Testing a framework for evaluating the quality of post-abortion care: an analysis using data from the AMoCo study in two sub-Saharan African hospitals in humanitarian settings

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Abstract

Background: Abortion-related complications remain a main cause of maternal mortality. Post-abortion care (PAC) provision in humanitarian settings suffers from limited accessibility, poor quality, and lack of research on how to address these challenges. We proposed a comprehensive conceptual framework for measuring the quality of PAC and applied it using data from the **AMoCo**(**A**bortion-related **Mo**rbidity and mortality in fragile or **Co**nflict-affected settings) study in two hospitals supported by Médecins Sans Frontières (MSF) in Jigawa State (Nigeria) and Bangui (Central African Republic, CAR).

Methods: We adapted the WHO Maternal and Newborn Health quality-of-care framework to measure PAC inputs, process (provision and experience of care) and outcomes. We analyzed data from 4 study components: an assessment of the two hospitals' PAC signal functions, a survey of the knowledge, attitudes, practices, and behavior of 140 and 84 clinicians providing PAC, a prospective review of the medical records of 520 and 548 women presenting for abortion complications, of whom 360 and 362 hospitalized women participated in an interview survey in the Nigerian and CAR hospitals, respectively.

Results:

Inputs – Among the total 27 PAC signal functions assessed, 25 were available in the Nigerian hospital and 26.5 in the CAR hospital.

Provision of care – In both hospitals, less than 2.5% were treated with dilatation and sharp curettage, a non-recommended technology when receiving instrumental uterine evacuation. Over 80% received blood transfusion or curative antibiotics when indicated. However, antibiotics were given to about 30% of patients without indication. All (99%) of discharged women in CAR received contraceptive counselling but only 39% in Nigeria.

Experience of care – Women reported generally good experience of respect and preservation of dignity. But only 49% in Nigeria and 59% in CAR said they were given explanations about their care and 15% felt capable of asking questions during treatment in both hospitals.

Outcomes – The risk of healthcare-related abortion-near-miss (happening ≥24h after presentation) was 0.2% in Nigeria and 1.1% in CAR. Only 65% of women in the Nigerian hospital and 34% in the CAR hospital reported that the staff provided them best care all the time.

Conclusion: Our proposed framework enabled comprehensive measurement of the quality of PAC in two MSF-supported hospitals in humanitarian settings. Its application identified that hospitals provided good clinical care resulting in a low risk of healthcare-related abortion-near-miss. However, hospitals need to improve provider-patient communication and would benefit from instituting antibiotic stewardships to prevent antibiotic-resistance.

BACKGROUND

Abortion-related complications are a major cause of maternal mortality. They account for 8–18% of global maternal deaths[1, 2], and they result mainly from unsafe abortions[3]. Although most of abortion-related deaths are preventable through access to contraception, safe abortion and timely, quality post-abortion care, abortion-related mortality showed one of the smallest declines among all direct causes of maternal death between 1990 and 2017[4].

Emergency care for women with abortion complications is instrumental to save lives and prevent morbidity. While law often restricts the provision of safe abortion care, all countries have committed to provide quality post-abortion care (PAC) to any women needing it[5]. Therefore, PAC is an essential component of Emergency Obstetric Care that consists of both curative care (treating complications of both induced and spontaneous abortions) and preventive care (contraceptive services)[6].

In humanitarian settings, the need for quality PAC likely increases given the deterioration of the health system. In such contexts, the maternal mortality ratio is estimated to be twice the global average[7] with abortion-related complications among its five main causes[7]. The disruption of health systems affecting availability of and access to routine contraceptive and safe abortion services[8] as well as the higher risk of exposure to sexual violence and transactional sex can increase the risk of unwanted pregnancies leading to unsafe abortion[9]. In addition, the deterioration of the access to adequate PAC at all levels of the health system as well as the increased food insecurity leading to chronic underlying anemia can contribute to increase the severity of complications from any abortion (spontaneous or induced)[10]. Therefore, ensuring provision of high quality PAC is as critical in these contexts as in stable contexts[11].

Quality of care is a multi-dimensional concept including several domains that are assessed to understand how to improve care. The Donabedian model[12] is very frequently used to operationalize the definition of quality and includes three main domains: inputs to care; process of care; and (health) outcomes of care.

Few studies evaluated the quality of PAC in humanitarian settings[13–20]. Some identified gaps in availability of equipment in health facilities, in commodity supply chain, and insufficient human resources as barriers to provision of quality PAC[13–15]. Others highlighted a lack of health providers knowledge regarding manual vacuum aspiration (MVA) which is a recommended instrumental technology to evacuate the uterus (instead of the dilatation and sharp curettage (D&C))[16]. Health providers' negative attitudes were also found to limit women's autonomy regarding their sexual and reproductive health needs[15, 17]. Studies assessing interventions showed that the support of PAC services by non-governmental organizations (NGO) increased post-abortion contraception counselling and uptake[19, 20], enhanced providers' use of appropriate technologies (MVA)[18–20] and changed their attitude towards a right-based, non-judgmental approach to women[18] leading to an overall positive experience of care for patients[21]. All but one[14] of these studies assessed only some of Donabedian's three conceptual domains: either inputs of care (facility equipment, supplies and human resources capacity to provide PAC)[13, 15, 18], indicators of provision of care (number of PAC, MVA use and contraception uptake)[20], patients' experience of care[17] or a combination of the latter two components of the process of care[19, 21].

Several quality-of-care frameworks incorporating the three Donabedian domains have been developed to drive quality improvement processes[22] including for maternity care[23–26] and safe abortion care[27, 28]. The World Health Organization (WHO) conceptual framework for maternal and newborn health care (MNHC) extends Donabedian's model by dividing the process of care into the provision of care by health professionals and women's experience of care to emphasize the importance of people-centered care[24]. However, there are no specific quality-of-care frameworks for PAC. This might be due to the fact that such care is often not prioritized because of the stigma attached to abortions in both stable and humanitarian settings[29, 30]. Proposing a comprehensive PAC framework which includes input, process, and outcome indicators that are practice-oriented and feasible in referral hospitals of all settings is essential to enable providers, facilities, and programmatic staff to assess and improve the quality of PAC.

