

IN THE SUPREME COURT OF PAKISTAN

HUMAN RIGHTS CASE NO. 8991-S OF 2017
(In the matter of death of 5 more infants at Civil Hospital in Mithi)

COMPLIANCE OF ORDER DATED: 31.03.2018

REPORT BY

**THE AGA KHAN
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SUMMARY

In March 2017, the Honorable Supreme Court of Pakistan took suo moto notice of the death of 5 children in Civil Hospital, Mithi, Tharparkar District, Sindh. The Department of Health (DoH), Government of Sindh submitted a report about the causes of death.

This Report is being submitted in compliance of the Order of the Honourable Supreme Court of Pakistan dated 31st March 2018, wherein the Honourable Court sought a report answering the question whether the death of the infants has taken place on account of the causes mentioned in the report of the Sindh Government or otherwise. A multidisciplinary team of experts was constituted and conducted an independent inquiry, which included assessment at the level of household(s), health facilities and social factors using standardised methodologies.

In relation to the causes of death of the infants, the team of AKU generally agrees with the causes of death identified in the report of the Department of Health, Sindh.

FINDINGS ON SOCIOCULTURAL CONTRIBUTING FACTORS

There is a high level of poverty in the community. There are informal social safety mechanisms (i.e. sharing of scarce resources) that prevent the households from starvation. There is scarcity of potable water.

None of the adults interviewed are educated, while children living closer to main city have access to school. None of the women interviewed have awareness of the importance of diet supplementation and care during pregnancy.

All of the deceased children resided in areas that are not covered by the Lady Health Worker (LHW) program, which is responsible for providing basic health, education, care and family planning. Public transport is not available in all the areas visited.

FINDINGS ON CIVIL HOSPITAL MITHI ADEQUACY & COMPETENCY OF HEALTH FACILITY PERSONNEL

Gaps identified by the committee at Civil Hospital Mithi:

- Lack of knowledge, skill(s) and experience of health care providers to provide appropriate essential health care services to pregnant women, sick newborns, and infants presenting to the hospital are the main factors contributing to the deaths in these five cases. There was also a major deficiency noted in record keeping by the Hospital staff.

- Non-availability and non-functionality of essential equipment, supplies and lack of existence of proper policies/ procedures/ protocols vis-à-vis the care of the pregnant women and sick new borns.

RECOMMENDATIONS FOR CIVIL HOSPITAL, MITHI:

The comprehensive set of recommendations appear in the main report; however, the most important recommendations are as follows:

Human Resource:

Update the required staffing to an acceptable level including more obstetricians and paedriticians with the right qualifications and skills.

Facilities:

Ensure the availability and functionality of relevant medical & general equipment, supplies, infection control devices & policies and maintenance of hospital records that enable provision of quality services for preganant women and infants.

CONCLUSION:

There is significant deficiency in the competency of health cadre (nurses and doctors) in the recognition and management of illnesses across MNCH.

In view of the findings of the Committee, while we agree that socio-cultural factors contribute to increased death and disease ; however, in the subject cases, we do not see these (including malnutrition) to be the predominant causes of death.

