Neonatal Death Audit Analysis Report

Lebanon, October 2020

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ANC   Antenatal Care

BML   Beirut and Mount Lebanon

ISSP-USJ   Higher Institute of Public Health - University Saint Joseph

MoPH   Ministry of Public Health

NICU   Neonatal Intensive Care Unit

NNM   Neonatal Mortality

NNMR   Neonatal Mortality Rate

PHC   Primary Health Care

PNC   Post Natal Care

SDG   Sustainable Development Goals

SPSS   Statistical Package for Social Sciences

TPA   Third Part Administrator

USJ   University Saint Joseph

UNHCR   United Nations High Commissioner for Refugees

1 Executive Summary

Neonatal mortalities are important indicators of the health care system performance. Neonatal Mortality audits aim to mainly reduce the number of neonatal mortalities through capturing information on the number of neonatal mortalities among the population, identifying potential preventable factors that contribute to the mortality, and addressing those factors by enhancing the health care services and quality of care provided to the pregnant women. A neonatal audit covering UNHCR hospitals network mortalities in neonates below 28 days was undertaken in 2020 with the objective of compiling data that would assist in providing recommendations for the improvement of neonatal care. This audit covered the refugee population accessing UNHCR hospitals network. The audit process consisted of conducting interviews with both caretakers and hospital personnel using an audit form prepared by UNHCR which was completed and submitted to UNHCR within 72 hours of receiving the report of death. A total of 137 neonatal deaths were included in this report from 1st of July till 30th of September 2020. Results of this quarter show that the highest proportion of the reported hospital neonatal mortalities were reported among refugees in the Bekaa followed by refugees in North Lebanon, Beirut Mount Lebanon and finally South Lebanon. The number of neonatal mortalities has witnessed a two folds increase between the first and third quarter of 2020 with a neonatal mortality rate exceeding the SDG recommended 12 per 1000 live births in all 4 regions across Lebanon. This alarming surge in number of neonatal mortalities and high Neonatal Mortality Rate pose the need to dig deeper into the factors contributing to the mortalities including the quality of health care services, continuum of care, and awareness of pregnant women on reproductive health and maternal and child health.

2   Background

The neonatal period which covers the first 28 days of a child's life is the most vulnerable time for an individual's survival with an average global rate of 18 deaths per 1,000 live births in 2018[1]. There are huge disparities in neonatal mortality rates across regions and countries with more than half of all neonatal deaths occurring in countries where neonatal mortality rates exceed 30 deaths per 1,000 live births[2]. Many of these countries have experienced recent conflicts or humanitarian emergencies and are hosting refugees. Currently, neonatal deaths account for approximately 44% of all deaths of children under the age of five within low-middle income countries.

Neonatal mortality which is addressed in the third sustainable development goal (SDG) is a serious public health problem that is often used as an indicator of economic development. One of the tenants of SDG 3 is to eliminate preventable newborn deaths and reduce neonatal mortality to less than 12 per 1,000 live birth by 2030[3]. Therefore, it is important to continuously monitor risk factors of neonatal mortality in order to improve the quality of life of children and reduce child mortality. Such risk factors include biological and socioeconomic determinants, as well as characteristics of healthcare in the prenatal, delivery and postpartum periods[4].

Neonatal death audit is the process of systematically capturing information on the number and causes of all neonatal deaths, conducted in a no-blame, interdisciplinary setting, in order to improve the care provided to all mothers and babies[5]. Death reviews provide opportunities to examine the circumstances surrounding, as well as the immediate and contributing causes leading to, a neonatal death. The main objective of such an audit is to identify potential avoidable factors linked to these deaths and

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[1] https://data.unicef.org/topic/child-survival/neonatal-mortality/

[2] https://www.unhcr.org/54bd0dc49.pdf

[3] https://www.un.org/development/desa/disabilities/envision2030-goal3.html

[4] Teixeira, G.A. et al. (2016). Risk factors for neonatal mortality in the life of first week. J. res.: fundam. care. Online 8(1): 4036-4046

[5]   Kerber K.J. et al. (2015). Counting every stillbirth and neonatal death through mortality audit to improve quality of care for every pregnant woman and her baby. BMC Pregnancy and Childbirth 15(Suppl 2): S9. http://www.biomedcentral.com/1471-2393/15/S2/S9

ultimately future morbidity and mortality[6]. Neonatal mortality audit is particularly important as care often falls between different providers and even between different departments or units[7,8].