In this article, we present a framework for assessing the quality of PAC in referral hospitals, adapted from the WHO framework for MNHC and encompassing the three Donabedian's domains. We describe how we applied this framework to the data collected in the AMoCo (Abortion-related Morbidity and mortality in fragile and Conflict settings) study to assess the quality of care provided in two hospitals of such context: one in Bangui in the Central African Republic (CAR) and one in Jigawa State in northern Nigeria.

METHODS

Quality of PAC framework

To develop the quality of PAC framework, we adapted the eleven dimensions of the WHO framework for MNHC[24] to PAC: competent human resources, essential physical resources, functional referral systems, coverage of key medical practices, actionable information system, evidence-based practices, effective communication, respect and preservation of dignity, emotional support as well as health and person-centered outcomes. For each dimension, we identified key indicators based on literature reviews[31–41] and WHO[42] and Médecins Sans Frontières (MSF)[43] PAC guidelines. Indicators were chosen by consensus between the study team members with clinical backgrounds, clinical experience in hospitals of humanitarian settings and/or experience in measuring quality of care (OO, BP, CF, DL, TF, CSH, EP). The following criteria were considered: their validity (when available), adaptation to sub-Saharan African contexts, feasibility of data collection in hospitals of low-income countries and/or humanitarian settings, and usefulness in triggering changes in practices. We then classified them into the three domains of Donabedian's model for quality-of-care assessment: inputs, process, and outcomes[12]. Figure 1 presents this quality of PAC framework with 11 dimensions and a total of 29 themes which are captured by the indicators described in Supplementary table 1.

Inputs, also called "structure" in some frameworks, were measured using an adapted and extended version of Campbell et al.[45] PAC signal functions[35] assessing the structural capability and readiness of a health facility to provide PAC. Signal functions are essential resources needed in a health facility to support key life-saving interventions including adequate drugs, supplies, equipment, infrastructure and

trained staff to competently provide the service[46]. The 27 extended comprehensive PAC signal functions[35] are described in Table 2.

We included two components of process of care: provision and experience of care. Provision of care indicators were proposed to measure 1) coverage of key medical practices, meaning the percentage of women who received these key practices, 2) completeness of key medical information in the women's medical records as an indicator of the information system and 3) percentages of women who received key medical interventions according to MSF PAC guidelines[43] as indicators of evidence-based practices. The women's experience of care related to effective communication, respect, preservation of dignity and emotional support was measured using questions from the validated person-centered maternity care scale[39, 40, 47] and from the questionnaire of the WHO Multi-Countries Study on Abortion (WHO-MCS-A) [48].

The percentage of women reporting that the staff took the best care of them all the time was chosen as the indicator of person-centered outcomes. Health outcomes included the facility-based abortion-related mortality index as defined by WHO[49] and the percentage of women having "healthcare-related near-miss" as proposed by Filippi et al.[50]. The definitions of these 2 indicators are provided in the Fig. 1.

Application to two African hospitals in humanitarian settings

Study sites

Data in this paper were collected from two MSF-supported referral hospitals in humanitarian settings. The hospital in the Central African Republic is situated in Bangui, the country's capital, in an area affected by decades of armed conflicts[51]. The hospital in Northern Nigeria is located in Jigawa State, a fragile rural State reporting frequent intense floodings, kidnappings and influx of displaced population because of armed conflicts in neighboring States[52]. Each facility had around 10 000 deliveries per year, a catchment area of more than 500,000 people, and the capability to provide comprehensive emergency obstetric care.

Study design and population

Data from four components of the AMoCo study were used: 1) a health facility assessment, 2) a knowledge, attitudes, practices, and behavior (KAPB) survey among health professionals, 3) a prospective medical records' review of women presenting with abortion-related complications in the two hospitals and 4) a quantitative patient survey among a sample of hospitalized women. The AMoCo study protocol, available in the MSF science portal[53], is registered with ClinicalTrials.gov. NCT04331847. A detailed description of its study design and settings is provided elsewhere [10].

Procedures

Variables needed to measure all indicators of the quality of PAC framework were included in four standardized data collection tools of the 4 components described above. The data collection procedures are briefly described below.

- *Health facility assessment*: after informed consent, the heads of the gynecology/obstetrics ward of the two hospitals completed the facility assessment form on signal functions.

KAPB survey

All physicians, midwives, nurses, and midwifery/nursing assistants providing PAC in study hospitals and literate in English or French were invited and consented to complete a self-administered questionnaire. The survey took place before the extraction of information from medical records and the interviews with women to prevent response biases linked to clinicians' involvement in the rest of the study.

Prospective medical records' review

All women presenting to study hospitals with signs and/or symptoms of complications related to spontaneous or induced abortions were included. Women with threatened abortions were excluded. Eligible women were identified by the study clinicians through hospital registers tracking and participations to daily gynecologic-obstetrics clinical meetings[10]. After checking their eligibility, women were included in the study after an informed opt-out consent process. Their medical records were reviewed prospectively daily with the help of the clinician in charge of the woman's care. Data were extracted in the standardized Case Report Form adapted from the WHO-MCS-A[48]. It included socio-demographics and obstetric characteristics, presentation clinical characteristics, severity criteria including WHO near-miss criteria[44], the detailed medical management received, and the outcome.

Quantitative patient survey

The prospective medical records' review was followed by an interview survey among women who stayed at least overnight. Before discharge, eligible women were invited to participate when they were medically stabilized. After informed consent, trained female interviewers conducted semi-directed face-to-face interviews in a private room. Questions in the survey included sociodemographic background, reproductive characteristics, and experience of care. The questionnaire was found to be too long after its pre-testing. As a result, questions of the emotional domain were chosen to be removed because they were identified as ambiguous in one of the validation studies of the Person-Centered Maternity Scale[39]. Our questionnaire was designed in English and was translated into French and local languages and then back translated into English.

