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**RAPID HEALTH FACILITY ASSESSMENT OF
MATERNAL AND NEWBORN SERVICES IN JORDAN**

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Executive summary

This report presents the results of a rapid health facility assessment of the maternal and newborn services in Jordan. The assessment was conducted to assess the quality of care provided to mothers and newborns during pregnancy, delivery, and postpartum periods. A total of 32 main hospitals that provide maternity services were assessed. These hospitals are distributed over the three regions of the country (14 in the north, 11 in the middle, and 7 in the south), representing the different health sectors, namely, the Ministry of Health (MoH), the Royal Medical Services (RMSs), the Private Sector, and the Teaching hospitals. The study involved direct observations of these hospitals and interviews with basic health staff and hospital staff, with the purpose of assessing and evaluating the availability of various services for mothers and newborns, availability of resources, equipment and supplies, documentation and staff training, and provision of the health care services.

Results revealed an overall satisfactory quality of maternal and newborn care and services; however, some deficiencies existed as follows:

- Some hospitals have significant shortages of obstetricians & gynaecologists, paediatricians, neonatologists, and midwives/nurses.
- Antenatal care was not provided systematically by many hospitals across the country.
- Insufficient supplies of some highly imperative items in the admission departments of some hospitals.
- The operation theatres in many hospitals lacked a variety of necessary equipments including some basic items such as thermometers and some advanced items such as an advanced resuscitation set for babies.
- Only two thirds of all delivery rooms in the selected hospitals had radiant heaters and obstetrical stethoscopes available.
- A significant lack of NICU equipments such as incubators, resuscitation tables, CPAP, O2 oximeters, and phototherapy.
- The majority of infants in NICUs (83.9%) received infant formula, while only 9.7% were offered breastfeeding.

- A significant lack of necessary equipment, drugs, and supplies was evident in many hospitals.
- Some of the practices of healthcare workers in few hospitals were not in line with the WHO recommendations and guidelines.
- A large number of hospitals, mainly the hospitals in the north region, lacked important guidelines, protocols, and policies.
- A lack of training of healthcare professionals on routine and special care for mothers and newborns, including emergency and critical care.

The findings of this rapid assessment is expected to aid policymakers, health professionals, and researchers to recognize the gaps in the processes, supplies, and quality of care related to services provided at maternal facilities and help them to design and implement evidence-based health programs in order to provide effective health services and promote the health of mothers and newborns.

Based on the findings of the rapid assessment, we recommend the followings:

1. Ensure that a sufficient number of facilities have enough capacity, drugs, equipment, and supplies to provide high quality basic and comprehensive care.

- Strengthen the current distribution system of equipment, supplies, medicals, and drugs.
- Procure and distribute, in all hospitals, essential, lifesaving equipment, commodities, and supplies, including lifesaving obstetric drugs (e.g. Magnesium sulphate, Oxytocin, Ergometrimne, Adrenaline, Anti D factor, Prostaglandines, Surfactant, Antibiotics, IV Cannulas and infusion sets, suction and feeding tubes, disposable items such as syringes, gauze, gloves).
- Establish an effective request process for equipment and supplies to decrease waiting periods and avoid stock-outs and establish effective supervision of equipment maintenance.
- Review the essential drugs list and establish a system to ensure procurement and distribution of essential drugs on a sustainable basis at all levels.
- Establish a system for the maintenance of health facilities and equipment at all levels and create budget lines for the maintenance of equipment and furniture.

- Equip institutions with teaching and learning materials to provide competency based training.
- Sustain safe blood supply.

2. Strengthen the competencies of existing personnel health care providers in Jordan maternity facilities to enable them to provide effective and high quality maternal and newborn health care across the continuum of care spectrum.

- Develop and scale-up a training strategy for in-service multidisciplinary training of maternal and neonatal health care providers on evidence-based perinatal care.
- Define the package of essential competencies that health care workers should master to provide preconception, maternal, and perinatal care and introduce evidence-based perinatal care training courses (e.g. WHO/MPS course on Effective Perinatal Care).
- Identify key maternities in each region to spearhead the training efforts.
- Strengthen the Continuous Medical Education (CME) system to deliver new knowledge to the physicians.
- Incorporate public health approaches related to maternal and newborn health as well as evidence-based perinatal care into the formal teaching curricula of medical, nursing, and midwifery schools.
- Develop and implement higher level courses in midwifery and neonatal intensive care, including training programs for neonatologists and pediatric nurses in advanced neonatal care (e.g. STABLE program, Neonatal Resuscitation Training Program,) to enable them to assess, diagnose, manage, and monitor the wide variety of possible conditions that can occur in neonatal critical care settings.

3. Increase the number of skilled personnel in health facilities for preconception, antenatal, childbirth, and postpartum; mainly neonatologists and paediatric nurses.

- Develop, introduce, and utilize staffing norms based on workload.
- Identify the number of practicing health personnel by occupational category and competencies and determine the gap between existing and needed levels for quality care.
- Encourage participation of professional associations of Obstetricians/Gynaecologists and paediatricians in the process of improving the quality of physicians' manpower.
- Recruit and retain more health care workers in hospitals that suffer from shortages in

human resources.

- Formulate a national human resources plan and allocate budgets to train more specialists in the area of neonatology inside the country or overseas (Scholarship program).

4. Ensure the availability and implementation of up –to- date guidelines and protocols.

- Establish and support a multidisciplinary working group of local and international experts to review, update, and standardize the national policies, protocols, and guidelines. Establish the guidelines based on perinatal approach (Focused antenatal care, labour, delivery, postpartum, newborn care) in collaboration with regional advisory and technical bodies.
- Produce and disseminate the updated policies and guidelines at all levels.
- Train health care providers on the implementation of the policies and guidelines.

5. Focus on high impact and cost-effective interventions and prioritize action during labour, childbirth, and the first days of life to improve the quality of obstetric and neonatal care services in hospitals.

- Increase emphasis on immediate and exclusive breastfeeding and the implementation of sound hospital policies promoting breastfeeding education and practice. Continue re-assessment of Baby Friendly Hospitals on a regular basis.
- Introduce "Kangaroo Mother Care (KMC)" to improve care for preterm infants through training of health care providers (neonatologists, midwives, and paediatric nurses) and the development of clinical practice guidelines, training materials, job aids, supervisory systems, and indicators to track implementation and monitor KMC outcomes. Establishment of KMC centres of excellence will maximize KMC expansion, knowledge and training transfer, and mentoring.
- Introduce and implement comprehensive infection prevention and control program in maternity units and NICUs (e.g. hand washing compliance program; standards compliance of infection control in IV fluid preparation; catheter/cannula insertions and other invasive procedures; rational antibiotic policies and guidelines; educational programmes on the prevention of hospital infection for hospital personnel; surveillance system of hospital infection).
- Improve assessment, management, and monitoring of neonatal critical conditions in

neonatal intensive care units. Areas such as prevention and management of neonatal infections, management of respiratory distress syndrome, expansion of N-CPAP technology, feeding support to preterm infants and parenteral nutrition, and standardization of procedures for monitoring newborn conditions in NICUs need particular attention.

- Improve surfactant therapy at the tertiary level. This intervention is costly and should be implemented after regionalized perinatal care is developed and the referral system is functional.
- Prevent severe bleeding by providing the Vitamin K 0.5mg injection for all LBW babies.
- Ensure competent staffs who are adequately equipped to provide neonatal resuscitation. Encourage service providers to anticipate newborns who may require resuscitation and to plan accordingly, and develop resuscitation standards for different levels at the setting. Use existing national or WHO guidelines as a basis.
- Ensure competent staff is adequately equipped to identify jaundice and provide appropriate treatment and services.
- Support and promote the principles of women and family-centered maternity care, including empowerment of women and families in collaboration with the health-care team to provide opportunities for mothers to participate in the care of their babies while in NICUs, and make informed decisions regarding treatment, care, and discharge of both mothers and newborns.
- Implement perinatal mortality audits in hospitals to enable a systematic approach to the investigation of perinatal deaths. All neonatal deaths and stillbirths with no evidence of a major congenital anomaly need to be fully investigated to identify if there were avoidable factors and areas for improvement in quality of obstetric and neonatal care, and track effectiveness of improvement programs.

6. Ensure that women start pregnancy as healthy a state as possible

- Increase coverage and quality of family planning services.
 - ✓ Increase access for family planning using novel approaches.
 - ✓ Provide effective communication about choices for delaying and spacing pregnancies.

- Update legislations to delay age at first pregnancy (more than 18 years of age).
- Increase school enrolment for all children through community mobilization, reduce the gender literacy gap by strengthening educational opportunities for girls and women, and advocate for national opportunities for girls to attend higher levels of education.
- Immunize women of reproductive age against key infections and ensure that women of reproductive age have had at least two Tetanus Toxoid immunizations.
- Provide quality care during pregnancy in order to prevent complications of pregnancy, identify and manage danger signs, and prepare for delivery and motherhood
- Provide evidence-based, client-centered antenatal care and include core services in standards of care.
- Increase coverage and improve the quality of antenatal care services.
- Develop systems for early detection and management of complications of pregnancy, especially pre-eclampsia, malpresentation, preterm labour, and premature rupture of membranes.
- Scale-up implementation and compliance with antenatal corticosteroid administration guidelines for prevention of respiratory distress syndrome and other problems of prematurity.
- Ensure tetanus toxoid immunization coverage for all pregnant women.
- Promote iron and folate supplementation for all pregnant women and prevent anaemia with healthy diet recommendations and iron and folate supplementation.
- Educate mothers and families to prepare for care of the newborn, especially regarding early and exclusive breastfeeding and avoiding harmful practices.
- Strengthen and improve the quality of postpartum care of the mother.
 1. Provide support for mother and family, especially for breastfeeding.
 2. Provide early identification of complications and referral.
 3. Provide family planning counselling.
 4. Define indicators of service delivery for mothers and babies and integrate them into routine data collection systems and instruments, conducting periodic health facility assessments to evaluate the quality of care if necessary.

Introduction

Maternal and child health facilities and services are essential for improving child and maternal health in the community. Quality of health care assessment is the process of evaluating the performance of health care providers and health plans according to the recognized quality standards [1]. For maternity services, Hulton, et al. defined the quality of care as “the degree to which maternal health services for individuals and populations increase the likelihood of timely and appropriate treatment for the purpose of achieving desired outcomes that are both consistent with current professional knowledge and uphold basic reproductive rights” [2].

Recently, the WHO published a “framework” for improving the quality of care for mothers and newborns around the time of childbirth. This framework, which was published in 2016, contains eight domains of quality of care that should be assessed, improved, and monitored within the health facility. These eight domains are:

1. Evidence-based practices for routine care and management of complications
2. Actionable information systems
3. Functional referral systems
4. Effective communication
5. Respect and preservation of dignity
6. Emotional support
7. Competent, motivated human resources
8. Availability of essential physical resources

Based on this framework, six strategic areas were identified to improve the quality of maternal and newborn care. The six areas are: clinical guidelines, standards of care, effective interventions, measures of quality of care, relevant research and capacity-building [3].

The Maternal Mortality Rate (MMR), which is an important indicator of the quality of health care in any country, has fallen globally by 44% since 1990 [4], a progress which is substantial but not sufficient enough to achieve the millennium development goal (MDG) 5 target of a three-quarter drop. The mean MMR for developed countries is approximately 10 per 100,000 live births [5].

