

Reports

# Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts

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### Background

Despite increasing rates of facility-based deliveries, neonatal mortality rates remain persistently high in low-resource settings (LRS). This has catalysed international focus on understanding and enabling quality newborn care. We aimed to understand persistent barriers to Quality of Care (QoC) and to identify quality improvement priorities from the perspective of a panel of neonatal experts with first-hand experience of delivering newborn care in low-resource settings (LRS).

### Methods

We conducted 13 semi-structured interviews with neonatal health experts via Skype. All interviews were recorded and transcribed verbatim. We adopted an inductive thematic analytical approach. Ethical approvals were not required.

### Results

Twenty-two experts were invited to participate, of whom 16 responded and 13 agreed to take part (five neonatologists, six paediatricians and two advanced neonatal nurse practitioners). Participants had a mean of 13 ( $\pm 7$  SD) years working in LRS. Lack of physical resources including basic equipment and infrastructure such as running water, combined with limited human resources, education and specialist neonatal training were cited as key barriers to delivering quality care. In addition, weak leadership at the community, local and national level were thought to hinder progress. Poor communication within clinical teams, limited documentation and lack of standardised and locally appropriate guidelines were also identified as challenges. Digital technologies were perceived to have potential for data capture and enabling standardised care. However, some highlighted that unreliable internet access and possible stigma may hinder implementation.

### Conclusions

With less than 10 years to reach the Sustainable Development Goals (SDGs), it is critical to ensure access to quality care for all sick and vulnerable newborns admitted to health facilities. Clinical leaders in low resource settings need to be empowered to define local agendas and advocate for critical resources in order to close the gap between local and global quality of care priorities.

Newborn survival has improved dramatically in the last 30 years.<sup>1</sup> The global neonatal mortality rate more than halved between 1990 and 2020, with rapid declines in many high burden countries.<sup>2</sup> Yet recent estimates from 2020

suggest at least sixty countries are not on track to meet the Sustainable Development Goal target (SDG 3) to reduce newborn mortality to 12 or fewer deaths per 1000 live births by 2030.<sup>2</sup>

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Poor quality of care (QoC) is a key contributor, accounting for approximately 60% of all neonatal deaths in low resource settings (LRS).<sup>3</sup> Improving QoC is therefore a global priority, and the WHO has established a clear framework for action. This includes the every Newborn Action Plan (ENAP), endorsed by the World Health Assembly in 2014, which sets out targets and priorities for scaling up essential packages of care across the care continuum (antenatal, childbirth, postnatal and inpatient care for sick and vulnerable new-borns)<sup>1</sup>; and the updated international QoC standards for small and sick newborns in facilities, which establishes benchmarks for QoC across 8 domains, including the experience and provision of care.<sup>4</sup>

Most countries, including countries with the highest burden of neonatal mortality, have developed national newborn action plans and defined newborn reduction targets; but as of 2018 only 44% of countries had adopted guidelines for QoC improvement.<sup>1</sup> Moreover, there is a lack of routine data with which to monitor quality standards and service readiness to implement in-patient newborn care.<sup>5</sup>

While routine data on newborn care in LRS is limited, researchers have sought to identify health system bottlenecks to implementing quality care via consultations with technical experts,<sup>6</sup> to explore provider barriers to developing QoC in LRS (primarily among nurses and midwives),<sup>7-11</sup> and to conduct periodic facility assessments.<sup>12,13</sup> However, there is limited research with clinical leaders in LRS, who are charged with translating QoC standards into day-to-day clinical practice. This short exploratory study sought to understand barriers to achieving quality neonatal care in facilities in LRS from the perspective of frontline experts and leaders, and to identify priority areas for improvement, including the potential role of digital innovations.