Data were collected between August 2019 and July 2021 at the Nigerian hospital (with an interruption between April and July 2020 due to COVID-19) and between September 2019 and January 2020 at the CAR hospital.

Data analysis

We described inputs available in each hospital by computing the proportion of extended comprehensive PAC signal functions available in each hospital.

Counts and proportions were used to describe the responses pattern of the health professionals in the KABP survey. Missing answers were classified as "don't known" to follow a conservative approach. Midwifery/nursing assistants were not included in the analysis of medical knowledge and practices indicators of the KABP survey because they were not expected to know antibiotic and misoprostol regimens and to practice instrumental uterine evacuation.

For the medical records review and the patients' survey, participants' characteristics (sociodemographic, reproductive, obstetrics) were summarized using the median with range for continuous variables or counts with proportion for categorical variables. Counts and proportion were also used to summarize the percentage of women with responses fulfilling each of the process and outcome quality-of-care indicators.

We adopted a case-study like approach. Each site was unique and not representative of the population of hospitals in humanitarian settings. Therefore, even if we contrasted some characteristics and indicators, we did not do statistical testing.

We calculated 95% confidence interval (95% CI) using exact methods and performed analysis using Stata 16.0 software (College Station, Texas, USA).

RESULTS

Inputs

Table 1 describes the knowledge, attitudes, and practices of health professionals in the two hospitals. 140 health professionals providing PAC in Nigeria (response rate: 99%) and 84 health professionals in CAR (response rate 94%) responded to the KAPB survey. Among them, 92 were doctors, midwives, or nurses in Nigeria, and 78 in CAR.

In both hospitals, around 90% of the health professionals had been trained on PAC and almost 80% thought that PAC was every woman's right.

Nevertheless, doctors, midwives and nurses had gaps in certain knowledge and practices. While almost 70% answered the questions on misoprostol and antibiotics correctly in the CAR hospital, in Nigeria, this figure was 50% for the question on misoprostol and 21% for that on antibiotics. In addition, almost 20% in Nigeria and 35% in CAR reported using the inappropriate technology of D&C.

Table 1
Inputs indicators - human resources competencies in the Nigeria and CAR hospitals

Indicators	Nigeria hospital			CAR hospital		
	n/N	Percentage %	95% Confidence Interval	n/N	Percentage %	95% Confidence Interval
Percentage of doctors, midwives/nurses, and midwifery/nursing assistants who:						
Self-reported that they were trained in PAC	123/140	87.9%	81.3−92.8	81/84	96.4%	89.9−99.3
Agreed that access to PAC is every woman's right	111/140	79.3%	71.6−85.7	66/84	78.6%	68.3−86.8
Percentage of doctors and midwives/nurses who:						
Knew the recommended misoprostol posology to treat first trimester incomplete abortions	46/92	50.0%	39.4−60.6	54/78	69.2%	57.8−79.2
Knew the recommended antibiotic regimen to treat septic abortions	19/92	20.7%	12.9−30.4	53/78	68.0%	56.4−78.1
Reported using D&C (inappropriate technology) for instrumental uterine evacuations	18/92	19.6%	12.0-29.1	27/78	34.6%	24.2−46.2
D&C: Dilatation and Curettage						

Table 2 describes the post-abortion care signal functions available in each hospital as assessed by the rapid facility assessment. Of the 27 extended comprehensive PAC signal functions, 93% were available in the Nigerian and 96% in the CAR hospitals, showing high levels of availability of human, physical and referral system resources. The two signal functions that were missing in the Nigerian hospital were internet connection and contraception services 7 days per week (only provided 5 days/week). In the CAR hospital, the only signal function not fully available was an Intensive Care Unit, as the High Dependency Unit lacked mechanical ventilation systems.

Table 2
Inputs indicators - Extended Comprehensive Post-Abortion Care signal functions in the Nigeria and CAR hospitals

	Nigeria hospital	CAR hospital
Comprehensive PAC Signal functions	Indicator present[d]	Indicator present[d]
Drugs, supplies and services available for Post-Abortion Care		
Parenteral Uterotonics (at least 2 uterotonics with at least 1 parenteral available for PAC)	YES (1)	YES (1)
Removal of retention products (manual or electric vacuum aspiration for PAC)	YES (1)	YES (1)
Parenteral antibiotics available	YES (1)	YES (1)
Intravenous fluids	YES (1)	YES (1)
Blood transfusion available (with routine screening of donor blood for HIV, Hepatitis B, Syphilis)	YES (1)	YES (1)
Surgical laparotomy capability (including hysterectomy)	YES (1)	YES (1)
Drugs, supplies and services available for Post-abortion Contraception		
3 + Modern short acting contraceptives (at least 3 methods: condoms + pills + injectables)	YES (1)	YES (1)
1 + Modern long-acting reversible contraceptives (at least 1 method)	YES (1)	YES (1)
Contraception available 7/7	NO (0)	YES (1)
Infrastructure and Human Resources		
Facility open 24/7	YES (1)	YES (1)
1 + medical doctor on duty 24/7	YES (1)	YES (1)
3 + medical doctor registered and effectively working	YES (1)	YES (1)
TOTAL n/N, (%)	11/12(92%)	12/12(100%)
Additional signal functions to fulfill the extended capability to provide comprehensive PAC	Indicator present	Indicator present
Infrastructure		
Electricity available and functioning	YES (1)	YES (1)
Generator available and functioning	YES (1)	YES (1)