BACKGROUND

District Demographics

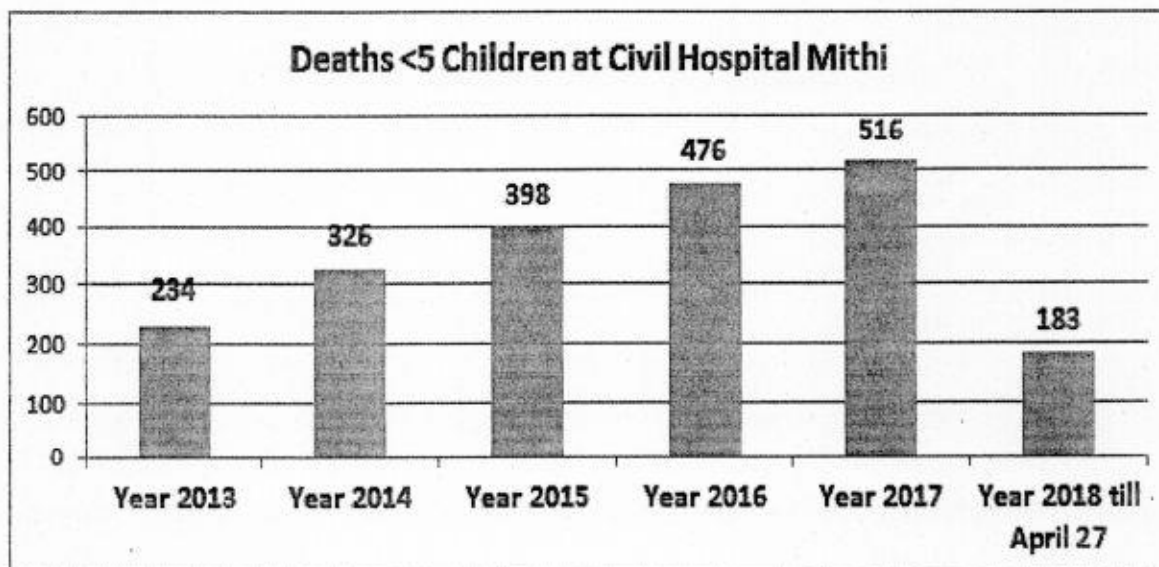
Tharparkar is the largest district of the province of Sindh with a total land area of 19,638 km². It has a population of 1.65 million out of which 297,938 are children under the age of 5 years. Most of its population resides in villages (2300) and urban settlements. Thar comprises of 7 taluqas in total, with its headquarter based in Mithi. Despite being the only fertile desert in the world, Thar possesses the lowest Human Development Index out of the 29 districts of Sindh.

Tharparkar lacks in basic human needs, such as adequate and nutritious food, clothing, housing and drinking water. The majority of Tharparkar residents have no access to clean drinking water. There is also a dearth of opportunities like health services, education facilities, transportation, sanitation and source of communication, etc.

Livestock is a major but only a single source of income. The livelihoods of a large number of residents come from shop retailing, small- and medium-scale trade, construction, transport, several services, and employment in the government and non-governmental sectors.

On an average, BHUs are 30 km away from the village and majority of villages constitute of handful of homes scattered over a large area with minimal resources and access to any level of health facility.

Figure 1: Depicts year-wise deaths of children under 5 (2013 -2018).



In March 2017, the Honourable Supreme Court of Pakistan took suo moto notice of the increased death toll of children in Thar; especially of the 5 infant deaths which occurred at Civil Hospital

Mithi in the same month. These deaths were reported in the local media, who had also highlighted the infants' demise was due to malnutrition and other diseases.

Following the notice, the Department of Health (DoH), Government of Sindh submitted a report in the Supreme Court detailing the causes that led to the death of children (Table 2). According to the report, the official infant mortality figures of children under 5 years in District Tharparker from the year 2014 till March 2018 are as follows:

Table 1: Depicts deaths under 5 by health facility 2014-2017

Year	Civil Hospital Mithi	THQ Diplo	THQ Nagarparkar	THQ Chachro	RHC Islamkot	Grand Total
2014	255	9	12	45	5	326
2015	335	2	24	24	13	398
2016	403	7	22	20	27	479
2017 till March	63	0	4	1	1	69

Additionally, the report had stated the causes of death of the five infants to be birth asphyxia, preterm birth, low birth weight, severe pneumonia, sepsis, respiratory distress syndrome and malnutrition. Other factors contributing to the mortality were poverty, early marriage, low birth spacing, access to health facilities, transportation etc.

Table 2: Depicts causes of death, admission details & timings of death (Department of Health report)

S.No	Age	Cause of death	Admission		Death	
			Date	Time	Date	Time
1	21 days	Neo natal Sepsis	07.03.2017	Morning	11.03.2017	08:50 am
2	NB	Pre term + Low birth weight	11.03.2017	Evening	13.03.2017	06:35 am
3	15 days	Neo natal Sepsis	12.03.2017	10:30 pm	13.03.2017	03:25 pm
4	01 day	Birth Asphyxia	13.03.2017	03:00 pm	14.03.2017	10:15 pm
5	5 months	S. Pneumonia	14.03.2017	07:50 pm	15.03.2017	06:15 am

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PLANNING AND PROCESS:

Scope of Work:

The scope of work involved ascertaining the medical cause of deaths and the events that directly or indirectly contributed to the poor outcome.