## METHODS

We conducted a short qualitative study with a group of neonatal experts who had all previously participated in a Delphi study with the research team (ME, CC, FF, MH) to refine a series of clinical diagnostic algorithms for a digital health intervention for neonatal care in LRS (Neotree).<sup>14-16</sup>

Twenty-two neonatal experts were invited to participate via email. Non-responders were sent a reminder email or sent a WhatsApp message two weeks later. Physicians or neonatal nurse practitioners who were known to the researchers for their neonatal clinical and research expertise and contributions to guideline development in LRS were identified in equal numbers from both high and low resource settings. Additional inclusion criteria included having more than ten years of neonatal experience (at least three years in LRS), neonatal postgraduate training, fluency in English, internet access and willingness to participate. Informed consent was obtained via email agreement. Experts were verbally informed that all responses would be kept anonymous. Ethical approvals were not required.

Of the 22 invited participants, 16 responded and 13 agreed to take part. Of the three who declined (two from HRS and one from LRS), one participant declined due to lack of financial incentive, one due to conflict of interest

**Table 1. Demographic characteristics of the expert panel**

		N=13 N(%)
<b>Nationality</b>	Experts from HRS	8 (62%)
	Experts from LRS	5 (38%)
<b>Level of Expertise</b>	Neonatologist	5 (38%)
	Paediatrician	6 (46%)
	Advanced neonatal nurse practitioner	2 (16%)
<b>Years of experience (mean ± SD)</b>	Years of experience overall	29 (±16)
	Years of experience in LRS	13 (±7)
<b>Regions of LRS Experience †</b>	Africa	13 (100%)
	Asia	7 (54%)
	Central America	4 (31%)
<b>Country of Qualification</b>	United Kingdom	6 (46%)
	United States	2 (15%)
	South Africa	2 (15%)
	Zimbabwe	1 (8%)
	Rwanda	1 (8%)
	Sudan	1 (8%)

\*Percentages may not add up to 100 due to rounding.

† Participants could select more than one region.

and one due to time constraints. The demographic characteristics of the expert panel are presented in [Table 1](#).

In June 2018 a female consultant paediatrician (ME) with masters level training in qualitative research methods conducted individual semi-structured interviews via Skype which lasted approximately 15-20 minutes. Interviews were recorded and transcribed verbatim. We conducted a thematic content analysis using an inductive coding approach.<sup>17</sup> EK, a medical student with training in qualitative research methods, led the analysis supervised by EW (an experience post-doctorate mixed methods researcher). First EK familiarised herself with the data by reading and re-reading the transcripts. Second, EK coded data across all transcripts, and then categorised codes into overarching themes and sub-themes. The coding framework was developed iteratively and collaboratively among the team (EK, EW, MH, ME).

## RESULTS

Five key themes were identified: lack of human resources, lack of physical resources, clinical leadership and organisational cultures, lack of standardised guidelines and challenges with information sharing.

## LACK OF SKILLED HUMAN RESOURCES

All experts felt that the primary challenge to the provision of quality neonatal care in LRS is the quantity and quality of the workforce.

### QUANTITY OF STAFF

High patient to staff ratios, and limited funding to recruit new staff, were described as persistent challenges which place undue pressure on clinical teams leading to compromised care.

*"We have a full complement of 30 nurses but usually two nurses to 100 babies. If you have a sick baby with that number of nurses that is a huge workload." [E11, LRS]*

Retaining staff was also reported to be a problem as poor wages, combined with a lack of professional recognition, contribute to low morale and prompt nurses to seek employment in the private sector.

### QUALITY OF STAFF

Experts described how staff shortages are further compounded by a lack of specialist training and education, particularly as care of vulnerable neonates is often considered more complex and daunting than care of other clinical groups.

*"Most of the time looking after a small baby is scary and if you don't have the knowledge of how to look after a baby then you don't even want to approach one." [E9, LRS]*

One expert from LRS felt that education in nursing and midwifery is overly focused on care of mothers rather than neonates [E1, LRS], while a number of experts complained of limited opportunities for nurses to receive on-the-job training. The practice of placing staff on rotation in LRS facilities was a particular source of frustration as participants felt they invested time in training staff, only to lose them to other departments.