[a] Sum of Comprehensive PAC signal functions + Additional signal functions

	Nigeria hospital	CAR hospital
Refrigerator available and functioning	YES (1)	YES (1)
Email/internet available and functioning	NO (0)	YES (1)
Incinerator available and functioning	YES (1)	YES (1)
Water supply available and functioning	YES (1)	YES (1)
Sewerage system available and functioning	YES (1)	YES (1)
Referral capacity to refer patients if needed[e]:		
Telephone/radio call available and functioning	YES (1)	YES (1)
Ambulance available and functioning	YES (1)	YES (1)
Guidelines, Equipment and Human Resources		
Evidence based PAC guidelines available and accessible for clinicians[b]	YES (1)	YES (1)
Clinical audits currently in use (regular mortality, morbidity and/or near-miss review)	YES (1)	YES (1)
Critical care unit available and functioning (ICU or HDU) [c]	YES (1) - ICU	YES (0.5) - HDU
Ultrasound available and functioning	YES (1)	YES (1)
Biochemical/clinical laboratory available and functioning	YES (1)	YES (1)
Anesthetist capacity on duty 24/7	YES (1)	YES (1)
TOTAL n/N, (%)	14/15(93%)	14,5/15(97%)
TOTAL EXTENDED CAPABILITY TO PROVIDE COMPREHENSIVE PAC[a]	25/27 (92.6%)	26.5/27 (98.1%)

[a] Sum of Comprehensive PAC signal functions + Additional signal functions

[b] Post Abortion Guidance/Clinical Handbook (MSF or WHO guidelines or evidence- based, locally adapted guidelines).

[c] As per the WHO near-miss approach definition[44], an intensive care unit (ICU) is a unit that provides 24-hour medical supervision (including continuous vital signs monitoring), mechanical ventilation (including oxygen) and continuous vaso-active drugs. The High Dependency Unit (HDU) is a unit with all those characteristics except the mechanical ventilation.

[d] Presence of a given indicator for a facility adds a score of one to the total category score for that facility

Facility has the communication means (phone and radio) and the referral means (ambulance) to refer the patient in case of specific severe complications that are outside the management capacity of the facility.

Processes and Outcomes

Population description

Supplementary Fig. 1 describes the study flow charts of the prospective medical records' review and the patient survey in both study sites. A total of 520 women with abortion complications were included in the medical records' review in the Nigerian and 548 in the CAR hospital. Among them, 360 (69%) and 362 (66%) participated in the patient survey in Nigeria and CAR. Most of the women who were not included did not stay overnight (not eligible for the quantitative survey) or were discharged before the interview.

Some of the sociodemographic, reproductive, and obstetric characteristics of the women in the two hospitals were different, as indicated in Supplementary table 2. Women were older in the Nigerian hospital where the majority (82%) were married, while in the CAR hospital, most women were unmarried (70%). Women of the Nigerian hospital had a much lower education level (62% had no formal education) than women of the CAR hospital (72% reached at least a secondary school level). In addition, among all included women, 62% presented in their second trimester of pregnancy in the Nigerian hospital compared to 33% in the CAR one. More than half presented themselves with severe complications; 27% had septic abortions in Nigeria and 18.7% in CAR.

Figure 2 presents key results of the quality of PAC process and outcomes indicators in each hospital; these are further detailed in Supplementary table 3.

Process - Provision of Care

Only 60% of medical records in the CAR hospital and 75% in the Nigerian hospital had a complete report of the key medical information.

Almost all women included in the medical records' review had a uterine evacuation (93% in Nigeria, 89% in CAR) but practices varied according to hospitals. In Nigeria, uterotonics were most often used (91%) while in CAR, instrumental evacuations were used for 71% of women. In both hospitals, very few women received the non-recommended method of D&C (1.1% in Nigeria and 2.3% in CAR).

42% and 6% of women received blood transfusion respectively in the Nigerian and CAR hospitals. Most women in needs of blood transfusion according to MSF guidelines received it (98% in Nigeria and 83% in CAR). However, in the Nigerian hospital, 29% of women received some blood transfusion when not indicated (versus 1% in CAR).

In both hospitals, more than 80% of women with septic abortion signs received antibiotics but antibiotics were also given to about 30% of patients without indication. Although 96% of women in Nigeria received prophylactic antibiotics when indicated, only 40% did in CAR. In addition, in both hospitals, very few

women had their tetanus immunization status checked and managed (2% of all Nigerian women and 7% of all CAR women)

In terms of pain management, while 36% of women received analgesics in the Nigerian hospital, 79% did in the CAR one. Nevertheless, while 89% of women received a recommended anesthesia method during instrumental uterine evacuation in the Nigerian hospital, only 61% did in the CAR one.

All (99%) of discharged women in CAR received contraceptive counselling but only 39% in Nigeria. Then, 63% of CAR women were discharged with a contraceptive method against only 5% of Nigerian women.

Process - Experience of care

Women reported generally good experience of respect and preservation of dignity. Most women reported that they were spoken to nicely (88% in Nigeria and 79% in CAR), that they received pain medication (80% in Nigeria and 82% in CAR) and that their waiting time was short or very short (82% in Nigeria and 62% in CAR). Nevertheless, while 86% of women in Nigeria reported that their privacy was respected all the time during physical examination, only 37% of the CAR women did.

Women reported poor experience of care regarding communication. Only 49% in Nigeria and 59% in CAR said they were given explanations about their care and only around 15% said they felt able to ask questions during examination and treatment in both hospitals.

Outcomes

The facility-based risk of healthcare-related abortion-near-miss was at 0.2% in Nigeria and 1.1% in CAR. But only 65% of women in Nigerian hospital and 34% in the CAR hospital reported that the staff provided them best care all the time.

DISCUSSION

To measure the quality of post-abortion care in referral hospitals, we adapted the comprehensive WHO framework for Quality of Maternal and Newborn Health Care[24] to post-abortion care and apply it in two hospitals in humanitarian settings. We will first discuss the findings in the two hospitals and then the strengths and limitations of the quality-of-care framework.

Quality of PAC in two hospitals in humanitarian settings

Our comprehensive evaluation of the quality of PAC suggests that overall, the two hospitals provided effective and life-saving PAC. The risk of healthcare-related near-miss was low (less than 2%) as was the mortality index compared to other facilities in Africa (9.5% in the CAR hospital and 4.2% in the Nigerian hospital versus 18.3% in the WHO-MCS-A[41]). However, we noted a possible overuse of antibiotics and blood transfusion, suggesting overmedicalization and inefficient use of resources. Further, women reported mixed experiences with the quality of care provided.

