

BRIEF REPORT

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Integration of IPC/WASH critical conditions into quality of care and quality improvement tools and processes: Bangladesh case study

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Abstract

Unsafe patient care in hospitals, especially in low- and middle-income countries, is often caused by poor infection prevention and control (IPC) practices; insufficient support for water, sanitation, and hygiene (WASH); and inadequate waste management. We looked at the intersection of IPC, WASH, and the global initiative of improving health care quality, specifically around maternal and newborn care in Bangladesh health facilities. We identified 8 primary quality improvement and IPC/WASH policy and guideline documents in Bangladesh and analyzed their incorporation of 30 subconditions under 5 critical conditions: water; sanitation; hygiene; waste management/cleaning; and IPC supplies, guidelines, training, surveillance, and monitoring. To determine how Bangladesh health care workers implemented the policies, we interviewed 33 informants from 16 public and private facilities and the national level. Bangladesh's 8 primary guidance documents covered 55% of the 30 subconditions. Interviews showed that Bangladesh health facility staff generally rely on eight tools related to quality improvement (five); IPC (two); and supportive supervision (one) plus a robust supervision mechanism. The stakeholders identified a lack of human resources and environmental hygiene infrastructure and supplies as the main gaps in providing IPC/WASH services. We concluded that the Bangladesh government had produced substantial guidance on using quality improvement methods to improve health services. Our recommendations can help identify strategies to better integrate IPC/WASH in resources including standardizing guidelines and tools within one toolkit. Strategizing with stakeholders working on initiatives such as universal health coverage and patient safety to integrate IPC/WASH into quality improvement documents is a mutually reinforcing approach.

Keywords Infection prevention and control, Water, sanitation, hygiene (WASH), Environmental hygiene, Waste management, Patient safety, Bangladesh, Quality improvement/Quality of health care, Maternal and newborn health

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Introduction

In addition to health care access and affordability, the dimensions of safety and quality are critical for universal health coverage to be truly effective and to achieve the 2030 Sustainable Development Goals. Poor quality care is a major problem, especially in low- and middle-income countries (LMICs), where it accounts for an estimated 60% of deaths from treatable conditions [1]. Unsafe care is often caused by poor infection prevention and control (IPC) practices; lack of support for water, sanitation, and hygiene (WASH); and inadequate waste management. Of 162 countries reporting to the World Health Organization (WHO), only 34% implement IPC programs nationwide, and only 19% of those have a monitoring system [2]; up to 61% of health workers do not adhere to recommended hand hygiene practices [3]; and almost one-third do not segregate health care waste. In the least-developed countries, 50% of health facilities have no basic water supply and 63% have no sanitation services [4].

Weaknesses in IPC and WASH practices and infrastructure are responsible for a huge proportion of health care-associated infections (HAIs), particularly in LMICs, where the average prevalence is 15.5% [5]. HAIs in maternal and newborn health (MNH) care settings in LMICs are also highly worrying; for example, studies have shown a high post-caesarean section infection rate of up to 20% in sub-Saharan countries [6]. Improving standards and service quality, such as effective IPC practices in health facilities, would dramatically reduce HAIs [5, 7]. WHO has published extensive guidelines and resources on how to improve IPC programs and practices, including hand hygiene, but LMICs struggle with these practices for reasons ranging from a lack of standards or enforcement of standards to inadequate infrastructure to support IPC and WASH.

In Bangladesh, a nationally representative baseline study of WASH in 875 health care facilities [8] found that 47% of facilities managed waste adequately; more than 90% of facilities provided basic drinking water service; 46% provided basic sanitation services; 68% provided basic levels for hand washing at point of care; and 26% provided hand-washing facilities for patients/caregivers. Only 2% of 4,676 hand hygiene opportunities among health care workers and caregivers resulted in recommended actions—health care workers followed recommended hand hygiene practices in 9% of 919 opportunities, while family caregivers washed hands with water in 48% of 2,751 opportunities, but only 3% with soap [9].

WHO provides guidance and assessment and training documents on the core components of IPC and WASH.¹

But LMICs often face major challenges in implementing IPC, WASH, and waste management due to barriers related to resources, standard-setting, training and education, infrastructure, motivation, and data availability [10]. The COVID-19 pandemic shined a light on health system weaknesses, and countries quickly pivoted their attention to strengthen IPC; similarly, LMIC deficiencies in WASH became strikingly evident. How can people wash their hands to reduce viral spread if they do not have clean water or soap? In response, the United Nations announced a new Sanitation and Hygiene Fund to improve the WASH situations in LMICs [11].