Maternity care in Jordan is generally of a high, and in some cases very high, standard. The majority (94%) of Jordanian women have at least 4 antenatal visits, the WHO recommended minimum. These are provided at clinics in the hospitals providing in-patient maternity care. About 98% of mothers are delivered within a health institution providing skilled care at birth. Jordan undertook its first national maternal mortality study in 1995/1996, which reported a MMR of 41.4 per 100,000 live births [6]. Jordan conducted its second national maternal mortality study in 2007-2008. The maternal mortality ratio was reported at 19.1 per 100,000 live births [7]. Both studies highlighted clearly that a high percentage of maternal deaths were avoidable with a high contribution of remediable factors, around 50-60%. Jordan now appears to have a low maternal death rate, even though there is general agreement that the figures are incomplete due to under ascertainment through non-reporting or misclassification. At the last survey, for 2007-08, around 35 maternal deaths were reported each year giving an MMR of 19 of which 54% were assessed to having some degree of suboptimal care. Although an overall 99% of women deliver in facilities, 17% of the maternal deaths reported in the survey for 2007-08 took place in the community. The overall MMR is a significant reduction from earlier figures and shows that the Millennium Development Goal 5, to reduce maternal deaths by 75% by 2015 has already been met. This does not mean, however, that the issue should not be addressed, as reporting needs to be made far more accurate and many improvements for maternal and newborn health remain to be made.

Infant and under-five mortality rates in Jordan have decreased steadily over the last two decades, reaching 21 and 24 per 1,000 live births (LB) respectively in 2007 [8-10]. Despite such significant improvement, babies are still at risk during the perinatal period, which covers pregnancy, delivery, and the postpartum period, as well as during the neonatal stage. In the late 1990s, the neonatal mortality rate (NNMR) in Jordan fell from 19 to 15 per 1,000 LB and remained relatively constant as Jordan transitioned into the new millennium [11]. To achieve the Sustainable goals, particular focus must be placed on reducing neonatal mortality. This will require effective planning and monitoring of health services and, most importantly, accurate measures of mortality.

The Jordan Perinatal and Neonatal Mortality Study (JPNM), initiated and funded by UNICEF/Jordan, was an effort to gather reliable neonatal and perinatal mortality data [12]. The

prospective hospital-based cohort study included 18 maternity hospitals in three regions of Jordan. All women who gave birth (dead or alive) at 20 weeks of gestation or more in each of the selected 18 hospitals during the period of March 1, 2011 – April 30, 2012 were enrolled in the study. Using the gestational age cut-off value of ≥ 20 weeks, stillbirth, neonatal, and perinatal mortality rates were 11.6/1,000 total births (TB), 14.9/1,000 LB, and 23.7/1,000 TB, respectively. The rates generally decreased as the gestational period increased to ≥ 28 weeks and reached 9/1,000 TB for stillbirth, 11.6/1,000 LB for neonatal mortality, and 18.1/1,000 TB for perinatal mortality. Excluding babies $< 1,000$ grams and < 28 weeks gestation in accordance to the WHO and UNICEF's annual neonatal mortality reports, the stillbirth rate was 8.2 /1,000 TB, the NNMR 10.5 /1,000 LB, and the perinatal mortality rate 16.5 /1,000 TB. About 79% of all neonatal deaths occurred in the first week after birth with over 42% occurring in the first day after birth.

According to NICE hierarchical classification, most neonatal deaths were due to congenital anomalies (27.2%), multiple births (26.0%), or unexplained immaturity (21.7%). Other important causes included maternal disease (6.7%), specific infant conditions (6.4%), and unexplained asphyxia (4.9%). Multiple births and unexplained immaturity were the most important causes of death in neonates < 1500 g at birth, while congenital anomalies, specific infant conditions, and unexplained asphyxia were the most important causes of death in neonates > 2500 g. According to the Expert Panel, respiratory distress syndrome (RDS) was the leading cause of death (53.5%). The most common causes of death following RDS were sepsis (16.2%), congenital anomalies (13.8%), and asphyxia (10.1%). Considering the multiplicity of the causes for each neonatal death, the most frequently mentioned causes were prematurity (72.5%) followed by RDS (60.1%), multiple birth (28.7%), congenital anomalies (27.2%), sepsis (18.7%), asphyxia (18.3%), and pulmonary haemorrhage (14.4%).

Using the Ministry of Health's *Clinical Practice Guidelines for Care of the Newborn* to assess the appropriateness or optimality of the care, the experts' panel determined that 37.3% of neonatal deaths received optimal medical care while the medical care provided to the rest was less than optimal. According to the panel, 40.6% of foetal deaths (66.7% of early foetal deaths and 32.8% of late foetal deaths) received optimal medical care [12].

Significance of the study

Quality of care has been identified internationally as a critical indicator of the unfinished maternal and newborn health agenda, especially when providing care during labor and delivery and in the early postnatal period [13]. Maternal and child health facilities and services are important for enhancing child and maternal health. Quality of health care assessment has been defined as the process of assessing and evaluating health care providers' performance and health plans according to well-known, evidence-based quality standards.

Research has shown that securing access to skilled, competent healthcare professionals as well as comprehensive, appropriate care around labour can substantially minimize maternal and newborn mortality and morbidity [14], including preventable causes of maternal and newborn death [15, 16]. Research has also highlighted that high-quality care requires accurate use of the available infrastructure, staff, and commodities to ensure effective case management [17]. Therefore, improvement of the quality of preventive and curative care during this critical period could have the greatest impact on maternal, foetal, and newborn survival. Assessing the current status of the quality of care in providing maternal and newborn health care according to recognized quality standards can pinpoint the areas that need to be improved to reach optimal care for both the mother and her fetus/newborn. The rapid assessment of the maternal and newborn services offered in Jordanian hospitals has the potential to provide policymakers, health professionals, and researchers with a clear picture about the current status of maternal and newborn health services and thus enable them to design and implement evidence-based health programmes to provide effective health services and promote the health of mothers and newborns.

Objectives

The aim of the rapid assessment is to determine the capacity of facilities at any level to provide care for well and sick newborns and critically assess information on the current status of the provision of obstetric and neonatal care at these facilities.

Specifically, the main objectives are:

- Assess the availability of resources, essential equipment, commodities, drugs/medications, consumables, supplies, and the availability of various service packages for mothers and newborns.
- Assess the availability of essential and important guidelines, protocols, and policies.
- Identify the gaps in the training of care providers.
- Assess the alignment of care providers' current practices with the WHO recommendations and guidelines.
- Recognize/identify gaps in the processes and quality of care related to services provided at maternal facilities and identify points where improvements can be made.
- Identify deficient areas for targeted interventions to improve maternal and neonatal health outcomes

Methods

Selection of Maternities

A total of 32 maternity hospitals were selected; 11 hospitals in the Middle region, 14 hospitals in the North region, and 7 hospitals in the South region. They represent the maternity hospitals in 12 governorates of Jordan and in different health sectors, namely, the Ministry of Health (MoH), the Royal Medical Services (RMSs), the private sector, and the university hospitals. The hospitals were selected based on the following criteria:

1. Representation of the three regions of Jordan, namely, the South, Middle, and North;
2. Representation, within the three regions, of the three health sectors, MOH, private, and military;
3. Inclusion of at least one university hospital; and
4. Consideration of the workload of the hospitals (number of deliveries) as well as the geographic distribution, which is likely to be related to the socioeconomic status of clients and the quality of services provided.

Study Instruments

The maternal and neonatal health services in the selected hospitals were assessed to evaluate the availability of various services for mothers and newborns, availability of resources, equipment and supplies, documentation and staff training, and provision of the health care services. The assessment took place during July-October 2017. A total of five experts were recruited and trained to assess the maternal and neonatal services in the selected hospitals. The assessors received training to develop a common understanding of the purpose and the objectives of facility assessment, to have input on the assessment forms, and to understand and be able to use the assessment forms. The training familiarized data collectors with the forms and provided instructions needed to complete the forms. The assessment forms (Annex 1) were developed to collect information in all key areas that have a major impact on neonatal outcomes, identify the areas where poor or substandard care is provided, and involve managers and staff at facility level in identifying actions to improve quality of care.

In general, the forms were structured as standard-based checklists and question/answer format covering important main areas: general hospital infrastructure and services, maternity ward/nursery and neonatal ward, routine neonatal care, sick newborn care, infection prevention and supportive care, human resources, and essential safety and life-saving practices. The assessment forms utilized different sources of information including direct observation and semi-structured interviews with staff. The forms included indicators and questions for assessing newborn care services at facilities and were developed based on the WHO tool, a tool developed by the Inter-agency Newborn Indicators Technical Working Group and the service provision assessment (SPA) tool developed by ICF International under the USAID-funded MEASURE DHS project [18, 19]. The tool aimed to collect data on indicators that assess whether a facility is able to address the three major causes of newborn deaths – intrapartum causes (birth asphyxia), preterm births, and infection. Indicators are divided into the following categories: Service availability, equipment and supplies, documentation, trained staff, supervision, and additional optional indicators

Data Collection

The data collection team was responsible for maintaining a log of all the facilities visited, the dates of the visits, and any important comments about the visits. Prior to visits, the health facility was informed about the time and date of the visit of the assessment team. Upon arrival at the facility, the team met the facility director or another officer in charge, explained the purpose of the visit, introduced the data collection team, presented the study authorization letter, and received permission to begin data collection. The data collectors recorded data according to the instructions offered during training by asking questions, listening, and observing. Their role was not to teach, critique, or advise. The service delivery was not interrupted during the visits. The data collection team was careful not to compromise provider-patient confidentiality. The duration of assessment varied from 3 to 5 hours depending on the size of the hospital. The assessors met after (usually the day after) the visit to discuss findings. All filled questionnaires received from the assessors were edited and coded before data entry. Data were presented as overall estimates and percentages and by region. Data were analyzed using IBM SPSS version 20.

Results

Hospitals' characteristics

A total of 32 hospitals distributed over the three regions of the country (14 in the north, 11 in the middle, and 7 in the south) and covering different sectors (17 MoH hospitals, 5 RMS hospitals, 9 private hospitals and 1 University hospital) were assessed. Princess Badea Hospital and Princess Rahma Hospital were assessed as one unit because of proximity and overlapping of staff and services. Table 1 shows the distribution of the studied hospitals according to sector and region.

Sector	North N = 14		Middle N = 11		South N = 7		Total N = 32	
	n	%	n	%	n	%	N	%
Ministry of Health	8	57.1	5	45.5	4	57.1	17	53.1
University	0	0.0	1	9.1	0	0.0	1	3.1
Royal Medical Services	1	7.1	2	18.2	2	28.6	5	15.6
Private	5	35.7	3	27.3	1	14.3	9	28.1

Structure of services

Table 2 shows the availability of services in the studied hospitals. All hospitals in all regions had a ward for admitting obstetrics patients, a theatre for performing Caesarean Section (CS), and a neonatal intensive care unit. The number of beds for admitting obstetric patients ranged from 3 to 98 and the number of beds in the neonatal intensive care unit ranged from 3 to 65. Three hospitals (9.4%) had no separate room or ward for admitting “infectious” cases.

	North	Middle	South	Total

Availability of services	N = 14		N = 11		N = 7		N = 32	
	n	%	n	%	n	%	n	%
A ward for admitting obstetrics patients	14	100.0	11	100.0	7	100.0	32	100.0
A theatre to perform CS	14	100.0	11	100.0	7	100.0	32	100.0
A separate room or ward for admitting “infectious” cases (isolation)	13	92.9	10	90.9	6	85.7	29	90.6
A neonatal intensive care unit	14	100.0	11	100.0	7	100.0	32	100.0

Human resources

All hospitals had a person (specialist/resident) skilled in performing deliveries at all times (24 hours a day), including weekends, to provide delivery care (Table 3). Of those, a skilled specialist/resident is present at all times in 22 (68.8%) hospitals and is on call in 10 (31.3%) hospitals. Figure 1 shows that the skilled person is available on call in one quarter (23.5%) of MoH hospitals and in two thirds (66.7%) of private hospitals.