*"You train nurses for 6 months and they are rotated to Orthopaedics. Of course, nurses are young and they need the experience but if they have trained and like neonatal care then they should stay and they should always keep a core group that know what they are doing. Otherwise, there is no role modelling or institutional knowledge." [E5, HRS]*

Limited skills in history taking, examination and diagnostic work up among nurses was highlighted, alongside weak knowledge in infection control, management of low-weight babies, and appropriate neonatal feeding practices. Some experts emphasised the need for essential training and supervision to ensure nurses 'get the basics right', as simple interventions such as basic infection control and kangaroo mother care, could hugely impact newborn outcomes.

*"Things just like maintaining hand hygiene (...) give basic treatment such as antibiotics or resuscitation equipment. These basic things can really save lives." [E11, LRS]*

Two experts (one from LRS and one from HRS) highlighted the need to adopt a holistic approach and tackle deficits in obstetric and neonatal training and care concurrently, because typically options and resources are limited once neonates reach the point of admission to intensive care:

*"I sometimes feel that the condition that the babies come in [with] is irreversible. Birth asphyxia, hypothermia, sepsis that no one has done anything about. Giving a mum prenatal antibiotics makes a huge difference and then preparing for a premature birth." [E1, LRS]*

## LACK OF PHYSICAL RESOURCES

Participants described shortages in physical resources, particularly in equipment and in basic infrastructure.

### EQUIPMENT

Equipment shortages included critical intensive care equipment such as incubators, heaters and non-invasive ventilators (i.e., continuous positive airways pressure (CPAP) machines), and poorly maintained equipment, which can result in rationing and overcrowding.

*"Babies were sharing incubators, incubators were dirty. It was a risk to their health to be admitted to a neonatal unit." [E2, LRS]*

In addition, three experts highlighted limited supplies such as cannulas, syringes and antibiotics, leaving them unable to provide the most basic care.

*"We understand the problems we are faced with, but we can't do anything about it. Such as having the right size cannula. You have a massive cannula for a tiny baby and what can you do but just use that. We are not equipped to look after small babies." [E1, LRS]*

### INFRASTRUCTURE

Participants emphasised poor infrastructure within facilities including electricity, heating, running water, as well as insufficient space to treat sick neonates:

*"I think the main barriers are health systems barriers particularly around infrastructure and provision of basic services. For instance, where I work the water supply is a constant issue." [E7, HRS]*

Timely care can be further compromised in contexts where roads are poor and patients travel long distances between referral centres, and where maternity and neonatal units are poorly laid out within facilities.

## CLINICAL LEADERSHIP AND ORGANISATIONAL CULTURES

Participants discussed a lack of supportive medical leadership including mentorship and peer support for nurses. Two experts [E5, HRS; E10, HRS] highlighted a lack of teamwork and communication, which they attributed to entrenched

hierarchies and a culture of fear whereby the authority of senior managers and clinicians is rarely challenged:

*“What the senior person says is not questioned (...) but I think it is changing and we need to be inclusive in our meetings and make sure we hear from people who don't normally speak up because they often have got some really interesting and important things to say.” [E5, HRS]*

One expert explained that this culture can inhibit the implementation of standardised care, as junior staff are expected to follow the instruction of their seniors, rather than follow clinical guidelines on their own initiative (E7, HRS). Two experts (E5, HRS; E10, HRS), made comparisons with the UK context, where they felt management structures to be more horizontal, facilitating teamwork and communication both within, and between, cadres of healthcare professionals.

#### LACK OF LOCALLY RELEVANT STANDARDISED GUIDELINES

Almost all experts agreed that there was a need to introduce concise, accessible, easy to follow clinical guidelines and frameworks. Two experts stressed the need for neonatal guidelines based on epidemiological data from LRS, which take account of the resource constraints in LRS, rather than relying on generic global guidance.

*“The number one problem is the data that we use to treat babies is extrapolated from developed countries and not appropriate for their setting.” [E12, HRS]*

Experts also mentioned the need for strong leadership at all levels of the health system - ministries, facilities, wards and communities - to ensure both timely dissemination of guidelines alongside consistent follow up and monitoring of implementation.

