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### **Quality of Maternal and Neonatal Health Care: Assessment and Improvement in Six Maternity Hospitals in Pernambuco, Brazil**

Settore scientifico-disciplinare: Med/40  
Ginecologia e Ostetricia

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## ABSTRACT

**Introduction:** Quality of care is recognized internationally as an unfinished agenda. In low and middle-income countries (LMICs), efforts towards quality improvement and comprehensive approach to childbirth have been indicated as strategies to reduce stillbirths, maternal and early neonatal deaths, and to promote gender equality and women's empowerment. Brazil has a context of worrying perinatal health indicators and intense medicalization of birth that contrasts with very high levels of institutional births assisted by skilled professionals and free access to care, pointing to poor quality as a key issue to be addressed. In spite of this, there is scarcity of both research and programmes aimed at improving quality of care in comparison with the international scenario.

**Methods:** A WHO standard based, participatory approach and quality improvement tool for maternal and neonatal care was used in a sample of 6 (six) maternity hospitals in the State of Pernambuco, Brazil, that were responsible for 29.128 live births in 2014. The main objective was to assess the quality of care and to define a Plan of Action for improvements together with health professionals. The tool was translated into Portuguese and a national team of assessors was trained. Monitoring visits were also performed after the initial assessment visit, to strengthen the Plan of Action implementation at facility level. After one year, all maternity hospitals were reassessed and the observed improvements were compared with the Plan of Action developed a year before. The factors that positively or negatively influenced changes were also analyzed. **Results:** All maternity hospitals presented a variety of quality gaps. Teaching/tertiary and secondary care hospitals were equally affected. Gaps in case management were predominant but infrastructure and staffing issues were also common. Monitoring visits were useful to increase awareness regarding quality gaps and commitment to change. Health professionals and managers received very well the participatory approach of the quality improvement cycle. After one year, some improvements were observed in all maternity hospitals, mainly in case management and respectful care. Besides the quality cycle, other factors influencing change were financial crisis, staff and manager's motivation, leadership strategies and quality research project and monitoring. The total cost of the intervention was 8.305,62 US dollars per each maternity hospital. **Conclusions:** Our systematic standard-based and participatory approach produced some significant results in a relatively short time at a relatively low cost, as previously shown in other health systems settings. It should be considered, preferably linked to certification/accreditation processes and performance-based mechanisms, for use at large scale in Brazil and other LMICs. **Key words:** Quality Assessment, Quality Improvement, Maternal and Neonatal Health Care, Standard Based Assessment, Hospital Care.

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# CONTENT LIST

|  |     |
|--|-----|
| Abstract.....  | i   |
| Acknowledgements.....  | ii  |
| List of Tables .....   | v   |
| List of Figures.....   | vi  |
| List of Abbreviations .....  | vii |
| 1) Introduction .....  | 1   |
| 1.1) Quality of Care: definition and importance.....   | 1   |
| 1.2) Quality in Maternal and Neonatal Health Care .....  | 3   |
| 1.3) Quality improvement: review of main approaches in Maternal and Neonatal Health Care .....       | 6   |
| 1.4) Maternal and Neonatal Health Care in Brazil – Quality of Care and national context.....         | 9   |
| 2) Objectives.....   | 13  |
| 3) Methods .....   | 14  |
| 3.1) Design and study period .....   | 14  |
| 3.2) WHO Hospital care for mothers and newborn babies: quality assessment and improvement tool ..... | 14  |
| 3.3) Pre-Assessment Phase .....  | 17  |
| 3.3.1) Ethics approval.....  | 18  |
| 3.3.2) Funding .....   | 18  |
| 3.3.3) Translation of the WHO tool.....  | 18  |
| 3.3.4) Training of National Assessors .....  | 18  |
| 3.3.5) Settings and Maternity hospitals selection.....   | 19  |
| 3.4) <i>QIC – Step 1 – First Assessment – Intervention</i> .....                                     | 20  |
| 3.5) <i>QIC – Step 2 – Plan of Action Development</i> .....  | 21  |
| 3.6) <i>QIC – Step 3 – Monitoring Visits</i> .....   | 21  |
| 3.7) <i>QIC – Step 4 – Reassessment</i> .....  | 22  |
| 3.8) Data analysis.....  | 23  |
| 3.8.1) <i>QIC – Step 1 – First Assessment</i> .....  | 23  |
| 3.8.2) <i>QIC – Step 2 - Plan of Action</i> .....  | 23  |
| 3.8.3) <i>QIC – Step 3 - Monitoring questionnaires</i> .....   | 24  |
| 3.8.4) <i>QIC – Step 4 – Reassessment</i> .....  | 24  |
| 4) Results .....   | 26  |
| 4.1) Patient’s flows and Maternity hospitals main indicators.....                                    | 26  |
| 4.2) Findings of the study .....   | 27  |
| 4.2.1) <i>QIC - Step 1</i> .....   | 27  |

|   |    |
|---|----|
| 4.2.2) QIC - Step 2 .....   | 32 |
| 4.2.3) QIC - Step 3 .....   | 36 |
| 4.2.4) QIC - Step 4 .....   | 37 |
| 5) Discussion.....  | 47 |
| 5.1) Summary of findings .....                                      | 47 |
| 5.2) Interpretation of findings – Factors influencing changes ..... | 48 |
| 5.3) Comparison with other studies .....                            | 51 |
| 5.4) Limitations of the study.....                                  | 54 |
| 6) Conclusions and perspectives .....                               | 56 |
| References.....   | 57 |
| Appendices.....   | 69 |
| Appendix 1. Informed consent for interviews – Mothers.....          | 69 |
| Appendix 2. Informed consent for interviews – Staff .....           | 72 |
| Appendix 3. Monitoring questionnaire.....                           | 75 |
| Annexes .....   | 78 |
| Annex 1. Template for Plan of Action at hospital level .....        | 78 |
| Annex 2. Template for Plan of Action at State/national level .....  | 79 |

## LIST OF TABLES

|   |    |
|---|----|
| Table 1. Main characteristics of selected Maternity hospitals – Pernambuco Brazil. ....                                       | 26 |
| Table 2. Average scores by chapters. First assessment QIC – Step 1. 2015. ....  | 27 |
| Table 3. Main quality gaps identified in QIC – Step 1. ....   | 29 |
| Table 4a. MH1 Plan of Action overview – QIC Step – 2 – 2015. ....   | 32 |
| Table 4b. MH2 Plan of Action overview – QIC Step – 2 – 2015. ....   | 32 |
| Table 4c. MH3 Plan of Action overview – QIC Step – 2 – 2015. ....   | 33 |
| Table 4d. MH4 Plan of Action overview – QIC Step – 2 – 2015. ....   | 34 |
| Table 4e. MH5 Plan of Action overview – QIC Step – 2 – 2015. ....   | 34 |
| Table 4f. MH6 Plan of Action overview – QIC Step – 2 – 2015. ....   | 35 |
| Table 5a. Influencing factors for QI cited by managers and staff during the first monitoring visit. QIC – Step 3. ....        | 37 |
| Table 5b. Influencing factors for QI described by managers and staff during the second monitoring visit. QIC – Step 3. ....   | 37 |
| Table 6. Average scores by chapters. Reassessment QIC – Step 4. 2016. ....  | 38 |
| Table 7a. Quality improvements observed in QIC – Step 4 by main area of care and their relation with MH1 Plan of Action. .... | 39 |
| Table 7b. Quality improvements observed in QIC – Step 4 by main area of care and their relation with MH2 Plan of Action. .... | 39 |
| Table 7c. Quality improvements observed in QIC – Step 4 by main area of care and their relation with MH3 Plan of Action. .... | 40 |
| Table 7d. Quality improvements observed in QIC – Step 4 by main area of care and their relation with MH4 Plan of Action. .... | 41 |
| Table 7e. Quality improvements observed in QIC – Step 4 by main area of care and their relation with MH5 Plan of Action. .... | 42 |
| Table 7f. Quality improvements observed in QIC – Step 4 by main area of care and their relation with MH6 Plan of Action. .... | 43 |
| Table 8a. Factors positively influencing QI, Pernambuco – Brazil – 2015/2016. ....  | 44 |
| Table 8b. Factors negatively influencing QI, Pernambuco – Brazil – 2015/2016. ....  | 44 |
| Table 9. Hours worked by national assessors during QIC, Pernambuco – Brazil – 2015/2016. ....                                 | 45 |
| Table 10. Cost analysis QIC, Pernambuco – Brazil – 2015/2016. ....  | 46 |

## LIST OF FIGURES

|  |    |
|--|----|
| Figure 1. Donabedian's Framework. ....   | 1  |
| Figure 2. Levels by which quality can be assessed according to Donabedian (1988).....              | 2  |
| Figure 3. WHO Quality of care framework for maternal and newborn health.....                       | 5  |
| Figure 4. Timeline of Quality Improvement Cycle (QIC) – Pernambuco – Brazil. ....                  | 14 |
| Figure 5. Geographic distribution of selected Maternity hospitals in Pernambuco – Brazil.<br>..... | 19 |



## **LIST OF ABBREVIATIONS**

BFHI - Baby Friendly Hospital Initiative

BFH - Baby Friendly Hospital

BMH - Brazilian Ministry of Health

CS - Cesarean section

CNPq - National Counsel of Technological and Scientific Development

D&A - Disrespectful and abusive treatment

EBM - Evidence-based medicine

FAPE - Support Funding for Research and Extension

FEBRASGO - Brazilian Federation of Obstetrics and Gynecology Associations

HICs - High-income countries

ICU - Intensive care unit

IMIP - Instituto de Medicina Integral Professor Fernando Figueira

IOM - Institute of Medicine

IRCCS - Istituti di Ricovero e Cura a Carattere Scientifico

LBW - Low birth weight

LMICs - Low and middle-income countries

MD - Maternal death

MCR - Under-five mortality rate

MH - Maternity hospital

MMR - Maternal mortality rate

MNHC - Maternal and neonatal health care

MPF - Federal Public Ministry

ND - Neonatal death

NGO - Non-governmental organizations

NICU - Neonatal intensive care unit

NMR - Neonatal mortality rate

OB/GYN - Obstetricians and gynaecologists

PAHO/WHO - Pan American Health Organization

PVE - Especial visiting researcher

QI - Quality improvement

QIC - Quality improvement cycle

QoC - Quality of care

SUS - Unified Health System

USP - São Paulo University

USD - US Dollars

WHO - World Health Organization

# 1) INTRODUCTION

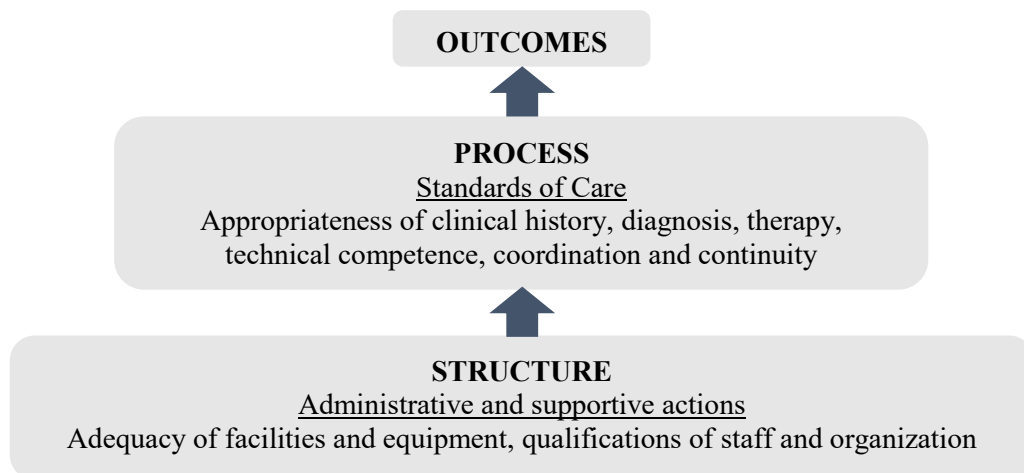
## 1.1) QUALITY OF CARE: DEFINITION AND IMPORTANCE

The concept of quality assurance was introduced in health systems in the last decades of 20th century. Classic concepts mutated from industry such as definition of standards, improvement cycles, consumer satisfaction, cost/benefit analysis and quality management started to be frequently used in health systems (1). Since then, several definitions of quality of care (QoC) have been proposed without reaching a universal consensus among researchers and health professionals.

A classical definition came from the Institute of Medicine (IOM): QoC is “the degree to which health services increase the likelihood of desired outcomes and are consistent with current professional knowledge” (2). According to the IOM report, “*Crossing the Quality Chasm*”, the difference between optimal and currently provided health care was in fact a chasm and not just a gap, even in high income countries (HICs), such as United States (3). The systematic mistakes and pitfalls in delivering care to individuals and populations were attributed to the growing complexity of health care, difficulties in appropriately applying new technologies, and raising incidence of chronic conditions without an appropriate multidisciplinary structure.

For Donabedian (4,5), medical care has several dimensions. Outcomes are not the only dimension to be considered when looking for quality. Structure and process of care are also part of a model for developing quality standards that has the advantage of dealing with concrete information and, on the contrary, the limitation that the relationship between structure and outcomes or structure and process is often not well recognized (Figure 1).

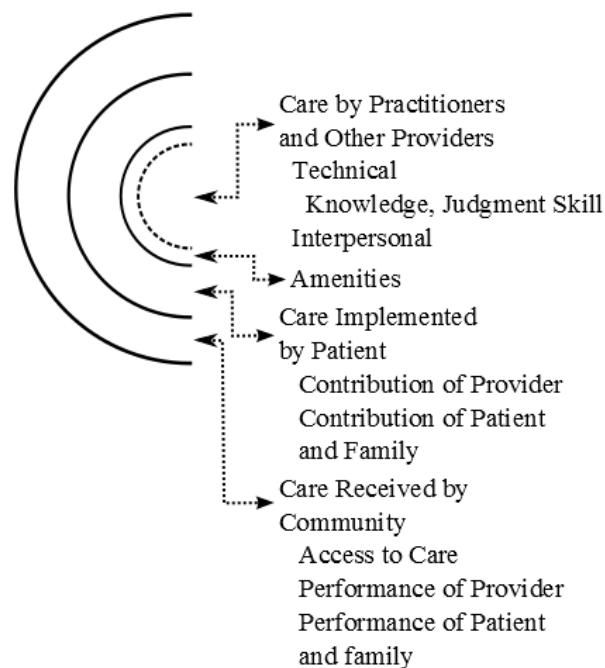
**Figure 1. Donabedian’s Framework.**



Based on: Donabedian A. Evaluating the quality of medical care. The Milbank Fund Quarterly 2005. 83:4, 691-729.

Figure 2 shows the levels for which QoC can be assessed: the central point is the care given by providers and the most peripheral one is the care received by community – for this author the definition of quality can varies according to the system of care and providers’ and service responsibilities.

**Figure 2. Levels by which quality can be assessed according to Donabedian (1988).**



Source: Donabedian A. The quality of care: How can it be assessed? JAMA 1988, 260: 12, 1743-1748.

Other authors argue that health providers, managers and patients can have different perspectives of QoC. Professionals tend to place the same emphasis on interpersonal aspects of care, material/physical environment and health indicators, while patients’ perceptions depend on their own experiences with health services (6).

International debate on QoC went through three phases during last century, but still faces open issues. In a first phase, the emphasis was technical and scientific with responsibility put on health workers. Total Quality, Continuous improvements and Accreditation, concepts linked to managing and organizational process, characterized the second phase. Only in a third phase, user’s views and satisfaction were taken into account due to raising concerns of humanization of care (7). So, over the years, the attention on biomedical outcomes has gradually given place to more inclusive definitions of QoC that consider patients’ perceptions and satisfaction, social, emotional and financial outcomes, and performance according to internationals’ standards, which is the easiest to be measured (1,4,5,8).

Currently, the World Health Organization (WHO) defines QoC as “the extent to which health care services provided to individuals and patient population improve desired health outcomes” (9). This definition reveals a concern for both individual and whole-system perspective. According to WHO, a quality health care is safe (minimizing risks and reducing errors), effective (using evidence-based guidelines), accessible (geographically reasonable reducing delays of care), efficient (taking full advantage of available resources), equitable (without variations due to gender, race or economic status) and people-centered (taking into account user’s preferences and culture) (9,10). In addition, negative economic impact on facilities and health systems caused by re-admission of patients, lawsuits and absenteeism of professionals has been related to quality gaps (6,11).

At present, QoC is recognized internationally as an unfinished agenda independent of the type of health system adopted. The focus is different according mainly to the extent of available resources. In HICs, differences on QoC delivered within facilities and pressure of payer’s agencies and patients against medical errors are driving the research on quality improvement (QI) strategies, while in low and middle-income countries (LMICs) decision makers and planners need to expand access and optimize the available investments, attempt to improve national outcomes and reducing inequities by effective health programs (9,12).

## **1.2) QUALITY IN MATERNAL AND NEONATAL HEALTH CARE**

Maternal and Neonatal Health Care (MNHC) carries some additional complexities. First, labor and delivery represent a social, physiologic and cultural event, fortunately with mostly preventable and rare adverse outcomes. Second, although it is the major cause of women’s hospitalization in most countries, mothers and their newborns usually do not need complex care. In addition, appropriate MNHC is not limited to labor but embraces previous women’s reproductive health, pregnancy care and postpartum as a continuum, which leads to a complex risk adjustment for severe complications and difficult comparison of health outcomes. We need to add to these factors a large number of quality measures, frequent poor data recording on medical records and the importance of non-biomedical outcomes such as women’s satisfaction (care that is desirable may diverge from technical standards) and the definition of areas for QI will be a challenge. (1,12-15).

To this regard, a comprehensive definition of QoC specific for MNHC that could be particularly important in LMICs was proposed: “High quality of care maternity

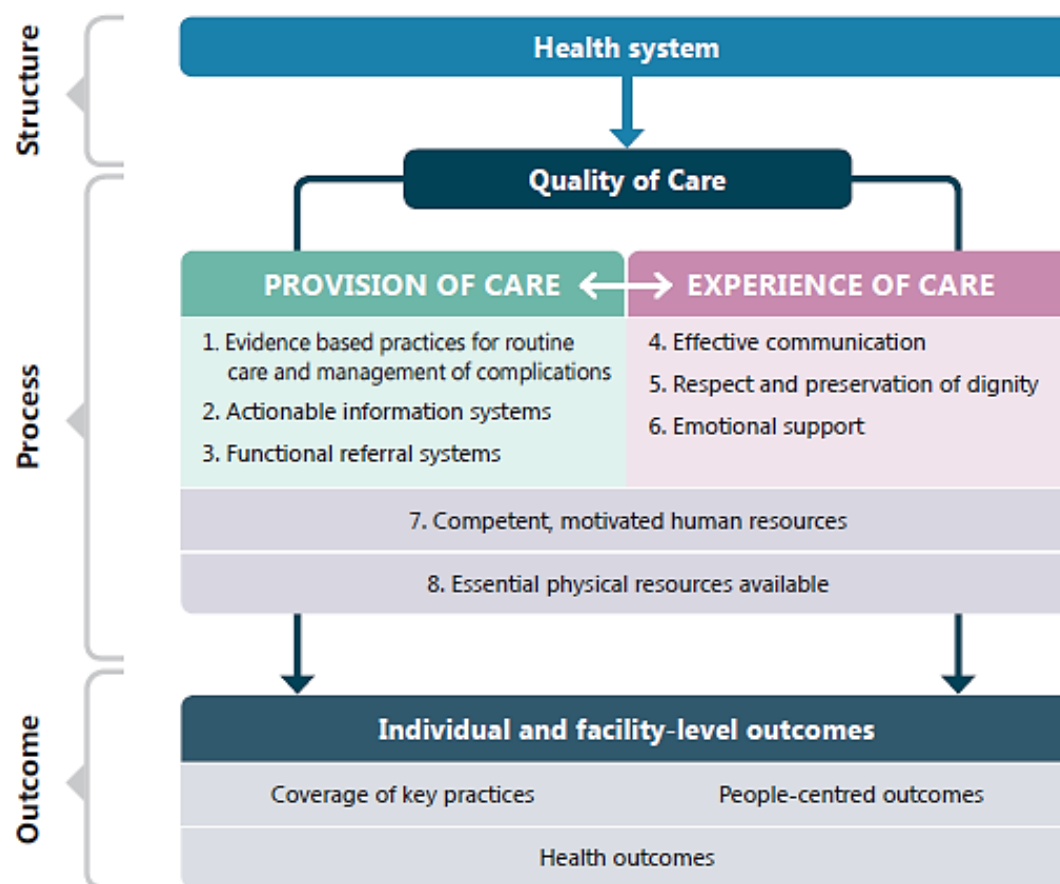
services involves providing a minimum level of care to all pregnant women and their newborn babies and a higher level of care to those who need it. This should be done while obtaining the best possible medical outcome, and while providing care that satisfies women and their families and their care providers. Such care should maintain sound managerial and financial performance and develop existing services in order to raise the standards of care provided to all women” (13).