The Syrian refugee population, that has been arriving in Lebanon since 2011, remains the largest concentration of refugees per capita and the fourth largest refugee population in the world[9]. It is estimated by the Lebanese government to be around 1.5 million refugees, 879,529 of which were registered with United Nation High Commissioner for Refugees (UNHCR) as of September 2020[10]. Before 2020, reported neonatal mortality rate were well below the SDG target, but even then, a higher neonatal mortality rates observed among Syrian refugee population (6.5 per 1000 live births in 2018) compared to the host community (4.5 per 1000 live births in 2018)[11]. However, currently there is no established system of data collection related to neonatal mortalities in Lebanon that would allow the possibility to identify and address the causes of elevated mortality rates.

3 Objectives

- Collect data and maintain a database for neonatal deaths, among refugees for 2020, which includes key variables such as age at death, place of death, gestational age, maternal age, birth weight, Apgar score, maternal antenatal history, type of delivery, length of labor, symptoms/signs prior to death, treatment given, etc;
- Provide a summary of the findings and offer recommendations for the improvement of neonatal care;
- Provide a summary of current and potential contributing factors.

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[6] http://www.who.int/pmnch/knowledge/publications/summaries/ks27/en/

[7] Pattinson R. et al. (2009). Perinatal mortality audit: counting, accountability, and overcoming challenges in scaling up in low- and middle-income countries. Int J Gynaecol Obstet. 107 (Suppl 1): S113-21, S121-2. doi: 10.1016/j.ijgo.2009.07.011.

[8] Buchmann E.J. (2014). Towards greater effectiveness of perinatal death audit in low- and middle-income countries. BJOG 121 (Issue Supplement s4): 134–136

[9] https://www.unhcr.org/lb/wp-content/uploads/sites/16/2018/12/VASyR-2018.pdf

10 https://data2.unhcr.org/en/situations/syria/location/71

[11] MoPH data observatory

4 Methodology

The neonatal audit process consisted of:

- Conducting interviews with caretakers and hospital personnel;
- Compiling information from medical records and death certificates;
- Completing the audit form, including details of the events leading up to the death;
- Submitting the completed forms to UNHCR within 72 hours of receipt of report of death.

4.1 Population and Sample

This audit included refugee families that have experienced neonatal deaths in a UNHCR hospitals network within a Neonatal Intensive Care Unit (NICU) across all regions of Lebanon. Hospitals are grouped geographically into 4 areas: Beirut Mount Lebanon (BML), Bekaa, South and North Lebanon. There are, in fact, 40 hospitals in the network, distributed as follows:

- Bekaa: 10 hospitals
- North: 11 hospitals
- Beirut Mount Lebanon: 10 hospitals
- South: 9 hospitals

Not all the hospitals on the network have neonatal units and therefore, some did not contribute any eligible cases for this audit.

4.2 Data Collection, Management and Analysis

The data collection process was initiated by a standardized email from the UNHCR focal point to the respective Higher Institute of Public Health – USJ (ISSP) field investigators with the project coordinator in cc. The field investigators confirmed receipt by email.

The ISSP project coordinator followed up with the field to ensure that the process was completed in a timely manner. One field investigator, recruited from the area of interest, was assigned per area. Field investigators conducted the neonatal audit by collecting primary data through phone interviews with the parents or relatives and

secondary data through the abstraction of medical records in the hospital where the death occurred. They used the neonatal mortality event review form provided and agreed upon by UNHCR which was filled out using the paper and pencil method and scanned and submitted to the project coordinator within 2-3 days. The project coordinator reviewed the information, reported back to the field investigators for any clarification or inconsistency before completing the forms and forwarding them to the medical consultant who reviewed their content. The forms were then finalized by the coordinator who submitted them to UNHCR as close as possible to the 72-hour deadline. The deadline excluded weekends and holidays.