#### INFORMATION SHARING AND THE POTENTIAL OF DIGITAL INTERVENTIONS

Poor quality and quantity of written documentation was described as a significant challenge, which undermines clinical decision-making and communication, as well as overall planning and management. When questioned on the role of technologies such as digital apps, all participants responded positively, as it was felt that digital platforms and applications could aid data capture and sharing, to inform clinical decision making.

One expert discussed the potential of electronic databases to support regional networks and comparisons both within and between countries, providing a catalyst for quality improvement:

*“Well, I think part would be the creation of regional networks and the most powerful way to motivate change is using neonatal databases [...] I think a great example is Brazil. There is a series of papers that show when Brazil introduced its databases they saw a dramatic change within nurseries within one city and around the country. Because they talked about this and shared best practises*

*and training, they were able to improve the low-lying ones.” [E4, HRS]*

However, there was some apprehension as to the sustainability of digital interventions in the absence of reliable internet connectivity and concern that digital devices might seem impersonal to patients. One expert suggested that digital aids could be stigmatising, as in some contexts doctors are expected to know everything - from medicine dosage to treatment protocol.

*“There can be odd things around professionalism and prestige when it comes to managing patients. If a parent feels that a doctor has to use this weird tablet to figure out what is going on with their child then they don't know what they are doing.” [E6, HRS]*

## DISCUSSION

Experts highlighted a range of intersecting barriers to delivering QoC in LRS. These included: insufficient quality and quality of human resources; a lack of basic supplies and infrastructure (such as reliable electricity supplies and running water); weak clinical leadership; limited access and adherence to evidence-based guidelines; and limited information-sharing. This raises critical questions about the service readiness of facilities to provide in-patient neonatal care in these contexts and the risk of harm to patients that this may imply.<sup>5</sup>

The limited supply and competency of the workforce is well documented and reflects stark global inequities. In HRS there are on average 10.9 nurses and midwives per 1,000 population, compared with only 0.9 in LRS.<sup>18</sup> This has profound consequences for delivering QoC as low nurse-to-infant ratios are associated with staff burnout,<sup>19</sup> missed nursing care for sick newborns<sup>20</sup> and potentially higher rates of neonatal mortality.<sup>21</sup>

At the same time, countries in LRS including those with the highest neonatal mortality burden, struggle with the quality of their workforce due to a lack of neonatal competency-based training and continuing education.<sup>6</sup> Our panel described deficiencies in basic clinical skills such as adequate infection control, history taking and diagnostic work up. Concerns regarding frequent staff rotation are shared throughout LRS,<sup>22</sup> as the continual loss of staff to other departments and the time investment required to train new staff, generates inefficiencies and compromises care.<sup>8</sup>

Experts described a sense of frustration and impotency when faced with limited supplies of essential medicines such as antibiotics, or basic infrastructure such as running water, impeding the delivery of the most basic level of care. This underscores the importance of systematic monitoring to ensure facilities meet the threshold for service readiness to deliver inpatient care<sup>5</sup>; alongside the strengthening of multisectoral approaches to ensure QoC plans are harmonised with national plans for infrastructure development, and procurement of essential medicines and commodities.<sup>23</sup>

The panel highlighted a pressing need to improve clinical leadership, teamwork and day-to-day mentoring of pro-

professionals. They described clinical and organisational cultures characterised by professional and social hierarchies, which they felt undermined communication, opportunities for learning, and cooperation within (e.g., between doctors and nurses) and between departments (e.g., obstetrics and neonatology). Such hierarchies are known to foster a blame culture, undermine staff morale, and compromise patient safety.<sup>10,24</sup>

The panel also expressed concerns with limited access to evidence-based guidelines and protocols, and a lack of leadership across the health system to ensure guidelines are disseminated, implemented, and monitored.