In the past, internationally adopted frameworks for assessing MNHC in LMICs focused mainly on availability of skilled professionals during childbirth and coverage of services and utilization (15,16). A recent systematic review regarding impact of QI strategies in LMICs reinforces the concept that utilization of health systems appears to be more associated with women’s perception of care than with technical performance (17). In fact, nowadays there is consensus that where there are no access limitations to institutional births, QoC becomes an important determinant of maternal and neonatal outcomes (15,16).

In post-2015 Sustainable Development Goal era, international agencies, governments and civil society organizations have committed to reduce stillbirths, preventable maternal and early neonatal deaths, and promote gender equality and women empowerment. Efforts on QoC and to ensure a more comprehensive approach to childbirth represent key strategical directions (15,18,19).

A specific framework for QoC in MNHC was developed by WHO (Figure 3) as part of the Global Strategy for Women’s, Children’s and Adolescents’ Health (10,18). It can be used to evaluate various sectors of the health system, from the perspectives of service users, providers and managers, increasing the likelihood that the desired individual and facility outcomes will be achieved. QoC is represented here by eight domains. Dimensions like Provision of Care (use of evidence-based practices, information and referral systems) and Experience of Care (effective communication with women and their family, respect, dignity and access to emotional support of women’s choices) are highlighted and linked. Prerequisites for good QoC in facilities are represented as cross-cutting areas: availability of competent, motivated human resources and physical resources. Based on this framework, WHO identified and recommended six strategic areas for QI: research, guidelines, standards of care, effective interventions strategies, indicators for all levels monitoring and capacity building.

**Figure 3. WHO Quality of care framework for maternal and newborn health.**



Source: World Health Organization. Standards for improving quality of maternal and newborn care in health facilities. 2016. Available:

[http://www.who.int/reproductivehealth/publications/maternal\\_perinatal\\_health/improving-mnh-health-facilities/en/](http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/improving-mnh-health-facilities/en/)

Recently the attention of global health community has been turned to the consequences of disrespectful and abusive treatment (D&A) of women during childbirth in facilities. D&A are not limited to verbal, physical or sexual violence but also include neglect used as a systematic punishment upon the women that “disrespect” moral codes, such as sexually active teenagers, women who have had abortions or did not attended antenatal care. Discrimination, non-consent interventions and systemic failures at facility and health system levels, for example inappropriate infrastructure, staff and equipment, or conditions contrary to human rights are also considered D&A (20-22). Evidence suggests that women’s fear of D&A limits access during pregnancy/labor and represents a common problem more prevalent that would be desired, even in HICs (1). Other authors have analyzed structural violence experienced by staff members, for example, heavy workload, long hours and inadequate equipment, influencing and legitimizing their behavior towards patients (22).

### 1.3) QUALITY IMPROVEMENT: REVIEW OF MAIN APPROACHES IN MATERNAL AND NEONATAL HEALTH CARE

The most important motivation of performing a QoC assessment is promoting QI to answer to users' needs (7,23). Several QI approaches have been proposed and implemented worldwide, but the level of evidence linking those strategies to improved outcomes in MNHC is still undesirably low (17).

The main challenge is to identify which approaches are effective in promoting change, feasible with limited financial and human resources, sustainable over time even in different contexts and overarching all aspects of care. There are benefits of stimulating a *Culture of Quality* i.e. awareness and commitment to quality involving all members of staff as “owners” of any QI strategy introduced. The effectiveness will be improved by recognized leaders who guide multidisciplinary teams using available resources and including needs of different groups – patients, families and staff (24,25).

#### - *Standard based methodology*

Reference standards are developed by international agencies, ministries of health or professionals bodies based on systematic reviews/metanalysis or experts opinions. Guidelines and clinical protocols, based on standards, are used in clinical wards to guide the conscientious delivery of the best care available to users (24). According to WHO, for MNHC a “standard” is “defined as a description of what is expected to be provided to achieve high-quality care around the time of childbirth” (10).

The local development of protocols and guidelines may promote ownership, proper use and sustainability of good practices over time. The experience of standards' development for post-partum hemorrhage in Malawi using the Donabedian's model (structure-process-outcomes) is a good example (26). The process was multiprofessional from the very beginning as doctors, nurses and midwives worked together. Managers and policymakers also joined the group and facilitated the implementation of recommendations that required funding or staff hiring. Authors concluded for the feasibility of the process with involvement of all health professionals and policymakers or managers. On the other hand, the use of out-of-date standards of care in countries of the former Soviet Union had a negative effect on QoC and resulted in intense medical intervention (13,27).

Standard based approach is also the basis for hospital accreditation to excellence. This strategy used mainly in Western Europe, North America and Australia requires important financial and human resource investments that are not affordable by



the majority of LMICs. It usually focuses on availability of the essential infrastructure and supplies and/or on the existence of written procedures and protocols.

The use of standard based tools for QoC assessment and improvements is comparatively recent and prioritizes attention to the whole continuum of care (28). The first successful experiences were in pediatric hospitals of less developed countries (29-32). In 2001, WHO Regional Office for Europe published the *Hospital care for children: quality assessment and improvement tool* and after some years, a similar tool for hospital care to mothers and newborns. This systematic, standard based and participatory approach has been used across different regions and health system contexts as an important agent for QI. The clear advantages of this approach include (28,33):

- Increasing knowledge regarding recent international guidelines among staff;
- Assessing the existence and proper functioning of equipment, availability of drugs and supplies, the number and organization of qualified staff and clinical management of cases along the continuum of care from pregnancy to labor, birth and neonatal care;
- Recognizing women's right to information and participation in decision-making process;
- Promoting commitment to change among managers and health professionals;
- Allowing immediate feedback and development of a preliminary action plan where are defined priorities and responsibilities, focusing on what can be addressed at facility level.

#### - Clinical Audits

Audits are initiatives for QI that include structured peer-review of practices and results against agreed standards of care promoting change of those practices when indicated (34). In HICs, they are frequently used to promote insights into deficiencies in process of care and more recently are raising attention in LMICs (35,36). According to a recent systematic review regarding effective strategies for QI in LMICs, audits, feedback and guidelines development improved health outcomes and quality measures in a variety of ways (17). Several types of audits can be described: maternal and perinatal deaths audits, confidential inquiries in maternal and perinatal deaths, near-miss audits and criterion-based (called standards-based) audits. The data analysis may be quantitative (surveillance) or qualitative (case reviews) (24,34,37).

Experts can conduct audits regarding maternal and perinatal deaths at facility or community level, combined or not with confidential inquiries. On the other hand,

criterion-based audits need a previous agreement regarding good practices of care and audits assistants, not necessary health professionals, may help in data collection on patients records (24,34).

The audit cycle usually is a five-step approach that can be repeated more than one occasion to evaluate effectiveness of interventions for QI (34):

- 1- Establish criteria for best practices – select a specific topic in the process of care; establish working definitions that will be used for assistants; define criteria for best practices (use of national guidelines or international standards from WHO library or Cochrane Library) and design structured forms if necessary.
- 2- Measure current practices – identify and collect data from patients' records; apply a baseline questionnaire for staff if necessary to clarify knowledge, attitudes and practices.
- 3- Feedback to all relevant staff and set of local standards – identify areas for improvements and develop an action plan (practical, affordable and sustainable).
- 4- Implement changes – name individual responsibilities to monitor a realistic timeframe.
- 5- Re-evaluate and feedback – close the cycle by the same process already defined.

A systematic review published in 2011 recommends to improve audit implementation by: a) performing a pilot test with at least 30 cases; b) training of non-medical assistants; c) assessing missing data – is useful also for future measures of archives' quality and fulfillment of patient's records; d) evaluating data recording; e) reporting both process and outcomes indicators (36).

The WHO guideline *Beyond the Numbers - Reviewing maternal deaths and complications to make pregnancy safer* defines fundamental principles for maternal death (MD) and near-miss audits and stresses the importance of a confidential, usually anonymous and non-threatening environment for analysis of cases in order to ensure cooperation (38). The routine of conducting near-miss reviews, as sentinel events, is complementary to maternal confidential inquiries and a necessary step to further reduce maternal morbidity and mortality. The advantages are: i) the discussion is a positive entry point – the women almost died, but survived by chance or because care received – so, health professionals may be more open to think over failures; ii) interviews allows women perspective of care received; iii) the regular discussion stimulates culture of emergence preparedness by protocols and training (39). In addition, the bigger absolute number of near miss cases, with the same clinical features of death cases, allows statistics

with more robust results in the same period of time (40). Currently, a complete set of WHO standardized criteria to identify potentially maternal life-threatening conditions and near miss is used in over than 30 countries in order to increase the quality of care provided in pregnancy, birth and postpartum (41).

#### **1.4) MATERNAL AND NEONATAL HEALTH CARE IN BRAZIL – QUALITY OF CARE AND NATIONAL CONTEXT**

Brazil is the world's fifth-largest country with 204.450.649 inhabitants in 2015 and an estimate annual population growth of 0.87% - more than 80% live in urban areas (42). From 2003 to 2014, a widely celebrated economic and social progress reduced the economic and social inequalities in real terms (Gini coefficient fell by 11% decreasing to 0,515 in 2014) (43,44). However, it remains at a relatively high level for a middle-income country with dramatic regional differences.

The Unified Health System (SUS) guarantees universal and free-of-charge access to comprehensive pregnancy, delivery and neonatal care since 1988. The system has primary health care as foundation stone with multidisciplinary teams of health professionals providing a family-oriented program (45-47). Over the last decades, sexual and reproductive indicators improved due to increase in women's education and presence in labor market, crescent urbanization and decrease of fertility rates (45). However, large regional disparities and high maternal and perinatal mortality rates persist in many states (48) and are a reason for concern for health authorities and civil society organizations.

While under-five mortality rate (MCR) decreased from 53.7 to 14.4 deaths per 1,000 live births between 1990 and 2013 (49), maternal mortality rate (MMR) remained at 64 deaths per 100.000 live births (2011) and neonatal mortality rate (NMR) at 11.1 deaths per 1000 live births (2012), highest rates occurring in the North and Northeast regions and in lower social classes. These data are still unacceptably high and show a slow reduction pace (49-51).

Currently, 70% of MD cases are due to hypertension, hemorrhage, puerperal infection and unsafe abortion (major cause of morbidity, but unfortunately less likely to be properly reported). Newborn deaths in the first 24 hours of live correspond to 25% of MCR. 30.3% of NMR is due to prematurity, cause preventable or treatable most of times (48,49).

Doctors dominate the birth care model in Brazil. Very high levels of institutional births are assisted by skilled professionals (99%), but in 2010, the number of births

attended by nurses midwives or midwives are lower than 10% and the number of home births or birthing centers are insignificant (45). Interventionist practices are routine in labor and high rates of cesarean section (CS) can be observed both in public and private health sector. The surprising Brazilian women's preference for this procedure is related to high social economic level, white ethnicity, higher educational level and social belief that medical technology and/or surgical interventions are associated to QoC (45,52,53). Unfortunately, obstetricians and gynecologists (OB/GYN) feel vulnerable to malpractice suits and isolated by professional colleagues if they engage in less interventionist practices. In 2005, an editorial of Brazilian Federation of Obstetrics and Gynecology Associations (FEBRASGO) main publication defended elective CS for safeguarding OB/GYN doctors from lawsuits even if it brings higher risks for mothers and newborns (54,55). More recently in 2012, one resolution of the Medical Council of Rio de Janeiro prohibited any doctor participation in out-of-hospital birth or providing second-level care for women transferred to hospital from a birth center or after a home birth (56).

In addition, there are extensive evidences of unequal distribution of health workers within the country. In general, nurses and physicians are concentrated in urban and richest areas of Brazil despite increased density of professionals per 1000 population in last years (46,57). Nurse-midwives have received government incentives legitimizing their autonomy to care of low risk women and newborn babies during birth. However, there is a strong resistance against this authorization coming from medical societies in spite of constant pressure by the Brazilian Ministry of Health (BMH). At individual level, conflicts and power disputes in labor room regarding care responsibilities are frequent (58).

It is also important to point that "Midwifery" as a profession faces a serious resistance and discrimination in Brazil, despite the existence of a course with competence-based curriculum at São Paulo University (USP), one of most renowned public universities. Brazilian Nursing Council has impeded midwifery graduates to work, despites protests of illegality made by Federal Public Ministry (MPF) – agency that defends social and individual rights in Brazilian democracy. Estimates from Brazilian Midwifery Association reveal that around 70% of graduates have left the profession and their contribution to Brazilian health workforce, in absolute numbers, are minimal (58).

Another point of concern is the poor integration between antenatal and delivery care that still contributes to women peregrination during labor. A low-risk woman trying to find assistance on high complexity maternities or a high-risk women looking for care in low complexity services are common situations. One metropolitan survey in Rio de

Janeiro showed that before admission, one third of women had visit more than one maternity hospital (MH) during labor (59).

This context of concerning maternal and neonatal health indicators and intense medicalization of birth strongly contrasts with very high levels of institutional births assisted by skilled professionals and free access with high attendance to antenatal visits (90% of women receive four or more visits)(48); it illustrates the situation known as “Brazilian perinatal paradox” with no easy short-term solutions (50,55,56).

Brazilian initiatives for QoC have started in 90’s. The initial steps were the creation of a National Committee for Health Quality and the formulation of protocols and guidelines for quality assurance in 1994. For MNHC, aiming to improve indicators were launched the Humanization of Pre-natal Care and Birth Program in 2000, the National Policy on Comprehensive Care for Women’s Health and the National Pact for the Reduction of Maternal and Neonatal Mortality, both in 2004 (60,61). Currently, QI strategies at federal level are limited mainly to transfer of funds while private facilities put efforts on expensive accreditation programs and user’s satisfaction evaluations (60).

The implementation between July 2009 and June 2010 of the Brazilian Network for the Surveillance of Severe Maternal Morbidity with the participation of 27 referral centers from different regions should also be mentioned as an initiative to improve QoC in MNHC (62). This pioneer network received financial funds from Brazilian agencies and developed a specific prospective electronic surveillance system that used WHO standards definition for near-miss cases. The number of identified cases was much higher than expected: more than nine thousand and five hundred and authors emphatically reported positive impact on participant centers. For instance: increased use of evidence-based interventions, review of referral criteria for intensive care unit (ICU) and improvements in centers’ organization, earlier identification of cases and request for specialist services for manage specific organ dysfunctions, changes in health policies and dissemination of information at local and regional level (62-64).

Over the last years, the federal government launched a national strategy to empower women in reproductive planning, prioritizing care for safe and humanized birth and puerperium, as well as, children’s rights to health growing and development (0-24 months). The Rede Cegonha (Stork Network) – ordinance nº 1.459, 24<sup>th</sup> June 2011 - intends to organize a hierarchized system providing high quality antenatal care, early risk definition with consequent referral to a qualified facility (65,66). The program has received severe criticisms from non-governmental organizations (NGO) for women’s

rights and experts. According to them, lack of inclusion of reproductive health issues, such as, safe abortion rights or familiar planning actions targeting non-pregnant women, lack of coordination with maternal and neonatal mortality committees and poor adaptation to local context problems can hinder chances of success. The implementation process that was initially focused on North and Northeast regions, until now is not complete and universal, since depends of local approval and involvement of municipal health managers (61,67).

The literature on QoC in Brazil is still scarce in comparison to the international scenario. Recently, government agencies and regulatory agencies have been engaged in disseminating such data, but the population's access to results remains limited. The panel is even more worrying with regard to QoC research in MNHC. A systematic review in 2013 included 48 QoC studies from Brazilian hospitals published mainly after 2004. Most papers explored process and outcomes. Only nine of them approached MNHC, mainly in the South and Southeast regions of the country (60).

Therefore, in Brazil there is clear need for increasing QI programs efforts and for implementing effective strategies, paying attention to their cost-effectiveness and sustainability (60,68).

## **2) OBJECTIVES**

The main objective of this research was:

- To evaluate the effects of a systematic, standard based and participatory approach to Quality Improvement (28) for maternal and neonatal health care in a sample of 6 (six) maternity hospitals in the State of Pernambuco – Brazil.

Specific objectives were:

- To assess the quality of care provided in a sample of 6 (six) maternity hospitals in Pernambuco - Brazil

- To define a Plan of Action for quality improvement together with health professionals.

- To reassess the quality of care after one year, identify whether any improvement occurred and evaluate to which extent changes reflected the Plan of Action.

- To identify factors that positively or negatively influenced changes and assess the role of the quality improvement approach in determining change.

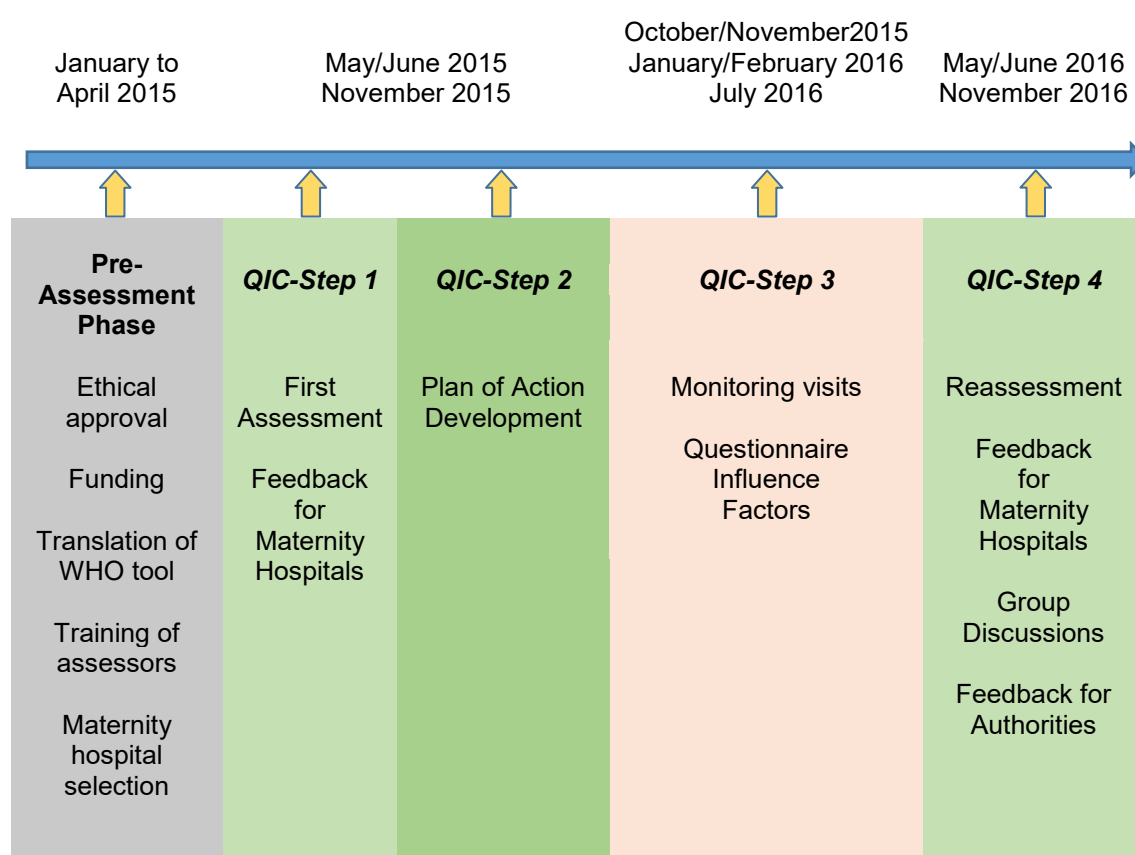
### 3) METHODS

#### 3.1) DESIGN AND STUDY PERIOD

An uncontrolled before-and-after study design was chosen as the best possible approach in the given context and considering time constraints, recognizing the practical and ethical barriers to randomization of MH and to blind observation.

The study activities were scheduled as shown in Figure 4.

**Figure 4. Timeline of Quality Improvement Cycle (QIC) – Pernambuco – Brazil.**



Legend: QIC - quality improvement cycle.

#### 3.2) WHO HOSPITAL CARE FOR MOTHERS AND NEWBORN BABIES: QUALITY ASSESSMENT AND IMPROVEMENT TOOL

In 2009, the Institute of Child Health IRCCS Burlo Garofolo, Trieste, Italy, a WHO Collaborating Centre for Maternal and Child Health, in a consultative process with the WHO Regional Office for Europe, released the first edition of a tool to assess and improve quality of hospital care for mothers and newborns babies. The objective was to guide hospitals and health authorities towards a process of improving QoC with a systematic, standard based and participatory approach (28). This specific tool was used in



several countries in Europe, Africa and the Middle East, with different epidemiological and health system contexts, by a variety of international agencies, donors and NGO, within countrywide programs as well as in single facilities (69-72).