The principles of quality of care (QoC) and quality improvement (QI) are also receiving global [1, 12, 13], and country-level recognition as being critical for effective and safe health care, including in MNH care settings. Since IPC and WASH are fundamental to safe care, they need to be adequately integrated into health systems' QoC/QI guides and processes. However, a report showed substantial gaps in addressing IPC/WASH in MNH-related global tools on QoC/QI in health facilities; while the tools generally referred to adequate facility conditions, specific crucial conditions related to WASH, environmental cleaning, and IPC were often not described [14].

Research conducted in a Bangladesh district hospital and mother and child welfare center on delivery and emergency obstetric and newborn care [15] showed that the QoC scores for IPC were higher than for other areas of care, although the hospital's QoC scores were still less than 50% for cleaning, decontaminating equipment, using antiseptics, and collecting soiled linen; in addition, scores were higher in the mother and child welfare center compared to the district hospital.

To improve MNH quality of care, US Agency for International Development's Maternal and Child Survival Program (MCSP), which worked in 23 countries worldwide, reviewed QoC/QI tools (i.e., training materials, implementation guides, and supervision and coaching resources) used in MNH care that they accessed from a wide range of resources including published and gray literature. MCSP determined how complete the tools' coverage was of critical environmental conditions for safe care, including adequate WASH infrastructure, environmental hygiene items for IPC, and other WASH/IPC-related activities, such as training. Their 2019 report included recommendations on how to integrate these critical environmental conditions into QoC/QI tools [14]. The US Agency for International Development-funded Medicines, Technologies, and Pharmaceutical Services program built on these MCSP findings by using similar methods to look at Bangladesh policies and guidelines and practices to understand how IPC/WASH adherence in MNH services can be strengthened through QoC/QI

¹ See the WHO's IPC website for extensive links to information and tools: <https://www.who.int/infection-prevention/en/>.

Table 1 Bangladesh documents related to QoC/QI

Primary MNH documents	
1.	National Reproductive, Maternal, Newborn, Child, and Adolescent Health (RMNCAH) QI Framework, 2019
2.	Standard Operating Procedure for Newborn Care Services at Primary and Secondary Level Hospitals, 2011
Primary QoC/QI and Patient Safety Guidelines and Policies	
3.	Standard Operating Procedure for Quality Improvement, 2019
4.	Hospital Infection Prevention and Control Manual, 2018
5.	Checklist for IPC, not dated (ND)
6.	National Patient Safety Strategic Plan in Bangladesh, 2018
7.	Strategic Planning on Quality of Care for Health Service Delivery in Bangladesh, 2015
8.	National Health Care Standards, 2015
Related Checklists, Indicators	
9.	Hospital minimum standards, ND
10.	Facility level standards and indicators, 2017*
11.	KPI-Set A: General (Facility level)/ Set B: Operational plan level, 2016*
12.	Supportive supervision tool, ND
13.	Safe surgery checklist, 2019*
14.	Monitoring checklist for cleanliness and infection prevention, ND
15.	Sterilization audit checklist, ND
16.	Clinical indicators, ND
Copies or Draft	
17.	Hospital Accreditation in Bangladesh, 2016 DRAFT
18.	Standard Operating Procedure for District Hospital, [‡] 2017*
19.	Standard Operating Procedure for Upazila Hospital, [‡] 2017*

* Documents not marked with dates, but the date listed is likely correct or close

[‡] These two documents are almost verbatim to 3. Standard Operating Procedure for Quality Improvement

approaches but expanded the assessment parameters to include IPC core components. The objectives were to:

- Determine the level of integration of IPC/WASH in QoC/QI guides and MNH care guides in Bangladesh.
- Compare the Bangladesh findings with those from other select countries.
- Characterize the process for implementing and institutionalizing guidelines in the Bangladesh health system.