The Aga Khan University representative committee comprising of 10 experts from Obstetrics & Gynecology, Neonatology, Pediatrics and Child Health and Community Health Sciences as well as public health scientists deliberated the methods and tools to be used to conduct the investigation. The committee conducted several meetings to discuss the modus operandi of the tasks in hand and devised the following work plan to carry out the investigation.

Work Plan:

It was decided that:

i. Verbal autopsy:

A Verbal autopsy will be conducted using the (VA) tool /instrument WHO to ascertain the medical cause of death of the five deaths in question.

Verbal autopsy is a method used to ascertain the cause of a death based on an interview with next of kin or other caregivers. The interview is done using a standardized questionnaire that elicits information on signs, symptoms, medical history and circumstances preceding death. The cause of death, or the sequence of causes that led to death, are assigned based on the data collected using the VA questionnaire and any other available information. Rules and guidelines, algorithms assist in interpreting the information collected using the VA questionnaire to determine the cause of death. A team of trained data collectors led by Senior social Scientist visited the homes of the deceased children and carried out interview with the parents with the aid of VA questionnaire. The tool was then reviewed by experts in VA tool and cause of death ascertained for the 5 infants.

ii. Social autopsy:

In addition, a Social Autopsy will be done using by COSMO to gather social, cultural, and contextual circumstances that may have contributed directly or indirectly to the cause of death.

Social autopsies are meant to complement verbal autopsies for maternal, newborn and child deaths and to determine psychosocial and behavioral circumstances around death. Social autopsy is a tool to provide information to policy makers and program managers to develop better strategies and interventions that would prevent avoidable deaths. The tool also provides communities with the information to make changes in behaviors within households and communities on the one hand, and demand greater accountability of health programs on the other. A separate team of data collectors from Aga Khan University will visit the Civil Hospital Mithi and its adjacent facilities to conduct a Health Facility Assessment to understand the prevailing medical services and the quality of care provided (facility readiness).

iii. Health Facility Assessment:

The health facility assessment would entail assessing the quality of health services provided in terms of human resources, competency, equipments available, resource usage, throughput and quality of care. It would also give insight into understanding how health facility characteristics influence health seeking behavior and health outcomes.

iv. Committee members visit to affected household and Civil Hospital, Mithi:

iv. Finally, the committee would visit the the Mithi Civil Hospital where the deaths took place to inquire about disease protocols in practice, interview relevant doctors and nursing staff providing care to determine factors contributing to the deaths. The team would also visit adjacent BHU, meet with the parents of the deceased children and interview community individuals to get an insight to the deaths.

OUTCOME OF VERBAL AUTOPSY EXERCISE:

Following are the causes of death based on verbal autopsy, medical records and interview taken from the parents of the deceased.

Depicts causes of death as investigated by the committee are summarized below;

Case # 1

Deceased Name: Varsha

Father Name: Gharvo

Mother Name: Sughar

Weight on admission: Not documented

Age at death: 5 months

Cause of death- Health Department report- *Severe pneumonia*

Cause of death- AKU Committee- *Meningitis*

Attributes in favor of diagnosis	Gaps identified in patient care	Positive Facts in patient care identified	Other Contributing factors		Remarks
			Mother	Child	
<p><i>Child had fever, seizures, excessive crying, vomiting, bulging fontanelle</i></p>	<p>Systematic history with details of relevant systems was not documented. Physical examination not documented. No record of vital sign monitoring in medical records. Appropriate lab investigations not requested / no record available for serum (electrolytes, calcium, CSF results, CBC, blood culture, CRP). Adequacy of antibiotic dosage (gm/kg for meningitis or pneumonia) could not be verified due to lack of weight documentation in medical records.</p>	<p>Choice of antibiotics was appropriate chest x ray advised but report not available to further guide in diagnosis. -oxygen administered (but no documentation of O2 saturation) I/V fluids were administered but cannot comment on the accuracy of the amount due to unavailability of weight) Prescriptions of fluid and medicines in newborns and all pediatric age group children are calculated as weight grams/kg.</p>	<p>Antenatal care not sought. Uncovered area, hence no visit by LHW to educate mothers on the components and importance of antenatal care for a healthy outcome of pregnancy.</p>	<p>Unvaccinated</p>	<p>According to the mother's narrative, child was average sized at birth and was of good weight at the time of illness. -Child was exclusively breast-fed The time from appearance of disease symptoms to death is approximately 48 hours.</p>

