this topic than to quality of care during labor and delivery. The limited available evidence suggests that women delivering in LMICs receive minimal attention and care in the time between childbirth and facility discharge. A study conducted across 33 sub-Saharan African countries found that one-third of women did not receive a single health check between delivery and discharge (5). There is also scant evidence on why postpartum monitoring is so limited, or on how it can be improved.

The World Health Organization (WHO)'s new postpartum care guidelines, published in March 2022 to update and expand on the 2014 guidelines, bring a renewed focus to the importance of prompt identification and management of complications in the immediate postpartum period (6,7). Motivated by the high burden of postnatal maternal and newborn mortality and by the “quality revolution” in global health (8–10), the new guidelines emphasize the importance of high-quality postnatal care – including continuous care and monitoring during the critical first 24 hours after childbirth followed by at least three postnatal care contacts during the first six weeks after delivery – and of ensuring a “positive postnatal experience” for women and their newborns. The release of these guidelines makes this an opportune time to address gaps in the quality of immediate postpartum care in LMICs.

In this commentary, we highlight the importance of immediate postpartum monitoring, an often-overlooked aspect of maternal health care. We identify opportunities for strengthening the quality of immediate postpartum care through improvements in measurement and data availability, research into barriers to high quality care, and innovations in service delivery design.

### **Clinical importance of postpartum monitoring**

The first recommendation in the WHO's 2022 postnatal care guidelines states that, following childbirth, all women should have "regular assessment of vaginal bleeding, uterine tonus, fundal height, temperature, and heart rate (pulse) routinely during the first 24 hours, starting from the first hour after birth." While the specific recommendations on postnatal assessment have not changed – it still holds that women should be monitored four times during the first hour after delivery, hourly from hours 1 to 4, and every 4 hours from hours 4 to 24 (11) – the new, more all-encompassing postpartum guidelines bring renewed focus to these recommendations and their clinical importance.

Evidence from maternal mortality reviews (sometimes called "maternal death audits") underscores the importance of these guidelines. In a wide range of settings, these reviews have identified insufficient monitoring and delays in treatment initiation as important factors contributing to maternal mortality (12–18). For example, in a review of maternal deaths over a 10-year period in France, delayed management was a leading factor contributing to deaths from postpartum hemorrhage (13). A review from the United Kingdom concluded that, "in many cases in this Report, the early warning signs of impending maternal collapse went unrecognized" (19,20). In a review in Kenya, inadequate monitoring was found to have played a role in 27% of the investigated mortality cases, and prolonged abnormal observation without action was found to have played a role in 24% (14).

Numerous studies from maternity care and other clinical domains have shown the value of vital signs measurements in predicting adverse clinical outcomes (21,22). For example, on medical and surgical wards, warning systems, which use clinical indicators such as vital signs and examination findings to identify patients at risk of clinical deterioration, have been shown to be effective in predicting cardiac arrest and mortality within 24 hours (21). A systematic review found that warning systems adapted for obstetric populations (sometimes called maternal warning systems) generally have high predictive accuracy for maternal morbidity, ICU admission, and mortality (22).

Beyond the ability to predict outcomes, there is also a growing body of evidence that systems that improve patient monitoring can lead to better and more timely care decisions and improved patient outcomes (4,22–25). For example, evidence from general hospital wards indicates that

continuous monitoring (e.g., using remote monitoring technologies) can reduce critical care use, shorten hospital stays, and improve clinical outcomes relative to intermittent monitoring (23). In a pilot study in a large hospital network in the United States, an obstetric warning system called the Maternal Early Warning Trigger (MEWT) tool was found to reduce severe maternal morbidity by 18% (4). It is important to note, however, that better monitoring alone does not always improve outcomes: in a large randomized trial in eight LMICs, the introduction of a device that improved vital signs measurement in maternity wards, together with a related education intervention, did not lead to improvements in clinical outcomes [53]. This finding highlights the importance of not only improving the measurement of clinical signs but also ensuring that effective systems are in place to respond to abnormal results.

There have been widespread efforts to improve postpartum monitoring in high-income settings, including national implementation of obstetric warning systems in the United Kingdom (26) and Ireland (27) and numerous efforts to introduce similar systems in American hospitals (4,28). However, this topic has received relatively little attention to date in LMIC settings, despite the high burden of maternal morbidity and mortality in these settings. It is therefore critical to bring attention to postpartum monitoring in LMICs.

### **Evidence on the quality of postpartum monitoring in LMICs**

The limited available evidence on the quality of postpartum monitoring in LMICs paints a concerning picture. While most women remain in the health facility after delivery for at least the WHO-recommended 24 hours (29), the care provided during this postpartum stay is minimal. Across 33 LMICs with available Demographic and Health Survey (DHS) data from between 2000 and 2016, only 66% of women who delivered in health facilities reported that they received at least one postpartum health check during their facility stay, ranging from 27% in Eswatini to 94% in Burkina Faso (5). The rate of postpartum health checks was lowest in public health centers (61%) and highest in public hospitals (75%). An analysis of DHS survey data from Uganda found that, among women who delivered in health facilities, the proportion who reported at least one postpartum health check increased from 36% in 2006 to 65% in 2016 (30). However, surveys with health workers suggest that

the quality of postpartum monitoring often worsened during the COVID-19 pandemic, especially in lower-resource settings: in a multi-country study, 45% of health workers in low-income countries and 11% of health workers in high-income countries reported reductions in the frequency of postpartum monitoring in health facilities (31).