Our purpose for the case study was to use the results of characterizing the intersection between IPC/WASH and QoC/QI guidelines to direct program priorities. Bangladesh was a suitable case study because its Quality Improvement Secretariat, Ministry of Health and Family Welfare (QIS, MoHFW) had published an impressive set of QoC/QI guidance documents and tools, including monitoring and supervision checklists and IPC and WASH guidance and tools. QIS's mandate is to ensure that facilities meet national health care standards. While the activity focused on MNH-related tools and guides, we

Box 1. WHO's Core Components of IPC Programs

The WHO organizes its IPC-related guidance, including assessment tools for health facilities and governments, by these eight core components. Performance indicators under each of them are used to measure progress:

1. IPC programs
2. IPC guidelines
3. IPC education and training
4. Surveillance
5. Multimodal strategies
6. Monitoring/audit of IPC practices and feedback
7. Workload, staffing, bed occupancy
8. Built environment (IPC facilities and equipment)

also looked at other QoC/QI tools to provide a broader perspective in support of IPC, WASH, and antimicrobial resistance containment.

Methodology

Analysis of IPC/WASH policies, guidelines, and tools

For this analysis, our study team in Bangladesh identified 19 documents related to QoC/QI in the Bangladesh health system with an emphasis on MNH (Table 1). Of the 19 documents, we identified 8 documents as primary because the other 11 were limited to specific areas, such as instrument sterilization. We then analyzed 19 similar documents gathered from our Medicines, Technologies, and Pharmaceutical Services partner country teams in Côte d'Ivoire, Democratic Republic of Congo, Ethiopia, Senegal, Tanzania, and Uganda. We wanted only to get a general sense of where Bangladesh stood relative to other LMICs; therefore, this convenience sample is not suitable for a comprehensive comparison.

We used the same methodology as in the MCSP 2019 gap analysis that was based on five critical conditions: 1) water, 2) sanitation, 3) hygiene, 4) waste management/cleaning, and 5) IPC supplies [14]. To improve the IPC characterization, we added one new critical condition (IPC core components) with five additional IPC subconditions, four based on the WHO core components 2, 3, 4, 6 (box 1) [16]. Similar to the original analysis, we also included a fifth subcondition capturing "Additional IPC considerations" that covered things outside of the other four subconditions. Table 2 shows the list of six critical conditions used for this analysis and their 30 evaluation subconditions.

Table 2 IPC/WASH-related critical conditions and subconditions

Critical condition	Subcondition
Water	Water source type; water availability; distance to water source; additional water considerations
Sanitation	Sanitation type; functional sanitation; private sanitation; meets the needs of women; meets the needs of staff; meets the needs of people with limited mobility; additional sanitation considerations
Hygiene	Hand hygiene stations near toilets; hand hygiene stations near points of care; water, soap, and/or alcohol-based hand rub; additional hand hygiene considerations
Waste management, cleaning	Waste segregation; sharps disposal/treatment; infectious waste disposal/treatment; protocols on cleaning; training on cleaning responsibilities; additional waste management, cleaning considerations
IPC supplies	Disinfectants; gloves; sterile instruments; additional IPC supplies considerations
IPC core components*	IPC guidelines; education and training; surveillance; monitoring IPC practices; additional IPC considerations

*Used in this analysis in addition to the MCSP analyzed conditions

We developed the scores for each of the five original critical conditions plus the additional IPC condition by calculating the proportion that each document included; therefore, if a set of guidelines covered three of four subconditions under “Water,” the score would be 75%.

Key stakeholder interviews

To complement the document review, we designed a qualitative study to gather Bangladesh stakeholders’ perspectives on how the various QoC/QI documents produced by the QIS, MoHFW relate to each other, the extent to which they had been implemented throughout the health system, and perceived gaps in the integration of IPC/WASH critical conditions into QoC/QI tools and processes. We engaged with the QIS leadership, specifically the Health Economics Unit, to design and plan this part of the study.

We produced a list of stakeholders to interview at the national and health facility level: the QIS focal person; an MNH provider identified with QIS (i.e., residential surgeon in obstetrics and gynecology [OB-GYN] or labor room in-charge); the member secretary for the facility’s QI committee; and a representative from the MaMoni project, which directly supports all public facilities in six districts and four private hospitals, and whose responses reflected these facilities’ experiences. Over June and July 2021, we interviewed 33 people total; all but four interviews (QIS and MaMoni focal persons and two interviews at the Shaheed Suhrawardy Medical College and Hospital in Dhaka Division) were conducted remotely due to COVID-19 restrictions. A QIS representative also participated in the interviews.