All experts were of the opinion that digital platforms may provide a solution to help overcome the barrier of access to guidelines, poor documentation, and information sharing, and may facilitate national and regional QoC comparisons and learning. While a number of nascent digital interventions that enable routine data capture and clinical decision support for neonatal care are being implemented in LRS facilities,<sup>25</sup> these require rigorous evaluation to establish their effectiveness to enable delivery at scale.<sup>25</sup>

#### POLICY IMPLICATIONS

The persistent human resource gap for the provision of neonatal care in LRS requires urgent attention if countries are to meet the SDG targets and fulfil the vision of the ENAP. Significant investment is required to recruit and retain health professionals, and international cooperation is required to address health worker migration<sup>26</sup> and to facilitate learning and knowledge sharing.<sup>27,28</sup>

Clinical leaders are best placed to understand the resource gaps and priorities within their wards and facilities, alongside an appreciation of the level and standard of care that is feasible to attain.<sup>29</sup> This may be at odds with more ambitious district or national plans and targets, particularly those that may have been imposed externally or to reach an international benchmark. Researchers in Kenya have highlighted a need for clinical leaders to be empowered to advocate for the resources they need,<sup>29</sup> which as our panel has indicated, may often include the most rudimentary supplies, training, and interventions.

Yet there is limited research on clinical leadership and management in LRS and investment in leadership is sparse. Many clinicians in LRS are forced to take on leadership roles with limited training, often in highly stressful contexts.<sup>30</sup> Models of clinical leadership that foster openness, communication, and cooperation within clinical teams need to be co-developed and driven by professional organisations and clinical leaders from LRS.<sup>29,31</sup>

Finally, routine data are urgently needed to enable QoC benchmarking at community, facility and national levels - to better understand QoC deficits and generate learning and insights relevant to LRS contexts. High quality clinical data from neonatal populations in LRS are required to inform clinical and management guidelines for newborn care, which are overly reliant on evidence from HRS, where health system and population characteristics are markedly different.<sup>25</sup>

#### STRENGTHS AND LIMITATIONS

Our short study sheds light on key day-to-day challenges of delivering quality newborn care in LRS from the perspective of senior clinicians and leaders with a wealth of experience across Africa, Latin America and South-East Asia. Clinical leaders are a critical, often unheard, group for QoC research. As we have illustrated this can result in a sharp disconnect between national and international QoC agendas and the reality of QoC priorities for clinical leaders overseeing day-to-day care.

The study had a number of limitations. The sample size is relatively small which means generalisability beyond experts' immediate experience may be limited. The recruitment of more experts from high resource (62%) compared with low resource settings (38%), despite originally inviting equal numbers to participate, could have contributed to expert panel bias. Nevertheless, the panel represented a breadth of expertise with a mean of 13 years of clinical experience in low resource settings, spanning Africa (14 countries), Asia (8 countries) and South America (4 countries). Two thirds had worked in both HRS and LRS and were able to make useful comparisons.

Some experts were known to the research team. This is unlikely to have influenced their responses on quality of care but may have led to some social desirability bias when questioned on their opinions of digital interventions, as the researchers are currently piloting a digital intervention in LRS.

As this was an exploratory study, we did not seek to achieve data saturation and therefore larger studies are likely to expand on our findings. Future studies can examine barriers to delivering neonatal care in more depth alongside potential solutions. For example, research can explore methods and approaches to co-develop clinical leadership models and training in LRS, or to determine the feasibility and acceptability of implementing digital interventions in LRS. As we have emphasised, clinical leaders are a key group in the delivery of inpatient newborn care and their insights can complement research with nurses, midwives, as well as parents/caregivers, providing a 360-degree perspective on QoC challenges.

#### CONCLUSIONS

With less than 10 years to reach the SDGs, it is critical to ensure access to quality care for all sick and vulnerable newborns admitted to health facilities. Clinical leaders in low-resource settings need to be empowered to define local agendas and advocate for critical resources in order to close the gap between local and global QoC priorities.

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## AUTHORSHIP CONTRIBUTIONS

ME, FF, CC, MH conceptualised the study; ME conducted the interviews, EK led on analysing the data, with supervision from EW, ME and MH; ME and EW wrote the first draft of the manuscript; FF, CC, MH, MC, EC, EK reviewed and edited subsequent drafts. All authors reviewed and approved the final manuscript for publication.

## COMPETING INTERESTS

“The authors completed the Unified Competing Interest form at <http://www.icmje.org/disclosure-of-interest/> (available upon request from the corresponding author), and declare no conflicts of interest.”

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