In parallel, the Kobo data entry and management platform was tested by having the field investigators enter the collected data into Kobo. They were also required to continue the data entry process once the coordinator completed the file and sent it back to them. Once the file was submitted on Kobo, the coordinator rechecked it one final time before approving it.

UNHCR facilitated the task by ensuring the cooperation of the Third-Party Administrator (TPA) delegates and by informing the hospitals of the process in writing. The field investigators were provided with an USJ ID card and a formal letter issued by UNHCR. The field investigators were individually trained by the project coordinator. A debriefing session is held every quarter to get feedback from the field.

The results were analyzed using SPSS. Descriptive results are presented in tables.

4.3 Ethical Considerations

The information received from the UNHCR focal point on the alerts through the TPA delegates contains the neonate's name, a contact number for the parents and the TPA delegate, the hospital where the neonatal death occurred as well as the date of and reason for admission.

The field investigators started the data collection process by interviewing the parents and requesting their permission to access the medical file of their deceased newborn. If permission was granted the field investigators contacted the TPA delegate in order

to arrange access to the hospital files. In cases where the hospitals refused to share the patient files, data was collected from the TPA files.

5   Results

5.1   Quantitative Findings

5.1.1 Distribution of Neonatal Deaths

There were 143 neonatal deaths reported among refugees that accessed UNHCR network hospitals in Lebanon between July 1, 2020 and September 30, 2020. Of these, 2 were not eligible as the infant was over 27 days at the time of death and 4 could not be processed as the parents could not be reached. Therefore, 137 neonatal deaths were included in this report.

During the third quarter of 2020, the highest proportion of the reported hospital neonatal deaths among refugees (41%) occurred in the Bekaa. In addition, 45% of the neonatal deaths were almost equally distributed between the South (30 deaths) and North (31 deaths) provinces and 15% between Mount Lebanon (12 deaths) and Beirut 8 deaths) (table 1). This proportion is also comparable with the refugee distribution across Lebanon; highest refugee population resides in Bekaa followed by North, BML, and South Lebanon

Table 1: Distribution of neonatal deaths among refugees in UNHCR network hospitals by region, Lebanon third quarter 2020 (n=137)

Region	Number	Percent	Live Births	NNMR[12]	Total Registered Refugees[13]
Bekaa	56	41%	2739	20.45	340,600
North	31	23%	1527	20.30	236,635
South	30	22%	2145	13.99	96,411
BML	20	15%	999	20.02	205,883

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[12] Total neonatal deaths/total deliveries*1000

[13] http://data2.unhcr.org/en/situations/syria/location/71

Table 2: Distribution of neonatal deaths among refugees in UNHCR network hospitals by hospital, Lebanon third quarter 2020 (n=137)

Hospital Code	Neonatal death	Percent	Live Births	Neonatal Admission
Bek01	19	13.7	432	103
S01	18	13.1	677	113
Bek03	13	9.8	379	95
Bek02	12	8.6	834	109
ML01	11	8.0	373	34
B01	8	5.8	463	63
N01	8	5.8	394	48
N02	8	5.8	438	77
N03	7	5.1	1	50
S02	6	4.4	928	185
Bek04	4	2.9	349	58
N04	4	2.9	241	26
S03	4	2.9	362	83
N05	3	2.2	319	28
Bek07	3	2.2	904	44
Bek05	2	1.5	96	8
Bek06	2	1.5	69	8
S04	2	1.5	178	19
ML02	1	0.7	50	12
N06	1	0.7	103	16
Bek08	1	0.7	25	5

Only 21 of the 40 network hospitals reported refugee neonatal deaths between July 1, 2020 and September 30, 2020; some hospitals in the network do not have a NICU and consequently do not report neonatal mortalities. Around a quarter of the reported deaths (27%) came from two hospitals: one in the Bekaa (19 cases; 34% of the cases in the Bekaa) and one in South Lebanon (18 cases; 60% of the cases in the South). Seventy-nine percent of the deaths in the Bekaa and 74% of the deaths in Tripoli came from 3 hospitals while 11 of the 12 deaths in Mount Lebanon and all 8 deaths in Beirut came from a single hospital.