Table 3 List of health facilities targeted for key informant interviews

Division	District	Health facility
Barisal	Patuakhali	Patuakhali 250-bed Sadar Hospital
Chittagong	Chattogram	Chittagong General Hospital
	Cox’s Bazaar	Cox’s Bazar 250-bed District Sadar Hospital
Dhaka	Cumilla	Cumilla Medical College Hospital
	Dhaka	Shaheed Suhrawardy Medical College and Hospital
		Dhamrai Upazila Health Complex
Khulna		Keraniganj Upazila Health Complex
	Jashore	Jashore General Hospital
	Satkhira	Satkhira Sadar Hospital
Mymensingh		Kaliganj Upazila Health Complex
	Sherpur	Shyamnagar Upazila Health Complex
Rajshahi		Sherpur District Hospital
	Bogura	250-bed Mohammad Ali District Hospital
Rangpur		Kahaloo Upazila Health Complex
	Kurigram	Kurigram Sadar Hospital
Sylhet	Moulvibazar	Moulvibazar 250-bed District Sadar Hospital

We worked with QIS to select health facilities from districts representing tertiary, secondary district, and primary upazila levels of care based on their participation in government and other stakeholder interventions to improve MNH quality of care, including IPC and WASH; the relationship between QIS and the facility’s quality improvement committee; and the willingness of facility management to strengthen IPC and WASH practices (Table 3). QIS provided official permission to conduct the interviews through a government order shared with the facilities.

We held a workshop for 13 participants who reviewed the questionnaires and made a list of suggestions that were addressed before the QIS finalized the questionnaires. The generic questionnaires were customized for the different stakeholder cadres depending on their job functions (e.g., policy, clinical) and included the following sections:

- Guidelines/tools availability.
- IPC/WASH statements contained in the guidelines/tools.
- Consistency, integration, and completeness of the guidelines/tools.
- Quality improvement program.
- Orientation, training, and support on the guidelines/tools.
- Implementation of the guidelines/tools.
- Supportive supervision and monitoring.
- Perceptions of tools/guidance and on gaps and challenges.

- Recommendations for improvement.

Limitations

One of our study limitations was that during the pandemic, remote interaction and providers' inability to devote much time due to human resource shortages limited the richness and detail of the stakeholder responses and precluded our ability to directly observe IPC/WASH practices or the availability of guidelines in maternal and newborn settings. In addition, facility-based interviewees represented only a fraction of Bangladesh's many public and private facilities, however, they did cross all levels of care in a number of districts.

Results

Analysis of QoC/QI policies, guidelines, and tools

We analyzed the proportion of six critical IPC/WASH conditions in each of the primary documents and by document type: MNH documents, QoC/QI documents, and related checklists and indicators. The 2015 National Health Care Standards had the highest coverage of the IPC/WASH conditions at 95%, while the 2015 Strategic Planning on Quality of Care for Health Service Delivery in Bangladesh covered 27% of the conditions. The other six documents had coverage ranging from 36 to 60%. In terms of critical conditions, Sanitation had only 18% coverage overall, while Waste Management/Cleaning and

IPC Supplies scored 71% and 75%, respectively. Table 4 presents the findings for the eight primary documents.

Additional Table 1 includes the results of the same analysis for the 19 documents from six other program-supported countries. The comparison shows that Bangladesh documents contained the highest percentage of critical conditions; for example, two documents from Tanzania on standards for MNH health care had scores of 70% and 73% coverage, while most guidelines and policies from the other countries were lower, with seven scoring under 15%.

As Table 5 illustrates, in Bangladesh, the most often-mentioned subconditions in the 19 documents were Sterile instruments (15/19) and Waste segregation and Water availability with 12/19 each. Water, soap, and/or alcohol-based hand rub was commonly mentioned in both the Bangladesh and other country documents (11 and 10, respectively). No country's documents mentioned Sanitation type (e.g., sewer system, septic tank, pit latrine); 11 of 19 country comparison documents included Functional sanitation, while only one Bangladesh document mentioned that subcondition. Likewise, only one Bangladesh document mentioned Sanitation meets the needs of people with limited mobility, while four documents from the other countries included it.