An updated version of the tool with new sections and improved overall format was prepared in 2014 (28,73). It considers recent changes in evidence-based practice, emphasizes patients' rights and equity, embraces previous experiences, and lessons learned thought the years (28). The guiding principles on which the tool is based are described below on Box 1.

#### Box 1. Guiding principles of the tool

1. Coverage needs to be complemented by quality of care to achieve the desired health outcome.
2. Checking availability of basic equipment and supplies is necessary but not sufficient. to evaluate quality of care; appropriate use of resources and case management also need to be assessed.
3. Focusing on single key interventions is not enough; quality perinatal care requires systematic attention to all main components that can guarantee a continuum of care.
4. Safe childbirth is critical to the health and wellbeing of both the woman and the newborn child.
5. Effective clinical management alone is not enough to ensure quality of care; holistic and culturally appropriate care is necessary. A health system should ensure all the rights of patients are met, not only the right to effective clinical management.
6. A participatory approach is needed for raising awareness of problems and for building commitment.
7. A blaming attitude and punitive approach causes denial and /or hiding of problems, decreases work satisfaction and motivation, and increases barriers to quality improvement.
8. Assessment is the first step for triggering a quality improvement cycle and to be effective it should be combined with planning for action.
9. Both capacities and commitment are needed to improve quality of care.
10. Health system factors need to be considered when planning quality improvement interventions.

Adapted from: Hospital Care For Mothers And Newborn Babies: Quality Assessment And Improvement Tool <http://www.euro.who.int/en/health-topics/Life-stages/maternal-and-newborn-health/publications/2014/hospital-care-for-mothers-and-newborn-babies-quality-assessment-and-improvement-tool>.

The tool comprises 12 chapters (around 600 items/key practices) organized in five main sections evaluating availability and appropriate use of resources, case management, and key hospital policies. The main sections content are:

- 1) Hospital support services – facility assessment of physical infrastructure, staff, availability of medicines, equipment and supplies;
- 2) Case management – facility assessment of essential case management and monitoring for mothers and newborn babies;
- 3) Policies and organization of services – facility assessment of existence, quality and use of policies regarding infection prevention, guidelines for essential care (development and dissemination), staff training (frequency and quality – simulation programs or not), audit systems (critical cases, mortality cases), access to hospital and continuity of care, and patient's rights;
- 4) Interviews with the staff and interviews with pregnant women and mothers – assessment of mothers and individual care providers;
- 5) Feedback of findings and Plan for action – instruments for facilitating team discussion after assessment, tables to facilitate structured feedback to the hospital staff and matrixes for Plan of Action's development at hospital and national level (Annexes 1 and 2).

WHO guidelines and international recommendations are the reference standards for chapters and the tool can be adapted (selecting or deleting some chapters or subchapters), after agreement of assessors, according to facility complexity level and epidemiologic features of the region. Information sources are mainly direct observation of case management, hospital statistics, medical records and semi-structured interviews with mothers and staff.

Each item/key practice is scored using the following categories:

- 3 = care corresponding to international standards (no need for improvement);
- 2 = substandard care but no significant direct hazard to health or violation of human rights (need for some improvement to reach standard care);
- 1 = inadequate care with consequent serious health hazards or violation of women's and/or children's rights (need for substantial improvement);
- 0 = very poor care with consequent systematic and severe hazards to the health of mothers and/or newborns (need for thorough revision of the specific item or area).

Several items contribute to a criterion, several criteria to a subsection and several subsection to a chapter score. The score for each subchapter and chapter is attributed through consensus among assessors with the same areas of expertise who work together as a sub-team. It is calculated as the arithmetical mean of the score of each item/key practice, including decimals when needed and is recorded in the tool. The information

gathered from semi-structured interviews is used to complement the information collected on each area regarding case management and organizational aspects of care and to provide a comprehensive information on rights and overall services from the perspective of facilities users and individual care providers.

The national team of assessors should be composed by professionals with sufficient clinical experience in MNHC, updated with the WHO recommendations and international standards of health care, and if possible, experience in staff training, to ensure peer-to-peer process. International assessors, habitually present, should have previous experience in the use of the tool and in evidence-based practices implementation.

Once all information is collected and the scores are discussed and agreed by the whole team, a list of main strengths and weaknesses for each chapter is defined using templates provided by the tool. This information will be used during a feedback meeting with managers and staff members that is held in each facility at the end of the assessment. The aim of the meeting is motivate to change (improvement is possible) and the general attitude is supportive, emphasizing that identifying individual responsibilities for quality gaps is not the objective of the assessment.

The feedback is provided in a succinct way focusing on priorities, but details of findings are used to illustrate one specific situation as well as appropriate references in existing guidelines/scientific literature, if needed. During the meeting, assessors encourage participants to take into account the users' view collected by interviews and they are allowed to make questions and provide their own views of findings.

The second part of the feedback meeting is dedicated to the development of a list of priority issues for each facility and a plan for action using the matrixes that are included in the tool (Annexes 1 and 2). The Plan of Action must include the identification of staff members in charge of specific actions, a timeline, the commitment of hospital managers to provide support and the necessary authorizations.

The whole process helps to build local capacity and can recognize gaps in key health system functions that need to be addressed at local or national level.

### **3.3) PRE-ASSESSMENT PHASE**

The preliminary arrangements for the study were made from January to April 2015 and are described in the following sections here (Figure 4).

### **3.3.1) ETHICS APPROVAL**

The Ethics Committee of the Instituto de Medicina Integral Professor Fernando Figueira - IMIP - Recife - Pernambuco approved the study (n ° 952.635 - 10/02/2015) and a written permission letter was received from both State and Municipal health authorities. Written informed consents for interviews were obtained from mothers and staff members (Appendices 1 and 2) and verbal consents were asked during direct observation of case managements in order to be not intrusive and respect privacy.

### **3.3.2) FUNDING**

Funding for the study was provided by CNPq - National Counsel of Technological and Scientific Development - Grant for Especial visiting researcher - PVE 2014 - Brazilian Government (Process number: 401546/2014-4) and FAPE - Support Funding for Research and Extension - IMIP - Recife - Pernambuco - Brazil (37º meeting, 6th April 2015).

All national assessors were volunteers and there was no conflict of interest regarding study results and further publications. The funding sources played no role in study design, collection and analysis of data and preparation of this thesis.

### **3.3.3) TRANSLATION OF THE WHO TOOL**

Researchers received an official permission from WHO to translate the tool, since it did not exist in Portuguese (Brazilian official language). Three native speakers with expertise on MNHC medical terms translated the tool. Two authors of the tool who fluent speak Portuguese verified the translation and adjusted occasional misconstructions. During the first assessment (*QIC – Step 1*), national assessors were recommended to make notes of any possible inaccuracies in translation or grammar and they were reported to team leader for further correction before subsequent assessments.

### **3.3.4) TRAINING OF NATIONAL ASSESSORS**

International experts with large previous experience in using the tool trained 13 national assessors, OB/GYN, nurse-midwives and pediatricians/neonatologists, in a one-day workshop.

The workshop content focused on the structure, practical application of the tool and recommended assessors attitudes (28). For instance: be respectful, seek permission from women and staff, try to make themselves unnoticed, avoid comments, and politely

avoid engaging in dialogue/discussion with staff and managers during observation of clinical practice.

A common understanding of the scoring system was achieved by practical activities with multidisciplinary evaluation of some items. Three health professionals with specific expertise in interviewing were also part of team and attended the workshop as well. All of them received a printed copy of the tool prior the start of the assessment (*QIC – Step 1*).

### **3.3.5) SETTINGS AND MATERNITY HOSPITALS SELECTION**

Pernambuco state is in Brazil's Northeast and has 8.796.032 inhabitants spread over 185 districts (42). In 2014, there were 145.024 live births, MMR at 68 deaths per 100.000 live births, NMR at 9.9 deaths per 1000 live births, with higher number of early neonatal deaths (76.8%), significantly above national data for mortality in the same period (48).

A convenience sample of six large MH was chosen based on strategic geographic distribution and representativeness in the public MNHC network in Pernambuco (Table 1). Half MH provide neonatal tertiary care. Two of them provide all ICU beds for pregnant and postpartum women of the whole State (32 ICU beds). A regular Obstetrics and Gynecology medical and nursing residence program works in three of them and two still have a Pediatric residency program. All MH receive funds exclusively from the SUS, however two of them have a Private Managing Organization as local administrator.

**Figure 5. Geographic distribution of selected Maternity hospitals in Pernambuco – Brazil.**



Legend: MH1 MH2 MH3 – Maternity hospitals in Recife - Metropolitan Region; MH4 – Maternity hospital in Mata Zone; MH5 – Maternity hospital in São Francisco Zone; MH6 – Maternity hospital in Agreste Zone.

Before the first assessment (*QIC – Step 1*) all hospital managers were contacted, invited to participate and received the tool and the study project. None of the selected MH declined invitation. State and Municipal health authorities were aware of aims and methods of the study and manifested interest on coming results.

### **3.4) *QIC – STEP 1 – FIRST ASSESSMENT – INTERVENTION***

MH1, MH2, MH3, MH4 and MH5 were assessed in May/June 2015 and MH6 was assessed in November 2015, due to logistical problems (Table 1 and Figure 4 – *QIC-Step 1*). The assessment took from one and a half to two full days to be completed in each MH. During the assessment visit, the members of the assessment team (including two international consultants) worked in parallel in different departments, according to their expertise, and all relevant services were visited. Assessors agreed on tool adaptation according to the characteristics of the MH: both fourth (Management of maternal complications) and sixth chapters (Sick newborn care) were assessed according to the expected - based on State regulations - level of care provided within the MNHC hospital network and the seventh chapter (Advanced newborn care) was not assessed in three MH that do not have neonatal intensive care unit (NICU).

For each MH, confidential semi-structured interviews were made in a quiet environment and ensuring privacy, in equal number for mothers and staff, including both medical and nursing personnel directly involved in care and students/residents. The most significant sentences were anonymously quoted and included in the feedback report. Hospital managers were requested to abstain from accompanying the assessors during direct observation or indicate the staff members or women to be interviewed, which remained a free choice of the interviewers.

After the assessment was completed and results compiled by the team, a feedback of the findings, including scores, specific strengths and weaknesses for each chapter and key aspect emerging from the interviews was presented to managers and staff. The feedback meeting was previously scheduled at the most convenient time for each MH to ensure participation, but always shortly after assessment. Key findings were described providing details and using literature references/international recommendations when appropriate to justify the assessment results. Attention was paid to present results in a peer-to-peer, supportive style, avoiding to point at individual responsibilities and trying to find out the process issues underlying the quality gaps.

### **3.5) *QIC* – STEP 2 – PLAN OF ACTION DEVELOPMENT**

As a second part of the feedback meeting, staff members and managers, using a matrix provided by the tool (Annexes 1 and 2), developed an initial Plan of Action for the following year, indicating priorities, staff in charge of specific actions and time line. Assessors facilitated the process by providing suggestions and examples of possible solutions.

Shortly after, local managers received both printed and digital copies of the assessment tool with all the assessors' notes compiled and a confidential report with detailed findings, scores and the Plan of Action as well. The objective of those documents were support implementation and supervision of planed changes.

### **3.6) *QIC* – STEP 3 – MONITORING VISITS**

Each MH received two monitoring visits during the study period, at around 4 months of interval (Figure 4 – *QIC Step 3*). Dates were previously scheduled at the most convenient moment for each MH to ensure participation of key staff members and managers, given holidays and vacation time (Box 2). The main objectives were to strengthen Plan of Action, address staff doubts, mitigate concerns and motivate changes by providing examples of solutions adopted in other countries and facilities.

Box 2 – Monitoring visits dates

|  |
|--|
| <b>MH1, MH2, MH3, MH4 and MH5</b><br>First - October/November 2015<br>Second - January/February 2016 |
| <b>MH6</b><br>First - January/February 2016<br>Second - July 2016                                    |

The assessor team leader (EPV) was the supervisor and conducted all visits in a supportive way. Pre-established steps were followed in both first and second visit:

- 1) PowerPoint presentation of strengths, weaknesses, and initial Plan of Action;
- 2) Discussion: changes achieved and barriers or facilitators for specific changes – new suggestions based on what has already been done;
- 3) Plan of Action adjustments, if needed;
- 4) Individual and anonymously fulfillment of Monitoring questionnaire (Appendix 3) by managers and key staff members nominated in initial Plan of Action;
- 5) Scheduling of next meeting (second visit or reassessment).

The Monitoring questionnaire is a semi-structured form with nine questions developed by researchers, which explores the process of planning and implementation of QI based on literature review. The frequency with which the assessment tool was used as a guide by staff and managers was also investigated.

### **3.7) *QIC* – *STEP 4* – REASSESSMENT**

The reassessment (Figure 4 – *QIC Step 4*) occurred approximately one year after the first assessment using the same methods that were already described for the initial assessment (WHO tool and *QIC – Step 1*), with focus on quality gaps which had been identified a year before and on achievements occurring with respect to the Plan of Action. To ensure consistency of methods and scoring, at least three national assessors, including the team leader, were, in each MH, the same who conducted the first assessment. In addition, all notes and confidential reports from the first assessment were made available for direct consultation and comparison. An international consultant that supervised first assessment supervised also reassessment visits.

A feedback meeting presented the results to MH staff and managers comparing the observed changes with the Plan of Action developed a year before. The meeting was usually kept at the end of the reassessment visit or shortly after, according with the most convenient time for each MH to ensure maximal participation. The general attitude was supportive and participants were reminded that the assessment is part of an initiative to support their MH in improving QoC. Finally, new suggestions for QI emerged from the discussion.

During this meeting, researchers used triggering questions, derived from Monitoring questionnaire results, to investigate factors influencing changes. Those questions actively investigated the role of factors such as support from managers, impact of overcrowded services, team motivation, external factors such as lack of financial resources, etc.

In all MH, researchers investigated the role of the microcephaly outbreak related to Zika epidemics infection and its influence on QI process and general facility functioning. In Pernambuco, the number of cases peaked in October 2015 (74-76), coincident with the period of our study.

The final reports were formally provided to MH managers, to Health Departments of Pernambuco state and to municipality of Recife, in printed and digital copies (by email). They included summary of the findings in all the main areas, detailed



QI achieved and individual chapters' scores from assessment and reassessment. The objective was to build awareness of quality gaps that may depend on systemic factors and policies and promote adoption of remedial action.

### **3.8) DATA ANALYSIS**

#### ***3.8.1) QIC – STEP 1 – FIRST ASSESSMENT***

##### *- Scoring*

Researchers followed strictly the approach suggested by the tool: the score for each subchapter and chapter was calculated as the arithmetical mean of the score of each key practice (including decimals). Results were recorded on the summary tables provided in the tool. The unit of analysis was each MH itself. No statistical analysis was performed beside the calculation of average scores for each chapter.

##### *- Interviews*

For interviews, the analysis followed the tool instructions and significant statements were categorized and quoted anonymously.

##### *- Main Quality gaps identification and analysis*

After *QIC – Step 1* all subchapters' scores that contributed to chapters' scores were analyzed. Every item/key practice of those subchapters that scored an average less than 2 was considered a quality gap of that specific chapter. The main weaknesses of the chapters, agreed by assessors during *QIC – Step 1*, were also considered quality gaps.

Researchers exhaustively discussed the resultant list of quality gaps for each chapter and summarized them. Within each chapter, statements regarding main gaps were grouped in broader categories and crosschecked to ensure consistency and avoid repetitions.

#### ***3.8.2) QIC – STEP 2 - PLAN OF ACTION***

Specific proposed actions for QI described in initial Plan of Action of the six MH were classified in four main areas: Infrastructure, Human resources, Case management and Respectful care. Those areas are based on WHO Quality of care framework for maternal and newborn health (10,18). This framework defines QoC using eight domains (Figure 3) and those domains were reorganized by researchers as described on Box 3.

Box 3. Areas for QI according to Plan of Action of six MH in Pernambuco - Brazil, based on WHO Quality of care framework for maternal and newborn health

| WHO domains for QoC  | Areas for QI    |
|--|-----------------|
| 1) Evidence-based practices for routine care and management of complications | CASE MANAGEMENT |
| 2) Actionable information systems  | INFRASTRUCTURE  |
| 3) Functional referral systems   |                 |
| 4) Effective communication   | RESPECTFUL CARE |
| 5) Respect and preservation of dignity                                       |                 |
| 6) Emotional support   |                 |
| 7) Competent, motivated human resources                                      | HUMAN RESOURCES |
| 8) Essential physical resources available                                    | INFRASTRUCTURE  |

### 3.8.3) QIC – STEP 3 - MONITORING QUESTIONNAIRES

All monitoring questionnaires (Appendix 3) completed during *QIC – Step 3* by managers and key staff members nominated in initial Plan of Action were analyzed. The analysis included only the distribution of relative frequency of factors among completed questions number 7 and number 8 (both multiple choice type with more than one option allowed). Those questions investigated the frequency of possible factors influencing changes (facilitators and barriers) found in literature in our sample.

The factors cited by managers and staff, with frequency at least 50% or more (first or second monitoring visit), have been the basis for identifying the triggering questions to be used during the feedback meeting *QIC – Step 4* in order to stimulate in depth discussion by the whole group.

### 3.8.4) QIC – STEP 4 – REASSESSMENT

#### - Scoring

Subchapter and chapter's scores were calculated as recommended in the tool (exactly as before for *QIC – Step 1*). Results were recorded in tables and comparisons were made between two moments for each chapter: before and after the intervention. No statistical analysis was performed beside the calculation of average scores for each chapter.

#### - Interviews

Interviews were analyzed exactly as before for *QIC – Step 1* and results were used only to confirm quantitative results.

#### - *Quality Improvements analysis*

All QI observed in each MH were matched with the Plan of Action developed a year before to assess presence (full implementation) or absence of any planned improvement.

Although only QI that were present in Plan of Action were considered for this analysis, other changes that were observed and not related to the Plan of Action were used as positive input for MH further improvements during feedback presentation in *QIC – Step 4*.

#### - *Analysis of Factors influencing change*

A research assistant documented all factors that could have facilitated or hindered QI discussed during the feedback meeting by managers and staff after *QIC – Step 4*. At least three different assessors and the international consultant, that were present to the meeting, checked the resultant draft for inconsistencies, ensuring validity.

After that, factors influencing changes were categorized into *internal* and *external*. Factors dependent to the MH itself, related to management, patients or staff views, which could have been weakened or strengthened changes without external influences, were called *internal factors*. On the other hand, factors dependents of SUS founding's, laws and organization structure of municipalities and/or State, that hardly can be addressed without external inputs, were called *external factors*. Next, internal and external factors were divided once again according with positive or negative influence for QI in MH.

#### - *Cost Analysis*

The costs of the whole QIC in Pernambuco were estimated per MH considering international consultants' fees, transport and accommodation for the study team during trips in Pernambuco, administrative costs of the study (printed material and copies) and cost of national assessors worked hours. In fact, all national assessors were volunteers and did not received fees. However, for this cost analysis we estimated the price of their worked hour similar to physicians' work hour for Pernambuco State in 2016, 1 hour = R\$66,23.

All expenses were calculated in Brazilian official currency, Reais (R\$), and converted into US dollars (USD), using an average of official daily exchange rates (77) during the study period, from 01/01/2015 (beginning of Pre-assessment Phase) to 30/11/2016 (end of *QIC – Step 4*) (Figure 4). For this study 1USD = R\$3,41.

## 4) RESULTS

### 4.1) PATIENT'S FLOWS AND MATERNITY HOSPITALS MAIN INDICATORS

The main characteristics of MH involved in QIC in Pernambuco – Brazil were described on Table 1.

**Table 1. Main characteristics of selected Maternity hospitals – Pernambuco Brazil.**

| Maternity Hospital | Level of care Provided        | Teaching hospital | Administration entity                              | Live births* | Stillbirths* | ND cases* | MD cases* |
|--------------------|-------------------------------|-------------------|--|--------------|--------------|-----------|-----------|
| MH1                | Tertiary (M and N)            | Yes               | Philanthropic Foundation                           | 6.826        | 186          | 295       | 23        |
| MH2                | Secondary (M and N)           | No                | Municipal Government                               | 3.260        | 73           | 10        | 0         |
| MH3                | Secondary (M and N)           | No                | Municipal Government                               | 2.870        | 61           | 15        | 0         |
| MH4                | Secondary (M)<br>Tertiary (N) | No                | State Government and Private Managing Organization | 3.690        | 36           | 28        | 0         |
| MH5                | Tertiary (M and N)            | Yes               | State Government and Private Managing Organization | 7.399        | 151          | 255       | 12        |
| MH6                | Secondary (M and N)           | Yes               | State Government                                   | 5.083        | 104          | 55        | 02        |

Legend: \*2014; N= neonatal care; M= maternal care; ND= neonatal deaths (0-28 days); MD= maternal deaths

The QIC was carried out in six MH that were responsible for 29.128 live births in 2014 (ranged from 2.870 to 7.399), representing 20% of Pernambuco live births. Two of them provide all ICU beds for pregnant and postpartum women (32 ICU beds) of the whole State and consequently maternal deaths cases are more frequent in these two MH (35 cases in 2014 – over 35% of total). The six MH together recorded over 40% of neonatal deaths (0-28 days) of the whole state; since Pernambuco had 1.449 neonatal deaths in 2014 (48) and half of them provide neonatal tertiary care.