5.1.2 Characteristics of Neonatal Deaths

Table 3 describes the characteristics of neonatal deaths reported among refugees in UNHCR network hospitals in Lebanon during the third quarter of 2020. Fifty-two percent (52%) of the neonates were males and 58% died within 7 days of birth. Where data was available, almost all the neonates required neonatal resuscitation (91%) and had no umbilical infection (98%). However, it is important to note that in around a third of the cases (31%), the records did not document whether the neonates required

resuscitation and for more than a quarter (27%) of the neonates, there was no indication if the neonate had an umbilical infection. As for prophylaxis, 79% of the neonates with known information were given vitamin K, half (51%) were given antibiotic eye ointment and a third (33%) were given surfactant. Half of the neonates (56%) had known low birth weight with 14% weighing less than 1000g and 16% weighing between 1000g and 1500g. Of the neonates with low birth weight, 81% were premature and 25% were born to adolescent mothers. The mean documented Apgar score was 4.4 with a standard deviation of 2.3 at 1 minute and 6.0 with a standard deviation of 2.2 at 5 minutes. Note that only 60% of the Apgar score were recorded at 1 minute and 53% at 5 minutes.

Table 3: Characteristics of the neonatal deaths among refugees in UNHCR network hospitals, Lebanon third quarter 2020 (n=137).

Characteristic	Number	Percent
Gender		
Male	71	51.8
Female	66	48.2
Age at time of Death		
< 24 hrs.	11	8.0
1-2 days	37	27.0
3-6 days	32	23.4
7-13 days	31	22.6
14-20 days	21	15.3
21-27 days	5	3.6
Low Birth Weight (≤ 2500g)		
Yes	77	56.2
No	50	36.5
Not documented	10	7.3
Birth weight classification		
Extremely low birth weight ≤ 1000 gm	19	13.9
Very low birth weight 1001-1500 gm	22	16.1
Moderate low birth weight 1501 -2500	36	26.3
Normal birth weight > 2500 gm	50	36.5
Not documented	10	7.3
Resuscitation required		
Yes	86	62.8
No	9	6.6
Not documented	42	30.7
Umbilical infection		
Yes	2	1.5
No	98	71.5
Not documented	37	27.0
Prophylaxis (more than 1)		
Vitamin K	91	66.4
Eye ointment	59	43.1
Surfactant	38	27.7
Not documented	22	16.1

None	7	5.1
Apgar Scores	**Mean ± SD[14]**	**Min-Max**
1 minute (n=82)	4.4 ± 2.3	0-10
5 minutes (n=73)	6.0 ± 2.2	2-10

The majority of the neonates (90%) were placed on a mechanical ventilator at birth (Table 4). In addition, 81% were given parenteral antibiotics, 65% were supplemented with IV fluids, 38% were administered oxygen and 37% were intubated.

Seventy percent (70%) of the neonatal deaths were considered to be admitted to hospital after birth but only 31% were admitted from another location (home, clinic or another hospital). Almost all (97%) were critically ill upon admission. Around a quarter of the hospital admissions after birth (table 5) were due to each of respiratory distress (26%) prematurity (23%) and dyspnea (23%).

Respiratory distress (69%) was the most common immediate cause of death (table 6). Additionally, 17% of the deaths were attributed to prematurity and 16% to cardiac arrest.