Table 4 Bangladesh primary quality of care and quality improvement tools with critical conditions

Document	Proportion of critical conditions included (%)						
	Water (n=4)	Sanitation (n=7)	Hygiene (n=4)	Waste Mgt/ Cleaning (n=6)	IPC supplies (n=4)	IPC core* (n=5)	Overall (n=30)
Primary MNH Documents							
1. National RMNCAH QI Framework, 2019	50%	29%	75%	83%	25%	80%	57%
2. Standard Operating Procedure for Newborn Care Services at Primary and Secondary Level Hospitals, 2011(ND)	100%	0%	75%	83%	100%	0%	60%
Subtotal average	75%	15%	75%	83%	63%	40%	59%
Primary QoC/QI and Patient Safety Guidelines and Policies							
3. Standard Operating Procedure for Quality Improvement, 2019	75%	14%	25%	83%	100%	60%	60%
4. Hospital Infection Prevention and Control Manual, 2018	0%	0%	75%	83%	100%	100%	60%
5. Checklist for IPC, ND	25%	14%	50%	50%	75%	0%	36%
6. National Patient Safety Strategic Plan in Bangladesh, 2018	25%	14%	25%	50%	75%	100%	48%
7. Strategic Planning on Quality of Care for Health Service Delivery in Bangladesh, 2015	0%	0%	25%	33%	25%	80%	27%
8. National Health Care Standards, 2015	100%	71%	100%	100%	100%	100%	95%
Subtotal average	38%	19%	50%	67%	79%	73%	54%
Overall average	46%	18%	56%	71%	75%	65%	55%

* WHO IPC core components #2, 3, 4, 6, plus additional IPC considerations

Table 5 Most commonly included critical conditions in QoC/QI tools: Bangladesh compared with select partner countries

Critical conditions	# Bangladesh documents that include condition (n = 19)	%	# documents from 6 partner countries that include condition (n = 19)	%
Sterile instruments	15	79%	9	47%
Waste segregation	12	63%	7	37%
Water availability	12	63%	9	47%
Additional IPC	11	58%	4	21%
Additional waste management considerations	11	58%	7	37%
Protocols for cleaning	11	58%	7	37%
Water, soap, and/or alcohol-based hand rub	11	58%	10	53%
Gloves	10	53%	8	42%
Sharps disposal/treatment	9	47%	9	47%
Additional hand hygiene considerations	8	42%	7	37%
Health care-associated infection surveillance	8	42%	2	16%
Infectious waste disposal/treatment	8	42%	9	47%
Chlorine or other disinfectant	7	37%	7	37%
National and facility IPC guidelines	7	37%	4	21%
IPC education and training	6	32%	3	16%
Monitoring, evaluation, and feedback of IPC practices	6	32%	1	5%
Sanitation meets the needs of women	6	32%	9	47%
Additional IPC supplies considerations	5	26%	5	26%
Additional water considerations	5	26%	5	26%
Hand hygiene stations near point of care	5	26%	9	47%
Water source type	5	26%	6	32%
Distance to water source	4	21%	6	32%
Hand hygiene stations near toilets	3	16%	7	37%
Additional sanitation considerations	2	11%	4	21%
Private sanitation	2	11%	4	21%
Sanitation meets the needs of staff	2	11%	9	47%
Training on cleaning	2	11%	2	11%
Functional sanitation	1	5%	11	58%
Sanitation meets the needs of people with limited mobility	1	5%	4	21%
Sanitation type	0	0%	0	0%

Key informant interviews

The majority of respondents at secondary and tertiary levels provided the same or similar responses; in fact, lack of human resources was the most commonly mentioned challenge at every level of care. Additional Table 2 summarizes the responses by cadre.

Quality improvement program

According to QIS, every health facility should have a QI committee with work improvement teams. And although QI training was being rolled out, not all upazila-level primary health care facilities had received it yet. All facility respondents confirmed the presence of a QI committee with work improvement teams, and they also agreed that the team members' capacity needed to be improved. Cox's Bazar 250-bed District Sadar Hospital had formed two work teams—one for the operating theater and one for OB-GYN. Respondents observed that not all work improvement team members had been trained in QI

and the 5S approach [17]; a couple said that none of the members had been trained yet. The QI committee member secretaries noted that although IPC/WASH was integrated into the quality checklist, it had not been properly incorporated into the QI committees' terms of reference.