Our quality-of-care measurement framework suggests that the low risk of healthcare-related near-miss can likely be explained by the adequate availability of healthcare inputs permitting the proper implementation of evidence-based practices. Almost all health professionals had received PAC training and almost all comprehensive and extended PAC signal functions were available in both hospitals, which has not been the case for many other African referral hospitals studied in more stable contexts[34, 35]. Some of the key evidence-based practices were correctly implemented in both hospitals including the provision of blood transfusion when indicated, antibiotics administered to patients with septic abortions and use of appropriate technology to evacuate the uterus. Only less than 2.5% of patients received the non-recommended and less safe D&C technology when having an instrumental uterine evacuation. This estimate is lower than in other studies in Africa (ranging from 8–100% [14, 38, 41, 54–58]) but is similar to levels found in facilities supported by international organizations[20, 59]. Research shows that once external support ceases, facilities struggle to maintain skills and supplies for MVA and so, reuse D&C[60]. Efforts should be maintained to completely abandon D&C and ensure a continuous use of the appropriate technology.

Nevertheless, our results also suggest inadequate knowledge and use of antibiotics in both settings. Although most women with septic abortion received antibiotics, they may not have received the recommended regimen. In fact, the KAPB survey identified insufficient knowledge among physicians, midwives, and nurses on this topic, particularly in the Nigerian hospital, where only 21% gave the correct answer. In contrast, while the prevention of surgical-related infection seems to be well implemented in the Nigerian hospital, only 40% of women receiving instrumental uterine evacuation received a prophylactic antibiotic in the CAR hospital. This preventative intervention is even more important in this context of restrictive abortion laws where women may have had unsafe instrumental abortions[10]. Moreover, as found in other African studies[60, 61], we identified some overprescription of antibiotics in both settings, even though some of these prescriptions might have been justified but not documented in the patient file. In referral hospitals like the two study sites, practitioners' continuous training, and regular antibiotic stewardships should be implemented to promote adequate and rational use of antibiotics. This strategy will not only better prevent and treat infections but also avoid or delay antimicrobial resistance in the longer term[62].

In addition to an overprescription of antibiotics, the possible overuse of blood transfusion in the Nigerian hospital or the high use of instrumental uterine evacuation in the CAR hospital could suggest "overmedicalization" for some patients. It might be due to possible provider preference and practice or organizational constraints rather than evidence-based recommendations[63]. In CAR, the choice of the faster method to evacuate the uterus (MVA) might be due to the high bed occupancy rate. The fact that only 15% of patients were able to ask questions about their treatment suggest that patients' preference might not have always been asked and taken into consideration. On the other hand, in the Nigerian hospital, some women might have had an undocumented indication of blood transfusion. Alternatively, the prescription of blood transfusions outside the guidelines' indications may suggest the need to adapt these recommendations to the context. Indeed, women of reproductive age in this fragile State of Jigawa have some of the worst nutritional and anemia indicators in the country[10, 64]. The fact that resources in

this hospital are not as restricted as in other hospitals not supported by international organizations[60] may have enabled clinicians to adapt their practice to the specificities of women in this state.

The provision of contraceptive services was found to be insufficient in the Nigerian hospital with less than 40% of women receiving counseling and less than 5% of contraception uptake at discharge, which is lower than what was found in the CAR facility (63.4%) and in other African hospitals studies (15–70%) [60, 65, 66]. Cultural factors may play a role to explain these poor results. This population traditionally puts high values on high fertility. They have one of the highest fertility rate in Nigeria[67] and women's autonomy in accessing contraception is limited[68]. In addition, as indicated by the available signal functions, another reason for these results may be a lack of coordination of PAC services with the contraceptive services provided in another hospital unit that was not opened 7/7. Evidence shows that post-abortion contraception should be provided at the same time and location as clinical treatment for complications[69]. Such strategy increases the uptake of contraceptive methods by women and thus protects them against the risk of future unintended pregnancies[15, 34, 69]. In parallel, women empowerment programs should be implemented to enhance their health contraceptive decision-making capacity[68].

In both study hospitals, around 80% of women reported having received pain medications. However, pain management was not optimal according to the medical records. In the CAR hospital, anesthesia was recorded as provided only to six out of ten women undergoing instrumental uterine evacuation, despite paracervical block being a part of the standard protocol. In contrast, in the Nigerian hospital, while anesthesia was recorded as provided almost routinely in instrumental evacuation, only 36% of patients received analgesics according to the medical records' review. The dissonance between the reported experience by women and the medical records' review results may be explained by a lack of documentation of analgesic in the medical files, a desirability bias, or women misunderstandings of the treatment provided. This latter hypothesis is supported by the fact that the lack of provider-patient communication was the most important gap identified in the patient survey. Only half of the women received explanations about their care and only one in six were able to ask questions in both hospitals. Those results were worse than what was found in the WHO-MCS-A African referral facilities of more stable settings, where 82% of women reported having had explanations and 67% that they could ask questions[41]. Evidence shows that poor communication in hospitals may be a significant barrier in women's satisfaction to care and adherence to treatment[70]. Furthermore, provider attitudes to abortion care can negatively impact provider-patient interaction, timeliness and quality of care[60]. The fact that in our study, almost 80% of health providers considered PAC as every woman's right is encouraging. Nevertheless, there is an urgent need to initiate strategies to enhance communication with patients about their condition, care, and post-abortion contraception in a supportive, empathetic, and nonjudgmental attitude. Previous research on PAC has shown that introducing educational protocols in PAC, using job aids and leaflets to provide information about women's treatment, postabortion fertility, and contraception, as well as conducting workshops to clarify values and attitudes about abortion, improve women's satisfaction with care and increases the likelihood of timely contraception uptake in the absence of pregnancy desire.[69, 71–75].