## 4.2) FINDINGS OF THE STUDY

### 4.2.1) QIC - STEP 1

#### - Average scores

The assessment showed that all MH, as unit of analysis, had several chapters with average scored below 2 (Table 2). Only MH1, in one single chapter - monitoring and follow-up, scored 3. The chapters Care for Normal Labor and Vaginal Birth and Care for Cesarean Section scored below 2 in all MH. Three MH scored below 1 for the chapter regarding existence of Guidelines, Training and Audits. Overall, neonatal care chapters scored better than maternal care and little variation was observed among hospitals with the same level/complexity of care.

**Table 2. Average scores by chapters. First assessment QIC – Step 1. 2015.**

| Chapters                                       | MH1  | MH2     | MH3     | MH4   | MH5  | MH6     |
|--|------|---------|---------|-------|------|---------|
| Infrastructure and Hospital Support Services   | 1,95 | 1,79    | 1,65    | 2,09  | 1,91 | 1,79    |
| Care for Normal Labor and Vaginal Birth        | 1,27 | 1,18    | 1,18    | 1,18  | 1,36 | 1,27    |
| Care for Caesarean Section                     | 1,57 | 1,28    | 1,28    | 1,42  | 1,42 | 1,00    |
| Management of Maternal Complications           | 2,42 | 1,72*   | 1,65*   | 1,68* | 2,00 | 1,37*   |
| Newborn Infant Care                            | 2,73 | 2,13    | 1,76    | 1,93  | 2,20 | 2,00    |
| Sick Newborn Care                              | 2,75 | 2,37*   | 1,77*   | 2,65* | 2,35 | 2,15    |
| Advanced Newborn Care                          | 2,85 | No NICU | No NICU | 2,57  | 2,10 | No NICU |
| Monitoring and Follow-up                       | 3,00 | 1,75    | 2,25    | 2,62  | 2,37 | 1,62    |
| Infection Prevention                           | 2,54 | 1,39    | 1,55    | 2,25  | 2,37 | 1,80    |
| Guidelines, Training and Audit                 | 2,76 | 0,60    | 0,11    | 2,22  | 1,25 | 0,55    |
| Access to Hospital Care and Continuity of Care | 2,50 | 2,50    | 2,37    | 2,37  | 2,00 | 1,75    |
| Mother and Newborn Rights                      | 2,81 | 1,48    | 1,38    | 2,02  | 1,61 | 1,60    |

Legend: \*Assessment adapted according to the level of care provided. NICU = neonatal intensive care unit.

- Interviews - Perceptions of women and staff

An average of twelve to twenty confidential interviews were made with equal number of women and staff members per MH during the assessment days. Data from women interviews showed some contradictory results. On one side, most women described themselves satisfied with the care received, easy and free access and sufficient information given about breastfeeding were mentioned as strengths in all MH. On the other, main quality gaps were confirmed by women interviews. The most frequent complaints were about lack of privacy during labor, overcrowded facilities, insufficient pain relief, frequent fasting during labor and lack of communication and poor information provided by health workers on discharge (Box 4).

Box 4. Meaningful statements from women interviews - QIC – Step 1

| Women   |
|---|
| <p><i>"I was in an inhuman condition in the labor room"</i> (MH1) - facility overcrowded</p> <p><i>"I wasn't afraid, there was a lot of doctors with me all the time"</i> (MH2) – overall satisfaction</p> <p><i>"Only in the next day (after birth), I could eat"</i> (MH3) – fasting on labor</p> <p><i>"When I arrived I was seen by a doctor fast... I can't complain"</i> (MH4) – easy access</p> <p><i>"There was a lot of people watching (the birth)"</i> (MH5) – lack of privacy</p> <p><i>"The doctor didn't asked for vaginal examination... and did it anyway"</i> (MH6) – disrespect to women rights</p> |

In general, staff interviews identified organizational problems such as low salaries, few chances for career progress, insufficient number of professionals, lack of appropriate equipment or deficient maintenance, problems with availability of supplies and lack of protocols and guidelines. Training opportunities were more frequently available for nurses than doctors and no MH offered communication skills training. Some meaningful statements that confirmed quantitative results are listed on Box 5.

Box 5. Meaningful statements from staff interviews - QIC – Step 1.

| Staff  |
|--|
| <p><i>"There is not enough people to care of patients and to teach students"</i><br/>(MH1) - Insufficient number of skilled professionals</p> <p><i>"The facility is always overcrowded"</i> (MH2) – facility overcrowded</p> <p><i>"We don't have protocols, anyone do what think is better"</i> (MH3) – lack of protocols</p> <p><i>"When you get the department routine they change you"</i> (MH4) – organizational issues</p> <p><i>"I would like to change job... my salary is not enough"</i> (MH5) - low salaries</p> <p><i>"We need more training courses... at least an incentive to progress on career..."</i><br/>(MH6) – lack of training opportunities and career' incentives</p> |

- *Main quality gaps*

The main quality gaps observed in at least half of MH assessed are listed on Table 3.

**Table 3. Main quality gaps identified in QIC – Step 1.**

| Chapters   | MH1 | MH2 | MH3 | MH4 | MH5 | MH6 |
|--|-----|-----|-----|-----|-----|-----|
| <b>Infrastructure and Hospital Support Services</b>                    |     |     |     |     |     |     |
| Inadequate privacy   | •   | •   | •   | •   | •   | •   |
| Lack of temperature control in delivery room and wards                 |     | •   | •   | •   | •   | •   |
| Inadequate laboratory support  |     | •   |     | •   | •   | •   |
| Insufficient number of skilled professionals                           | •   | •   | •   | •   | •   | •   |
| <b>Care for Normal Labor and Vaginal Birth</b>                         |     |     |     |     |     |     |
| Inadequate monitoring of oxytocin's use                                | •   | •   | •   | •   | •   | •   |
| Insufficient use of Partograph to support decision making              | •   | •   | •   | •   | •   | •   |
| Poor monitoring of fetal wellbeing during labor                        |     | •   | •   | •   | •   | •   |
| Unnecessary interventions (amniotomies, episiotomies)                  |     | •   | •   | •   | •   | •   |
| Choice of position for delivery not offered                            | •   | •   | •   | •   | •   | •   |
| Inadequate active management of 3 <sup>rd</sup> stage of labor         |     | •   | •   | •   | •   | •   |
| Routine suctioning of the newborn                                      | •   | •   | •   | •   | •   | •   |
| <b>Care for Caesarean Section</b>                                      |     |     |     |     |     |     |
| Scarce implementation of policies to reduce cesarean sections          | •   | •   | •   | •   | •   | •   |
| Unnecessary separation between mother and baby immediately after birth | •   | •   | •   | •   | •   | •   |
| Inadequate postoperative monitoring                                    | •   | •   | •   | •   | •   | •   |
| <b>Management of Maternal Complications</b>                            |     |     |     |     |     |     |
| Inappropriate management of emergencies                                | •   | •   | •   | •   | •   | •   |
| Irregular provision of drugs and consumables for emergency conditions  |     | •   | •   |     | •   | •   |
| Inappropriate monitoring of severe conditions                          | •   | •   | •   | •   | •   | •   |
| <b>Newborn Infant Care</b>   |     |     |     |     |     |     |
| Inadequate skin-to-skin contact  | •   | •   | •   | •   | •   | •   |

|  |   |      |      |   |   |     |
|--|---|------|------|---|---|-----|
| Early initiation of breastfeeding not adequately encouraged                              | • | •    | •    | • | • | •   |
| Insufficient staff preparedness for newborn resuscitation                                |   |      | •    | • | • |     |
| <b>Sick Newborn Care</b>   |   |      |      |   |   |     |
| Lack of guidelines for oxygen therapy  |   | •    | •    | • |   | •   |
| Absence of kangaroo mother care unit   |   | •    | •    | • |   |     |
| <b>Advanced Newborn Care</b>   |   |      |      |   |   |     |
| Unnecessary light, noise and manipulation  |   | n.a. | n.a. | • | • | n.a |
| Lack of protocols for specific conditions  |   | n.a. | n.a. | • | • | n.a |
| Insufficient number of properly functioning incubators                                   | • | n.a. | n.a. |   | • | n.a |
| <b>Monitoring and Follow-up</b>  |   |      |      |   |   |     |
| Maternal and neonatal records insufficiently filled in                                   |   | •    | •    | • | • | •   |
| <b>Infection Prevention</b>  |   |      |      |   |   |     |
| Inadequate hand washing and use of gloves  | • | •    | •    | • | • | •   |
| Overuse of antibiotics   |   | •    | •    | • |   | •   |
| Inadequate sterilization system  |   | •    | •    | • |   | •   |
| <b>Guidelines, Training and Audit</b>  |   |      |      |   |   |     |
| Lack of clinical guidelines and protocols for emergency situations                       |   | •    | •    |   |   | •   |
| Absence of continuous professional development activities                                | • | •    | •    |   | • | •   |
| Lack of periodical internal audits for critical cases                                    |   | •    | •    |   | • | •   |
| Lack of periodical clinical meetings   |   | •    | •    | • | • | •   |
| <b>Access to Hospital Care and Continuity of Care</b>                                    |   |      |      |   |   |     |
| Insufficient information and advice at discharge   | • | •    | •    | • | • | •   |
| Insufficient communication with primary health care services                             | • | •    | •    | • | • | •   |
| <b>Mother and Newborn Rights</b>   |   |      |      |   |   |     |
| Insufficient information about practices and procedures regarding women and their babies | • | •    | •    | • | • | •   |
| Insufficient pain relief   | • | •    | •    | • | • | •   |
| Insufficient presence of Partner/Companion during labor and delivery                     | • | •    | •    | • | • | •   |

Legend: n.a. = not assessed – maternity hospitals without neonatal intensive care unit.



Regarding infrastructure and support services, inadequate privacy and insufficient number of skilled professionals were observed in all MH. The lack of temperature control in delivery room and wards was also frequent.

During care for normal labor, the use of oxytocin with inadequate monitoring was frequently observed in all MH and only rarely clinical decisions were based on partograph, except when nurse midwives were actively involved in labor and delivery.

In addition, there was insufficient pain relief, the position for delivery were not chosen by women and routine newborn suctioning was commonly observed in all facilities, including teaching/referral hospitals. Scarce implementation of policies to reduce CS in all MH coexisted with an inadequate post-operative monitoring. Inappropriate management of emergencies coexisted with irregular provision of drugs and consumables in most MH. In addition, poor attention was paid to skin-to-skin contact in all MH. Unnecessary separation for a relatively long time between mother and babies immediately after birth without an acceptable medical condition was commonly observed. In this context, there was a lack of systematic encouragement for bonding and early start of breastfeeding.

The care of sick newborn was often performed without any guideline support. For instance: lack of guidelines for oxygen therapy was reported in four out of six MH. In addition, continuity of care for low birth weight (LBW) babies was compromised by absence of kangaroo mother care unit in three MH. For those MH that were assessed for advanced newborn care, insufficient number of functioning incubators, lack of protocols and unnecessary exposure to light, noise and manipulation were the main quality gaps.

Attention to infection prevention was very poor. Inadequate hand washing or use of gloves and overuse of antibiotics were very common in all wards, with the aggravating factor that an inadequate sterilization system was observed in four out of six MH.

All MH had specific paper documentation for mothers and newborns and one of them had electronic health records. Patients' records consisted in medical records (admission chart, medical history and physical examination, progress notes including partograph, procedure report and discharge letter), nurses' records (nursing progress notes, medication list and vital signs charts) and laboratory/diagnostic imaging results. Overall, maternal and neonatal records were insufficiently filled in five out of six MH even when adverse events were observed. Periodical clinical meetings, internal audits and continuous professional development were rare, hindering management of critical cases in most of MH.

Finally, women were poorly informed about procedures and appropriate care during the whole admission period and after discharge. The insufficient communication with primary health care services was also an important quality gap in all MH. Women rights were violated also because companion presence was not always ensured.

#### **4.2.2) QIC - STEP 2**

The initial Plans of Action developed by each MH in 2015 are described below in Tables 4(a, b, c, d, e, and f).

**Table 4a. MH1 Plan of Action overview – QIC Step – 2 – 2015.**

|            |                        |  |
|------------|------------------------|--|
| <b>MH1</b> | <b>Infrastructure</b>  | Place normal delivery room out of surgical center<br>Increase number of curtains and screens between beds  |
|            | <b>Human Resources</b> | Enhance the role of obstetric nurses on labor<br>Motivate staff members to change practices<br>Consider physiotherapists on labor ward<br>Develop training courses for voluntary doulas  |
|            | <b>Case Management</b> | Review of hospital policies using the tool as guideline – specifically cesarean section reduction<br>Promote clinical discussion regarding standards for labor care specially on weakness lightened by assessment<br>Discuss adequate post-delivery monitoring<br>Enforce rational use of disposable materials and supplies by staff |
|            | <b>Respectful Care</b> | Increase non pharmacologic pain relief and/or management<br>Support partner/companion presence on birth  |

**Table 4b. MH2 Plan of Action overview – QIC Step – 2 – 2015.**

|            |                        |  |
|------------|------------------------|--|
| <b>MH2</b> | <b>Infrastructure</b>  | Finalize labor room structural reform<br>Purchase thermometers<br>Change infant cots position on postpartum wards        |
|            | <b>Human Resources</b> | Demand training opportunities for staff to central level (municipal)<br>Motivate staff to change communication practices |
|            | <b>Case Management</b> | Promote regular clinical team meetings to discuss standards of care  |

|  |                        |  |
|--|------------------------|--|
|  |                        | <p>Discuss protocols with central level (municipal):<br/>use of partograph, pain relief on labor, skin-to-skin contact and early breastfeeding initiating.</p> <p>Encourage nurses to change monitoring practices</p> <p>Review structure of charts and forms for vital signs registration</p> <p>Review sterilization policies: place of clean material disposal</p> <p>Increase written information regarding washing hands procedures</p> <p>Review discharge protocols</p> |
|  | <b>Respectful Care</b> | <p>Improve privacy</p> <p>Improve communication practices</p> <p>Include partner/companion during discharge procedures</p>   |

**Table 4c. MH3 Plan of Action overview – QIC Step – 2 – 2015.**

|            |                        |  |
|------------|------------------------|--|
| <b>MH3</b> | <b>Infrastructure</b>  | <p>Purchase wardrobes for postpartum wards</p> <p>Review cooling central system</p> <p>Change blood storage</p> <p>Change medication storage areas on wards</p> <p>Increase number of hands washing facilities</p> <p>Promote more frequent maintenance of toilets</p> <p>Place curtains and screens between beds</p>  |
|            | <b>Human Resources</b> | <p>Demand training opportunities for staff to central level (municipal)</p> <p>Motivate staff to change communication practices</p>  |
|            | <b>Case Management</b> | <p>Discuss safe temperature parameters for newborns</p> <p>Promote regular clinical meetings to discuss standards of care, indicators and critical cases</p> <p>Discuss protocols with central level (municipal): antibiotics use, starving, use of partograph, pain relief, episiotomy, amniotomy, skin-to-skin contact, newborn suctioning, early breastfeeding</p> <p>Promote meetings and encourage nurses to change monitoring practices</p> <p>Increase written information regarding washing hands procedures</p> <p>Define discharge protocols</p> |

|  |                        |  |
|--|------------------------|--|
|  | <b>Respectful Care</b> | <p>Include contraception information on discharge protocol</p> <p>Encourage partner/father presence on birth</p> |
|--|------------------------|--|

**Table 4d. MH4 Plan of Action overview – QIC Step – 2 – 2015.**

|            |                        |   |
|------------|------------------------|---|
| <b>MH4</b> | <b>Infrastructure</b>  | <p>Purchase locked wardrobes for medication storage in wards</p> <p>Purchase thermometers for wards and clean material storage room</p> <p>Change infant cots position in surgical ward</p> <p>Make coats for incubators</p> <p>Demand to central level (state): structural reform of sterilization center, new bed line sets for wards and labor room, curtains for postpartum wards</p> |
|            | <b>Human Resources</b> | <p>Promote training courses for obstetric staff – include communication skills development</p> <p>Enhance the role of obstetric nurses on labor</p> <p>Support Neonatology post-graduation for doctors</p>  |
|            | <b>Case Management</b> | <p>Promote regular clinical team meetings to discuss standards of care in Neonatology and Obstetrics</p> <p>Increase written information regarding washing hands procedures</p> <p>Promote systematic review of medical charts regarding antibiotics use and discuss clinical choice individually with doctors</p>  |
|            | <b>Respectful Care</b> | <p>Reinforce rules of cell phone use in neonatal intensive care unit</p> <p>Improve staff communication skills</p> <p>Include contraception information and essential care on women's discharge letter</p> <p>Encourage partner/father presence on birth</p> <p>Develop specific written orientation for partners/companion</p>   |

**Table 4e. MH5 Plan of Action overview – QIC Step – 2 – 2015.**

|            |                        |   |
|------------|------------------------|---|
| <b>MH5</b> | <b>Infrastructure</b>  | <p>Reform labor room</p> <p>Change structure of postsurgical observation room</p> |
|            | <b>Human Resources</b> | <p>Stimulate participation on regular clinical meetings</p>                       |

|  |                        |  |
|--|------------------------|--|
|  |                        | Promote newborn resuscitation simulation training<br>Ensure skilled professional on postsurgical observation room<br>Encourage staff to change washing hands practices – alternative strategies, such as, videos.<br>Encourage staff to change communication practices |
|  | <b>Case Management</b> | Stimulate research regarding quality improvements for labor care<br>Update protocols and clinical guidelines using assessment tool as a guide<br>Review content of mother's discharge meeting  |
|  | <b>Respectful Care</b> | Improve privacy<br>Improve communication<br>Include written information regarding essential care on discharge procedures   |

**Table 4f. MH6 Plan of Action overview – QIC Step – 2 – 2015.**

|            |                        |   |
|------------|------------------------|---|
| <b>MH6</b> | <b>Infrastructure</b>  | Purchase thermometers and permanent supplies for vertical birth in labor room<br>Purchase curtains for postpartum wards<br>Start women identification before procedures<br>Organize outpatient service for discharged women                                       |
|            | <b>Human Resources</b> | Stimulate participation on regular clinical meetings<br>Encourage staff to change washing hands practices<br>Encourage staff to change communication practices<br>Encourage staff to change vital signs monitoring practices on wards<br>Promote training courses |
|            | <b>Case Management</b> | Promote regular clinical meetings to discuss standards of care and critical cases<br>Set up adequate blood storage on facility<br>Increase written information regarding washing hands procedures   |
|            | <b>Respectful Care</b> | Encourage partner/father presence<br>Improve communication<br>Include information regarding essential care and contraception on discharge procedures<br>Improve privacy   |

During the Plan of action development, actions for QI in Human resources and Case management were more frequently proposed in all MH. Most of these actions were targeted to reduce excessive intervention in normal labor and newborn care and increase infection prevention. MH3 and MH4 had a Plan of Action that also focused in infrastructure. Proposed actions that could indirectly improve Respectful Care were present also in other areas for QI.

### **4.2.3) QIC - STEP 3**

#### **- Monitoring questionnaire results**

Were completed 56 monitoring questionnaires (Appendix 3); most of them during the second monitoring visit (29 questionnaires). None of the selected professionals declined the invitation to answer.

The majority of selected health professionals completed the questionnaire twice, once for each visit. The most frequent reasons for completing it only once were vacation period during one monitoring visit, absence from work and recent hiring or transfer to another hospital (after *QIC - Step 1* or after first monitoring visit). Four out of six MH had the Nursing coordinator changed during the study period and two of these changed medical coordinator as well. The Box 6 brings the number of health professionals that completed questions number 7 and 8, by monitoring visit.

Box 6. Number of health professionals that completed the questions 7 and 8, by monitoring visit.

#### ***Question number 7***

First visit - 24 health professionals

Second visit - 27 health professionals

#### ***Question number 8***

First visit - 26 health professionals

Second visit - 28 health professionals

The Tables 5a and 5b describe the frequency of influencing factors for QI in the total number of completed questions 7 or 8 (Appendix 3). As the questions allowed more than one answer/factor, most health professionals choose more than one influencing factor per question.