QIS has had a nonmonetary performance recognition emblem for high-performing facilities to display. When asked about incentives or penalties related to use of IPC/WASH tools and adherence to standards, however, only two facilities knew of such a mechanism, and one had received the recognition.

Availability and use of guidelines and tools

QIS provides QI/QoC tools and guidelines including 5S tools and its Plan, Do, Check, and Act Manual for Quality Improvement. All but Keraniganj Upazila Health Complex reported using these QI/QoC tools. All health facility respondents believed that the national QoC guideline includes IPC and WASH components. Some reported

using one tool and others used multiple tools. QIS also said that facilities should have separate IPC and WASH guidelines/tools [7]; specific IPC statements for hospital care; and the Infection Prevention and Control Monitoring & Supervision Checklist that the QIS adapted from a WHO resource. MaMoni reported having their own QoC/QI guidelines that were adapted from government-approved tools and confirmed that the national guidelines covered IPC and WASH; however, its facilities had no stand-alone IPC or WASH guidelines. Although MaMoni staff were familiar with the RMNCAH Quality Improvement Framework, the government facilities that MaMoni supports use this resource according to their project needs.

When asked about completeness of and consistency across QI/QoC and IPC/WASH guidelines and tools, QIS felt that Bangladesh's IPC/WASH guidance was consistently presented but said that keeping the IPC checklist updated for all levels is a challenge and that "We have created some documents at the initial level. Those were done easily. Later, for the COVID situation, for example, new components were added to the document that need further monitoring and follow-up." The QIS informant also noted that although the National RMNCAH Quality Improvement Framework does not cover IPC and WASH, the targeted IPC guidelines are sufficient, and that if the RMNCAH framework included a thorough treatment of IPC, it would be too detailed and broad. He added that some facilities had IPC committees that monitor activities as a cross-cutting issue.

The OB-GYN resident surgeons in all but two facilities said that staff receive training and ongoing support in using tools and guidelines, and most said that the QI committee focal person was the go-to for questions. QIS confirmed district-wide training for facilities above primary care. Development partners also help conduct trainings and supply guidelines and tools to facilities in the locations that they support.

In summary, while at least one respondent knew about the tools presented in Table 1, multiple respondents said that the facilities use the following list of tools:

1. National RMNCAH QI Framework.
2. Standard Operating Procedure for Quality Improvement.
3. Hospital Infection Prevention and Control Manual.
4. Supportive supervision tool.
5. Infection Prevention and Control Monitoring & Supervision Checklist.
6. Rapid-Assessment-of-5S-Activities-at-Hospital.
7. 5S-WIT-Performance-Assessment-Checklist.
8. Plan, Do, Check and Act Manual for Quality Improvement.

Tools 1–5 were included in the critical conditions analysis with overall scores ranging from 0% of critical conditions covered (supportive supervision checklist) to 60% (Standard Operating Procedure for QI and Hospital Infection Prevention and Control Manual). Informants shared the tools related to 5S and Plan, Do, Check, Act (numbers 6–8 above) during the interviews, which we had not previously identified.

Supportive supervision and monitoring

All OB-GYN and QI interviewees said that their facilities have a quality monitoring mechanism in place, except for Keraniganj Upazila Health Complex, and all reported receiving supportive supervision visits; however, the responsible entities conducting the supervision varied by facility. Monitoring was led mainly by work improvement teams and QI and IPC committees where available, while facilities received supportive supervision visits from a variety of sources including the government (e.g., Directorate General of Health Services, civil surgeon's office, or National Institute of Preventive and Social Medicine) and development partners. The Directorate General of Health Services was cited as the most frequent visitor. All reported having had a visit by an external supervisor within the previous six months and confirmed the supervisors' use of the QI checklist, Monitoring & Supervision Checklist, and supportive supervision tool.

QIS reported that before the COVID-19 pandemic, the department staff made monthly supportive supervision visits to facilities. After that, they received reports every three months. MaMoni had its own team to provide supportive supervision with government representatives. Their team updates the QIS, MoHFW team, who then provides suggestions. MaMoni also reported receiving a quarterly visit from a national-level supervisor.