Table 4: Interventions provided at admission among refugees in UNHCR network hospitals, Lebanon third quarter 2020 (n=137)

Interventions provided (more than 1 per neonate)	Number	Percent
Category 1:		
Parenteral antibiotics	111	81.0
IV fluids	89	65.0
Oxygen	52	38.0
Vaccines	20	14.6
Phototherapy	19	13.9
Transfusion	17	12.4
Fresh frozen plasma	11	8.0
Adrenalin/Dopamine	10	7.3
Parenteral anticonvulsants	3	2.2
Oral rehydration salts	2	1.5
Epanutin	2	1.5
Albumin	2	1.5
Category 2:		
Mechanical ventilator	123	89.8
Tube through nose	51	37.2
Umbilical line/catheter	12	8.8
Operation for illness	5	3.6
NPO	3	2.2
Echocardiogram	3	2.2
CT brain	3	2.2

[14] SD = standard Deviation

Table 5: Reasons for hospital admissions of the neonates among refugees in UNHCR network hospitals, Lebanon third quarter 2020 (n=137)

Reasons for admissions (more than 1 per neonate)	Number	Percent
Respiratory distress	36	26.3
Prematurity	31	22.6
Dyspnea	31	22.6
Congenital anomaly	18	13.1
Sepsis/Septic shock	12	8.7
Dehydration	9	6.6
Asphyxia/Hypoxia	7	5.1
Jaundice	6	4.4
Other reasons[15]	35	25.5

Table 6: Immediate cause of neonatal deaths among refugees in UNHCR network hospitals, Lebanon third quarter 2020 (n=137)

Immediate cause of death	Number	Percent
Respiratory distress	95	69.3
Prematurity	23	16.8
Cardiac arrest	22	16.1
Neonatal sepsis/Septic shock	15	10.9
Congenital anomalies/birth defects	7	4.4
Dehydration	8	5.8
Other causes[16]	18	13.1

5.1.3 Maternal Characteristics

Table 8 depicts the characteristics of the mothers that had neonatal deaths in UNHCR network hospitals during the third quarter of 2020 as well as certain characteristics of their delivery experience. The average age of the mothers was 26 years (SD=6.6) with a minimum of 15 years and a maximum of 41 years. Around 18% of the women were less than 20 and 11% were over 35 years of age. On average their gravida and parity were 3.5 pregnancies (SD=2.1) and 2.8 neonates (SD=2.0) respectively. The number of antenatal visits average was 6.8 visits (SD = 4.0) with median and mode of 6 and 5

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[15] Other reasons include 3 cases of hypoactivity, 2 cases each of diarrhea, hypotonia, bradycardia, comatose, cyanosis, pneumonia and vomiting as well as single cases of fever, hypothermia, refusal to suck, low birth weight, apnea, hemangioma, enterocolitis, near cardiac arrest, anuria, abdominal distension, desaturation, hypoglycemia, meconium aspiration, heart surgery, metabolic disease, pulmonary hemorrhage, renal failure, infection.

[16] Other causes include 2 cases each of neonatal asphyxia, respiratory failure, jaundice, single cases of hypovolemic shock, bradycardia, convulsions, DIC, coma, heart failure, internal bleeding, metabolic illness, postoperative complications, pulmonary hemorrhage, renal failure, urinary infection.

visits respectively. Almost two-thirds of the women were prescribed iron supplements (66%) and vitamins (66%).