Our evaluation of the quality of PAC in the two hospitals was comprehensive but cannot be generalized to other hospitals of the targeted areas, regions, and countries, nor to hospitals of humanitarian settings. Health providers' and women's answers to self-administered or face-to face surveys are prone to memory and desirability biases, limiting the validity of the surveys' results, especially in a subject like abortion, which is prone to stigma. While the same prospective methodologies were used to collect data in the two hospitals, and the same management guidelines and standardized medical records were applied, some documentation differences in the patients' files may have remained. This may limit the validity and comparability of the evidence-based practices and health outcomes indicators. The differences in patients' characteristics between the two settings could affect participants responses, with the Nigerian women being more likely to be older, married, with less education and more severe complications than the CAR women. Individual experiences of care are highly subjective variables[76]. Differences between the two settings might be due to different levels of patients' understanding and expectations of quality according to their characteristics or different social norms[47].

Overall, the good quality of care provided in these two hospitals of humanitarian settings can partly be explained by the important support of MSF to the two facilities in terms of provision of equipment, medication, staffing, continuous training, supervision, and availability of medical protocols. Other research in humanitarian contexts assessing the impact of NGO interventions found important improvement in some quality indicators[20, 59]. This suggests that even in such challenging contexts, providing and improving quality of PAC inside health facilities is feasible and that some of the potential barriers linked to fragility or insecurity can be overcome.

Strengths and limitations of the quality of PAC framework

Using this framework, we were able to identify various strengths and gaps in the quality of PAC. The analysis of the similarities and discontinuities between the inputs, process and outcome indicators allowed to strengthen our understanding of the issues identified. In these two NGO-supported hospitals, several gaps were thoroughly analyzed, enabling field-oriented recommendations to be formulated. This suggests that the framework may also be able to identify areas for improvement in all types of hospital settings, whether stable or humanitarian, and supported or not by NGO.

Regular measurement of quality of care is a core principle of quality improvement programs and the primary step in improving quality of care[77]. To our knowledge, this conceptual framework is the first to measure the three Donabedian's domains of PAC quality provided in referral hospitals, examining the eleven dimensions included in the WHO framework for MNHC[24]. Indicators measuring the patient experience in terms of communication, respect, dignity, and emotional support ensure a person-centered approach and complement the more traditional assessment of the hospital's structural capacity to provide PAC[34, 35, 45, 78, 79] and its coverage of key clinical practices[19–21]. Furthermore, the inclusion of indicators assessing the implementation of evidence-based practices and one indicator assessing the information system is a clear added value, since most of these indicators are rarely included in PAC evaluations[14, 31, 60]. Both health and people-centered outcome indicators allow an overall assessment of the impact of the care provided. The use of multiple sources of information to

measure the framework's indicators, including clinical data and surveys data from three different populations (ward managers, PAC providers, and patients), increases the robustness of the evaluation by considering and triangulating different points of view.

We applied a more robust outcome quality-of-care measure than the mortality index which has been used in other studies[44]. A limitation of this indicator is that it does not exclude inevitable deaths from the estimates and therefore doesn't accurately reflect the outcome of the care provided in the health facility. As we have done in our study, we recommend that future quality-of-care research uses the risk of healthcare-related near-miss as their outcome indicator[50]. This indicator corrects for the flaw of the mortality index because it measures the worsening of the state of the women after 24h and eliminates most inevitable deaths or near-miss that are happening in the first 24h after presentation and for which the responsibility of the quality of care provided in the facility is difficult to determine.

Although this is not the case in many contexts, it would be optimal if all post-abortion, safe abortion, and contraceptive care were routinely implemented as part of a comprehensive abortion care package. Our framework is complementary to the recently published framework on the quality of safe abortion care[27] and we recommend that future assessments of the quality of safe abortion care should include an evaluation of PAC quality[16]. Nonetheless, PAC does not have to be solely assessed as part of safe abortion care, as it is a broader component of pregnancy-related care including the management of complications of any types of abortion (spontaneous and induced).

Our quality-of-care framework faced implementation challenges that requested some adaptations. In particular, the indicators measuring the emotional support were removed because questions were identified as ambiguous[40]. Nevertheless, we believe that this is an important drawback of our evaluation as emotional support is a key dimension of experience of care. Researchers should do more work to develop short valid scales including this dimension to allow a comprehensive evaluation of experience of care.

Whereas around 20% and 35% of clinicians reported using D&C to evacuate the uterus respectively in the Nigerian and CAR hospitals, less than 2.5% of patients having an instrumental uterine evacuation received this inappropriate technology according to the medical records' review of both hospitals. This contradiction in the results might be explained by a possible confusion of the definition of D&C by the clinicians answering the KAPB questionnaire, especially in CAR where the expression "curettage" is often used to name different types of instrumental uterine evacuation, including MVA[80]. In fact, the MSF standardized medical records of both hospitals include a full page detailing the type of instrumental evacuation and is probably providing more reliable results for this indicator than the KAPB survey. This suggests that questionnaires need to clearly indicate the reference to sharp curettage and that measuring such indicator using clinical data or direct observation rather than survey among health professionals might be preferable[81].

Additionally, only few indicators per dimension of the complete framework were selected. While this limited number of indicators improves its usability, it limits its content validity. Furthermore, the

classification of each of the eleven dimensions in the 3 Donabedian domains was a consensual but a subjective process taking the perspective of the measurement of quality of care at referral hospital level. Another group of investigators may have classified them differently. In particular, the coverage indicators are sometimes considered as outcomes and the signal functions indicators as process ones[24, 26].

Our framework tested in the context of a research study requires the use of different sources of data which can be challenging to collect routinely. Nevertheless, it can provide some guidance for routine assessment of PAC quality as all dimensions could be at least partially assessed by the following minimum package: the evaluation of the PAC signal functions in the hospital (which include human and physical resources indicators), the evaluation of the quality of the documentation, the evidence-based practices and the healthcare outcome indicators in a random sample of patients medical records and the different indicators of experience of care and person-centered outcome by short patients exit surveys including the nine proposed questions.