Gaps and challenges

When asked about challenges with delivering quality IPC and WASH services while providing maternal and newborn care, the overwhelming responses from the facility representatives concerned the lack of supplies/infrastructure. One labor in-charge at a hospital noted that, "Yes, whenever we do our duty in private hospitals, we get the supplies the next day after we inform them about our requirements. It's not like that here. There are many gaps in government hospitals. For example, in some months they don't supply bleach at all. We have to make chlorine solution for infection control. How can we do that? Suddenly we see that there's no supply. Then we have to buy it on our own." Two facilities also mentioned waste management, cleaning, and visitor control as difficult issues they faced.

The other most commonly mentioned gap was the alarming lack of human resources—from clinical to

security staff. Another labor in-charge said, “We are short of manpower; we have backup for 100 beds, but we have to maintain 250 beds. This is really tough for us.” Several labor in-charges also reported too few cleaners. One complained, “Yes, we have a shortage of cleaners. We really need that. Only a few people cannot take care of the whole ward.” The resident surgeon in the labor ward at another hospital complained about no security guard.

QIS also identified a critical human resource shortage. One respondent noted “There are obviously challenges in a facility where there are only two medical assistants.... If we need to ensure the quality of service, we must have supportive human resources. Many hospitals have been updated [infrastructure], but manpower is not increased in any hospital. This is a huge challenge for us.”

Recommendations for improvement

The OB-GYN resident surgeons and labor in-charges felt that the best way to integrate IPC and WASH practices into MNH services was through improved training and monitoring. Their recommendations focused mainly on developing a routine training program and increasing training frequency and participation. One labor in-charge wanted to see training on how to manage patient visitors and caretakers to control infection risk. Clinicians also focused on improving the infrastructure for IPC/WASH and increasing the staffing level.

In response to the question about how to improve IPC and WASH practices, one respondent said that well-performing hospitals have their own IPC officers who present problems to their QI committee, “So, to improve IPC, we need a dedicated IPC officer.” The respondent recommended that dedicated IPC officers in facilities be trained and that IPC activities be monitored regularly. Analyzing infection rates would also strengthen IPC. The respondent also felt strongly that autoclaving equipment and skills were big gaps in QoC for MNH services.

Discussion

In Bangladesh, after multiple document analyses, our impression was that the QIS, MoHFW had produced a substantial number of policy and guidance documents on using QoC and QI methods to improve health service quality, including IPC and WASH, particularly compared with other countries; however, we were unsure how the documents related to each other or how they should be implemented. For example, many of the documents included guidance on IPC and WASH topics, but guidance was not consistent across and sometimes even within documents. We noted overlaps, particularly among the checklists and standard operating procedures. Interviews with QIS, implementing partner, and facility staff revealed a more cohesive picture, however.

Clearly, facilities widely used the Hospital Infection Prevention and Control Manual and Infection Prevention and Control Monitoring & Supervision Checklist and QI checklist to track performance in IPC/WASH practices, and notably, interviewees were familiar with numerous QI/QoC guidelines and tools. However, considering that the overall inclusion of IPC/WASH critical conditions in Bangladesh’s key QI/QoC documents averaged around 55%, there is considerable room to further integrate these critical conditions in the tools, particularly those related to sanitation, whose inclusion is less than 20%. Undoubtedly, the COVID-19 pandemic reinforced the important need to strengthen these areas.

Though facilities used some guidelines consistently, we recommended distributing toolkits with IPC/WASH and QoC/QI guidelines, standards, and checklists to every health facility to help ensure that they are standardized across facilities, approved by the MoHFW, and ideally aligned with those developed by global authorities such as WHO, UNICEF, and Joint Monitoring Programme for Water Supply, Sanitation, and Hygiene [18]. Toolkits could be grouped by level of care depending on their resource needs, with hospitals requiring more resources than lower-level facilities. Sharing these toolkits with private-sector facilities would further help standardize practices and strengthen monitoring between the public and private sectors.

Functional facility-level QoC committees, but not IPC committees, appeared to be in place, so there was no opportunity for interaction. In addition to emphasizing collaboration between QoC and IPC committees, other effective cross-fertilization could include enhancing IPC committee roles in WASH-related activities and including MNH staff on quality improvement and IPC committees and teams. MNH providers identified QI focal people as primary contacts, so they could become involved to address the gaps in implementation of IPC/WASH services in MNH care in health facilities, especially at primary care-level facilities or below.