	North		Middle		South		Total	
	N = 14		N = 11		N = 7		N = 32	
	n	%	n	%	n	%	n	%
Yes, present	6	42.9	10	90.9	6	85.7	22	68.8
Yes, on call	8	57.1	1	9.1	1	14.3	10	31.3
No 24-hour coverage	0	0	0	0	0	0	0	0

Figure 1. Availability of a skilled person (24 hours a day) to provide delivery care according to health sector

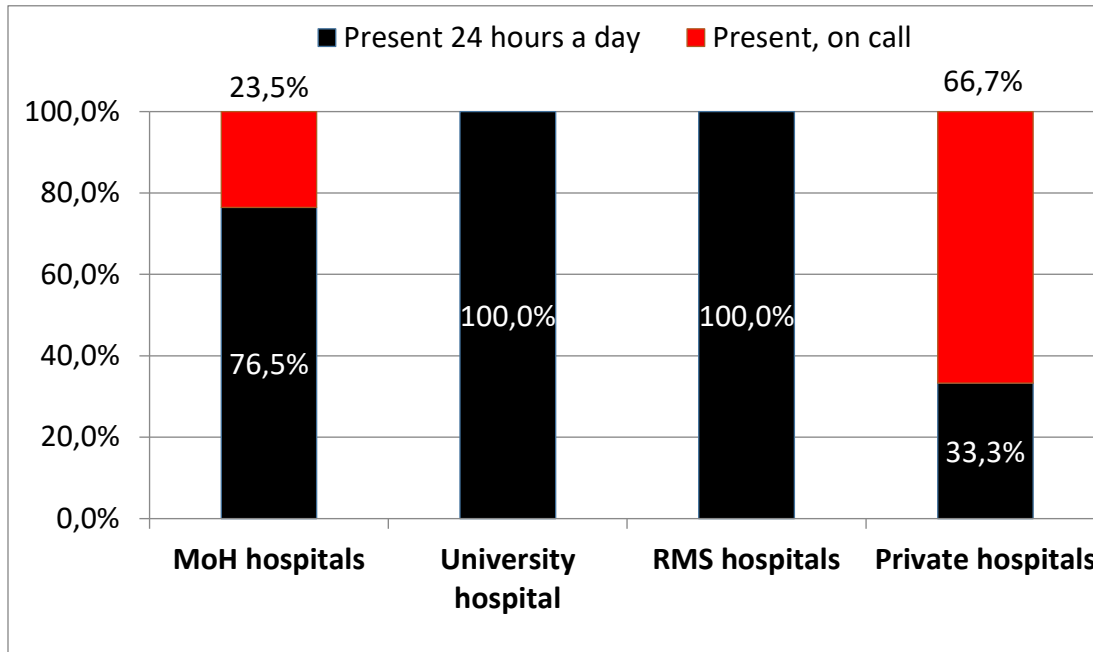


Table 4 shows the number of full-time health care providers, their adequacy, and the additional number needed as perceived by the health care providers. Some hospitals have significant shortages of Ob & Gyns, paediatricians, neonatologists, and midwives/nurses. As perceived by health professionals in the studied hospitals, the number of Ob &Gyns was inadequate in 10 (31.3%) hospitals, the number of paediatricians was inadequate in 10 (31.3%) hospitals, the number of neonatologists was inadequate in 14 (43.8%) hospitals, the number of midwives/nurses providing obstetric care was inadequate in 12 (37.5%) hospitals, and the number of paediatric nurses was inadequate in 20 (64.5%) hospitals.

Table 4. Number of full-time health care providers, their adequacy, and the additional number needed as perceived by the health care providers

Region	Human resources	Number available		Hospitals with inadequate staff		Additional needed			
		Range	Median	N (%)		Range	Median		
North	Ob&Gyns	1	20	4	4	28.6	0	10	0
	Pediatricians	2	12	3	5	35.7	0	7	0
	Neonatologists	0	2	0	3	75.0	0	2	2
	Midwives/nurses (obstetrics)	4	147	22	5	35.7	0	25	0
	Pediatric Nurses	3	56	10	8	61.5	0	20	3
Middle	Ob&Gyns	3	25	8	2	18.2	0	4	0
	Pediatricians	1	17	4	3	27.3	0	3	0
	Neonatologists	0	6	1	7	63.6	0	2	1
	Midwives/nurses (obstetrics)	15	102	24	4	36.4	0	40	0
	Pediatric Nurses	7	75	26	7	63.6	0	31	5
South	Ob&Gyns	1	6	2	4	57.1	0	4	2
	Pediatricians	0	10	4	2	28.6	0	4	0
	Neonatologists	0	1	0	4	80.0	0	2	1
	Midwives/nurses (obstetrics)	11	39	14	3	42.9	0	7	0
	Pediatric Nurses	8	26	13	5	71.4	0	13	4
Total	Ob&Gyns	1	25	5	10	31.3	0	10	0
	Pediatricians	0	17	4	10	31.3	0	7	0
	Neonatologists	0	6	0	14	43.8	0	2	1
	Midwives/nurses (obstetrics)	4	147	20	12	37.5	0	40	0
	Pediatric Nurses	3	75	14	20	64.5	0	31	4

The number of hospitals with inadequate staff according to the health sector is shown in Table 5. MoH hospitals were more stressed by the shortage of human resources, especially of neonatologists and pediatric nurses. The majority of MoH hospitals suffered from shortages in the number of neonatologists and pediatric nurses. The university hospital had an inadequate number of neonatologists and pediatric nurses and 5 private hospitals out of 9 had an inadequate number of neonatologists. The shortage was evident in RMSs for midwives/nurses (obstetrics) and pediatric nurses

Table 5. The number of hospital with inadequate staff according to the health sector. *								
Human resources	Ministry of Health N = 17		Royal Medical Services N = 5		Private N = 9		Total N = 32**	
	n	%	n	%	n	%	n	%
Ob&Gyns	10	58.8	0	0.0	0	0.0	10	31.3
Pediatricians	9	52.9	1	20.0	0	0.0	10	31.3
Neonatologists	7	87.5	1	20.0	5	83.3	14	70.0
Midwives/nurses (obstetrics)	9	52.9	2	40.0	1	11.1	12	37.5
Pediatric Nurses	15	88.2	3	60.0	1	12.5	20	64.5
*The number of neonatologists and pediatric nurses is inadequate in the university hospital.								
** Including one teaching hospitals								

Basic and comprehensive emergency obstetric care and neonatal care

Almost all hospitals offer the basic and comprehensive emergency obstetric care and neonatal care, including normal vaginal delivery, caesarean section, administration of parenteral antibiotics or anticonvulsants, manual removal of the placenta, removal of retained products after delivery, basic neonatal resuscitation (e.g., with a bag and a mask), and intubation/ventilation for baby (Table 6). Corticosteroids for premature labour were not available in one hospital in the

north. This same hospital does not perform assisted vaginal delivery (e.g. vacuum extraction, forceps delivery). Four hospitals (two MoH hospitals and two private hospitals) do not perform non-invasive ventilation (CPAP) for baby.

Table 6. The availability of basic and comprehensive emergency obstetric care and neonatal care services in the selected hospitals*

Type of service	North N = 14		Middle N = 11		South N = 7		Total N = 32	
	n	%	n	%	n	%	n	%
Administration of uterotonic drugs (i.e. parenteral oxytocin)	14	100.0	11	100.0	6	85.7	31	96.9
Perform assisted vaginal delivery (e.g. vacuum extraction, forceps delivery)	13	92.9	11	100.0	7	100.0	31	96.9
Corticosteroids for preterm labour	13	92.9	11	100.0	7	100.0	31	96.9
Non-invasive ventilation (CPAP) for baby	11	78.6	10	90.9	7	100.0	28	87.5

*The followings services are available in all hospitals: 1- Normal vaginal delivery, 2- Caesarean section, 3- Administration of parenteral antibiotics; (IV or IM), 4-Administration of parenteral anticonvulsants for pre-eclampsia and eclampsia (i.e. magnesium sulphate), 5- Manual removal of the placenta, 6- Removal of retained products after delivery (e.g., manual vacuum aspiration), 7- Basic neonatal resuscitation (e.g., with bag and mask) , 8- Intubation/ventilation for baby and 9- Blood transfusion

Antenatal care

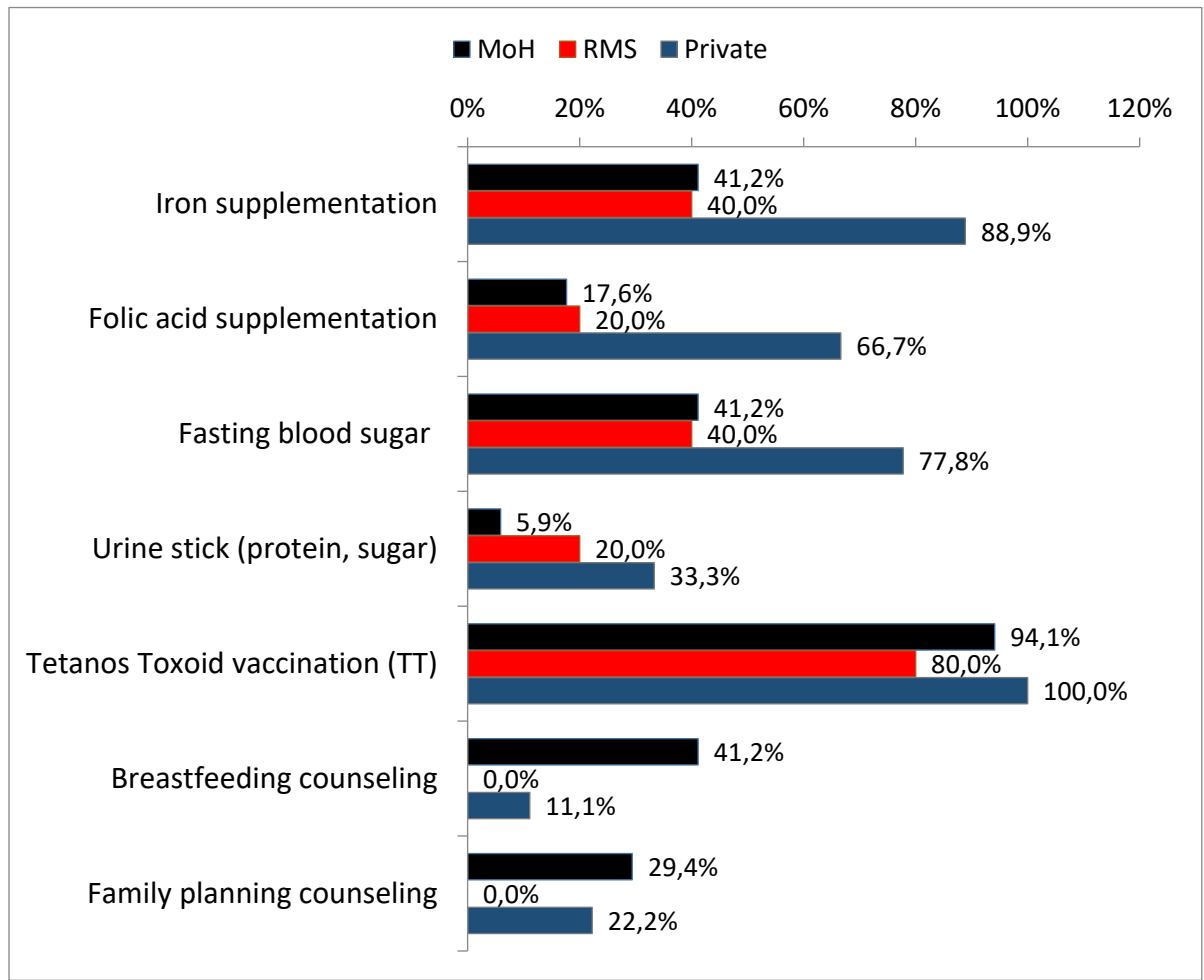
All hospitals were found to provide antenatal care except one private hospital. Table 7 and 8 show the number of hospitals that do not provide selected services during pregnancy or provide them but not systematically. Services such as blood pressure and haemoglobin measurements were available and were provided systematically in all hospitals. However, other services including iron supplementation, folic acid supplementation, fasting blood sugar measurement, urine stick (protein, sugar), Tetanos Toxoid vaccination (TT), breastfeeding counselling, and family planning counselling were not fully implemented during pregnancy and were not provided systematically in some hospitals.