Finally, while we proposed a framework adapted from existing models and using existing, pretested and sometimes partially validated indicators from the literature, further research is needed to assess the reliability and the validity of the indicators in other referral hospitals of different contexts including in hospitals not supported by an NGO[82].

CONCLUSION

Post-abortion care is an essential reproductive health service everywhere, including in humanitarian contexts where women may face higher risk of severe complications. Providing high-quality comprehensive abortion care, including post-abortion, safe abortion and contraceptive care in all facilities is an ethical and humanitarian imperative. Our proposed framework to measure the quality of post-abortion care in term of inputs, process, and outcomes across eleven dimensions can be a key tool to contribute to reduce abortion-related morbidity and mortality from induced and spontaneous abortion in referral hospitals. The use of this tool in two hospitals of humanitarian settings showed that providing good quality of postabortion care was feasible in such context, accounting for the low risk of near-miss events happening 24 hours after presentation. It allowed to identify key areas of improvement over a broad range of indicators. Both hospitals could benefit from the set-up of antibiotic stewardships to prevent nosocomial infections as well as antibiotic-resistances. In addition, it is urgent to implement interventions to develop patient-provider communication to ensure an effective patient-centered approach.

Abbreviations

AMoCo: Abortion-related Morbidity and mortality in fragile and Conflict-affected settings (study)

CAR: Central African Republic

D&C: Dilatation and sharp Curettage

KAPB: Knowledge Attitude Practice and Behavior

MNHC: Maternal and Newborn Health Care

MRR: Prospective Medical Record Review

MSF: Médecins Sans Frontières

MVA: Manual Vacuum Aspiration

NGO: Non-Governmental Organization

PAC: Post-Abortion Care

WHO: World Health Organization

WHO-MCS-A: World Health Organization Multi-Country Study on Abortion

Declarations

Ethics approval and consent to participate.

This research adhered to the principles of the Declaration of Helsinki. Independent ethical approvals were obtained from MSF (ID 18110), the Guttmacher Institute (DHHS identifier IRB00002197), and both Central African Republic (N°18/UB/FACSS/CSCVPER/19) and Jigawa State ethical review boards (MOH/SEC.3/S/548/I). Participants of the health facility assessment, KAPB survey (health professionals) and patient quantitative survey were included after an informed consent process. In accordance with the Council for International Organizations of Medical Sciences guidelines[83], all ethical committees provided a waiver of written informed consent for the extraction of routine clinical data in the prospective medical records review with no identifying information and approved the application of an informed consent opt-out procedure instead.

Consent for publication

Not applicable

Availability of data and materials

The AMoCo study protocol is available in the MSF science portal: https://scienceportal.msf.org/assets/7660. The dataset collected during the study, including deidentified participant data, data dictionary and additional related documents are available from the corresponding author or dpco@epicentre.msf.org on reasonable request, following MSF's data sharing policy which ensures that data will be available upon request to interested researchers while addressing all security, legal, and ethical concerns, especially for sensitive subjects like abortion in vulnerable populations. (https://www.msf.org/sites/msf.org/files/msf_data_sharing_policycontact_infoannexes_final.pdf)."

Competing interests

The authors declare that they have no competing interests.

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Contribution to Authorship

EP, OO, TF, AM, RN, MAG, CF, DL, CSH, BP participated in developing the study design and protocol. EP, OO, BP, CF, DL, TF, RN and CSH participated in developing the quality of PAC framework. EP, OO, RN, TF, AM, CF, DL, CSH, VF participated to the development of data collection tools and procedures. EP, OO, RN, MAG, TW, HC, DL and CF participated in coordinating data collection. TW and HC were responsible for data management of the study. EP, HC, PDB and OO performed the statistical analysis. EP wrote the first draft of the manuscript. OO, BP, PDB, VF, LB and OD made substantial contributions to the first and subsequent versions of the manuscript. All authors made substantial contributions to interpretation of findings and commented on previous versions of the manuscript and approved the final manuscript.

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Figures

Figure 1

Framework for assessing the quality of PAC in hospitals, including 11 dimensions and 29 themes.

PAC: Post-Abortion Care, US: Ultra-Sound, ICU: Intensive Care Unit

[a] Abortion-related mortality index = number of abortion-related deaths/ number of abortion-related near-miss cases and deaths