While survey evidence can provide some basic insight into postpartum monitoring, evidence from clinical observation can tell us more about its content. For example, in the “BetterBirth” trial, a cluster-randomized trial of a quality improvement intervention in health facilities in Uttar Pradesh, India, only 7% of women across 15 control facilities had their blood pressure taken at any time between admission to the facility and 1 hour after delivery (32). During the same period, only 0.3% ever had their temperature taken (32). In a study in Uganda, only 5% of observed providers took mothers’ vital signs during the first hour after birth (33). In a study across 36 primary health centers in Burkina Faso, Ghana, and Tanzania, postpartum monitoring for uterine contraction and vaginal blood loss was often not performed between delivery and discharge from the health facility (34). Though it provides a limited picture, this evidence points to important gaps in postpartum monitoring. The remainder of this piece describes our recommendations for improvements in immediate postpartum monitoring in LMICs, summarized in Table 1.

### **Improving measurement of quality of postpartum monitoring**

A first step to improving the quality of immediate postpartum monitoring is better measurement. High quality immediate postpartum monitoring includes not only conducting the appropriate examinations with the appropriate frequency (as set out in WHO guidance), but also using the information gathered to inform clinical decision-making, escalate care as needed, and intervene in a timely manner. Quality measures should be developed to capture all of these steps, and then data should be collected to identify gaps in quality.

Currently, the quality of immediate postpartum monitoring is measured in a piecemeal and inconsistent manner; different studies report different quality measures, and they typically omit important aspects of immediate postpartum monitoring. In recent years, there have been significant improvements in measurement of quality of care during labor and delivery, including the development

of quality scales such as the Tripathi Index [39], which provides a standardized and validated approach for measuring the quality of labor and delivery care in LMICs. There has also been progress in the measurement of disrespect and abuse during childbirth [40] using standardized and validated measures. There is a need for similar progress in measurement of the quality of immediate postpartum monitoring. Standardized measures should be developed that incorporate the content and frequency of monitoring, whether systems are in place to use information from patient monitoring to inform decisions about when to escalate care, and whether complications are managed in a timely manner. The use of standardized quality measures across settings and over time will facilitate the identification of gaps in quality, inform the design of interventions to improve quality, and enable the measurement of progress towards improved quality.

In addition to a lack of standard measures, there are several major challenges with the data collection approaches that are currently used to measure the quality of immediate postpartum monitoring. First, much of the existing work in this area relies on maternal recall, which likely contains substantial measurement error as women may not accurately recall the care they received or may not know what constitutes a postpartum health check (35,36). For example, in the widely used DHS, women are asked to recall care from the past five years (5,29,30). Direct observation can provide more accurate, detailed information on quality. However, to date, direct observation studies have typically collected only limited information on postpartum care. Most delivery observation studies have ended within one hour of delivery (37), and postpartum care studies have typically focused on later postpartum assessments in the weeks following delivery (38); few studies have measured quality of care during the 24 hours after delivery, despite the high risk of complications during this period. Future studies should employ direct observation methods or other innovative techniques to evaluate the quality of care throughout the immediate postpartum period. Another approach may be the use of health facility records to evaluate the quality of postpartum monitoring (39); however, facility records should be used with caution in health systems with low quality administrative data (36).

### **Service delivery research and innovation**

Next, it will be critical to understand and address the different barriers that have hindered progress to date.

Barriers to high quality care exist at many levels, including the health system, health facility, provider, and patient. Health system barriers include challenges with supplies such as blood pressure cuffs and thermometers, staffing, and provider training. However, in studies from a variety of different health domains, insufficient equipment and knowledge rarely fully explain quality gaps; indeed substantial “know-do gaps” have been identified in maternity care and other domains in low- and middle-income countries (33,34,40,41). Health facility norms and health care provider beliefs, behavior, and motivation likely also play a role. For example, even if maternity care providers are aware of postpartum care guidelines (33), they may not perceive postpartum monitoring as part of their job. Qualitative research with health care providers in India and Nigeria suggests that once a delivery has been completed many providers feel “their work is over” (42,43). In addition, insufficient communication between providers in labor and postnatal wards can mean that risks, which may be evident during labor and delivery, are ignored or miscommunicated when patients are transferred to the postnatal ward (44). There is evidence that over-confidence bias among health care providers can contribute to lower quality care (45); understanding the potential role of overconfidence in shaping postpartum monitoring decisions may provide insights into how to improve care. Finally, patient-level challenges may include patient preferences to leave health facilities soon after delivery. The WHO recommends that all women remain in the health facility for at least 24 hours after an uncomplicated vaginal delivery: while the majority do this, many women leave much sooner (29). Insights into patient decision-making and the factors that support or hinder longer facility stays are needed to ensure that all women receive adequate postpartum monitoring.