Tetanos Toxoid vaccination (TT) was not provided systematically or not provided at all in almost all hospitals in the north, 63.6% of hospitals in the middle, and all hospitals in the south. In about half of the hospitals of the three regions, iron supplementation was not systematically provided. These services were found to be more commonly provided in the MoH hospitals compared to RMSs and private hospitals (Figure 2). All of these services were found to be provided systematically in the university hospital.

Table 7. The number of hospitals that don't provide selected services during pregnancy or provide them but not systematically*									
Services	Not provided or provided but not systematically								
	North N = 14		Middle N = 11		South N = 7		Total N = 32		
	n	%	n	%	n	%	n	%	
Iron supplementation	9	64.3	5	45.5	3	42.9	17	53.1	
Folic acid supplementation	6	42.9	4	36.4	0	0.0	10	31.3	
Fasting blood sugar	9	64.3	3	27.3	4	57.1	16	50.0	
Urine stick (protein, sugar)	4	28.6	1	9.1	0	0.0	5	15.6	
Tetanos Toxoid vaccination (TT)	13	92.9	7	63.6	7	100.0	27	84.4	
Breastfeeding counseling	5	35.7	2	18.2	1	14.3	8	25.0	
Family planning counseling	6	42.9	1	9.1	0	0.0	7	21.9	

*All hospitals offer blood pressure and hemoglobin measurements

Figure 2. The number of hospitals that don't provide selected services during pregnancy or provide them but not systematically by health sector



Admission Department

The admission departments of few hospitals had insufficient supplies of inexpensive items such as essential equipment, consumables, and drugs (Table 9). The admission departments of three hospitals lacked an emergency set. Two hospitals had no obstetrical stethoscope. Medications such as magnesium sulfate, diazepam, and oxytocin were missing in five to six hospitals. Posters or information on hand washing were missing in almost one third of hospitals.

Table 9. The availability of essential equipment, consumables and drugs in the admission department of the selected hospitals*

	North		Middle		South		Total	
	N = 14		N = 11		N = 7		N = 32	
	N	%	n	%	n	%	N	%
Obstetrical stethoscope	12	92.3	11	100.0	7	100.0	30	96.8
Thermometer	12	92.3	10	90.9	6	85.7	28	90.3
Couch	13	100.0	10	90.9	7	100.0	30	96.8
Towels	8	61.5	10	90.9	4	57.1	22	71.0
Posters or information on hand washing	9	69.2	8	72.7	4	57.1	21	67.7
Surgical transport like wheel chair	13	100.0	11	100.0	5	71.4	29	93.5
Emergency set:	13	100.0	9	81.8	7	100.0	29	93.5
- Bag and mask for adults	13	100.0	9	81.8	7	100.0	29	93.5
- IV line, syringes, IV catheter, sterile medical gloves, and normal saline	13	100.0	9	81.8	7	100.0	29	93.5
- Magnesium sulfate	11	84.6	9	81.8	7	100.0	27	87.1
- Diazepam	10	76.9	9	81.8	7	100.0	26	83.9
- Oxytocin	11	84.6	9	81.8	7	100.0	27	87.1

*The followings are available in the admission departments of all hospitals: Blood pressure gauge, stethoscope for adults, soap

Delivery Room

Table 10 shows the availability of safety/lifesaving essential equipment and consumables in the delivery rooms of the 32 hospitals. For delivery services, items and equipment were generally available, but not all items needed to guarantee high quality care were available. The delivery rooms of some hospitals suffered from shortages in essential equipment. Electronic thermometers for measuring babies' temperature were available in all delivery rooms of 10 (31.3%) hospitals only. Moreover, room thermometers were available in all delivery rooms of 10 (31.3%) hospitals only, indicating that room temperature was not monitored in the delivery rooms of some hospitals. A radiant heater and obstetrical stethoscope were available in all delivery rooms of two thirds of hospitals.

Safety/Saving life medical equipment/supply	Availability in all delivery rooms							
	North N = 14		Middle N = 11		South N = 7		Total N = 32	
	n	%	n	%	n	%	n	%
Normal bed	3	21.4	10	90.9	3	42.9	16	50.0
Transferable bed	6	42.9	9	81.8	1	14.3	16	50.0
More than one delivery bed	6	42.9	10	90.9	1	14.3	17	53.1
Obstetrical stethoscope	9	64.3	10	90.9	2	28.6	21	65.6
Electronic thermometer for baby	3	21.4	6	54.5	1	14.3	10	31.3
Ambu bag and mask for baby	7	50.0	10	90.9	4	57.1	21	65.6
A radiant heater	7	50.0	9	81.8	4	57.1	20	62.5
Adult blood pressure gauge	9	64.3	11	100.0	4	57.1	24	75.0
Wall clock	8	57.1	8	72.7	2	28.6	18	56.3
Sterile equipment for cutting and tying the cord	13	92.9	11	100.0	6	85.7	30	93.8
Infant weighing scale	7	50.0	9	81.8	2	28.6	18	56.3
Room thermometer	4	28.6	4	36.4	2	28.6	10	31.3
Curtains on the window and on the door to insure privacy of the DR	14	100.0	10	90.9	7	100.0	31	96.9
Water /Towel/ Soap	13	92.9	11	100.0	5	71.4	29	90.6

Delivery block/department

Emergency equipment necessary for advanced newborn resuscitation in delivery blocks/departments was missing in two hospitals (Table 11). Delivery rooms of only 12 hospitals had a separate fridge for blood components.

	North N = 14		Middle N = 11		South N = 7		Total N = 32	
	n	%	n	%	N	%	n	%
Emergency set for advanced newborn resuscitation	14	100.0	10	90.9	6	85.7	30	93.8
A separate fridge for blood components	4	28.6	6	54.5	2	28.6	12	37.5

* The followings are available in all hospitals: Aspiration catheter, adrenalin syringes (5 ml), normal saline, and sterile gloves

Operation Theater (OT)

Operation theatres of some hospitals lacked necessary equipment (Table 12). Thermometers were available in all operation theatres of 15 (46.9%) hospitals only. A set of advanced resuscitation for babies was available in 22 (68.8%) hospitals. A transportation heated cradle/incubator for babies was missing in operation theatres of two thirds of hospitals. Only 18 (56.3%) hospitals had a warming device for the newborn in the operation theatre. Oxygen was not available in the operation theatre of one hospital in the south.

Table 12. The availability of safety/saving life medical equipments in all or some operation theatres								
Safety/Saving life medical equipment	Availability in all hospital's operation theaters							
	North N = 14		Middle N = 11		South N = 7		Total N = 32	
	n	%	n	%	n	%	n	%
Thermometer	8	57.1	4	36.4	3	42.9	15	46.9
Ambu bag and mask for baby	12	85.7	10	90.9	5	71.4	27	84.4
A set of advanced resuscitation for the baby	7	50.0	10	90.9	5	71.4	22	68.8
A warming device for the newborn in the operation theater (radiant heater, incubator)	6	42.9	10	90.9	2	28.6	18	56.3
A wall clock with a second hand	10	71.4	9	81.8	4	57.1	23	71.9
A transportation (portable) incubator for baby in the operation theater	2	14.3	8	72.7	2	28.6	12	37.5
An adult blood pressure gauge	13	92.9	9	81.8	6	85.7	28	87.5
Oxygen available	13	92.9	11	100.0	7	100.0	31	96.9

NICU

NICUs of all hospitals except one had a source of oxygen available for each baby and had a vacuum aspirator in each section (Table 13). NICUs in some hospitals lacked basic and essential equipments. About one third of hospitals did not have resuscitation set in all sections. A breastfeeding room or corner was missing in four hospitals and fridges for storing breast milk were missing in almost half the hospitals.

A wall thermometer was present in each section/room of 12 (37.5%) hospitals only and an individual thermometer for each infant was present in 24 (75.0%) hospitals.

Infants were seen wearing hats in the incubator/cradle of 2 hospitals only. Babies sharing the same incubator or cradle (excluding twin, triplet) was seen in one hospital. Staffs were seen washing hands between each baby in almost 53.6% of the hospitals.

Infants in NICUs were usually fed special formula in 26 (83.9%) hospitals, breastfeeding in three hospitals, and expressed breast milk in two hospitals. The temperature was not recorded in the NICUs of 11 hospitals and the temperature was less than 25 C in the NICUs of 8 hospitals.

	n		%		n		%	
	n	%	n	%	n	%	n	%
A wall thermometer in each section/room	4	28.6	6	54.5	2	28.6	12	37.5
An individual thermometer for each infant	10	71.4	7	63.6	7	100.0	24	75.0
A source of oxygen available in the department for each baby	13	92.9	11	100.0	7	100.0	31	96.9
Vacuum aspirator available in each section	13	92.9	11	100.0	7	100.0	31	96.9
One resuscitation set available in each section	5	35.7	10	90.9	6	85.7	21	65.6
Disinfectant in the admission part of NICU	13	92.9	11	100.0	6	85.7	30	93.8
Warm water available in each room day and night	12	85.7	8	72.7	5	71.4	25	78.1
Breastfeeding room or corner	14	100.0	8	72.7	6	85.7	28	87.5
A fridge in the department to store breast milk	9	64.3	4	36.4	2	28.6	15	46.9
Infants' feeding practices								
Breastfeeding	1	7.7	1	9.1	1	14.3	3	9.7
Expressed	0	0.0	1	9.1	1	14.3	2	6.5
Special formula	12	92.3	9	81.8	5	71.4	26	83.9
Incubators	11	78.6	6	54.5	6	85.7	23	71.9
Resuscitation table	12	85.7	7	63.6	4	57.1	23	71.9
Continuous Positive Airway Pressure (CPAPs)	6	42.9	3	27.3	1	14.3	10	31.3
Lung ventilation devices (ventilators)	11	78.6	5	45.5	6	85.7	22	68.8
Pulse oximeters	9	64.3	4	36.4	4	57.1	17	53.1

The number of hospitals with an adequate number of incubators was 23 (71.9%), with an adequate number of Continuous Positive Airway Pressure (CPAPs) machines was 10 (31.3%)

hospitals, an adequate number of resuscitation table was in 23 (71.9%) hospitals, with an adequate number of lung ventilation devices was in 22 (68.8%) hospitals, with an adequate number of pulse oximeters was in 17 (53.1) hospitals, and with an adequate number of phototherapy lamps was in 16 (50.0%) hospitals (Table 14). According to NICU staff, the NICUs of these hospitals needed 0 to 12 additional incubators, 0 to 3 additional resuscitation tables, 0 to 8 additional CPAPs machines, 0 to 5 additional lung ventilation devices (ventilators), 0 to 25 additional pulse oximeters, and 0 to 10 additional phototherapy lamps.