The majority of the cases reported involved singleton births (88%), born in a network hospital (86%) and attended by physicians (88%). There was only 1 home delivery this quarter and 1 neonate was born on the way to the hospital. Forty-four percent (44%) of the presentations were cephalic and 45% were unknown mostly due to C-section deliveries. Sixty-one percent (61%) of the neonates were premature with 10% extremely preterm. The average gestational age was 34 weeks (SD = 5) with a minimum of 20 weeks and a maximum of 40 weeks. Half of the deliveries (53%) were Cesarean sections. There were 3 cases of assisted vaginal delivery and 3 cases of unattended spontaneous vaginal deliveries. Most of the women (83%) were not anemic, and had no adverse labor events (81%). Around two-thirds of the women reported no danger signs (69%) or pregnancy complications (64%). Out of women who reported danger signs, the most commonly identified danger signs were vaginal bleeding with 14/42 cases and abdominal pain with 12/42 cases while the most common adverse labor event was preterm Premature rupture of membranes with 12/27 cases. More than half of the delivery complications included unplanned/emergency C-sections (28/48 cases) while around a quarter included prolonged obstructed labor (11/48 cases) and 21% postpartum bleeding (10/48 cases). There was only one maternal death among the 132 women. The deceased mother was 39 years old with 7 pregnancies and 7 live births. She had 3 antenatal visits and was prescribed iron supplements. Labor began at the clinic/health center, but she delivered in a network hospital by assisted vaginal delivery attended by a physician. This was a singleton birth. The mother was anemic and had post-partum hemorrhage and an obstructed delivery. She had a hysterectomy and died the next day.

Table 8: Maternal and Delivery Characteristics of neonatal deaths among refugees in UNHCR network hospitals, Lebanon third quarter 2020 (n=137)

Characteristics	Mean ± SD	Min-Max
Age	26.0±6.6	15-41
Gravida	3.5±2.1	1-10
Parity	2.8±2.0	0-9
Antenatal visits (n=134)	6.8±4.0	1-24
Gestational age (n=131)	34.2±4.8	20-40

	Number	Percent
Maternal age		
< 20 years	25	18.2
20-35 years	97	70.8
> 35 years	15	10.9
Gestational age		
Extremely preterm (< 28 weeks)	13	9.5
Very preterm (28 - 31 weeks)	26	19.0
Moderate preterm (32 - 36 weeks)	43	31.4
Full Term (37 - 42 weeks)	54	39.4
Unknown	1	0.7
Type of pregnancy		
Single	121	88.3
Twin	13	9.5
Triplets	3	2.2
Antenatal care		
Yes	134	97.8
No	3	2.2
Place of birth		
Network Hospital	118	86.1
Clinic	8	5.8
Referral hospital	8	5.8
Home (unskilled)	1	0.7
Syrian provider	1	0.7
On the way	1	0.7
Mode of delivery		
Cesarean Section	73	53.3
Spontaneous Vaginal Delivery (skilled attendant)	58	42.3
Spontaneous Vaginal Delivery (unattended)	3	2.2
Assisted Vaginal	3	2.2
Fetal Presentation		
Cephalic	60	43.8
Breech	11	8.0
Transverse	5	3.8
Don't Know	61	44.5
Pregnancy Danger Signs		
Yes	42	30.7
No	95	69.3
Anemia		
Yes	24	17.5
No	113	82.5
Adverse labor events		
Yes	27	19.7
No	110	80.3
Delivery complications		
Yes	49	35.8
No	88	64.2

5.1.4 Risk Factors

The most common risk factor was prematurity (60%). In addition, 20% of the mothers reported delivery by C-section as a delivery complication.

Table 9: Risk factors for neonatal deaths among refugees in UNHCR network hospitals, Lebanon third quarter 2020 (n=137)

Contributing Risk Factors	Number	Percent
Antenatal complications		
Vaginal bleeding	14	10.2
Abdominal pain	12	8.8
Elevated blood pressure	7	5.1
No fetal movement	2	1.5
Labor/Delivery related		
C-section delivery (complication)	28	20.4
Premature rupture of membranes	12	8.8
Prolonged obstructed labor	11	8.0
Post-partum haemorrhage	10	7.3
Eclampsia/pre-eclampsia	6	4.4
Nuchal cord	1	0.7
Cord prolapses	1	0.7
Meconium-stained discharge	1	0.7
Neonate related		
Prematurity	82	59.8

6   Discussion

The cases of neonatal mortality among refugees in UNHCR network hospitals in Lebanon have considerably increased during the year 2020. In the first quarter, there were around 20 neonatal deaths per month with a total of 65 alerts over the 3 months. The second quarter witnessed a 1.5-fold increase with a total of 107 alerts. The third quarter witnessed a doubling of the expected number of deaths with 137 alerts.