**Table 5a. Influencing factors for QI cited by managers and staff during the first monitoring visit. QIC – Step 3.**

| Factors influencing change                   | % of completed Questions |
|--|--------------------------|
| Positive support from direct managers        | 70,8                     |
| Use of WHO Tool as a guide for changes       | 70,8                     |
| Lack of financial resources                  | 69,2                     |
| Positive team motivation for changes         | 62,5                     |
| Overcrowded service / increase of admissions | 38,4                     |
| Lack of team motivation and support          | 38,4                     |

**Table 5b. Influencing factors for QI described by managers and staff during the second monitoring visit. QIC – Step 3.**

| Factors influencing change                   | % of completed questions |
|--|--------------------------|
| Lack of financial resources                  | 85,7                     |
| Positive team motivation for changes         | 62,9                     |
| Overcrowded service / increase of admissions | 60,7                     |
| Use of WHO Tool as a guide for changes       | 55,5                     |
| Positive support from direct managers        | 48,1                     |
| Lack of team motivation and support          | 46,4                     |

The triggering questions used in the reassessment visits and derived from these results investigated positive support from direct managers, lack of financial resources, use of the WHO tool as a guide for QI, influence of overcrowded services and team motivation. They were used in feedback meeting during *QIC – Step 4*.

#### **4.2.4) QIC - STEP 4**

*- Average scores from QIC – Step 4 and comparisons with QIC – Step 1 Scores*

The results from *QIC – Step 4* in 2016 are represented on Table 6. Changes were observed in most chapters in all MH. Once more, chapters assessing neonatal care scored better than chapters assessing maternal care. Five out of six MH improved scores in Infrastructure and Hospital Support Services (chapter 1) and four out of six in Newborn Infant Care (chapter 5). On the other hand, Infection Prevention scored worse than in

2015 in five out of six MH. MH4 improved care in two important chapters: sick newborn care and advanced newborn care, and achieved score 3.

**Table 6. Average scores by chapters. Reassessment QIC – Step 4. 2016.**

| Chapters                                       | MH1  | MH2     | MH3     | MH4   | MH5  | MH6     |
|--|------|---------|---------|-------|------|---------|
| Infrastructure and Hospital Support Services   | 1,98 | 1,79    | 1,72    | 2,13  | 1,98 | 1,86    |
| Care for Normal Labor and Vaginal Birth        | 1,36 | 1,18    | 1,27    | 1,18  | 1,63 | 1,27    |
| Care for Caesarean Section                     | 1,57 | 1,33    | 1,28    | 1,42  | 1,42 | 1,00    |
| Management of Maternal Complications           | 2,37 | 1,82*   | 1,69*   | 1,84* | 2,00 | 1,36*   |
| Newborn Infant Care                            | 2,73 | 2,30    | 1,90    | 2,37  | 2,40 | 1,93    |
| Sick Newborn Care                              | 2,87 | 2,25*   | 1,50*   | 3,00* | 2,42 | 2,15    |
| Advanced Newborn Care                          | 2,85 | No NICU | No NICU | 3,00  | 2,42 | No NICU |
| Monitoring and Follow-up                       | 3,00 | 1,75    | 2,25    | 2,62  | 2,75 | 1,87    |
| Infection Prevention                           | 2,60 | 1,19    | 1,65    | 2,03  | 2,37 | 1,58    |
| Guidelines, Training and Audit                 | 2,66 | 0,52    | 0,11    | 2,33  | 1,25 | 0,88    |
| Access to Hospital Care and Continuity of Care | 2,50 | 2,50    | 2,37    | 2,37  | 2,00 | 2,00    |
| Mother and Newborn Rights                      | 2,81 | 1,48    | 1,55    | 2,14  | 1,61 | 1,77    |

Legend: \*Assessment adapted according to the level of care provided. NICU = neonatal intensive care unit

#### - *Quality Improvements*

The Tables 7(a,b,c,d,e,f) present an overview of QI observed in 2016 compared with Plan of Action developed in 2015 by areas of care in each MH. All MH showed QI after one year of *QIC – Step 1*. Major changes were observed on case management with progressive demedicalization of labor and improvement in Respectful Care. Human Resources and Infrastructure were areas with less significant changes. Local managers' actions were responsible for majority of results, since only one out of six hospitals received state/federal funds and completely restructured delivery room (MH5).



**Table 7a. Quality improvements observed in QIC – Step 4 by main area of care and their relation with MH1 Plan of Action.**

| <b>Maternity Hospital</b> | <b>Plan of action</b>  |   | <b>Implemented (●)</b> |
|---------------------------|------------------------|---|------------------------|
| <b>MH1</b>                | <b>Infrastructure</b>  | Place normal delivery room out of surgical center   | -                      |
|                           |                        | Increase number of curtains and screens between beds  | -                      |
|                           | <b>Human Resources</b> | Enhance the role of obstetric nurses on labor   | -                      |
|                           |                        | Motivate staff members to change practices  | ●                      |
|                           |                        | Consider physiotherapists on labor ward   | -                      |
|                           |                        | Develop training courses for voluntary doulas   | -                      |
|                           | <b>Case Management</b> | Review of hospital policies using the tool as guideline – specifically cesarean section reduction         | -                      |
|                           |                        | Promote clinical discussion regarding standards for labor care specially weakness lightened by assessment | -                      |
|                           |                        | Discuss adequate post-delivery monitoring   | -                      |
|                           |                        | Enforce rational use of disposable materials and supplies by staff  | ●                      |
|                           | <b>Respectful Care</b> | Increase non pharmacologic pain relief and/or management  | -                      |
|                           |                        | Support partner/companion presence on birth   | ●                      |

**Table 7b. Quality improvements observed in QIC – Step 4 by main area of care and their relation with MH2 Plan of Action.**

| <b>Maternity Hospital</b> | <b>Plan of action</b>  |  | <b>Implemented (●)</b> |
|---------------------------|------------------------|--|------------------------|
| <b>MH2</b>                | <b>Infrastructure</b>  | Finish labor room structural reform                                  | -                      |
|                           |                        | Purchase thermometers  | -                      |
|                           |                        | Change infant cots position on postpartum wards                      | -                      |
|                           | <b>Human Resources</b> | Demand training opportunities for staff to central level (municipal) | ●                      |
|                           |                        | Motivate staff to change communication practices                     | -                      |

|  |                        |   |   |
|--|------------------------|---|---|
|  | <b>Case Management</b> | Promote regular clinical team meetings to discuss standards of care   | - |
|  |                        | Discuss protocols with central level (municipal): use of partograph, pain relief on labor, skin-to-skin contact and early breastfeeding initiating. | ● |
|  |                        | Encourage nurses to change monitoring practices   | - |
|  |                        | Review structure of charts and forms for vital signs registration   | - |
|  |                        | Review sterilization policies: place of clean material disposal   | - |
|  |                        | Increase written information regarding washing hands procedures   | - |
|  |                        | Review discharge protocols  | - |
|  | <b>Respectful Care</b> | Improve privacy   | ● |
|  |                        | Improve communication practices   | - |
|  |                        | Include partner/companion during discharge procedures   | - |

**Table 7c. Quality improvements observed in QIC – Step 4 by main area of care and their relation with MH3 Plan of Action.**

| <b>Maternity Hospital</b> | <b>Plan of action</b>  |  | <b>Implemented (●)</b> |
|---------------------------|------------------------|--|------------------------|
| <b>MH3</b>                | <b>Infrastructure</b>  | Purchase wardrobes for postpartum wards                              | -                      |
|                           |                        | Review cooling central system  | -                      |
|                           |                        | Change blood storage   | -                      |
|                           |                        | Change medication storage areas on wards                             | -                      |
|                           |                        | Increase number of hands washing facilities                          | -                      |
|                           |                        | Promote more frequent maintenance of toilets                         | ●                      |
|                           |                        | Place curtains and screens between beds                              | ●                      |
|                           | <b>Human Resources</b> | Demand training opportunities for staff to central level (municipal) | ●                      |
|                           |                        | Motivate staff to change communication practices                     | -                      |

|  |                        |  |   |
|--|------------------------|--|---|
|  | <b>Case Management</b> | <p>Discuss safe temperature parameters for newborns</p> <p>Promote regular clinical meetings to discuss standards of care, indicators and critical cases</p> <p>Discuss protocols with central level (municipal): antibiotics use, starving, use of partograph, pain relief, episiotomy, amniotomy, skin-to-skin contact, newborn suctioning, early breastfeeding</p> <p>Promote meetings and encourage nurses to change monitoring practices</p> <p>Increase written information regarding washing hands procedures</p> <p>Define discharge protocols</p> | <p>●</p> <p>-</p> <p>●</p> <p>-</p> <p>-</p> <p>-</p> |
|  | <b>Respectful Care</b> | <p>Include contraception information on discharge protocol</p> <p>Encourage partner/father presence on birth</p>   | <p>-</p> <p>●</p>                                     |

**Table 7d. Quality improvements observed in QIC – Step 4 by main area of care and their relation with MH4 Plan of Action.**

| <b>Maternity Hospital</b> | <b>Plan of action</b>  |   | <b>Implemented (●)</b>                       |
|---------------------------|------------------------|---|--|
| <b>MH4</b>                | <b>Infrastructure</b>  | <p>Purchase locked wardrobes for medication storage in wards</p> <p>Purchase thermometers for wards and clean material storage room</p> <p>Change infant cots position in surgical ward</p> <p>Make coats for incubators</p> <p>Demand to central level (state): structural reform of sterilization center, new bed line sets for wards and labor room, curtains for postpartum wards</p> | <p>-</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> |
|                           | <b>Human Resources</b> | <p>Promote training courses for obstetric staff – include communication skills development</p> <p>Enhance the role of obstetric nurses on labor</p>   | <p>-</p> <p>-</p>                            |

|  |                        |  |                       |
|--|------------------------|--|-----------------------|
|  |                        | Support Neonatology post-graduation for doctors  | ●                     |
|  | <b>Case Management</b> | Promote regular clinical team meetings to discuss standards of care in Neonatology and Obstetrics<br>Increase written information regarding washing hands procedures<br>Promote systematic review of medical charts regarding antibiotics use and discuss clinical choice individually with doctors      | -<br>●                |
|  | <b>Respectful Care</b> | Reinforce rules of cell phone use in neonatal intensive care unit<br>Improve staff communication skills<br>Include contraception information and essential care on women's discharge letter<br>Encourage partner/father presence on birth<br>Develop specific written orientation for partners/companion | ●<br>-<br>-<br>-<br>● |

**Table 7e. Quality improvements observed in QIC – Step 4 by main area of care and their relation with MH5 Plan of Action.**

| <b>Maternity Hospital</b> | <b>Plan of action</b>  |  | <b>Implemented (●)</b> |
|---------------------------|------------------------|--|------------------------|
| <b>MH5</b>                | <b>Infrastructure</b>  | Reform labor room<br>Change structure of postsurgical observation room   | ●<br>-                 |
|                           | <b>Human Resources</b> | Stimulate participation on regular clinical meetings<br>Promote newborn resuscitation simulation training<br>Ensure skilled professional on postsurgical observation room<br>Encourage staff to change washing hands practices – alternative strategies, such as, videos.<br>Encourage staff to change communication practices | ●<br>●<br>-<br>-<br>-  |
|                           | <b>Case Management</b> | Stimulate research regarding quality improvements for labor care   | -                      |
|                           |                        |  |                        |

|  |                        |  |   |
|--|------------------------|--|---|
|  |                        | Update protocols and clinical guidelines using assessment tool as a guide    | ● |
|  |                        | Review content of mother's discharge meeting                                 | - |
|  | <b>Respectful Care</b> | Improve privacy  | ● |
|  |                        | Improve communication  | - |
|  |                        | Include written information regarding essential care on discharge procedures | - |

**Table 7f. Quality improvements observed in QIC – Step 4 by main area of care and their relation with MH6 Plan of Action.**

| <b>Maternity Hospital</b> | <b>Plan of action</b>  |  | <b>Implemented (●)</b> |
|---------------------------|------------------------|--|------------------------|
| <b>MH6</b>                | <b>Infrastructure</b>  | Purchase thermometers and permanent supplies for labor room                            | -                      |
|                           |                        | Purchase curtains for postpartum wards   | -                      |
|                           |                        | Start identification procedures for women  | ●                      |
|                           |                        | Organize outpatient service for discharged patients                                    | ●                      |
|                           | <b>Human Resources</b> | Stimulate participation on regular clinical meetings                                   | ●                      |
|                           |                        | Encourage staff to change washing hands practices                                      | -                      |
|                           |                        | Encourage staff to change communication practices                                      | -                      |
|                           |                        | Encourage staff to change vital signs monitoring practices on wards                    | ●                      |
|                           |                        | Promote training courses   | -                      |
|                           | <b>Case Management</b> | Promote regular clinical meetings to discuss standards of care and critical cases      | ●                      |
|                           |                        | Set up adequate blood storage on facility  | -                      |
|                           |                        | Increase written information regarding washing hands procedures                        | -                      |
|                           | <b>Respectful Care</b> | Encourage partner/father presence  | ●                      |
|                           |                        | Improve communication  | -                      |
|                           |                        | Include information regarding essential care and contraception on discharge procedures | -                      |
|                           |                        | Improve privacy  | -                      |

*- Factors influencing change*

The main factors that could have influenced (facilitated or hindered) the QI, according to health professionals of assessed MH are summarized in Tables 8a and 8b. According to staff members and managers, the Federal Law for the Companionship in Childbirth (n. 11.108/05) and the presence of Baby Friendly Hospital Initiative (BFHI) represented factors which positively influenced QI in all MH assessed. On the other hand, staff resistance to changes and demotivation, resulting in low attendance to training courses and non-adherence to clinical protocols, facility overcrowding with inadequate number of skilled professionals were mentioned as factors negatively influencing QI in all MH.

**Table 8a. Factors positively influencing QI, Pernambuco – Brazil – 2015/2016.**

| <b>INTERNAL FACTORS</b>   | <b>H1</b> | <b>H2</b> | <b>H3</b> | <b>H4</b> | <b>H5</b> | <b>H6</b> |
|---|-----------|-----------|-----------|-----------|-----------|-----------|
| Use of communication technologies (WhatsApp®)   | •         |           | •         | •         | •         |           |
| Participative approach to management – leadership strategies  |           |           | •         | •         |           |           |
| Staff and managing group motivated  | •         |           | •         | •         |           |           |
| Students and residents presence   | •         |           |           |           | •         | •         |
| Presence of volunteer doulas  | •         | •         | •         |           |           |           |
| Professional “bonding” between staff and facility   | •         |           |           | •         |           | •         |
| Active involvement of nurses midwives in labor and delivery   | •         |           | •         |           | •         | •         |
| Local protocols   | •         |           |           | •         | •         |           |
| Alternatives strategies to increase attendance to training – sections organized during working shifts |           |           |           | •         |           | •         |
| <b>EXTERNAL FACTORS</b>   |           |           |           |           |           |           |
| Partnership of Ministry of Health for training courses  | •         |           |           | •         | •         |           |
| Federal Law for the Companionship in Childbirth (Law decree n. 11.108/05)                             | •         | •         | •         | •         | •         | •         |
| Baby Friendly Hospital Initiative   | •         | •         | •         |           | •         | •         |
| QIC (our project)   |           |           | •         | •         |           | •         |

**Table 8b. Factors negatively influencing QI, Pernambuco – Brazil – 2015/2016.**

| <b>INTERNAL FACTORS</b>                      | <b>H1</b> | <b>H2</b> | <b>H3</b> | <b>H4</b> | <b>H5</b> | <b>H6</b> |
|--|-----------|-----------|-----------|-----------|-----------|-----------|
| Staff resistance to changes and demotivation | •         | •         | •         | •         | •         | •         |
| “Emergency-solving” managing style           | •         | •         |           |           | •         | •         |

|  |   |   |   |   |   |   |
|--|---|---|---|---|---|---|
| Lack of institutional “bonding” between staff and facility – constant changes in working group |   | • | • |   | • |   |
| Conflicts in labor room – doctors <i>versus</i> nurses   |   | • | • |   | • | • |
| Lack of electronic information systems   |   | • | • | • |   | • |
| <b>EXTERNAL FACTORS</b>  |   |   |   |   |   |   |
| Inadequate infrastructure  | • | • | • | • |   | • |
| Lack of essential equipment and supplies   | • | • | • |   | • | • |
| Facility overcrowding - inadequate number of professionals                                     | • | • | • | • | • | • |
| Centralized managing / administrative bureaucracy  |   | • | • |   |   | • |
| Zika virus / microcephaly outbreak   | • |   |   |   |   |   |
| Rare administrative punishment for bad practices   |   | • |   |   | • | • |
| Family pressure for CS and medical lawsuits concerns   | • | • | • |   | • |   |

- *Cost Analysis*

Considering 8 hour of work per day, it was estimated that the total number of hours worked by volunteers in the study were 1000 hours in 2015 and 592 hours in 2016 (Table 9).

**Table 9. Hours worked by national assessors during QIC, Pernambuco – Brazil – 2015/2016.**

| Maternity Hospital | 2015 | 2016 | TOTAL |
|--------------------|------|------|-------|
| <b>MH1</b>         | 192  | 144  | 336   |
| <b>MH2</b>         | 160  | 128  | 288   |
| <b>MH3</b>         | 192  | 96   | 288   |
| <b>MH4</b>         | 192  | 80   | 272   |
| <b>MH5</b>         | 144  | 64   | 208   |
| <b>MH6</b>         | 120  | 80   | 200   |
| <b>TOTAL</b>       | 1000 | 592  | 1592  |

The whole QIC in Pernambuco had a cost of 49.833,73 USD including international consultants’ fees, transport and accommodation for the study team during trips in Pernambuco, administrative costs of the study (printed material and copies) and cost of national assessors worked hours (Table 10). Per MH the cost estimated is 8.305,62 USD.

**Table 10. Cost analysis QIC, Pernambuco – Brazil – 2015/2016.**

| <b>Expenses</b>                 | <b>Cost (R\$)</b> | <b>Cost (USD)</b> |
|---------------------------------|-------------------|-------------------|
| International consultancy fees  | 28.000,00         | 8.211,14          |
| Transport (by plane and by car) | 21.100,94         | 6.187,95          |
| Accommodation                   | 13.571,38         | 3.979,87          |
| Printed material, copies        | 1.822,56          | 534,47            |
| National assessors worked hours | 105.438,16        | 30.920,28         |
| <b>TOTAL</b>                    | <b>169.933,04</b> | <b>49.833,73</b>  |



## **5) DISCUSSION**

### **5.1) SUMMARY OF FINDINGS**

The findings of the first systematic assessment of MNHC in six MH in Pernambuco, Brazil identified a variety of QoC gaps. Teaching/tertiary care hospitals and secondary care hospitals were equally affected.

Gaps in case management were predominant. The frequent use of unnecessary or inappropriate interventions such as oxytocin use, amniotomy, routine episiotomy and newborn suctioning delineate a situation of intense medicalization of birth. In addition, insufficient pain relief concern and poor use of partograph were commonly observed, except when nurse midwives were actively involved in care.

Evidence-based practices were not widespread. Even teaching/referral hospitals had difficulties in implementing routine skin-to-skin contact and early start of breastfeeding due to unnecessary separation for a relatively long time between mother and babies immediately after birth. Scarce implementation of protocols to reduce CS was observed in all MH in contrast with government policies and incentives to reduce high national rates of CS. Staff regular training for management of emergencies was rare while inadequate post-operative monitoring was frequent, for example, vital signs were irregularly checked and/or registered on medical records. Moreover, poor attention was paid to infection prevention, antibiotics use and washing hands appropriate procedures, even in ICU.

Infrastructure and staffing issues were also common. Overcrowded services and reduced availability of equipment and supplies were combined with reduced number of skilled professionals in OB/GYN and neonatology. Low salaries in OB/GYN and pediatric field and lack of career' incentives represent common issues, which were reported in staff interviews.

Interviews with women gave some contradictory results. On one side, most women described themselves satisfied with the care received in all MH. On the other, main quality gaps were confirmed: lack of communication with women and routine poor information provided by health workers during discharge, lack of privacy, insufficient pain relief and right to a partner/companion during birth and delivery was not respected in all MH assessed.

Health professionals and managers received very well the participatory approach and particularly the fact that the results/feedback were delivered immediately after the assessment and discussed with them. They felt motivated to develop a Plan of action. Monitoring visits were useful to increase awareness regarding quality gaps and commitment with QI process over the study period.

The reassessment made after one year, showed some improvements in all MH and more prominently in areas such as Case Management and Respectful Care. External (Federal or State Government) interventions were very limited over this period also due to financial crisis, so the observed QI were clearly the result of efforts by hospital managers and key staff. However, improvements were observed only in some of the areas indicated in the Plans of Action developed after the first assessment. Reasons for partial success are complex and can be discussed in the light of the Brazilian context and using the results of the analysis of factors influencing change, which complemented our study. The whole QIC has an estimated low cost per MH.

## **5.2) INTERPRETATION OF FINDINGS – FACTORS INFLUENCING CHANGES**

A number of factors may have influenced the QoC in Pernambuco, Brazil over the study period. During 2015 and 2016, in line with world economic crises, the country is going through a deep recession, further worsened by political instability with consequences in all fields, including health system financing (43,44).