	North		Middle		South		Total	
	N = 14		N = 11		N = 7		N = 32	
	n	%	n	%	n	%	n	%
Incubators	11	78.6	6	54.5	6	85.7	23	71.9
Resuscitation table	12	85.7	7	63.6	4	57.1	23	71.9
Continuous Positive Airway Pressure (CPAPs)	6	42.9	3	27.3	1	14.3	10	31.3
Lung ventilation devices (ventilators)	11	78.6	5	45.5	6	85.7	22	68.8
Pulse oximeters	9	64.3	4	36.4	4	57.1	17	53.1
Phototherapy lamps	8	57.1	5	45.5	3	42.9	16	50.0

Other equipment, drugs, and supplies in the facility overall

Availability and functionality of equipment, drugs, and supplies which provide basic maternal and newborn health care were checked in all selected hospitals. Many hospitals had insufficient supplies of inexpensive items such as essential equipment, consumables, and drugs (Table 15). Breast pumps, feeding cups, and hats were available in 3 hospitals only. A Bilirubinometer and HIV testing kit were available in 18.8% of hospitals, surfactants in 40.6% of hospitals, chlorexidhine 7% for cord care in 28.1% of hospitals, Tetanos Toxoid vaccines (TT) in 31.3% of hospitals, and partograph in 56.3% of hospitals. The hospitals in the south were the least affected by the poor availability of such supplies whereas hospitals in the north were the most affected.

Poor availability of the consumables and medications was more evident in the private sector followed by the MoH. The university hospital had almost all necessary supplies and medications.

Table 15. The availability of other equipment, drugs and supplies in the hospital overall.								
	North N = 14		Middle N = 11		South N = 7		Total N = 32	
	n	%	n	%	n	%	n	%
Towel for drying and wrapping babies	9	64.3	8	72.7	5	71.4	22	68.8
Blood sugar sticks	11	78.6	7	63.6	7	100.0	25	78.1
Breast pump	1	7.1	1	9.1	1	14.3	3	9.4
Feeding cups	1	7.1	0	0.0	2	28.6	3	9.4
Hats	0	0.0	2	18.2	1	14.3	3	9.4
Oxygen supply/blender	14	100.0	10	90.9	7	100.0	31	96.9
Bilirubinometer	2	14.3	3	27.3	1	14.3	6	18.8
Eye cover	11	78.6	9	81.8	5	71.4	25	78.1
HIV testing kit	2	14.3	3	27.3	1	14.3	6	18.8
Antibiotics (ampicillin, cefazolin, erythromycin, gentamicin or penicillin)	14	100.0	9	81.8	7	100.0	30	93.8
IV fluids	14	100.0	9	81.8	6	85.7	29	90.6
Corticosteroids	14	100.0	7	63.6	6	85.7	27	84.4
Surfactants	2	14.3	6	54.5	5	71.4	13	40.6
Aminophylline/caffeine	14	100.0	7	63.6	7	100.0	28	87.5
Vitamin K (IM)	14	100.0	7	63.6	7	100.0	28	87.5
Chlorexidhine 7 for cord care	2	14.3	5	45.5	2	28.6	9	28.1
Iron	5	35.7	7	63.6	5	71.4	17	53.1
Folic acid	6	42.9	7	63.6	5	71.4	18	56.3

Tetanos Toxoid vaccines (TT)	1	7.1	5	45.5	4	57.1	10	31.3
Anithypertensive drugs	13	92.9	7	63.6	7	100.0	27	84.4
Magnesium sulphate (injection)	13	92.9	7	63.6	7	100.0	27	84.4
Partograph	4	28.6	7	63.6	7	100.0	18	56.3
Uterotonic (oxytocin and/or misoprostol)	12	85.7	7	63.6	6	85.7	25	78.1
Antibiotics (ampicillin,)	13	92.9	7	63.6	7	100.0	27	84.4

Practices

Table 16 shows the alignment of health care workers' practices with the WHO recommendations and guidelines. Based on interviews with health workers and direct observation, women are usually supported during labour in all selected hospitals. In specific, support provided to women during labor, initiation of breastfeeding and breastfeeding support/ counseling, postpartum care of the mother, mothers' counseling at discharge, dry and open cord care, management of Asphyxia, and management of Jaundice were in line with the WHO recommendations in the majority of hospitals. However, some healthcare workers' practices in a few hospitals were not in line with these recommendations and guidelines. Interestingly, the practice of skin to skin contact (kangaroo care) and daily measurement of the healthy full term baby weight were consistent with the WHO recommendations in about one third of hospitals (34.4%); however, free delivery position was practiced in only 12.5% of selected hospitals.

Table 16. The alignment of practices with the WHO recommendations and guidelines								
Practices	Number of hospitals with practices that are in line with WHO recommendations							
	North N = 14		Middle N = 11		South N = 7		Total N = 32	
	n	%	n	%	n	%	n	%
Support to the women during labor	13	92.9	11	100.0	7	100.0	31	96.9
Free delivery position	0	0.0	3	27.3	1	14.3	4	12.5
Use of partogram	6	42.9	11	100.0	6	85.7	23	71.9
“Skin to skin” contact	2	14.3	4	36.4	5	71.4	11	34.4
Transportation of the baby within maternity	11	78.6	7	63.6	5	71.4	23	71.9
Initiation of Breastfeeding and breastfeeding support/ counseling	13	92.9	10	90.9	6	85.7	29	90.6
Postpartum care of the mother	13	92.9	11	100.0	5	71.4	29	90.6
Mother counseling at discharge	11	78.6	11	100.0	6	85.7	28	87.5
Dry and open cord care	12	85.7	10	90.9	7	100.0	29	90.6
Checking daily the healthy full term baby weight	1	7.1	7	63.6	3	42.9	11	34.4
Checking the baby temperature	10	71.4	6	54.5	6	85.7	22	68.8
Assessing daily the correct attachment of the baby to the breast	9	64.3	7	63.6	6	85.7	22	68.8
Management of Asphyxia	13	92.9	11	100.0	7	100.0	31	96.9
Management of Jaundice	13	92.9	11	100.0	7	100.0	31	96.9

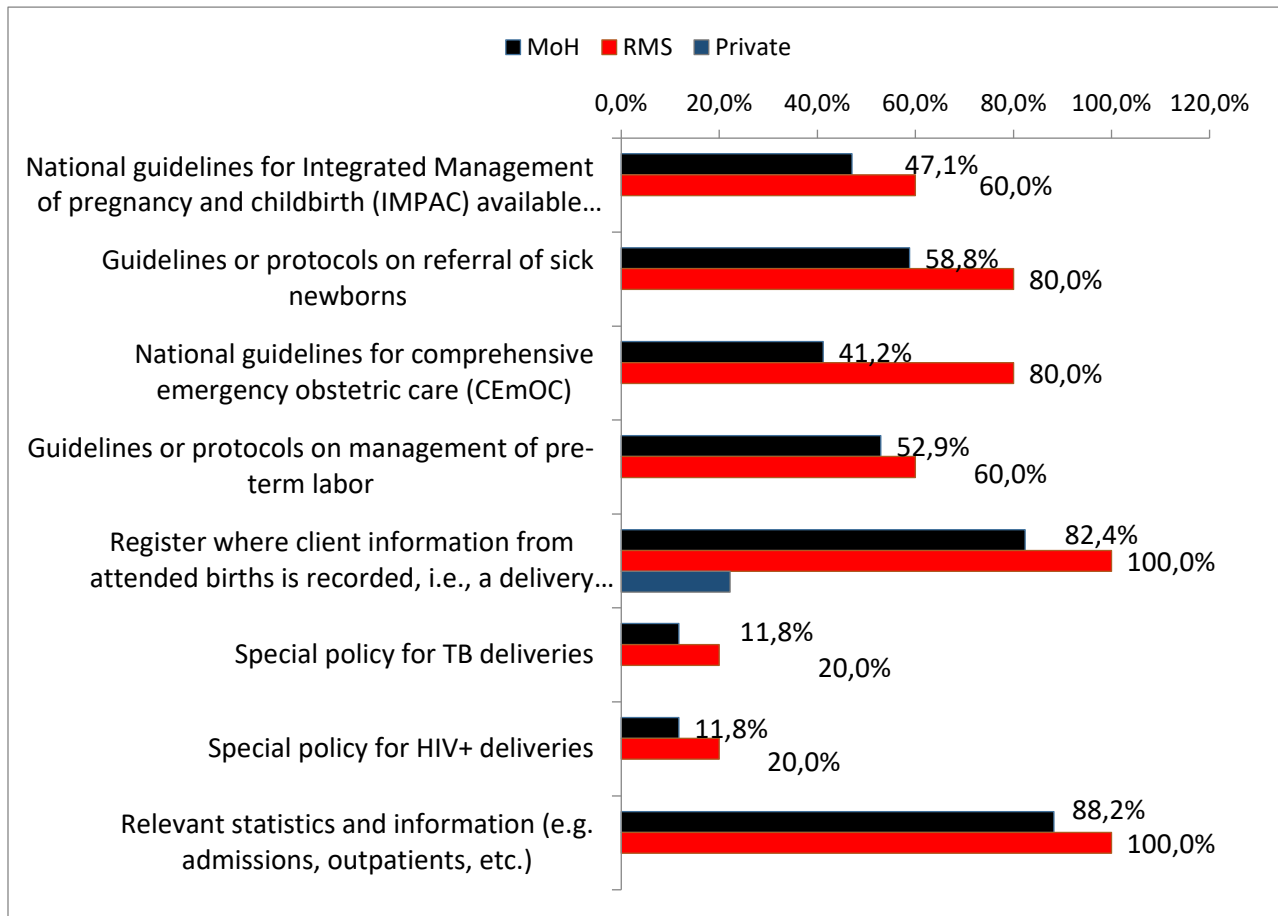
A total of 18 (56.3%) hospitals had separate space (apart from the delivery room) for mothers and newborns together. Only two hospitals (6.3%) practiced Kangaroo Mother Care for all low birth weight babies and 8 (25.0%) hospitals practiced it for some low birth weight babies.

Documentation, guidelines, policies, and statistics

Table 17 shows the availability of essential and important guidelines and policies. A large number of hospitals, mainly the hospitals in the north region, lacked important guidelines, protocols, and policies. Almost one third (37.5%) of hospitals lacked national guidelines for integrated management of pregnancy and childbirth (IMPAC), 46.9% lacked protocols on referral of sick newborns, 37.5% lacked national guidelines for comprehensive emergency obstetric care (CEmOC), and 40.6% lacked protocols on management of pre-term labour. Special policies for TB or HIV+ deliveries were present in 3 (9.4%) hospitals only. Only 3 (9.7%) hospitals participated in regular reviews of maternal or newborn deaths or “near-misses for both mothers and newborn. According to health sector, almost all private hospitals lacked these guidelines/protocols (Figure 3).