The neonatal mortality rate was calculated per region per quarter[17] (Table 1). Even though UNHCR financially covered deliveries, do not represent all deliveries, they constitute around 80-90% of deliveries among refugee populations. The neonatal mortality rates per 1000 live births for the third quarter were as follows: 20.45 for the Bekaa, 20.30 for the North, 20.02 for BML and 13.99 for the South. In comparison, the rates for the first quarter were: 12.23 for the Bekaa, 6.70 for the North, 7.25 for BML and 9.50 for the South. It is obvious that the rates in the third quarter have significantly increased across the country, exceeding the sustainable development goals (SDG) recommended rate of no more than 12 neonatal deaths per 1000 live births. These numbers are also in excess of data reported by the MoPH for non-Lebanese which was estimated at 6.3 neonatal deaths per 1000 live births according to the most recently published data in 2019[18]. Although the Syrian refugees are not the only non-Lebanese populations considered in this yearly rate, they constitute the majority.

There are a number of possible explanations for the excess reported neonatal deaths that are worth investigating. The most obvious could be that neonatal deaths are indicator of the health system performance, with the health system in Lebanon being overwhelmed by the COVID-19 pandemic starting in February 2020 demonstrated by lack of COVID ICU beds, shortages in medicines and medical supplies, and hospitals converting to COVID treatment centers, or modifying its scope of health services provided. Consequently, by Beirut Blast which physically damaged important health facilities, including MoPH central warehouse, 3 major hospitals, 27 health care centers, among others.

The number of cases of COVID-19 started to increase after the reopening of the airport in July and more dramatically after the August 4th blast in Beirut. This parallels the increase in cases of neonatal deaths observed in the 3rd quarter of the year. Although there has been no evidence from the literature of a clinical association between COVID-19 infection in the mother and vertical transmission to the neonate, there could

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[17] Neonatal mortality rate is a population-based indicator expressed as NN deaths per 1000 live births, data on deliveries and live births are collected per region, NNM rate is calculated by region consequently

[18] https://www.moph.gov.lb/en/DynamicPages/page_download_file/3829

be issues of access to care during confinement, precarious socioeconomic situations and difficulties in admission to hospital NICUs.

The access to health care services in primary health care centers and private clinics has been significantly affected during COVID-19 pandemic due to the governmental restrictions on transportation during the lockdown periods which directly implicated the access of both patients and health care providers to the centers. Also, due to fear of exposure to COVID19 in health care settings, pregnant women rather choose to postpone Antenatal care visits avoiding contact with health care staff and crowding of patients. One additional factor that might contribute to the limited access to Antenatal and Postnatal care is attributed to the socioeconomic condition of most of the refugees who lost their jobs due to the lockdowns and the economic situation in the country. Limited financial ability to pay for health care services in primary health care centers and private clinics and prioritizing non-medical basic needs might also play a pivotal role in access of women and their neonates to ANC & PNC.

In the same vein, there could be better reporting from the TPA end as the project progresses, and all parties become more familiar and comfortable with the process and its requirements. There are also more hospitals participating, especially in the more remote areas, which could also explain part of the increase in the number of cases. Again, the disruption of services in some hospitals due to the COVID-19 pandemic could explain the referral of cases to different hospitals and possibly better reporting in these hospitals.

6.1   Limitations

The findings of the current report must be interpreted in light of some limitations. The population of interest for this audit is captured from the UNHCR hospitals network; hence, only neonatal mortalities occurring in the hospitals network are reported in this audit. Any neonatal mortality occurring in other settings (hospitals outside the network and home mortalities) are not captured. Although the latter is valid, the number of deliveries, neonatal admissions, and neonatal mortalities occurring in the hospitals network are representative of the total refugee mortalities in Lebanon.