[b] Risk of healthcare-related abortion-near-miss= number of women with abortion-related near-miss happening >= 24h after presentation/total number of women presenting for abortion complications. Near-miss cases include women with organ dysfunction of either one or more of the following: cardiovascular, respiratory, renal, coagulation, hepatic, neurological or uterine dysfunction according to WHO criteria[44]
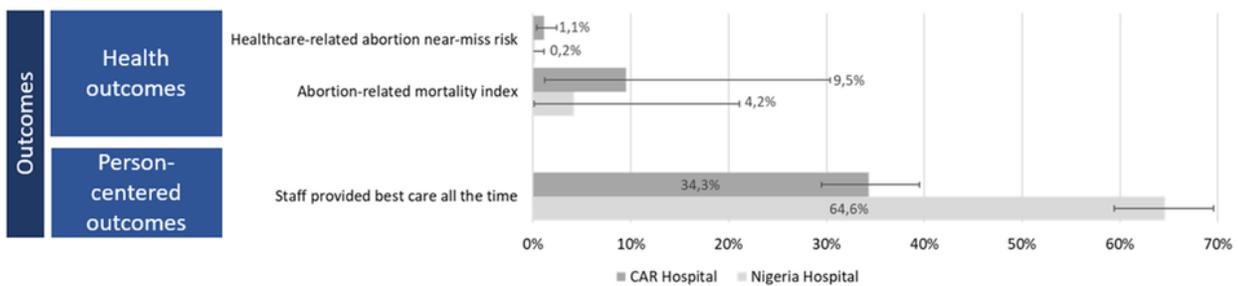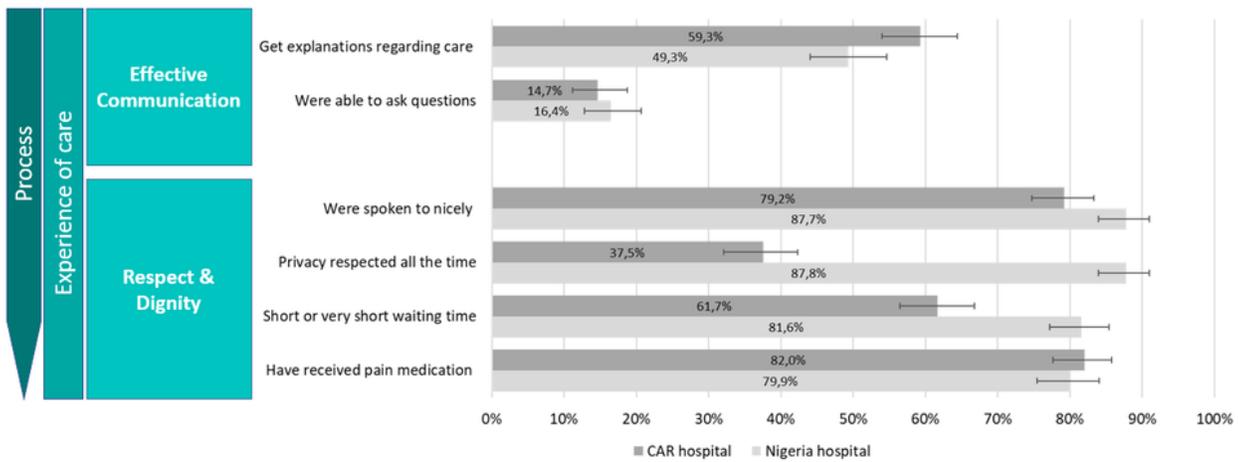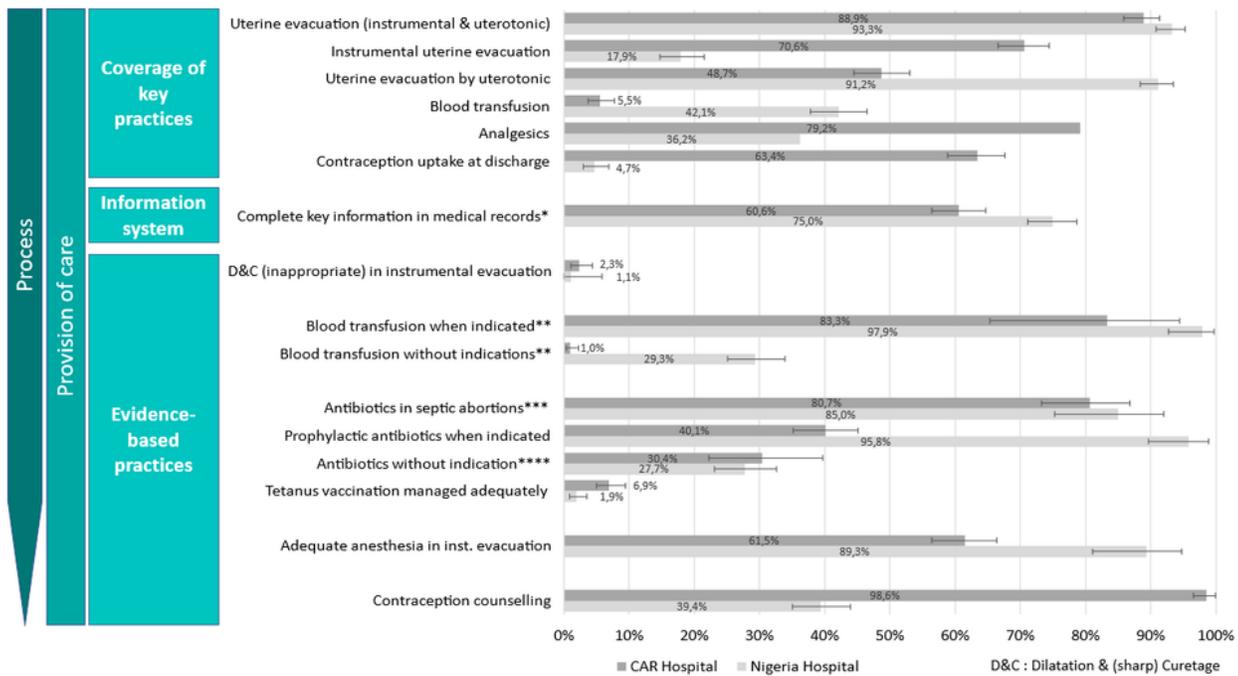
Figure 2

Process (provision & experience of care) & outcome indicators in the Nigeria and CAR hospitals.

Figure 2.a: Provision of care

* All the following key pieces of information are available in their medical record: estimate of gestational age, information on vital signs (temperature, systolic & diastolic blood pressures, heart rate, respiratory rate), abdominal examination, cervix examination, mental status, appearance at presentation & final diagnosis.

** A woman who had an indication of blood transfusion is defined by (MSF guidelines 2019[43]) a woman with Hb ≤ 5 g/dl, even if there are no signs of decompensation or with Hb > 5 g/dl and < 7 g/dl if there are signs of decompensation (lowest SBP <= 90 mm Hg & pulse >= 100 b/min) or sickle cell disease or severe malaria or serious bacterial infection or pre-existing heart disease.

*** Septic abortions include uterine infections, generalized peritonitis, or severe systemic infections with genital origin.

**** No indication of antibiotics includes: no documented infection, no instrumental/surgical procedure, no trauma/perforation (no evidence of cervix/vaginal mechanical injury at clinical examination, uterine perforation or other intra-abdominal perforation confirmed at laparotomy or at clinical examination), no notion of septic maneuver to induce abortion and no foreign body found in the vagina.

Figure 2.b: Patients' experience of care

Figure 2.c: Outcomes

Supplementary Files

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