	North		Middle		South		Total	
	N = 14		N = 11		N = 7		N = 32	
	n	%	n	%	n	%	n	%
National guidelines for Integrated Management of pregnancy and childbirth (IMPAC) available in this service site	3	21.4	5	45.5	4	57.1	12	37.5
Guidelines or protocols on referral of sick newborns	5	35.7	5	45.5	5	71.4	15	46.9
National guidelines for comprehensive emergency obstetric care (CEmOC)	3	21.4	5	45.5	4	57.1	12	37.5
Guidelines or protocols on management of pre-term labour	4	28.6	5	45.5	4	57.1	13	40.6
Register where client information from attended births is recorded, i.e., a delivery register	8	57.1	8	72.7	6	85.7	22	68.8
Special policy for TB deliveries	1	7.1	1	9.1	1	14.3	3	9.4
Special policy for HIV+ deliveries	1	7.1	1	9.1	1	14.3	3	9.4
Relevant statistics and information (e.g. admissions, outpatients, etc.)	7	50.0	8	72.7	6	85.7	21	65.6

Figure 3. The availability of essential and important guidelines, protocols and policies according to health sector



Staff Training

Interviews with the available health workers showed that there were gaps in the training of staff. Health care providers of delivery and newborn services in many hospitals did not receive any training or updates either on or off-site in some special skills (Table 18). Training on neonatal resuscitation using bag and mask was provided for all staff in 14 hospitals only. None of the staff in 17 hospitals received training on the Kangaroo care method for low birth weight babies, and none of the staff in 20 hospitals received training on special delivery care practices for preventing mother-to-child transmission of HIV. A large number of health professionals in hospitals were not trained on essential and lifesaving skills and practices such as use of corticosteroids for preterm labor, sterile cord cutting and appropriate cord care, thermal care

(including immediate drying and skin-to-skin care), newborn infection management (including injectable antibiotics), and breastfeeding (early and exclusive).

Table 18. The number of hospitals whose staff received any training or updates either on or off-site in any of the following topics within the past 2 years								
Topics	North N = 14		Middle N = 11		South N = 7		Total N = 32	
	n	%	n	%	n	%	n	%
Neonatal resuscitation using bag and mask								
Yes, all staff	4	28.6	6	54.5	5	71.4	15	46.9
Yes, most of them	5	35.7	2	18.2	1	14.3	8	25.0
Yes, some of them	2	14.3	3	27.3	1	14.3	6	18.8
None of them	3	21.4	0	0.0	0	0.0	3	9.4
Breastfeeding (early and exclusive)								
Yes, all staff	3	21.4	3	27.3	4	57.1	10	31.3
Yes, most of them	5	35.7	5	45.5	2	28.6	12	37.5
Yes, some of them	1	7.1	2	18.2	0	0.0	3	9.4
None of them	5	35.7	1	9.1	1	14.3	7	21.9
Newborn infection management (including injectable antibiotics)								
Yes, all staff	5	35.7	7	63.6	7	100.0	19	59.4
Yes, most of them	5	35.7	2	18.2	0	0.0	7	21.9
Yes, some of them	1	7.1	2	18.2	0	0.0	3	9.4
None of them	3	21.4	0	0.0	0	0.0	3	9.4
Thermal care (including immediate drying and skin-to-skin care)								
Yes, all staff	0	0.0	6	54.5	6	85.7	12	37.5

Yes, most of them	2	14.3	1	9.1	1	14.3	4	12.5
Yes, some of them	3	21.4	3	27.3	0	0.0	6	18.8
None of them	9	64.3	1	9.1	0	0.0	10	31.3
Sterile cord cutting and appropriate cord care								
Yes, all staff	6	42.9	7	63.6	5	71.4	18	56.3
Yes, most of them	1	7.1	3	27.3	0	0.0	4	12.5
Yes, some of them	2	14.3	1	9.1	0	0.0	3	9.4
None of them	5	35.7	0	0.0	2	28.6	7	21.9
Kangaroo method for low birth weight babies								
Yes, all staff	0	0.0	1	9.1	0	0.0	1	3.1
Yes, most of them	1	7.1	0	0.0	0	0.0	1	3.1
Yes, some of them	2	14.3	2	18.2	3	42.9	7	21.9
None of them	11	78.6	8	72.7	4	57.1	23	71.9
Special delivery care practices for preventing mother-to-child transmission of HIV								
Yes, all staff	3	21.4	1	9.1	1	14.3	5	15.6
Yes, most of them	1	7.1	0	0.0	0	0.0	1	3.1
Yes, some of them	0	0.0	2	18.2	0	0.0	2	6.3
None of them	10	71.4	8	72.7	6	85.7	24	75.0
Use of corticosteroids for preterm labor								
Yes, all staff	2	14.3	8	72.7	3	42.9	13	40.6
Yes, most of them	2	14.3	3	27.3	0	0.0	5	15.6
Yes, some of them	2	14.3	0	0.0	1	14.3	3	9.4
None of them	8	57.1	0	0.0	3	42.9	11	34.4

Discussion

The quality of maternal and child health facilities and services has been improving in Jordan; however, not all hospitals are providing high level of quality in the same degree. There is significant variation in available resources between geographical areas and health sector in Jordan. This rapid assessment highlighted many deficiencies in providing high quality of care in some of the selected hospitals.

Our findings are in alignment with the WHO standards for provision of maternal and neonatal care (2016) [3], stating that every woman and newborn should receive private care based on their needs and preferences in order to facilitate the continuity of care through having specific and maintained areas for labor, childbirth, and postnatal care. The WHO also encourages hospital managers to supervise the assessment and monitoring of the availability of resources and find out areas that need to be improved, thus promoting quality improvement.

Measures should be adapted to each context, but standards must be implemented consistently to ensure quality improvement. The quality measures include input, output/process, and outcome measures. Input measures include physical resources, human resources, policies, protocols, and guidelines. Output measures include coverage of key practices. The outcome measures include people centered and health outcomes.

Our findings with regards to human resources are alarming and are inconsistent with the WHO (2016) guidelines for providing optimal care for mothers and their newborns. In particular, standard 7 emphasizes having competent, motivated, and available staff to provide routine care and manage complications, but this is not the case in some hospitals in Jordan, according to the current project.

The assessed hospitals offer basic and comprehensive emergency care; however, these are not fully consistent with the recent 2016 WHO standards which state that routine care of newborns immediately after birth facilitates adaptation of the newborn to the new environment, meets the baby's immediate needs in the best possible way, and avoids preventable and avoidable complications. Any complications need to be correctly identified and managed carefully and in a comprehensive approach.

Other WHO quality statements emphasize routine assessment of women on admission and during labor to ensure essential care that is appropriate to the woman's case, to prevent the onset of complications and to identify risks or complications that require urgent action or referral for better outcomes of pregnancy and labor.

As noted with regards to antenatal care, some of the current findings do not fully adhere to the WHO guidelines of providing optimal care for mothers and newborns in the antenatal period, which stress out the importance of effective prevention and management of conditions in late pregnancy in order to minimize the maternal death rate as well as antepartum -related stillbirths. On the basis of the current evidence on burden and impact, the following thematic areas are considered high priorities for evidence-based practices in routine and emergency care:

- management of pre-eclampsia, eclampsia and its complications;
- management of preterm labor;
- management of maternal infections.

Our assessment demonstrated insufficient supplies of some highly imperative items in the admission departments of some hospitals, including, for example, an emergency set, which is lacking in three hospitals. Other important deficiencies that were seen in 5 – 6 hospitals including magnesium sulphate, diazepam, and oxytocin. Magnesium sulphate, for instant, is an antihypertensive medication, which is used to prevent hypertension related complications for women with pre-eclampsia. In its quality statement number 1.2, the WHO (2016) recommended that women with pre-eclampsia or eclampsia should promptly receive appropriate interventions. Therefore, Magnesium sulphate, along with the other medications, should be prepared beforehand to be ready for any potential crisis that may put mother and infant at risk during labour and delivery [20].

This assessment indicated that the operation theatres in many hospitals lacked a variety of necessary equipment, including some basic items such as thermometers and some advanced items such as advanced resuscitation sets for babies and a transportation heated cradle/incubator. The WHO stressed the need for providing a transportation incubator for each delivery room, to

be used when the newborn is transferred to another area [21]. Operation theatres are active and complex environments which require great attention in order to ensure highest level of patient safety. Harm to mothers and newborn babies may occur due to the lack of necessary equipment and supplies. Operation theatres should provide basic and advance resuscitation for newborn babies. The WHO (2016) [3] recommended in its quality statement # 1.5 that newborns who are not breathing spontaneously after birth should receive resuscitation with a bag and mask within 1 minute of birth. In low resource settings and whenever health care staff cannot handle complications that may arise during labour, immediate referral for both mother and infant should be available.

It is recommended that every delivery room should be a safe environment for both mothers and newborn babies. Only two third of all delivery rooms in the selected hospitals had radiant heaters and obstetrical stethoscopes available. Delivery rooms should have an appropriate physical environment and adequate supplies for both routine and advanced management of complications, including emergency resuscitation equipment that is available and ready to use [3, 22].

The assessment revealed a marked geographical variation in relation to available NICU equipment. Hospitals located in the South of Jordan had better scores in the number of incubators in their NICUs than hospitals in the North and the Middle. Meanwhile, hospitals in the North scored better than the rest of the country's hospitals in relation to the availability of resuscitation tables, CPAP, O2 oximeters, and phototherapy. Generally, all hospitals need to increase their capacity of this equipment. One third of all assessed hospitals did not have resuscitation sets in all sections. It has been reported that almost 25% of first week neonatal deaths can be prevented by immediate basic resuscitation [23]. Availability of essential resuscitation equipment and well trained staff is likely to reduce intra-partum related neonatal deaths by 30% [24].

Although a breastfeeding room was available in all hospitals except four, the majority of infants (83.9%) received infant formula, while only 9.7% of all hospitals offered breastfeeding, with 2 hospitals (6.5%) providing expressed breast milk. Breastfeeding and providing newborn babies with expressed mother's milk was proved to have many benefits to a child's health and therefore should be facilitated and encouraged.

As noticed in our results regarding the availability of equipment, drugs, and supplies, a significant lack of necessary equipment, drugs, and supplies was evident. This is in contrast to the WHO standards for improving quality of maternal and newborn care in health facilities (2016), in particular standard 8¹, which emphasize the provision of optimal quality care through ensuring available, adequate essential medicines, equipment, and other supplies.

Furthermore, the WHO (2016) stressed the importance of the availability of a list of important medicines and supplies and a secure storage, with a good system to prevent lack of these items. For example, one quality statement in standard 8 ensures that all suitable medicines are available in the relevant maternal wards and departments whereas necessary equipment is available in the right places, at all times, with a system for constant maintenance and guidelines for correct equipment usage. Unfortunately, these WHO quality statements are not fully reflected in several Jordanian hospitals.

While our findings of the practices align with standard 1² of the WHO guidelines and quality statements related to providing optimal maternal and newborn care, the practices for routine care and management of complications during labor, childbirth, and the early postnatal period were not totally evidence-based. Providing up to date evidence-based practices, according to the WHO recommendations, can significantly decrease the number of deaths and improve outcomes of women and newborns during labor and the early postnatal period.

Our findings relating to documentation, guidelines, policies, and statistics are disappointing and imply poor maternal and newborn care in Jordan due to the lack of guidelines and protocols in several hospitals. One of the WHO (2016) standards of care (standard 1) has nine quality statements, which include how to care for mothers/newborns in emergency or critical cases. If such guidelines are not available in hospitals, poor maternal and newborn outcomes, and hence high rates of morbidity and mortality, are expected.

¹Standard 8: The health facility has an appropriate physical environment, with adequate water, sanitation and energy supplies, medicines, supplies, and equipment for routine maternal and newborn care and management of complications.

²Standard 1: Every woman and newborn receives routine, evidence-based care and management of complications during labour, childbirth, and the early postnatal period, according to WHO guidelines.