While not all facility staff had undergone QI/QoC training, it was being rolled out to health facilities nationwide, with a focus on incorporating IPC and WASH, using 5S and plan, do, check, act approaches. Similarly, supervision mechanisms—both internal and external—applied standards checklists; however, findings need to be turned into action more consistently, which is something that training to fill specific skill gaps in the MNH service setting could help. Additionally, health care facilities could report on their IPC/WASH performance based on checklists completed during supportive supervision visits or through self-assessments. If every facility/level of facility is using a standardized metric, then the MoHFW can make useful comparisons and detect trends to monitor, best practices to scale up, and gaps to address.

Pandemic-related programs in other countries, such as Kenya, incorporated cleaners, waste management, and administrative staff involved with IPC/WASH in training and monitoring; although vital, they often are overlooked and under-trained categories of staff. The private sector should also be included in training and monitoring to periodically analyze their initiatives and performance. In addition, in view of other countries' success [19, 20], nonmonetary incentives such as designating IPC linkage nurses and electing doctors and nurses as IPC champions, then providing recognition for good performance, could be a soft but powerful behavior-change approach.

The National Technical Committee, which is the highest-level technical governance body overseeing implementation of the National Strategy and Action Plan for Antimicrobial Resistance Containment in Bangladesh 2021–2026 [21], can provide strategic support because IPC and WASH are important factors in containing antimicrobial resistance. The action plan covers the WHO IPC core components related to programs and committees, guidelines, and training, but it does not cover the WHO core components related to HAI surveillance, multimodal strategies for IPC implementation, workload/staffing, and infrastructure; the latest 2021–2026 action plan de-emphasizes WASH compared to the previous 2017–2022 action plan and roadmap [22, 23]. Also, Bangladesh's 2017–2022 national action plan (but not the 2016–2026 revision) was one of the few national action plans that made some community-specific recommendations including advocacy and social mobilization around issues such as hand washing, hygiene, sanitation, and waste management [24]. The latest version does call for those issues to be included in educational curricula at all levels.

Conclusion

Bangladesh's QIS has produced a strong set of guidance documents on quality of care and quality improvement including IPC and WASH. Based on our analysis and interpretation of Bangladesh and other country documents, the key informant interviews with Bangladesh stakeholders, and the previous research and recommendations from the Maternal and Child Survival Program [11], we developed recommendations for Bangladesh, and potentially other countries, on using QoC/QI approaches to improve IPC/WASH practices in MNH services. Primarily, standardizing the tools and guidance and distributing them as a toolkit to all facilities including those in the private sector will clarify and help institutionalize standard procedures. In addition, standardization will allow for meaningful monitoring and comparisons with similar facilities. Therefore, a goal should be to intensify support to the practical aspects of generating, harmonizing, monitoring, sharing, and celebrating performance

data that contribute to QI/QoC efforts in the IPC/WASH domain. Finally, IPC/WASH stakeholders in MNH settings can engage with and seek support from stakeholders working in universal health coverage, patient safety, antimicrobial resistance containment, and pandemic preparedness to enhance IPC/WASH integration and implementation as a mutually beneficial and reinforcing strategy.

Abbreviations

HAI	Health care-associated infections
IPC	Infection prevention and control
LMIC	Low- and middle-income countries
MCSP	Maternal and Child Survival Program
MNH	Maternal and newborn health
EMoHFW	Ministry of Health and Family Welfare
ND	Not dated
OB-GYN	Obstetrics and gynecology
QI	Quality improvement
QIS	Quality Improvement Secretariat
QoC	Quality of care
RMNCAH	Reproductive, maternal, newborn, child, adolescent health
WASH	Water, sanitation, and hygiene
WHO	World Health Organization

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

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Author contributions

ME conducted the analysis and wrote the first draft of the manuscript. ME, TH, MPJ, SP, MHI, and SMAZ, designed the qualitative data collection and SP and MHI collected the qualitative data in the field. TH conducted and interpreted the analysis and edited the manuscript. MPJ was the overall study PI, provided inputs to the data analysis and recommendations, and helped to write and edit the manuscript. All authors contributed to interpretation of the findings and reviewed the manuscript.

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Data availability

Data, including deidentified interview notes, are available on request from ME (membrey@msh.org).

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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