The economic crisis was in fact a recurrent complaint during monitoring visits. Inadequate infrastructure of labor wards, inadequate number of skilled professionals and lack of equipment represented problems, which unfortunately could not be solved at facility level. In addition, the bureaucracy of a centralized managing system and the daily need to deal with administrative emergencies ended up undermining motivation even of the most well intentioned managers.

In Brazil, health programs for children have received higher attention than maternal programs for decades. The Rede Cegonha program is still not fully implemented in Brazil (67) and several MH do not receive incentives for structure improvements besides SUS regular funding. In addition, only in 2014, after 22 years of BFHI in Brazil, the formal accreditation started to ask for compulsory requirements of appropriate practices for maternal care during labor and birth according to WHO standards, called “*Cuidado Amigo da Mulher*” (Woman friendly care) – ordinance nº 1.153, May 22, 2014

(78). However, being included in these programs does not represent a guarantee for enough additional funds for QI.

In Brazil, most doctors have multiple commitments with a variety of public and private institution due to low salaries, social pressure for high incomes and scarce control over effectively worked hours. This fact represent an obstacle to identification with a specific institution, to continuous professional development and to commitment with teamwork. The findings of our analysis showed that staff demotivation, constant changes in working group, competing economic needs and lack of institutional “bonding” represented factors that inhibited participation in QI initiatives.

Among the factors able to facilitate changes, an interesting strategy used by most managers to increase the attendance to training courses and disseminate protocols was the use of communication technologies with staff. The WhatsApp® messenger (Facebook, Inc.) was extensively mentioned as an effective communication tool among managers and staff. Specific training sections organized during working shifts was also mentioned as a facilitating factor.

Being a teaching hospital did not protect from major quality gaps. Half of MH from our sample have medical obstetrics and gynecology residence programs (with minimal duration of 3 years) and midwifery nursing residence programs (with minimal duration 2 years) certified by BMH and Education Ministry. Undergraduate students from medical and nursing courses, also attend internship in these facilities. Our results raise concerns regarding the quality of education provided to the future health workforce since educational environmental clearly do not prioritize evidence-based practices and periodical clinical meetings to discuss critical cases are rare.

The active involvement of nurses midwives in labor and delivery is lower than expected in 4 out of six MH of our sample. Conflicts with doctors in labor room, who typically are more interventionists, are frequent in most services assessed. Those findings reflect the Brazilian reality where nurses midwives are still fighting to strengthen their role in labor room and midwives are not socially recognized as a profession outside birth centers. Strengthening nurses and midwives roles in labor room and development of local protocols were mentioned as positive influence factors for QI in our MH sample.

Professionals were aware of *Law for the Companionship in Childbirth* (Decree n. 11.108/05), sanctioned since 2005, that support the right for a companion presence of the woman’s choice, such as her husband, partner, mother or friend, both on labor room, birth and puerperium wards (79). They mentioned the existence of this Law as a factor

positively influencing change in all MH. However, our analysis showed that in spite of strong evidence of meaningful benefits from continuous support during labor (80) and the existence of the law, the presence of partner/companion during labor and delivery was insufficient and volunteer doulas (experienced provider of labor support with at least a modest amount of training) were not always available. The most frequent “justifications” were lack of appropriate infrastructure, overcrowded services and fear of inappropriate behavior by companions, especially those of the male sex.

In general, staff and managers were aware of WHO, BMH and FEBRASGO recommendations for partograph use (81-83) and Medicine Federal Council Resolutions (n° 1.638/2002 and 1.821/2007) that include compulsory partograph in medical records. However, five out six MH had patients’ records insufficiently filled in and poor use of partograph was common in all MH. In our study, when partograph was used it was frequently associated to involvement of nurse midwives in labor management. In fact, active involvement of nurse midwives in labor and delivery was mentioned as a factor positively influencing change in four out of six MH.

Pernambuco was the first state to notice an outbreak of severe microcephaly at birth preceded by Zika transmission in Brazil. It peaked in October 2015 and influenced maternal and neonatal health services organization (74-76,84). All maternity hospitals assessed had an increased incidence of microcephaly in 2015/2016 and two of them are referral hospitals for mothers and infants with suspected Zika infection. The epidemic event was coincident with the period of our study, however it did not influenced QoC planning or QIC according to manager’s opinion in five out of six MH.

These health system, policy and epidemiological constraints contributed to make any change difficult. The analysis of factors influencing change provides some clues for identifying factors that can be modified at health facility level, such as staff motivation, managing style, use of communication technologies and nurses role. On the other side, to reform mechanisms and financing rules, for example rewarding good practices or discouraging inappropriate ones, and doctors contracting requisites, are required policy and system changes. This differentiation is necessary to both stimulate policy change at health authority level (Federal and State), to avoid the usual justification given by hospital managers and staff who attribute all problems to external causes, to identify effective strategies to motivate staff and to identify aspects of care that can be addressed without any external input.

Our cost analysis may have overestimated USD expenses. The USD official exchange rate had a great variation during our study period due to economic crisis and political uncertainties in Brazil. In the first semester of 2016, 1USD was over R\$ 4,00 (77). Thus, the costs would be significantly lower in USD if we had converted expenses at the end of each *QIC - Step* and not only in the end of the process. In addition, the price of volunteer's worked hours were also overestimated. The group was multidisciplinary and we used for our cost analysis the physicians' work hour price for Pernambuco State in 2016, significantly higher than nurse-midwives and other categories.

### **5.3) COMPARISON WITH OTHER STUDIES**

In Brazil, a few other studies reported findings, such as high level of inappropriate medical interventions for labor/delivery and low use of evidence-based recommended practices in public facilities, which were confirmed by our analysis (50,55,85-88).

Results from *Birth in Brazil Survey*, a nationwide hospital-based cohort study on labor and birth from February 2011 to July 2012, showed that maternity services in North/Northeast regions of Brazil presented serious structural problems. Deficiencies in availability of equipment and materials, lack of specialized staff (especially neonatologists) and lack of organization in the network for referral are common in public facilities (88-90). Our data revealed a similar picture in Pernambuco. All MH, independently of geographic position, had insufficient number of skilled professionals.

The *Birth in Brazil Survey*, which analyzed the implementation of companion's presence during labor and delivery care showed that the Law for the Companionship in Childbirth (Decree n. 11.108/05) was not always applied (91). Only 42.1% of women who went into labor and even a smaller percentage (32.7%) during birth had a companion. Inadequate hospital structure (lack of chairs or beds) was associated with higher chances of total or partial absence of companions – which was also described in our study. On the other hand, not being a Baby Friendly Hospital (BFH) presented an OR of 2.3 for total absence of companion and an OR of 1.8 for partial absence. In our sample, even those MH accredited as BFH had insufficient presence of partner/companion during labor and birth and most of them presented restrictions for fathers' presence. Other authors previously associated the systematic denial to the right of the companionship in SUS to discriminatory attitudes against women part of D&A spectrum during childbirth (55,92,93).

Interesting analytical clues can be obtained by comparing our findings with the results of the BFHI assessment process, which occurred in three MH of our sample during the study period. All these MH had their accreditation as BFH confirmed. However, according to our assessment, some accreditation requirements were not met such as immediate skin-to-skin contact and encouragement for early breastfeeding. One plausible justification of this difference is the motivation of staff and managers to comply with BFHI requirements as a team only during the external visit. This appears to show that our approach is more efficient in identifying the actual clinical practices and MH routines. Other authors have also described motivation of health professionals a key factor for QoC provided (94) and lack of collaborative work as a barrier to implementation of practice changes (95).

Over the last two years, the BMH launched national guidelines to guide health professionals, Brazilian women and managers through the best available evidences in labor and delivery care (96,97). The guidelines were the result of a multidisciplinary effort and were submitted to popular consultation prior to the final publication. They are available on-line and use a user-friendly layout but, unfortunately, are still unknown by most OB/GYN and scarcely used in MH from SUS. Previous research had already speculated regarding low dissemination of evidence-based medicine (EBM) among OB/GYN in Brazil (98,99). Results from a prospective cohort study with a group of doctors attending 49th Brazilian Congress of Obstetrics and Gynecology demonstrated that only half of participants actually used metanalysis as sources of information, even if they were motivated physicians participating in a national educational event and more than 80% of them had completed medical residence (99).

In our sample, the use of communication technologies with staff (WhatsApp®) and specific training sections organized during working shifts were mentioned as factors positively influencing dissemination of guidelines and protocols. Our analysis is similar to those reported by a study carried out in Latin American public hospitals where OB/GYN doctors considered word-of-mouth communication (one-to-one informational section) as the most effective (95). In addition, it contributes to the emergent literature regarding social media use to support public health practices as an alternative method for telemedicine and to facilitate team coordination and rapid communication in hospital setting (100-105).

The partograph is a tool for monitoring the progress of labor that facilitates the continuity of care. It can reduce maternal and neonatal death related to obstructed labor and fetal hypoxia (106). WHO strongly recommends this low cost tool as part of national

guidelines and training for health professionals who care of labor in low-resource settings (81). Besides insufficient evidence of its efficacy in different contexts (107), a recent systematic review reported common barriers for partograph use in LMICs, such as: lack of knowledge and skills, lack of regular training, lack of leadership and supportive culture, tool perceived as time-consuming, high workload, staff rotation and job dissatisfaction. The same authors related low use of partograph as a sentinel event of a wider deficit in record-keeping (106). Those factors might also play a role in our sample since some of them were cited as factors negatively influencing QI in Pernambuco and five out six MH had patients' records insufficiently filled in.

The association between quality of clinical documentation and QoC is not new (108,109). In our sample, surprisingly, patients' records were incomplete even when adverse events and/or electronic records were present contributing for major quality gaps in continuity of care and hindering future audit procedures.

Our findings concerning lack of effective communication with women by health professionals confirmed what has been reported by several studies underlining the importance of communication skills training to promote effective communication with mothers and consequently improve women's involvement and control over their care (94,110). Professionals from our sample argued that work overload was a reason for poor communication with women, but further research should investigate whether their attitude, which seems confined to public MH, is the result of underestimation of women literacy and/or overestimation of possible language or understanding barriers.

In Brazil, in theory, the whole population can use SUS, while in practice its users are usually from low-income classes with low level of formal education who are unaware of their rights (56). Other authors have called attention to the existence within the SUS of a discriminatory attitude towards women economically vulnerable, which combines with a passive acceptance of care offered by users (93).

Childbirth satisfaction is a multidimensional concept. Factors as personal control, labor pain relief, having their expectations met and health providers' interactions and communication with women have consistently been associated with it (93,111-113). In general, in our study, most women described themselves satisfied with the care received in all MH during interviews, but at the same time confirmed quality gaps. This, may be explained in the light of "Halo effect" commonly observed in postpartum assessments: women relief for coming through the experience of delivery with a healthy newborn would bias their evaluation. However, long-term memories may turn to be more

negative (114). In Brazil, other authors have discussed how the strong social expectation for a positive emotional experience is associated with a sense of satisfaction and gratitude, when mother and newborn are healthy and alive, independently from suffering during birth (115).

Our results confirm what has been reported in assessments conducted with the same approach in other LMICs, reflecting the existence of universal systemic issues (69-72); such as limited number of skilled professionals, insufficient infection prevention, insufficient staff training skills, lack of guidelines and local protocols, restriction for companionship, poor attention to communication with mothers and respect to their rights.

In our approach, structured monitoring visits were included. They helped Plan of Action adjustments during the study period and were well received by managers and staff enhancing motivation for changes with limited time investment by the supervisor. Although few studies have investigated the role of supportive supervision as a QI intervention, there are recent evidences that periodic supportive supervision could increase the overall QoC in LMICs (116-119).

Our cost analysis per MH demonstrate that significant QI may be achieved with this approach with low investment. In spite of wide implementation of accreditation initiatives, there is little evidence, mostly confined to HICs, of benefits in QoC and financial costs for hospitals participating in accreditation programs (120-122). Recent research highlighted the high impact of accreditation costs on smaller hospitals from rural areas related to unavailability of experts (121). In our approach, the national assessors' team training could help to reduce the overall costs of QI initiatives replication in the future and stimulate a quality culture in the region. Other authors have recommended capacity-building activities as part of strategic QI efforts aimed at reducing morbidity and mortality in LMICs (10,123).

#### **5.4) LIMITATIONS OF THE STUDY**

We acknowledge a number of limitations in our study. An uncontrolled before-and-after study with a short duration must have its results interpreted with caution (124,125). QI results may have occurred due to other factors and not only due to our intervention.

Other limitations are inherent to the WHO approach itself and some of them have already been discussed (69), such as the Hawthorne effect, causing on overestimation of quality scores due to the positive effect of direct observation on health



workers practices. If we admit some effect of this kind, the findings of our first assessment are even more concerning since all MH presented substandard care in most areas. Moreover, the comparability of results across *QIC - Step 1* and *QIC – Step 4* cannot be completely guaranteed. However, the use of a standardized score system used, the accurate training of the assessors training, the consistency in the assessors group composition and the international supervision should have minimized this risk.

Impact on outcome variables such as morbidity and mortality indicators could not be evaluated, since a much longer follow-up would be needed, which was beyond the possibility and scope of our study. However, there is enough evidence of the impact on mortality and morbidity as well as on patient satisfaction of QoC improvements aimed at avoiding/improving specific procedures during labor, birth and post-partum care (18,29).

## **6) CONCLUSIONS AND PERSPECTIVES**

Our results analyze the QoC provided along the continuum of labor, delivery and postpartum maternal and neonatal care from several perspectives, including health professionals' and patients' perspectives. They show that systematic standard-based participatory QI approaches may produce some meaningful results in a relatively short time at a cost that seems quite lower than for QI and Quality Assurance/Accreditation approaches widely used in HICs.

To our knowledge, this is the first report of a complete QIC applied to MNHC hospital level using the WHO approach and assessment tool (28) in the Pan American Health Organization (PAHO/WHO) region. Comparable results were reported in other countries with a similar QI approach (69,71). Although our study was not a countrywide effort with government participation, managers and staff were motivated by this approach and some of the observed QI were achieved only based on their efforts. In addition, for the first time structured monitoring visits were associated to the use of this WHO tool. Their role in facilitating QI seemed encouraging given the little additional investment required.

We believe that the described approach should be considered for use for large scale QI exercises/programs in Brazil and other LMICs. To maximize its effectiveness, it should be linked to certification/accreditation processes as a basis for developing performance-based mechanisms. This can be accomplished using the proposed scoring system as a basis for accreditation and the extent of the correspondence between the Plan of Action objectives and the observed QI as a basis for individual and team rewarding systems. Other authors have recommended financial incentive programs based on performance or results of providers for QI in MNHC (126-128).

## REFERENCES

- 1) Raven JH, Tolhurst RJ, Tang S, van den Broek N. What is quality in maternal and neonatal health care? *Midwifery* 2012; 28: e676–83. DOI: 10.1016/j.midw.2011.09.003
- 2) Institute of Medicine (1999). *To err is human: Building a safe health system*. Washington, DC: National Academy Press.
- 3) Institute of Medicine (2001). *Crossing the quality chasm: A new health system for the 21st century*. Washington, DC: National Academy Press.
- 4) Donabedian A. The quality of care: How can it be assessed? *JAMA* 1988; 260: 12, 1743-1748.
- 5) Donabedian A. Evaluating the quality of medical care. *The Milbank Fund Quarterly* 2005; 83:4, 691-729.
- 6) Silva SA, Costa PL, Costa R, Tavares SM, Leite ES, Passos AM. Meanings of quality of care: Perspectives of Portuguese health professionals and patients - ORCAB special series. *British Journal of Health Psychology* 2013; 1-16. DOI: 10.1111/bjhp.12031.
- 7) Serapione M. Avaliação da Qualidade em Saúde. *Revista Crítica de Ciências Sociais*, 2009; 85, 65-82.
- 8) Campbell SM, Roland MO, Buetow SA. Defining quality of care. *Social Science & Medicine* 2000; 51, 1611-1625. DOI: 10.1016/S0277-9536(00)00057-5.
- 9) World Health Organization. *Quality of Care: A Process for Making Strategic Choices in Health Systems*. Geneva: WHO, 2006. Available: <http://www.who.int/iris/handle/10665/43470>. Accessed 24<sup>th</sup> February, 2017.
- 10) World Health Organization. *Standards for improving quality of maternal and newborn care in health facilities*. 2016. Available: [http://www.who.int/reproductivehealth/publications/maternal\\_perinatal\\_health/improving-mnh-health-facilities/en/](http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/improving-mnh-health-facilities/en/). Accessed 24<sup>th</sup> February, 2017.
- 11) West, E. Management matters: The link between hospital organisation and quality of patient care. *Quality in Health Care* 2001; 10, 40–48. DOI: 10.1136/qhc.10.1.40
- 12) Janakiraman V, Ecker J. Quality in Obstetric Care: Measuring What Matters. *Obstet Gynecol* 2010; 116: 728–32.
- 13) Pittrof R, Campbell OMR, Filippi VGA. What is quality in maternity care? An international perspective. *Acta Obstet Gynecol Scand* 2002; 81: 277–283.
- 14) Bailit JL. Measuring the Quality of Inpatient Obstetrical Care. *Obstetrical and Gynecological Survey* 2007; 62: 3, 207-213.
- 15) Graham WJ, Varghese B. Quality, quality, quality: gaps in the continuum of care. *Lancet* 2012; 379(9811):e5–6. DOI: 10.1016/S0140-6736(10)62267-2.

- 16) Pitchforth E, Lilford RJ, Kebede Y, Asres G, Stanford C, Frost J. Assessing and understanding quality of care in a labour ward: A pilot study combining clinical and social science perspectives in Gondar, Ethiopia. *Social Science & Medicine* 2010; 71: 1739e1748. DOI: 10.1016/j.socscimed.2010.08.001.
- 17) Dettrick Z, Firth S, Soto JE. Do Strategies to Improve Quality of Maternal and Child Health Care in Lower and Middle Income Countries Lead to Improved Outcomes? A Review of the Evidence. *PLoS ONE* 2013; 8(12): e83070. DOI: 10.1371/journal.pone.0083070.
- 18) Tunçalp Ö, Were WM, MacLennan C, Oladapo OT, Gülmezoglu AM, Bahl R, et. al. Quality of care for pregnant women and newborns—the WHO vision. *BJOG* 2015; DOI: 10.1111/1471-0528.13451.
- 19) United Nations. Transforming our World: The 2030 Agenda for Sustainable Development. New York; 2015. Available: <https://sustainabledevelopment.un.org/post2015/transformingourworld/publication>. Accessed 24<sup>th</sup> February, 2017.
- 20) Freedman LP, Kruk ME. Disrespect and abuse of women in childbirth: challenging the global quality and accountability agendas. *Lancet* 2014 Sep 20; 384(9948):e42-4. DOI: 10.1016/S0140-6736(14)60859-X. Epub 2014 Jun 22.
- 21) Bohren MA, Vogel JP, Hunter EC, Lutsiv O, Makh SK, Souza JP, et al. The Mistreatment of Women during Childbirth in Health Facilities Globally: A Mixed-Methods Systematic Review. *PLoS Med* 2015; 12(6): e1001847. DOI: 10.1371/journal.pmed.1001847.
- 22) d'Oliveira AFPL, Diniz SG, Schraiber LB. Violence against women in health-care institutions: an emerging problem. *Lancet* 2002; 359: 1681–85.
- 23) Stufflebeam, Daniel (1996), “The CIPP Model for Program Evaluation”, in George Madaus et al. (orgs.), *Evaluation Models. Viewpoints on Educational and Human Services Evaluation*. Dordrecht: Kluwer Nijhoff Publishing.
- 24) Raven J, Hofman J, Adegoke A, van den Broek N. Methodology and tools for quality improvement in maternal and newborn health care. *International Journal of Gynecology and Obstetrics* 2011; 114, 4–9. DOI: 10.1016/j.ijgo.2011.02.007.
- 25) Conry MC, Humphries N, Morgan K, McGowan Y, Montgomery A, Vedhara K, et al. A 10 year (2000–2010) systematic review of interventions to improve quality of care in hospitals. *BMC Health Services Research* 2012; 12:275. DOI: 10.1186/1472-6963-12-275.