As it has been found in our study, there is a huge lack of healthcare professionals training on routine and special care for mothers and newborns, including emergency and critical care. This is in contrast to the WHO (2016) guidelines for the provision of maternal and newborn care, particularly standard 7³, which focuses on having skilled, competent birth attendants and support staff to meet requirements during labor, childbirth, and the early postnatal period and thus improve their performance and roles.

In order to accomplish this standard, the WHO recommends that all healthcare providers need to have a job description that outlines the required competence, roles, and responsibilities, supported by the desired qualifications. This can be achieved through special programs for recruitment, retention, professional development, and higher education for all healthcare providers.

It is essential to provide whatever is needed for a safe and healthy delivery to guarantee a high quality of care for both mother and newborn. Identification of deficiencies in maternity hospitals is important for further improvement, and therefore, substantial reduction in mortality rates among these vulnerable populations.

Strengths of the study

This study has many strengths that need to be acknowledged. The study was multisite and multi-sector since it included hospitals from 12 different governorates in Jordan and from all health sectors, thus increasing generalizability of the findings on the national level. Additionally, we assessed quality of care of maternal and newborn care using a comprehensive, validated checklist that reflected all the WHO standards for easier and more accurate comparisons (various services for mothers and newborns, availability of resources, equipment and supplies, documentation and staff training, and provision of health care services). Importantly, we used the triangulation method during data collection to improve the credibility and reliability of findings. In particular, the assessment forms utilized different sources of information from hospitals during data collection, including direct observation of cases, and semi-structured interviews with staff. Finally, the sample size was large, resulting in a representative sample.

³Standard 7: For every woman and newborn, competent, motivated staff are consistently available to provide routine care and manage complications.

Conclusions and Recommendations

The findings of this study showed that, overall, the quality of the provision of maternal and newborn care in many Jordanian hospitals from different governorates and health sectors was adequate. Nonetheless, some deficiencies were found when compared with the WHO guidelines for optimal maternal and newborn care (2016) across some of the recruited hospitals. Some of these deficiencies included shortages of skilled and competent birth attendants, lack of optimal thorough antenatal care, and lack of necessary supplies, drugs, equipment, and resources during labour and the early postnatal care. Importantly, we found that some healthcare professionals are not regularly trained in routine and special care needed for labour and the early post-partum period in both normal and complicated births. Finally, our rapid assessment of the maternal and newborn services in Jordanian hospitals revealed the lack of pivotal protocols, policies, and guidelines necessary for optimal care. Improvement of the quality of preventive and curative care during this critical period could improve the survival rate of the mother and her newborn. Assessing the current status of the quality of care in providing maternal and newborn health care according to recognized quality standards can pinpoint the areas that need to be improved to reach optimal care for both the mother and her fetus/newborn. The deficiencies revealed from this assessment can be utilized by health professionals and stakeholders to provide optimal quality care for women and their newborns. One way is to enforce health programs to develop and implement health services to close the gap between the current situation and that recommended by the WHO.

Recommendations

Strategic area 1: Equipment, commodities, and supplies

Ensure that a sufficient number of facilities have enough capacity, drugs, equipment, and supplies to provide high quality basic and comprehensive care.

1. Strengthen the current distribution system of equipment, supplies, medicals, and drugs.
2. Procure and distribute, in all hospitals, essential, lifesaving equipment, commodities, and supplies, including lifesaving obstetric drugs (e.g. Magnesium sulphate, Oxytocin, Ergometrimine, Adrenaline, Anti D factor, Prostaglandins, Surfactant, Antibiotics, IV Cannulas and infusion sets, suction and feeding tubes, disposable items such as syringes, gauze, gloves).
3. Establish an effective request process for equipment and supplies to decrease waiting periods and avoid stock-outs and establish effective supervision of equipment maintenance.
4. Review the essential drugs list and establish a system to ensure procurement and distribution of essential drugs on a sustainable basis at all levels.
5. Establish a system for the maintenance of health facilities and equipment at all levels and create budget lines for the maintenance of equipment and furniture.
6. Equip institutions with teaching and learning materials to provide competency based training.
7. Sustain safe blood supply.

Strategic area 2: Skilled human resources

Strengthen the competencies of existing personnel health care providers in Jordan maternity facilities to enable them to provide effective and high quality maternal and newborn health care across the continuum of care spectrum

1. Develop and scale-up a training strategy for in-service multidisciplinary training of maternal and neonatal health care providers on evidence-based perinatal care.
2. Define the package of essential competencies that health care workers should master to provide preconception, maternal, and perinatal care and introduce evidence-based perinatal care training courses (e.g. WHO/MPS course on Effective Perinatal Care).
3. Identify key maternities in each region to spearhead the training efforts.
4. Strengthen the Continuous Medical Education (CME) system to deliver new knowledge to the physicians.
5. Incorporate public health approaches related to maternal and newborn health as well as evidence-based perinatal care into the formal teaching curricula of medical, nursing, and midwifery schools.
6. Develop and implement higher level courses in midwifery and neonatal intensive care, including training programs for neonatologists and pediatric nurses in advanced neonatal care (e.g. STABLE program, Neonatal Resuscitation Training Program,) to enable them to assess, diagnose, manage, and monitor the wide variety of possible conditions that can occur in neonatal critical care settings.

Increase the number of skilled personnel in health facilities for preconception, antenatal, childbirth, and postpartum; mainly neonatologists and paediatric nurses.

1. Develop, introduce, and utilize staffing norms based on workload.
2. Identify the number of practicing health personnel by occupational category and competencies and determine the gap between existing and needed levels for quality care.
3. Encourage participation of professional associations of Obstetricians/Gynaecologists and paediatricians in the process of improving the quality of physicians' manpower.
4. Recruit and retain more health care workers in hospitals that suffer from shortages in human resources.

5. Formulate a national human resources plan and allocate budgets to train more specialists in the area of neonatology inside the country or overseas (Scholarship program).

Strategic area 3: Policy, guidelines, and protocols

Ensure the availability and implementation of up –to- date guidelines and protocols

1. Establish and support a multidisciplinary working group of local and international experts to review, update, and standardize the national policies, protocols, and guidelines. Establish the guidelines based on perinatal approach (Focused antenatal care, labour, delivery, postpartum, newborn care) in collaboration with regional advisory and technical bodies.
2. Produce and disseminate the updated policies and guidelines at all levels.
3. Train health care providers on the implementation of the policies and guidelines.

Strategic area 3: Quality of maternal and neonatal care during labour, childbirth, and the first days of life

Focus on high impact and cost-effective interventions and prioritize action during labour, childbirth, and the first days of life to improve the quality of obstetric and neonatal care services in hospitals

1. Increase emphasis on immediate and exclusive breastfeeding and the implementation of sound hospital policies promoting breastfeeding education and practice. Continue re-assessment of Baby Friendly Hospitals on a regular basis.
2. Introduce "Kangaroo Mother Care (KMC)" to improve care for preterm infants through training of health care providers (neonatologists, midwives, and paediatric nurses) and the development of clinical practice guidelines, training materials, job aids, supervisory systems, and indicators to track implementation and monitor KMC outcomes. Establishment of KMC centres of excellence will maximize KMC expansion, knowledge and training transfer, and mentoring.
3. Introduce and implement comprehensive infection prevention and control program in maternity units and NICUs (e.g. hand washing compliance program; standards compliance of infection control in IV fluid preparation; catheter/cannula insertions and other invasive procedures; rational antibiotic policies and guidelines; educational

programmes on the prevention of hospital infection for hospital personnel; surveillance system of hospital infection).

4. Improve assessment, management, and monitoring of neonatal critical conditions in neonatal intensive care units. Areas such as prevention and management of neonatal infections, management of respiratory distress syndrome, expansion of N-CPAP technology, feeding support to preterm infants and parenteral nutrition, and standardization of procedures for monitoring newborn conditions in NICUs need particular attention.
5. Improve surfactant therapy at the tertiary level. This intervention is costly and should be implemented after regionalized perinatal care is developed and the referral system is functional.
6. Prevent severe bleeding by providing the Vitamin K 0.5mg injection for all LBW babies.
7. Ensure competent staffs who are adequately equipped to provide neonatal resuscitation. Encourage service providers to anticipate newborns who may require resuscitation and to plan accordingly, and develop resuscitation standards for different levels at the setting. Use existing national or WHO guidelines as a basis.
8. Ensure competent staff is adequately equipped to identify jaundice and provide appropriate treatment and services.
9. Support and promote the principles of women and family-centered maternity care, including empowerment of women and families in collaboration with the health-care team to provide opportunities for mothers to participate in the care of their babies while in NICUs, and make informed decisions regarding treatment, care, and discharge of both mothers and newborns.
10. Implement perinatal mortality audits in hospitals to enable a systematic approach to the investigation of perinatal deaths. All neonatal deaths and stillbirths with no evidence of a major congenital anomaly need to be fully investigated to identify if there were avoidable factors and areas for improvement in quality of obstetric and neonatal care, and track effectiveness of improvement programs.

Strategic area 4: Care during pre-pregnancy, pregnancy, and postpartum

Ensure that women start pregnancy as healthy a state as possible

- Increase coverage and quality of family planning services.
 - ✓ Increase access for family planning using novel approaches.
 - ✓ Provide effective communication about choices for delaying and spacing pregnancies.
- Update legislations to delay age at first pregnancy (more than 18 years of age).
- Increase school enrolment for all children through community mobilization, reduce the gender literacy gap by strengthening educational opportunities for girls and women, and advocate for national opportunities for girls to attend higher levels of education.
- Immunize women of reproductive age against key infections and ensure that women of reproductive age have had at least two Tetanus Toxoid immunizations.

Provide quality care during pregnancy in order to prevent complications of pregnancy, identify and manage danger signs, and prepare for delivery and motherhood

1. Provide evidence-based, client-centered antenatal care and include core services in standards of care.
2. Increase coverage and improve the quality of antenatal care services.
3. Develop systems for early detection and management of complications of pregnancy, especially pre-eclampsia, malpresentation, preterm labour, and premature rupture of membranes.
4. Scale-up implementation and compliance with antenatal corticosteroid administration guidelines for prevention of respiratory distress syndrome and other problems of prematurity.
5. Ensure tetanus toxoid immunization coverage for all pregnant women.
6. Promote iron and folate supplementation for all pregnant women and prevent anaemia with healthy diet recommendations and iron and folate supplementation.
7. Educate mothers and families to prepare for care of the newborn, especially regarding early and exclusive breastfeeding and avoiding harmful practices.

Strengthen and improve the quality of postpartum care of the mother

5. Provide support for mother and family, especially for breastfeeding.
6. Provide early identification of complications and referral.
7. Provide family planning counselling.
8. Define indicators of service delivery for mothers and babies and integrate them into routine data collection systems and instruments, conducting periodic health facility assessments to evaluate the quality of care if necessary.

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Annex 1
Maternal and Newborn Services
Rapid Facility Assessment Forms

Date: / / 2017	Name of the surveyors:	
Name of the hospital: _____	Town/ city	Governorate
Director of the Hospital	Head of Maternity	Head of Neonatal Unit
Name:	Name:	Name:
Phone #:	Phone #:	Phone #:
Sector		
<input type="checkbox"/> Ministry of health of Jordan	<input type="checkbox"/> University hospital	
<input type="checkbox"/> Royal Medical service	<input type="checkbox"/> Private hospital	
<input type="checkbox"/> Other, mention-----		

A. Service availability

[Please interview both the head of the maternity and the head of neonatal unit and ask about the availability of the following services]

Availability of services				If yes, how many beds?
1	Does the health facility have a ward for admitting obstetrics patients?	1. Yes	2. No	
2	Does the health facility have a theatre to perform CS?	1. Yes	2. No	
3	Does the health facility have a separate room or ward for admitting “infectious” cases (isolation)?	1. Yes	2. No	
4	Does the health facility have a separate ward or room for admitting newborn babies (nursery)?	1. Yes	2. No	
5	Does the health facility have a neonatal intensive care unit?	1. Yes	2. No	

B. Human resources

B.1 Is a person (specialist/resident) skilled in conducting deliveries present at the facility or on call at all times (24 hours a day), including weekends, to provider delivery care?