In addition, the current audit captures mortalities of neonates below 28 days of age; the sample for data collection does not include stillbirth cases which in turn restricts the overall findings on the health care services and the quality of care received by the refugee population.

To our knowledge, no neonatal mortality audits have been conducted in Lebanon neither for the refugee population nor for the Lebanese population. Triangulation of data and referring to previously available information is key in similar audits; however, given minimal studies and accordingly knowledge on the situation in Lebanon regarding the variables contributing to neonatal mortality restricts the comparability of the findings.

The current audit did not capture a number of important variables that would feed into the analysis of the preventable factors leading to neonatal mortality and the quality of health care services provided to the pregnant women. Those include data on length of stay, discharge date, time of birth, early marriage, spacing, etc.

Recommendations relating to the above-mentioned limitations will be addressed in section 7 aiming to generate a more concise report in the coming quarters.

6.2   Challenges

The UNHCR neonatal audit process was recently started in Lebanon as it was launched in December 2019. With the exception of a few challenges faced in obtaining the cooperation of some of the hospitals in the Bekaa and the North, the process itself has been relatively smooth.

In general, there were no problems getting the parents to cooperate, consent to the interviews and authorize access to the neonate's medical file. On the contrary they appeared to be grateful for the opportunity to give feedback and express their concerns. A few parents were hesitant and even appeared scared and had to be reassured of the purposes of the study. Some parents took advantage of the contact number to recontact the investigators and ask for help.

The difficulties encountered with the parental interviews were more in terms of scheduling the interviews at a convenient time and the inability of parents to provide the information requested, especially if the neonate was moved to the ICU at birth and remained there until death. The field investigators used the hospital files to complete the information provided by the parents when there were gaps. It is noteworthy that the hospital files tended to be incomplete when the infant was born elsewhere. There were some inconsistencies between the hospital accounts and those of the parents.

For this reporting period, due to the COVID-19 situation in the country, all the interviews with the hospital personnel and the parents were also conducted over the phone. Interestingly, with the exception of the investigator from the Bekaa, all the investigators felt that they were getting more accurate information in a more efficient manner over the phone as they were able to access the health care team that specifically worked on the neonatal case. When they were going to the hospitals, the teams were more often than not too busy or not available and the investigators had to resort to the TPA delegates for information. The latter is still the case in one hospital in the North and most of the hospitals in the Bekaa.

7   Conclusions and Recommendations

In conclusion, several recommendations can be suggested based on the challenges faced on the field, data completeness and reporting and the actual findings.

With respect to completeness of the form and uniformity of the information:
  1. Training for the health personnel on the necessity of having complete information pertaining to the birth of the neonate including birth weight and Apgar scores.
  2. Standardize the physician's reporting of immediate cause of death and underlying cause of death.

With respect to the findings of the report:
  1. Providing community education sessions for raising the awareness of women on the importance of proper antenatal care as well the risks of early marriage, adolescent pregnancies and lack of birth spacing.

2. Brainstorming to develop options for timely and affordable transportation to the hospital.
3. Offering workshops for hospital personnel that address interpersonal relations and communication issues within the hospital and with the parents.
4. Consider package of care for pregnant women to encourage timely attendance of ANC and PNC visits, including financial incentives, such as full coverage of deliveries for those complete 8 ANC visits, etc.
5. Ensure the complementarity of services between primary and secondary health care services for pregnant women.
6. Extending the neonatal mortality audit to capture cases of stillbirth which would in turn provide a more comprehensive analysis of the data.
7. Extending the neonatal mortality audit to include the host community.
8. Looking deeper into the age of mother and birth spacing to inform the reason for premature babies, limited access to care, delay to care, quality of care, prohibitive costs, etc.
9. More emphasize on baby friendly hospitals initiative
10. Involving different stakeholders in the discussions on the neonatal mortalities for both refugee population and host communities including neonatal medical specialists and order of midwives among others.
11. Discuss the establishment of a national system for neonatal mortalities.