- 26) Kongnyuy EJ, Van den Broek N. Developing Standards for Postpartum Hemorrhage in a Resource-Limited Country. *Health Care for Women International* 2009; 30:989–1002, DOI: 10.1080/07399330902836126.
- 27) Grimshaw JM, Russell IT. Effect of clinical guidelines on medical practice: a systematic review of rigorous evaluations. *Lancet* 1993; 342: 1317–22.
- 28) World Health Organization. Hospital Care for Mothers and Newborn Babies: Quality Assessment and Improvement Tool. Available: <http://www.euro.who.int/en/health-topics/Life-stages/maternal-and-newborn-health/publications/2014/hospital-care-for-mothers-and-newborn-babies-quality-assessment-and-improvement-tool>. Accessed 24<sup>th</sup> February, 2017.
- 29) Nolan T, Angos P, Cunha AJLA, Muhe L, Qazi S, Simoes EAF, et al. Quality of hospital care for seriously ill children in less developed countries. *Lancet* 2001; 357:106–10.
- 30) Duke T, Tamburlini G, The Paediatric Quality Care Group. Improving the quality of paediatric care in peripheral hospitals in developing countries. *Arch Dis Child* 2003; 88:563–565.
- 31) Duke T, Keshishyan E, Kuttumuratova A, Ostergren M, Ryumina I, Stasii E, et al. Quality of hospital care for children in Kazakhstan, Republic of Moldova, and Russia: systematic observational assessment. *Lancet* 2006; 367: 919–25.
- 32) Campbell H, Duke T, Weber M, English M, Carai S, Tamburlini G. Pediatric hospital improvement group. Global initiatives for improving hospital care for children: state of the art and future prospects. *Pediatrics* 2008; 121(4): e984–e992. DOI: 10.1542/peds.2007-1395.
- 33) World Health Organization. Hospital care for children: quality assessment and improvement tool. A systematic standard based participatory approach. Second Edition 2015. Available: <http://www.euro.who.int/en/health-topics/Life-stages/child-and-adolescent-health/publications/2015/hospital-care-for-children-quality-assessment-and-improvement-tool-2015>. Accessed 24<sup>th</sup> February, 2017.
- 34) Graham WJ. Criterion-based clinical audit in obstetrics: bridging the quality gap? *Best Pract Res Clin Obstet Gynaecol.* 2009; 23:375–88. DOI: 10.1016/j.bpobgyn.2009.01.017.
- 35) Graham WJ, Wagaarachchi P, Penney G, McCaw-Binns A, Antwi KY, Hall MH. Criteria for clinical audit of the quality of hospital-based obstetric care in developing countries. *Bull World Health Organ* 2000; 78:614–20.

- 36) Pirkle CM, Dumont A, Zunzunegui MV. Criterion-based clinical audit to assess quality of obstetrical care in low- and middle-income countries: a systematic review. *Int J Qual Health Care* 2011; 23:456–63.
- 37) Kongnyuy EJ, Uthman OA. Use of criterion-based clinical audit to improve the quality of obstetric care: a systematic review. *Acta Obstet Gynecol Scand* 2009; 88:873–81. DOI: 10.1080/00016340903093542.
- 38) Beyond the numbers: reviewing maternal deaths and complications to make pregnancy safer. Geneva: World Health Organization; 2004. Available: <http://whqlibdoc.who.int/publications/2004/9241591838.pdf?ua=1>. Accessed 24<sup>th</sup> February, 2017.
- 39) Tunçalp Ö, Souza JP. Maternal near-miss audits to improve quality of care. *BJOG* 2014; 121(Suppl.4):102–4. DOI: 10.1111/1471-0528.12868.
- 40) Pileggi C, Souza JP, Cecatti JG, Faúndes A. Neonatal near miss approach in the 2005 WHO Global Survey Brazil. *J Pediatr* 2010; 86(1):21-26. DOI: 10.2223/JPED.1965.
- 41) World Health Organization, Department of Reproductive Health and Research. Evaluating the quality of care for severe pregnancy complications. The WHO near-miss approach for maternal health. 2011. Available: [http://whqlibdoc.who.int/publications/2011/9789241502221\\_eng.pdf?ua=1](http://whqlibdoc.who.int/publications/2011/9789241502221_eng.pdf?ua=1). Accessed 24<sup>th</sup> February, 2017.
- 42) IBGE - Instituto Brasileiro de Geografia e Estatística. Censo 2010. <http://censo2010.ibge.gov.br/>. Accessed 24<sup>th</sup> February, 2017.
- 43) International Monetary Fund 2016. World Economic Outlook (WEO) Update July 2016 - Uncertainty in the Aftermath of the U.K. Referendum. Available: <https://www.imf.org/external/pubs/ft/weo/2016/update/02/index.htm>. Accessed 24<sup>th</sup> February, 2017.
- 44) The World Bank Group 2016. Brazil Overview. Available: <http://www.worldbank.org/pt/country/brazil/overview>. Accessed 24<sup>th</sup> February, 2017.
- 45) Victora CG, Aquino EML, Leal MC, Monteiro CA, Barros FC, Szwarcwald CL. Maternal and child health in Brazil: progress and challenges. *Lancet* 2011; 377: 1863–76. DOI: 10.1016/S0140-6736(11)60138-4.
- 46) Paim J, Travassos C, Almeida C, Bahia L, Macinko J. The Brazilian health system: history, advances, and challenges. *Lancet* 2011; published online May 9. DOI: 10.1016/S0140-6736(11)60054-8.
- 47) Ministério da Saúde do Brasil. Entenda o SUS. Available: <http://portalsaude.saude.gov.br/index.php/cidadao/entenda-o-sus>. Accessed 24<sup>th</sup> February, 2017.

- 48) DataSUS – Informações de Saúde. Ministério da Saúde do Brasil. Available: <http://www2.datasus.gov.br/DATASUS/index.php?area=0402>. Accessed 24<sup>th</sup> February, 2017.
- 49) Millennium Development Goals – National Report – Brazil 2014. In: United Nations MDG Progress Reports - Latin America and the Caribbean. Achieving the Millennium Development Goals with equality in Latin America and the Caribbean: Progress and challenges. Available: <http://www.undp.org/content/undp/en/home/librarypage/mdg/mdg-reports/lac-collection.html>. Accessed 24<sup>th</sup> February, 2017.
- 50) Lansky S, Friche AAL, Silva AAM, Campos D, Bittencourt SDA, Carvalho ML, et al. Birth in Brazil survey: neonatal mortality profile, and maternal and child care. *Cad. Saúde Pública* 2014; 30 Suppl S192-S207. DOI: 10.1590/0102-311X00133213.
- 51) World Health Organization. Trends in maternal mortality: 1990 to 2015: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva 2015. Available: <http://www.who.int/reproductivehealth/publications/monitoring/maternal-mortality-2015/en/>. Accessed 24<sup>th</sup> February, 2017.
- 52) Béhague DP, Victora CG, Barros FC. Consumer demand for caesarean sections in Brazil: informed decision making, patient choice, or social inequality? A population based birth cohort study linking ethnographic and epidemiological methods. *BMJ* 2002; 324: 942–45.
- 53) Vieira GO, Fernandes LG, Oliveira NF, Silva LR, Vieira TO. Factors associated with cesarean delivery in public and private hospitals in a city of northeastern Brazil: a cross-sectional study. *Pregnancy and Childbirth* 2015; 15: 132. DOI: 10.1186/s12884-015-0570-8.
- 54) Martins-Costa, S E Ramos, J G L. A Questão das Cesarianas. *Rev. Bras. Ginecol. Obstet.* 2005; 27 (10): 571-574.
- 55) Diniz SG. Gênero, saúde materna e o paradoxo perinatal. *Rev Bras Crescimento Desenvolv Hum.* 2009; 19(2):313-326.
- 56) Diniz SG, d'Oliveira AFP, Lansky S. Equity and women's health services for contraception, abortion and childbirth in Brazil. *Reprod Health Matters* 2012; 20:94-101. DOI: 10.1016/S0968-8080(12)40657-7.
- 57) Sousa A, Dal Poz MR, Carvalho CL. Monitoring Inequalities in the Health Workforce: The Case Study of Brazil 1991–2005. *PLoS ONE* 2012; 7(3): e33399. DOI: 10.1371/journal.pone.0033399.

- 58) Gualda DMR, Narchi NZ, Campos EA. Strengthening midwifery in Brazil: Education regulation and professional association of midwives. *Midwifery* 2013; 29 (10), 1077–1081. DOI: 10.1016/j.midw.2013.08.002.
- 59) Leal MC, Gama SGN, Campos MR, Cavalini LT, Garbayo LS, Brasil CLP, et al. Fatores associados à morbimortalidade perinatal em uma amostra de maternidades públicas e privadas do Município do Rio de Janeiro, 1999–2001. *Cadernos de Saúde Pública* 2004; 20:S20–S33.
- 60) Machado JP, Martins ACM, Martins MS. Avaliação da qualidade do cuidado hospitalar no Brasil: uma revisão sistemática. *Cad. Saúde Pública* 2013; 29 (6): 1063–1082.
- 61) Cavalcanti PCS, Gurgel Junior GD, Vasconcelos ALR, Guerrero AVP. Um modelo lógico da Rede Cegonha. *Revista de Saúde Coletiva* 2013; 23 (4): 1297–1316.
- 62) Haddad SM, Cecatti JG, Parpinelli MA, Souza JP, Costa ML, Sousa MH, et al. for National Network for the Surveillance of Severe Maternal Morbidity Group. From planning to practice: building the national network for the surveillance of severe maternal morbidity. *BMC Public Health* 2011; 11:283. DOI: 10.1186/1471-2458-11-283.
- 63) Luz AG, Osis MJ, Ribeiro M, Cecatti JG, Amaral E. Impact of a nationwide study for surveillance of maternal near-miss on the quality of care provided by participating centers: a quantitative and qualitative approach. *BMC Pregnancy Childbirth* 2014; 14:122. DOI: 10.1186/1471-2393-14-122.
- 64) Luz AG, Osis MJ, Ribeiro M, Cecatti JG, Amaral E. Perspectives of professionals participating in the Brazilian Network for the Surveillance of Severe Maternal Morbidity regarding the implementation of routine surveillance: a qualitative study. *Reprod Health*. 2014; 11:29. DOI: 10.1186/1742-4755-11-29.
- 65) Universidade Federal do Maranhão. UNA-SUS/UFMA. Redes de atenção à saúde: a Rede Cegonha. 2015.
- 66) Ministério da Saúde. Rede cegonha. Available: [http://dab.saude.gov.br/portaldab/ape\\_redecegonha.php](http://dab.saude.gov.br/portaldab/ape_redecegonha.php). Accessed 24<sup>th</sup> February, 2017.
- 67) Carneiro RG. Anthropological dilemmas of a public health agenda: Rede Cegonha program, individuality and plurality. *Interface – Comunic Saude Educ* 2013; 17(44):49–59.
- 68) Ovretveit J. Contemporary quality improvement. *Cad. Saúde Pública* 2013; 29(3):424–426.
- 69) Tamburlini G, Siupsinskas G, Bacci A. Maternal and Neonatal Care Quality Assessment Working Group. Quality of maternal and neonatal care in Albania,



- Turkmenistan and Kazakhstan: a systematic, standard-based, participatory assessment. PLOS ONE 2011; 6(12): e28763. DOI: 10.1371/journal.pone.0028763.
- 70) Mersini E, Novi S, Tushe E, Gjoni M, Burazeri G. Adoption of the WHO Assessment Tool on the Quality of Hospital Care for Mothers and Newborns in Albania. Acta inform med 2012 Dec; 20(4): 226-234. DOI: 10.5455/aim.2012.20.226-234.
- 71) Tamburlini G, Yadgarova K, Kamilov A, Bacci A. Improving the Quality of Maternal and Neonatal Care: the Role of Standard Based Participatory Assessments. PLoS ONE 2013; 8 (10): e78282. DOI:10.1371/journal.pone.0078282
- 72) Wilunda C, Putoto G, Riva DD, Manenti F, Atzori A, Calia F, et al. Assessing Coverage, Equity and Quality Gaps in Maternal and Neonatal Care in Sub-Saharan Africa: An Integrated Approach. PLoS ONE 2015; 10(5): e0127827. DOI: 10.1371/journal.pone.0127827.
- 73) Lazzerini M, Bacci A, Lazdane G. Hospital care for mothers and newborn babies: WHO quality assessment and improvement tool - Conference paper, Human Rights in Childbirth Eastern Europe. Zagreb, Croatia April 2015. In: WHO Europe - Maternal and newborn health 2016. <http://www.euro.who.int/en/health-topics/Life-stages/maternal-and-newborn-health/publications/2014/hospital-care-for-mothers-and-newborn-babies-quality-assessment-and-improvement-tool/hospital-care-for-mothers-and-newborn-babies-who-quality-assessment-and-improvement-tool>. Accessed 24<sup>th</sup> February, 2017.
- 74) Microcephaly Epidemic Research Group. Microcephaly in Infants, Pernambuco State, Brazil, 2015. Emerging Infectious Diseases 2016; 22(6): 1090-1093. DOI: 10.3201/eid2206.160062.
- 75) OPAS/WHO. Sala de Situação - Infecção pelo vírus Zika. [http://www.paho.org/bra/index.php?option=com\\_content&view=category&layout=blog&id=1293&Itemid=880](http://www.paho.org/bra/index.php?option=com_content&view=category&layout=blog&id=1293&Itemid=880) . Accessed 24<sup>th</sup> February, 2017.
- 76) Teixeira MG, Costa MCN, Oliveira WK, Nunes ML, Rodrigues LC. The Epidemic of Zika Virus–Related Microcephaly in Brazil: Detection, Control, Etiology, and Future Scenarios. American Journal of Public Health 2016; 106 (4): 601-605. DOI: 10.2105/AJPH.2016.303113.
- 77) Banco Central do Brasil. Taxas de Câmbio. Available: <http://www.bcb.gov.br/pt-br/#!/n/txcambio>. Accessed 24<sup>th</sup> February, 2017.
- 78) Ministério da Saúde. Iniciativa Hospital Amigo da Criança; 2017. Available: <http://portalsaude.saude.gov.br/index.php/o-ministerio/principal/secretarias/515-sa-raiz/dapes/saude-da-crianca-e-aleitamento-materno/13-saude-da-crianca-e-aleitamento-materno/10384-prevencao-de-violencia-e-promocao-da-cultura-de-paz>. Accessed 24<sup>th</sup> February, 2017.

- 79) Ministério da Saúde. Legislação Federal em Saúde – Saúde da Mulher; 2017 Available: <http://bvsms.saude.gov.br/bvs/legislacao/mulher.php>. Accessed 24<sup>th</sup> February, 2017.
- 80) Hodnett ED, Gates S, Hofmeyr GJ, Sakala C. Continuous support for women during childbirth. Cochrane Database of Systematic Reviews 2013, Issue 7. Art. No.: CD003766. DOI: 10.1002/14651858.CD003766.pub5.
- 81) World Health Organization. Recommendations for Augmentation of Labour - Highlights and Key Messages from World Health Organization's 2014 Global Recommendations. 2015. Available: [http://www.who.int/reproductivehealth/publications/maternal\\_perinatal\\_health/key-msgs-augmentation-labour/en/](http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/key-msgs-augmentation-labour/en/). Accessed 24<sup>th</sup> February, 2017.
- 82) Ministério da Saúde. Ministério da Saúde e ANS publicam regras para estimular parto normal na saúde suplementar. Portal da Saúde SUS. 2015. Available: <http://portalsaude.saude.gov.br/index.php/cidadao/principal/agencia-saude/16177-ministerio-da-saude-e-ans-publicam-regras-para-estimular-parto-normal-na-saude-suplementar> . Accessed 24<sup>th</sup> February, 2017.
- 83) Federação Brasileira das Associações de Ginecologia e Obstetrícia FEBRASGO. Entenda o que é o partograma. 2015. Available: <http://www.febRASGO.org.br/site/?p=10298>. Accessed 24<sup>th</sup> February, 2017.
- 84) Zinszer K, Morrison K, Brownstein JS, Marinho F, Santos AF, Nsoesie EO. Reconstruction of Zika Virus Introduction in Brazil. Emerging Infectious Diseases 2017; 23(1): 91-94. DOI: 10.3201/eid2301.161274.
- 85) d'Orsi E, Chor D, Giffin K, Angulo-Tuesta A, Barbosa GP, Gama AS, et al. Qualidade da atenção ao parto em maternidades do Rio de Janeiro. Rev. Saúde Pública 2005; 39(4): 645-654. DOI: 10.1590/S0034-89102005000400020.
- 86) Oliveira MICD, Dias MAB, Cunha CB, Leal MDC. Quality assessment of labor care provided in the Unified Health System in Rio de Janeiro, Southeastern Brazil, 1999-2001. Revista de Saúde Pública 2008; 42(5), 895-902.
- 87) Vogt SE, Diniz SG, Tavares CM, Santos NCP, Schneck CA, Zorzam B, et al. Características da assistência ao trabalho de parto e parto em três modelos de atenção no SUS, no Município de Belo Horizonte, Minas Gerais, Brasil. Cad. Saúde Pública 2011; 27(9): 1789-1800.
- 88) Leal MC, Silva AAM, Dias MAB, Gama SGN, Rattner D, Moreira ME, et al. Birth in Brazil: national survey into labour and birth. Reproductive Health 2012 9:15. DOI: 10.1186/1742-4755-9-15.

- 89) Bittencourt SDA, Reis LGC, Ramos MM, Rattner D, Rodrigues PL, Neves DCO, et al. Structure in Brazilian maternity hospitals: key characteristics for quality of obstetric and neonatal care. *Cad. Saúde Pública*. 2014; 30(suppl.1): S208-219.
- 90) Bittencourt SDA, Domingues RMSM, Reis LGC, Ramos MM, Leal MC. Adequacy of public maternal care services in Brazil. *Reproductive Health* 2016; 13(Suppl 3):120. DOI: 10.1186/s12978-016-0229-6.
- 91) Diniz CSG, d'Orsi E, Domingues RMSM, Torres JA, Dias MAB, Schneck CA, et al. Implementation of the presence of companions during hospital admission for childbirth: data from the Birth in Brazil national survey. *Cad. Saúde Pública* 2014; 30 Sup:S1-S14. DOI: 10.1590/0102-311X00127013.
- 92) Diniz SG, Bick D, Bastos MH, Riesco ML. Empowering women in Brazil. *Lancet* 2007; 370(9599):1596–98.
- 93) d'Orsi E, Brüggemann OM, Diniz CSG, Aguiar JM, Gusman CR, Torres JA, et al. Social inequalities and women's satisfaction with childbirth care in Brazil: a national hospital-based survey. *Cad. Saúde Pública* 2014; 30 Sup:S154-S168. DOI: 10.1590/0102-311X00087813.
- 94) Nair M, Yoshida S, Lambrechts T, Boschi-Pinto C, Bose K, Mason EM, et al. Facilitators and barriers to quality of care in maternal, newborn and child health: a global situational analysis through metareview. *BMJ Open* 2014; 4:e004749. DOI: 10.1136/bmjopen-2013-004749.
- 95) Belizan M, Meier A, Althabe F, Codazzi A, Colomar M, Buekens P, et al. Facilitators and barriers to adoption of evidence-based perinatal care in Latin American hospitals: a qualitative study. *Health Education Research* 2007; 22 (6): 839–853. DOI: 10.1093/her/cym012.
- 96) Ministério da Saúde do Brasil. Protocolos Clínicos e Diretrizes Terapêuticas Diretrizes de Atenção à Gestante: a operação cesariana. Nº 179. March/2016. Available: [http://conitec.gov.br/images/Consultas/Relatorios/2016/Relatorio\\_Diretrizes\\_Cesariana\\_N179.pdf](http://conitec.gov.br/images/Consultas/Relatorios/2016/Relatorio_Diretrizes_Cesariana_N179.pdf). Accessed 24<sup>th</sup> February, 2017.
- 97) Ministério da Saúde. Protocolos Clínicos e Diretrizes Terapêuticas: Diretriz Nacional de Assistência ao Parto Normal. January/2016. Available: [http://conitec.gov.br/images/Consultas/2016/Relatorio\\_Diretriz-PartoNormal\\_CP.pdf](http://conitec.gov.br/images/Consultas/2016/Relatorio_Diretriz-PartoNormal_CP.pdf). Accessed 24<sup>th</sup> February, 2017.
- 98) Diniz CSG. Humanization of childbirth care in Brazil: the numerous meanings of a movement. *Ciência & Saúde Coletiva* 2005; 10(3): 627-637.
- 99) Sass N, Torloni MR, Soares BGO, Atallah AN. Continuing medical education in Brazil: what about obstetricians and gynecologists? *Sao Paulo Med J*. 2005; 123(1):5-10.