1. Yes, present 2. Yes, on call 3. No 24-hour coverage

B.2 Number of permanent staff providing perinatal care in the facility					
Human resources	Number	Adequacy of the staff			If inadequate, how many <u>more</u> is needed?
		1.Plenty	2.Satisfactory	3.Inadequate	
1. Ob&Gyns					
2. Pediatricians					
3. Neonatologists					
4. Residents in Ob&Gyns					
5. Residents in Pediatrics					
6. Midwives/nurses (obstetrics)					
7. Pediatric Nurses					

C. Basic and comprehensive emergency obstetric care and neonatal care

Please tell me if the facility is able to provide any of the following services and if currently provides it					
Type of service		Able to provide it		Currently provides it	
1.	Normal vaginal delivery	1.Yes	2. No	1.Yes	2. No
2.	Caesarean section	1.Yes	2. No	1.Yes	2. No
3.	Administration of parenteral antibiotics; (IV or IM)	1.Yes	2. No	1.Yes	2. No
4.	Administration of uterotonic drugs (i.e. parenteral oxytocin); (IV OR IM)	1.Yes	2. No	1.Yes	2. No
5.	Administration of parenteral anticonvulsants for pre-eclampsia and eclampsia (i.e. magnesium sulphate)	1.Yes	2. No	1.Yes	2. No
6.	Manual removal of the placenta	1.Yes	2. No	1.Yes	2. No
7.	Removal of retained products after delivery (e.g., manual vacuum aspiration)	1.Yes	2. No	1.Yes	2. No
8.	Perform assisted vaginal delivery (e.g. vacuum extraction, forceps delivery)	1.Yes	2. No	1.Yes	2. No
9.	Perform blood transfusion	1.Yes	2. No	1.Yes	2. No
10.	Perform basic neonatal resuscitation (e.g., with bag and mask)	1.Yes	2. No	1.Yes	2. No
11.	Corticosteroids for preterm labour	1.Yes	2. No	1.Yes	2. No
12.	Non invasive ventilation (CPAP) for baby	1.Yes	2. No	1.Yes	2. No
13.	Intubation/ventilation for baby	1.Yes	2. No	1.Yes	2. No

D. Antenatal care

[Ask the head of the maternity]

D1. Does this facility provide antenatal care?

1. Yes [if yes fill the table below]

2. No [If no Go to section E]

D2. If the facility provides antenatal care, are the following services systematically provided during pregnancy?				
Service		YES systematically provided	YES but not systematically	NOT provided
1.	Iron supplementation	1	2	3
2.	Folic Acid supplementation	1	2	3
3.	Fasting Blood Sugar	1	2	3
4.	Blood pressure	1	2	3
5.	Haemoglobin	1	2	3
6.	Urine stick (protein, sugar)	1	2	3
7.	Tetanus Toxoid Vaccination	1	2	3
8.	Breastfeeding counseling	1	2	3
9.	Family planning counseling	1	2	3

E. Admission Department (maternity)

Please observe and indicate if the followings are available in the Admission Department:

- | | | | |
|-----------|--|------------|-----------|
| 1 | .Blood pressure gauge | 1. Yes [] | 2. No [] |
| 2 | Obstetrical stethoscope | 1. Yes [] | 2. No [] |
| 3 | Stethoscope for adults | 1. Yes [] | 2. No [] |
| 4 | Thermometer | 1. Yes [] | 2. No [] |
| 5 | Couch | 1. Yes [] | 2. No [] |
| 6 | Soap | 1. Yes [] | 2. No [] |
| 7 | Towels | 1. Yes [] | 2. No [] |
| 8 | Posters or information on hand washing | 1. Yes [] | 2. No [] |
| 9 | Surgical transport like wheel chair | 1. Yes [] | 2. No [] |
| 10 | Emergency set: | | |
| | 10.1 Bag and mask for adults | 1. Yes [] | 2. No [] |
| | 10.2 IV line | 1. Yes [] | 2. No [] |
| | 10.3 Syringes | 1. Yes [] | 2. No [] |
| | 10.4 IV catheter | 1. Yes [] | 2. No [] |
| | 10.5 Sterile medical gloves | 1. Yes [] | 2. No [] |
| | 10.6 Normal saline | 1. Yes [] | 2. No [] |
| | 10.7 Magnesium sulfate | 1. Yes [] | 2. No [] |
| | 10.8 Diazepam | 1. Yes [] | 2. No [] |
| | 10.9 Oxytocin | 1. Yes [] | 2. No [] |

F. Delivery Room

F.1 Number of Delivery Rooms in the facility []

F.2 Please <u>observe</u> and indicate if the followings are available in delivery room/s:				
Safety/Saving life medical equipment		Availability		
		Available in all delivery rooms	Available in some delivery rooms	Not available
1.	Normal bed			
2.	Transferable bed			
3.	More than one delivery bed			
4.	Obstetrical stethoscope			
5.	Electronic thermometer for baby			
6.	Ambu bag and mask for baby			
7.	A radiant heater			
8.	Adult blood pressure gauge			
9.	Wall clock			
10.	Sterile equipment for cutting and tying the cord			
11.	Infant weighing scale			
12.	Room thermometer			
13.	Curtains on the window and on the door to insure privacy of the DR			
14.	Water /Towel/ Soap			

G. Delivery block/department

Please <u>observe</u> and indicate if the followings are available in the Delivery block/department.			
1.	Is there an emergency set for advanced newborn resuscitation?	1. Yes	2. No
2.	Laryngoscope (in work condition)	1. Yes	2. No
3.	Blades of 2 sizes	1. Yes	2. No
4.	Intubation's tubes (4 sizes)	1. Yes	2. No
5.	T-adapter	1. Yes	2. No
6.	Aspiration catheter	1. Yes	2. No
7.	Adrenalin	1. Yes	2. No
8.	Syringes (5 ml)	1. Yes	2. No
9.	Normal saline	1. Yes	2. No
10.	Sterile gloves	1. Yes	2. No
11.	How many emergency sets are in delivery block/department?*		
12.	Is there a separate fridge for blood components?	1. Yes	2. No

H. Operation Theater (OT)

H1. Number of operation theaters []

H2. Check in each operation theater

Safety/Saving life medical equipment		Available in all operation theaters	Available in some operation theaters	Not available
4.1	Is there a thermometer?			
4.3	Are there Ambu bag and mask for baby?			
4.4	Is there a set of advanced resuscitation for the baby?			
4.5	Is there a warming device for the newborn in the operation theater (radiant heater, incubator)?			
4.6	Is there a wall clock with a second hand in the operation theater?			
4.7	Is there a transportation (portable) incubator for baby in the operation theater?			
4.8	Is there an adult blood pressure gauge?			
4.9	Is oxygen available?			

I. NICU

What is the maximum capacity of infants in the NICU? []

What is the total number of nurses working in NICU? []

Please observe and answer the following questions?				
1.	Is a wall thermometer present in each section/room?	1.All []	2.Some []	3.None []
2.	Are infants wearing hats in the incubator/cradle?	1.All []	2.Some []	3.None []
3.	Is there an individual thermometer for each infant?	1.All []	2.Some []	3.None []
4.	Is there a source of oxygen available in the department for each baby?	1.All []	2.Some []	3.None []
5.	Is there vacuum aspirator available in each section?	1.All []	2.Some []	3.None []
6.	Is there one resuscitation set available in each section	1.All []	2.Some []	3.None []
7.	What is the temperature in the department?	[] C°		
8.	Is there a disinfectant in the admission part of NICU?	1.Yes []	2.No []	
9.	Is warm water available in each room day and night?	1.All []	2.Some []	3.None []
10.	Are there more than one baby sharing the same incubator or cradle (excluding twin, triplet)	1.All []	2.Some []	3.None []
11.	Did you observe the staff washing hands between each baby?	1.All []	2.Some []	3.None []
12.	How usually are the infants fed in this department?	1.Breastfeeding 2 Expressed breast milk 3 Special infant formula		
13.	Are there breastfeeding room or corner?	1.Yes []	2.No []	
14.	Is there a fridge in the department to store breast milk?	1.Yes []	2.No []	

Please interview the neonatologist and ask him/her these questions.			
Equipment	How many in the department?	Are they sufficient	How many more are needed if not sufficient?
1. Incubators		1.Yes [] 2.No []	
2. Resuscitation table		1.Yes [] 2.No []	
3. Continuous Positive Airway Pressure (CPAPs)		1.Yes [] 2.No []	
4. Lung ventilation devices (ventilators)		1.Yes [] 2.No []	
5. Pulse oxymeters		1.Yes [] 2.No []	
6. Phototherapy lamps		1.Yes [] 2.No []	

J. Other equipment, drugs and supplies in the facility overall

I would like to know if the following items are available in the facility (if not functional then it is unavailable)				
		Availability		
		Reported and Observed	Reported and not observed	Not available
1.	Towel for drying and wrapping babies	1	2	3
2.	Blood sugar sticks	1	2	3
3.	Breast Pump	1	2	3
4.	Feeding cups	1	2	3
5.	Hat	1	2	3
6.	Oxygen supply/blender	1	2	3
7.	Bilirubinometer	1	2	3
8.	Eye cover	1	2	3
9.	HIV testing kit	1	2	3
10.	Antibiotics (ampicillin, cefazolin, erythromycin, gentamicin or penicillin)	1	2	3
11.	IV fluids	1	2	3
12.	Corticosteroids	1	2	3
13.	Surfactants	1	2	3
14.	Aminophylline/caffeine	1	2	3
15.	Vitamin K (IM)	1	2	3
16.	Chlorexidhine 7% for cord care	1	2	3
17.	Iron	1	2	3
18.	Folic Acid	1	2	3
19.	TT vaccines	1	2	3
20.	Anithypertensive drugs	1	2	3
21.	Magnesium sulphate (injection)	1	2	3
22.	Partograph	1	2	3
23.	Uterotonic (oxytocin and/or misoprostol)	1	2	3
24.	Antibiotics (ampicillin,)	1	2	3

K. Practices

Based on the interview with available health care providers, which of the followings are implemented and according to WHO recommendations?

Topic	In line with WHO	
	Yes	No
1. Support to the women during labour		
2. Free delivery position		
3. Use of partogram		
4. “Skin to skin” contact		
5. Transportation of the baby within maternity		
6. Initiation of Breastfeeding and breastfeeding support/ counseling		
7. Post partum care of the mother		
8. Mother counseling at discharge		
9. Dry and open cord care		
10. Checking daily the healthy full term baby weight		
11. Checking the baby temperature		
12. Assessing daily the correct attachment of the baby to the breast		
13. Management of Asphyxia		
14. Management of Jaundice		

Does the facility have a separate space (apart from the delivery room) for mothers and newborns together or for newborns only (postnatal area/ward)?

1. Yes, mothers and newborns together 2. Yes, for newborns only 3. No

Does this facility practice Kangaroo Mother Care for low birth weight babies?

1. Yes, for all 2. Yes, for some 3. No, at all