While the new WHO guidelines address the frequency and content of postpartum monitoring, they do not provide guidance on how monitoring could be improved or how to ensure that information collected during patient monitoring is used to inform decisions about when to escalate care (6). Addressing quality gaps will require innovative thinking, including the adaptation of existing approaches and the development of new systems and tools. This is an important area for future research. In some contexts, there may need to be increases in staffing or reallocation of staffing

towards monitoring roles. There may also be a need for investment in monitoring devices including accurate, affordable, automated blood pressure monitors (46,47).

More complex interventions may also be needed. One promising way forward is the design and implementation of maternal warning systems for different contexts, building on experiences to date in settings such as Ethiopia, Malawi, Nigeria, Pakistan, and Zimbabwe (48–52). For example, a pilot study of a maternal warning system in referral hospital in Zimbabwe suggested that wider implementation of these interventions may be a feasible and effective way to improve patient outcomes (48). Warning systems provide a structured protocol for monitoring and for using information from monitoring to inform decision-making about care (28). While there are a variety of different approaches used, including both single-parameter and multi-parameter warning measures, these systems typically rely on metrics that are easy to collect in low-resource settings (53,54). Existing work has highlighted a number of factors that are critical to the success of warning systems, including local validation of the predictive accuracy of the warning system, clear processes for escalating care, facility norms that reward providers when they call for support as needed, and buy-in from senior clinicians and facility leadership (28,50,51). These findings should be considered in efforts to innovatively and adaptively develop warning systems for implementation in different settings.

Beyond warning systems, further innovations could be informed by evidence on closing the “know-do gap” from a variety of clinical domains. For example, multifaceted approaches that combine health worker training with supervision or group problem-solving activities have been effective in improving adherence to pediatric care guidelines (55); similar interventions could be adapted to improve communication around patient risks and decision-making around escalation of care in maternity wards. Health care providers at facilities in rural areas are likely to face particular challenges, given their often limited experience with emergency or complex cases: novel training or coaching interventions may be needed in these settings. There is evidence that different types of facilities may be better at motivating providers to provide high quality care and therefore reduce know-do gaps: for example, research from India suggests that quality is higher in public hospitals and private clinics than in small public clinics (56), and research from Tanzania suggests that providers

perform better in facilities with decentralized authority (e.g., where decisions about hiring and firing providers are made more locally) (57). Changes in facility organization and norms may be needed to promote a culture in which providers actively assess patients for the risk of postpartum complications, rather than responding after complications have already progressed to severe (42). Principles from human-centered design could be applied to increase the salience of postpartum monitoring to providers (58). Interventions should be informed by an understanding how providers think, communicate, and make decisions about postpartum care (59).

### **Conclusions**

In order to reduce morbidity and mortality from postpartum complications in LMICs, there is a vital need for researchers, policymakers, and practitioners to bring increased focus to immediate postpartum monitoring. We need to better understand the current state of immediate postpartum monitoring, examine reasons for limited postpartum monitoring, and develop and test interventions to improve it.

**Table 1: Summary of challenges and recommendations for improving the quality of immediate postpartum monitoring**

Domain	Challenges	Recommendations
Measurement	Lack of standardized metrics for quality measurement	1. Development of standardized metrics and measurement tools for the quality of immediate postpartum monitoring, including: <ul style="list-style-type: none"> <li>- The content and frequency of postpartum health checks;</li> <li>- The presence of decision-making systems for when to escalate care; and</li> <li>- The timeliness of interventions in case of complications</li> </ul>
	Over-reliance on maternal recall in quality measurement and limited observational data	2. Development of better approaches to measuring quality of immediate postpartum monitoring, including through clinical observation
Service delivery design	Limited understanding of the reasons for low quality care	3. Research on context-specific barriers to high-quality immediate postpartum monitoring, including: <ul style="list-style-type: none"> <li>- Structural barriers, such as insufficient supplies or high patient-to-staff ratios; and</li> <li>- Barriers related to health facility norms, and health care provider behavior and decision-making</li> <li>- Barriers related to patient decision-making</li> </ul>
	Limited knowledge of effective interventions to improve quality	4. Development and testing of interventions to improve immediate postpartum monitoring, such as: <ul style="list-style-type: none"> <li>- Changes to facility staffing to clearly define and allocate responsibilities in this period;</li> <li>- Investment in monitoring devices designed for low-resource settings;</li> <li>- Introduction of maternal warning systems, tailored to different contexts;</li> <li>- Innovative training and supervision approaches to improve health worker communication and decision-making; and</li> <li>- Behavior change interventions, such as the use of reminders to health workers or the application of human-centered design principles to increase the salience of postpartum monitoring</li> </ul>

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