- 100) Suliman MT. Sending photos through WhatsApp: A faster method for teleconsultation. *Journal of Local and Global Health Science* 2014;2. DOI: 10.5339/jlghs.2014.2.
- 101) Johnston MJ, King D, Arora S, Behar N, Athanasiou T, Sevdalis N, et al. Smartphones let surgeons know WhatsApp: an analysis of communication in emergency surgical teams. *Am J Surg* 2015;209:45–51. DOI: 10.1016/j.amjsurg.2014.08.030.
- 102) Drake TM, Claireaux HA, Khatri C, Chapman SJ. WhatsApp with patient data transmitted via instant messaging? *Am J Surg.* 2016 Jan;211(1):300-1. DOI: 10.1016/j.amjsurg.2015.04.004.
- 103) Fernández-Valencia JA, Egea J, Pinyol MC, Orench M, Salas E, Gallart X. Whatsapp Messenger for Team Coordination in Surgical Areas. Initial Experience of a Hip Team in a Third Level Hospital. *Int J Adv Jt. Reconstr.* 2015; 2(1): 23-25.
- 104) Shah B, Kaushik S. Innovative use of social media platform WhatsApp during influenza outbreak in Gujarat, India. *WHO South-East Asia J Public Health* 2015; 4(2): 213–214.
- 105) Charles-Smith LE, Reynolds TL, Cameron MA, Conway M, Lau EHY, Olsen JM, et al. (2015) Using Social Media for Actionable Disease Surveillance and Outbreak Management: A Systematic Literature Review. *PLoS ONE* 10(10):e0139701. DOI: 10.1371/journal.pone.0139701.
- 106) Ollerhead E, Osrin D. Barriers to and incentives for achieving partograph use in obstetric practice in low- and middle-income countries: a systematic review. *BMC Pregnancy and Childbirth.* 2014;14:281. DOI: 10.1186/1471-2393-14-281.
- 107) Lavender T, Hart A, Smyth RMD. Effect of partogram use on outcomes for women in spontaneous labour at term. *Cochrane Database of Systematic Reviews* 2013, Issue 7. Art. No.: CD005461. DOI: 10.1002/14651858.CD005461.pub4.
- 108) Zegers M, de Bruijne MC, Spreeuwenberg P, Wagner C, Groenewegen PP, van der Wal G. Quality of patient record keeping: an indicator of the quality of care? *BMJ Qual Saf.* 2011; 20 (4): 314-8. DOI: 10.1136/bmjqs.2009.038976.
- 109) Sequist TD. Clinical Documentation to Improve Patient Care. *Ann Intern Med.* 2015; 162:315-316. DOI: 10.7326/M14-2913.
- 110) Rowe RE, Garcia J, Macfarlane AJ, Davidson LL. Improving communication between health professionals and women in maternity care: a structured review. *Health Expectations* 2002; 5(1): 63-83.
- 111) Goodman P, Mackey MC, Tavakoli AS. Factors related to childbirth satisfaction. *Journal of Advanced Nursing* 2004; 46(2), 212–219.

- 112) Jamas MT, Hoga LAK, Reberte LM. Women's narratives on care received in a birthing center. *Cad. Saúde Pública* 2013; 29(12):2436-2446. DOI: 10.1590/0102-311X00039713.
- 113) Mannava P, Durrant K, Fisher J, Chersich M, Luchters S. Attitudes and behaviours of maternal health care providers in interactions with clients: a systematic review *Globalization and Health* 2015; 11:36. DOI: 10.1186/s12992-015-0117-9.
- 114) Hodnett ED. Pain and women's satisfaction with the experience of childbirth: a systematic review. *Am J Obstet Gynecol* 2002; 186(5 Suppl Nature):S160-72.
- 115) Salgado HO, Niy DY, Diniz CSG. Groggy and with tied hands: the first contact with the newborn according to women that had an unwanted C-section; *Journal of Human Growth and Development* 2013; 23(2): 190-197.
- 116) Ayieko P, Ntoburi S, Wagai J, Opondo C, Opiyo N, Migiro S, et al. A multifaceted intervention to implement guidelines and improve admission paediatric care in Kenyan district hospitals: a cluster randomised trial. *PLoS Med.* 2011; 8(4):e1001018. DOI: 10.1371/journal.pmed.1001018.
- 117) Hoque DME, Rahman M, Billah SM, Savic M, Rezaul Karim AQM, Chowdhury EK, et al. An assessment of the quality of care for children in eighteen randomly selected district and sub-district hospitals in Bangladesh. *BMC Pediatrics* 2012 12:197. DOI: 10.1186/1471-2431-12-197.
- 118) Hoque DME, Arifeen SE, Rahman M, Chowdhury EK, Haque TM, Begum K, et al. Improving and sustaining quality of child health care through IMCI training and supervision: experience from rural Bangladesh. *Health Policy Plan* 2013; 29 (6): 753-762. DOI: 10.1093/heapol/czt059.
- 119) Lazzerini M, Shukurova V, Davletbaeva M, Monolbaev K, Kulichenko T, Akoev Y, et al. Improving the quality of hospital care for children by supportive supervision: a cluster randomized trial, Kyrgyzstan. *Bulletin of the World Health Organization* 2016. Article ID: BLT 16.176982. Available: [http://www.who.int/bulletin/online\\_first/en/](http://www.who.int/bulletin/online_first/en/). Accessed 24<sup>th</sup> February, 2017.
- 120) Mumford V, Forde K, Greenfield D, Hinchcliff R, Braithwaite J. Health services accreditation: what is the evidence that the benefits justify the costs?. *Int J Qual Health Care* 2013; 25(5): 606-620. DOI: 10.1093/intqhc/mzt059.
- 121) Mumford V, Greenfield D, Hogden A, Forde K, Westbrook J, Braithwaite J. Counting the costs of accreditation in acute care: an activity-based costing approach. *BMJ Open* 2015;5:e008850. DOI: 10.1136/bmjopen-2015-008850.

- 122) Brubakk K, Vist GE, Bukholm G, Barach P, Tjomsland O. A systematic review of hospital accreditation: the challenges of measuring complex intervention effects. *BMC Health Services Research* 2015; 15:280. DOI: 10.1186/s12913-015-0933-x.
- 123) Ruelas E, Gómez-Dantés O, Leatherman S, Fortune T, Gay-Molina JG; Strengthening the quality agenda in health care in low- and middle-income countries: questions to consider. *Int J Qual Health Care* 2012; 24(6):553-557. DOI: 10.1093/intqhc/mzs061.
- 124) Grimshaw J, Campbell M, Eccles M, Steen N. Experimental and quasi-experimental designs for evaluating guideline implementation strategies. *Family Practice* 2000; 17: S11–S18.
- 125) Sedgwick P. Before and after study designs. *BMJ* 2014;349:g5074. DOI: 10.1136/bmj.g5074.
- 126) World Health Organization. The World health report 2000 - Health systems: improving performance. Geneva. Available: <http://www.who.int/whr/2000/en/>. Accessed 24<sup>th</sup> February, 2017.
- 127) World Health Organization. 2007. Everybody's Business: Strengthening Health Systems to Improve Health Outcomes: WHO's Framework for Action. Geneva. Available: <http://apps.who.int/iris/handle/10665/43918>. Accessed 24<sup>th</sup> February, 2017.
- 128) Koblinsky M, Moyer CA, Calvert C, Campbell J, Campbell OMR, Feigl AB, et al. Quality maternity care for every woman, everywhere: a call to action. *Lancet* 2016; 388 (10057): 2307–2320. DOI: 10.1016/S0140-6736(16)31333-2.

## APPENDICES

### APPENDIX 1. INFORMED CONSENT FOR INTERVIEWS – MOTHERS

#### TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO MÃE PUÉRPERA – SUBPROJETO A

##### IDENTIFICAÇÃO

**Título do projeto:** Inovações no cuidado materno infantil em Pernambuco: avaliação e melhoria da assistência ao parto e visitas domiciliares para gestantes e crianças de até 09 (nove) meses

**Instituição:** Instituto de Medicina Integral Professor Fernando Figueira – IMIP

##### **Pesquisadores responsáveis:**

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Emanuelle Pessa Valente - Fone: (81) 9132-0944 / E-mail: [emanuellevalente@imip.org.br](mailto:emanuellevalente@imip.org.br)

Tereza Rebecca de Melo e Lima - Fone: (81) 92628299 / E-mail: [terezarebeca@yahoo.com.br](mailto:terezarebeca@yahoo.com.br)

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##### **Comitê de Ética de Pesquisa em seres humanos do IMIP (CEP/IMIP)**

**Endereço:** Rua dos Coelho, 300, Boa Vista. Diretoria de Pesquisa do Imip

**E-mail:** [comitedeetica@imip.org.br](mailto:comitedeetica@imip.org.br) **Telefone:** (081) 2122-4756

##### ORIENTAÇÕES

A senhora está sendo convidada a participar, de livre e espontânea vontade, do projeto de pesquisa intitulado “Inovações no cuidado materno infantil em Pernambuco: avaliação e melhoria da assistência ao parto e visitas domiciliares para gestantes e crianças de até 09 (nove) meses”.

Este termo de consentimento visa esclarecê-la sobre a pesquisa e garantir o seu direito à liberdade de consentimento e participação. Você receberá uma cópia deste termo de consentimento para seu registro.

## **INFORMAÇÕES SOBRE A PESQUISA**

A presente pesquisa tem como objetivo organizar um programa de melhoria da assistência hospitalar através de um ciclo completo de avaliação de maternidades, utilizando-se de um instrumento de avaliação com acompanhamento da execução do plano de ação resultante.

Será realizado em 06 (seis) maternidades do estado de Pernambuco.

Durante o período de visitas de avaliação das maternidades, a senhora será convidada a participar de entrevistas individuais e em grupo para saber a sua opinião sobre disponibilidade ou o uso apropriado dos recursos de saúde, como também o manejo de casos clínicos e rotinas/conduitas adotadas pelo corpo clínico do serviço.

## **RISCOS E BENEFÍCIOS**

A metodologia adotada apresenta um risco mínimo aos participantes do estudo que consiste no tempo gasto durante o preenchimento dos questionários e a participação das entrevistas. O possível desconforto que poderá ser gerado seria o constrangimento por participar de discussões em grupo. Para amenizá-los, usamos os critérios de confidencialidade e participação voluntária do estudo.

A pesquisa visa avaliar a assistência à saúde materno infantil. As percepções dos participantes trarão críticas, sugestões de aperfeiçoamento do programa. Com a pesquisa você estará contribuindo para melhoria dos cuidados.

## **CONFIDENCIALIDADE, PARTICIPAÇÃO VOLUNTÁRIA E RETIRADA**

As informações obtidas nesta pesquisa serão tratadas rigorosamente com sigilo. Os resultados serão divulgados publicamente, mas sua identidade não será revelada.

A sua participação nesta pesquisa é voluntária, você pode recusar-se a participar ou retirar seu consentimento em qualquer fase sem qualquer prejuízo.

## **DÚVIDAS**

Caso não entenda algum tópico deste termo ou se você tiver alguma consideração ou dúvida sobre a ética da pesquisa, entre em contato com o comitê de Ética em Pesquisa em Seres Humanos do IMIP (CEP-IMIP) que objetiva defender os interesses dos participantes da pesquisa em sua integridade e dignidade e contribuir no desenvolvimento da pesquisa dentro de padrões éticos. 10.2 O CEP-IMIP está situado à Rua dos Coelho, 300, Boa Vista. Diretoria de Pesquisa do IMIP, Prédio Administrativo Orlando Onofre, 1º Andar tel: 2122-4756 – Email: [comitedeetica@imip.org.br](mailto:comitedeetica@imip.org.br). O



CEP/IMIP funciona de 2<sup>a</sup> a 6<sup>a</sup> feira, nos seguintes horários: 07:00 às 11:30 hs (manhã) e 13:30 às 16:00hs (tarde).

## CONSENTIMENTO

Declaro que entendi os objetivos, riscos e benefícios de minha participação na pesquisa, concordo em participar.

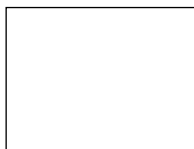
\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
**Voluntário**

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
**Testemunha**

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
**Testemunha**

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
**Pesquisador Responsável**

**Impressão digital**



## **APPENDIX 2. INFORMED CONSENT FOR INTERVIEWS – STAFF**

### **TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO PROFISSIONAIS DE SAÚDE E ESTUDANTES – SUBPROJETO A**

#### **IDENTIFICAÇÃO**

**Título do projeto:** Inovações no cuidado materno infantil em Pernambuco: avaliação e melhoria da assistência ao parto e visitas domiciliares para gestantes e crianças de até 09 (nove) meses

**Instituição:** Instituto de Medicina Integral Professor Fernando Figueira – IMIP

#### **Pesquisadores responsáveis:**

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#### **ORIENTAÇÕES**

O(a) senhor(a) está sendo convidado(a) a participar, de livre e espontânea vontade, do projeto de pesquisa intitulado “Inovações no cuidado materno infantil em Pernambuco: avaliação e melhoria da assistência ao parto e visitas domiciliares para gestantes e crianças de até 09 (nove) meses”.

Este termo de consentimento visa esclarecê-la sobre a pesquisa e garantir o seu direito à liberdade de consentimento e participação. Você receberá uma cópia deste termo de consentimento para seu registro.

#### **INFORMAÇÕES SOBRE A PESQUISA**

A presente pesquisa tem como objetivo organizar um programa de melhoria da assistência hospitalar através de um ciclo completo de avaliação de maternidades, utilizando-se de um instrumento de avaliação com acompanhamento da execução do plano de ação resultante.

Será realizado em 06 (seis) maternidades do estado de Pernambuco.

Durante o período de visitas de avaliação das maternidades, o(a) senhor(a) será convidada a participar de entrevistas individuais e em grupo para saber a sua opinião sobre disponibilidade ou o uso apropriado dos recursos de saúde, como também o manejo de casos clínicos e rotinas/conduitas adotadas pelo corpo clínico do serviço.

## **RISCOS E BENEFÍCIOS**

A metodologia adotada apresenta um risco mínimo aos participantes do estudo que consiste no tempo gasto durante o preenchimento dos questionários e a participação das entrevistas. O possível desconforto que poderá ser gerado seria o constrangimento por participar de discussões em grupo. Para amenizá-los, usamos os critérios de confidencialidade e participação voluntária do estudo.

A pesquisa visa avaliar a assistência à saúde materno infantil. As percepções dos participantes trarão críticas, sugestões de aperfeiçoamento do programa. Com a pesquisa você estará contribuindo para melhoria dos cuidados.

## **CONFIDENCIALIDADE, PARTICIPAÇÃO VOLUNTÁRIA E RETIRADA**

As informações obtidas nesta pesquisa serão tratadas rigorosamente com sigilo. Os resultados serão divulgados publicamente, mas sua identidade não será revelada.

A sua participação nesta pesquisa é voluntária, você pode recusar-se a participar ou retirar seu consentimento em qualquer fase sem qualquer prejuízo.

## **DÚVIDAS**

Caso não entenda algum tópico deste termo ou se você tiver alguma consideração ou dúvida sobre a ética da pesquisa, entre em contato com o comitê de Ética em Pesquisa em Seres Humanos do IMIP (CEP-IMIP) que objetiva defender os interesses dos participantes da pesquisa em sua integridade e dignidade e contribuir no desenvolvimento da pesquisa dentro de padrões éticos. 10.2 O CEP-IMIP está situado à Rua dos Coelho, 300, Boa Vista. Diretoria de Pesquisa do IMIP, Prédio Administrativo Orlando Onofre, 1º Andar tel: 2122-4756 – Email: [comitedeetica@imip.org.br](mailto:comitedeetica@imip.org.br). O

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## CONSENTIMENTO

Declaro que entendi os objetivos, riscos e benefícios de minha participação na pesquisa, concordo em participar.


\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
**Voluntário**

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
**Testemunha**

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
**Testemunha**

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
**Pesquisador Responsável**

**Impressão digital**



### APPENDIX 3. MONITORING QUESTIONNAIRE

**PESQUISA: Inovações no cuidado materno infantil em Pernambuco: avaliação e melhoria da assistência ao parto e visitas domiciliares para gestantes e crianças de até 9 meses.**

*Prezado (a),*

*Sua maternidade está participando da nossa pesquisa e a qualidade da assistência prestada a mães e recém-nascidos foi avaliada há alguns meses. Durante a reunião de entrega de resultados foi elaborado em conjunto com a equipe um plano de ação com sugestões de melhorias. Você foi escolhido como profissional responsável para garantir a implementação de algumas das melhorias necessárias.*

*O instrumento abaixo foi desenvolvido para esclarecer os fatores que podem estar influenciando essas mudanças. Suas respostas são confidenciais e serão usadas apenas para fins de pesquisa!*

*Obrigada pela colaboração!*

#### INSTRUMENTO DE AVALIAÇÃO DOS FATORES QUE INFLUENCIAM AS MUDANÇAS

Hospital: \_\_\_\_\_

Profissão: \_\_\_\_\_ Data: \_\_\_\_/\_\_\_\_/\_\_\_\_

1) Qual área de melhoria está sob sua responsabilidade?

- ☐ Gestão Hospitalar
- ☐ Setores Mães
- ☐ Setores Neonatologia
- ☐ Setores Apoio Hospitalar (Farmácia, lavanderia, informática e gestão de dados)
- ☐ Outros - especifique \_\_\_\_\_

2) Nos últimos 4 meses foram realizados planejamentos de melhorias nas áreas sob sua responsabilidade?

- ☐ Sim, plano de melhorias por escrito
- ☐ Sim, plano de melhorias verbal
- ☐ Não

Se Sim, por escrito ou verbal, cite aqui as principais ações planejadas na sua área de atuação: \_\_\_\_\_

\_\_\_\_\_

3) Existe alguém que ajuda você no planejamento de melhorias?

(     ) Sim

(     ) Não

Caso a resposta seja Sim, especificar quem ajuda: \_\_\_\_\_

4) Qual foi a influência que a avaliação baseada no instrumento da OMS exerceu para o planejamento das melhorias na sua maternidade?

(     ) Nenhuma

(     ) Muito pouca influência

(     ) Influência significativa, mas não foi o único fator

(     ) Foi determinante, sem a avaliação a melhoria não teria sido planejada

5) As melhorias planejadas foram realizadas? (Caso não tenham sido planejadas passar para a pergunta número 7)

(     ) Sim, todas as planejadas

(     ) Sim, apenas algumas daquelas planejadas

(     ) Não

(     ) Não sei

Cite aqui as melhorias já realizadas: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6) Existe alguém que ajuda você na execução de melhorias? (Caso não tenham sido planejadas ou executadas passar para a pergunta número 7)

(     ) Sim

(     ) Não

Caso a resposta seja Sim, especificar quem ajuda: \_\_\_\_\_

7) Quais os fatores que facilitaram (tem facilitado) a realização de melhorias? (podem ser marcadas mais de uma opção)

(     ) Presença de recursos financeiros

(     ) Apoio e motivação da equipe

(     ) Apoio da direção

(     ) Apoio do governo

(     ) Solicitação da população atendida

(     ) Uso do instrumento de avaliação como guia para melhorias

(     ) Diminuição no número de admissões/atendimentos no período

(     ) Outros. Especificar: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

8) Quais os fatores que dificultaram (tem dificultado) a realização de melhorias? (podem ser marcadas mais de uma opção)

- ☐ Ausência de recursos financeiros
  - ☐ Falta de apoio e/ou motivação da equipe
  - ☐ Falta de apoio da direção
  - ☐ Falta de apoio do governo
  - ☐ Ausência de solicitação da população atendida
  - ☐ Dificuldade na interpretação do instrumento de avaliação
  - ☐ Aumento no número de admissões/atendimentos no período
  - ☐ Outros. Especificar: \_\_\_\_\_
- 
- 

9) Nos últimos 4 meses, com qual frequência você utilizou o instrumento de avaliação como guia para melhorias?

- ☐ Usei frequentemente
  - ☐ Usei algumas vezes
  - ☐ Usei raramente. Por quê? \_\_\_\_\_
- 
- ☐ Nunca usei. Por quê? \_\_\_\_\_
-

## ANNEXES

### ANNEX 1. TEMPLATE FOR PLAN OF ACTION AT HOSPITAL LEVEL

Discuss the above summary of hospital findings with the senior hospital management, giving details and providing real examples more as appropriate. Discuss their perception of the findings, and how action could be taken to improve services for mothers and babies. Discuss importance and feasibility of each action. Write down a plan of action, using the following matrix (expand as needed).

| PRIORITY PROBLEMS | ACTION NEEDED<br>(INCLUDING REMOVAL OF<br>BARRIERS) | RESPONSIBLE PERSON<br>AND TIMETABLE |
|-------------------|---|-------------------------------------|
|                   |   |                                     |
|                   |   |                                     |
|                   |   |                                     |
|                   |   |                                     |
|                   |   |                                     |
|                   |   |                                     |



## **ANNEX 2. TEMPLATE FOR PLAN OF ACTION AT STATE/NATIONAL LEVEL**

When the findings of the evaluation are discussed at a national/central level, it may assist to use this matrix. Expand the matrix as needed.

| HEALTH<br>SERVICE<br>FUNCTION     | PRIORITY<br>PROBLEMS | ACTION NEEDED<br>(INCLUDING REMOVAL<br>OF BARRIERS) | RESPONSIBLE<br>PERSON AND<br>TIMETABLE |
|-----------------------------------|----------------------|---|--|
| 1. Stewardship and Governance     |                      |   |  |
| 2. Service Delivery               |                      |   |  |
| 3. Infrastructure and Commodities |                      |   |  |
| 4. Human Resources                |                      |   |  |
| 5. Financing                      |                      |   |  |
| 6. Information System             |                      |   |  |