Case # 2

Descended Name: Khalique

Father Name: Hanif

Mother Name: Wilayat

Weight on admission: 2.4 KG

Age at death: 25 Days

Cause of death- Health Department report- Neonatal Sepsis and Low Birth Weight

Cause of death- AKU Committee- Neonatal Sepsis

Attributes in favor of diagnosis	Gaps identified in patient care	Positive Facts in patient care identified	Other Contributing factors		Remarks
			Mother	Child	
Lethargy, Respiratory distress, lethargy, fever, apnea and fits	O2 saturation not documented. Baby was not timely intubated and referred, although was in respiratory distress and gasping state. Inj aminophylline used that has no role in term babies with respiratory distress. Lab investigations as blood culture not done Birth weight not documented as it was a home delivery	Appropriate choice of antibiotics Weight documented Detailed history available Vitals at admission documented Management documented in detail	Unremarkable	Unvaccinated Baby did not receive BCG vaccine at birth	<p>Patient was treated first at RHC Islamkot and then referred to Civil Hospital Mithi.</p> <p>We do not have information regarding care provided during transport of the baby from RHC to DHQ</p> <p>Baby was received in critical condition as per medical record notes.</p> <p>However no attempt was made to intubate the baby and refer to higher facilities for ventilation support.</p> <p>The time from appearance of disease symptoms to death is approximately 6 days.</p> <p>The total time admitted at Mithi Civil Hospital was around 30 hours.</p>

Case # 3

Decesed Name: Aasifa

Father Name: Kamil

Mother Name: Marium

Weight on admission: 1.5 KG

Age at death: 20 Days

Cause of death- Health Department report- *Neonatal Sepsis*Cause of death- AKU Committee- *Neonatal Sepsis*

Attributes in favor of diagnosis	Gaps identified in patient care	Positive Facts in patient care identified	Other Contributing factors		Remarks
			Mother	Child	
Low birth weight, Breathing difficulty (respiratory distress), fits, dehydration, hypothermia & jaundice	Inappropriate antibiotics administered. No gram-negative coverage for neonatal sepsis. Baby continued to be in respiratory distress, but no efforts made to intubate the baby and refer for ventilation.	Unremarkable	Antenatal care was not done Home delivery by "Traditional Birth Attendant"	Unvaccinated Baby did not receive BCG vaccine at birth Low birth weight	Neonate remained in hospital for 4 to 5 days. Time from appearance of disease symptoms to death is approximately 4 to 5 days. No attempt was done to refer the baby for better management, although as per the medical staff 6 functional ambulances are available at Civil Hospital Mithi for referrals.

SOCIOCULTURAL CONTRIBUTING FACTORS

Generic findings of Diseased Families

Social autopsy was used along with interview with community members to identify contributing factors leading to the death of the infants at Mithi civil hospital.

1) Community Scenario

In order to understand the social/community context of deaths, we visited the communities and the households of deceased children to conduct verbal and social autopsies. We adopted a multi-tier approach and assessed the situation at the community level, household level and the individual level using a socio-ecological model of health so that we could fully understand the social determinants of health. The goal of this activity was to obtain first-hand information about the underlying reasons for child deaths such as poverty, family practices of child-rearing, education and undernutrition and health services available to the community. We also collected information on the events, processes, care seeking to ascertain the causes of the deaths.

- a) **Health Service:** At the community level we observed that that all of the deceased children resided in areas that were not covered by the LHW program, which indicates gaps in coverage of the program in the district. The distance required to seek health care is also an impeding factor in saving lives and obtaining good quality of health care. An associated factor is the unavailability of transport in remote areas of the district. Most of the residents were were living in remote scattered communities that perhaps made provision as well as access to health care delivery challenging.
- b) **BHU Services:** We also observed the working of a BHU which was a PPHI Bhu and found the services satisfactory in general. The one factor that perhaps could be further strengthened is the link between the outreach community service (LHW) program and the BHU. The current work is limited to referral of the sick children by the LHW to the BHU with limited understanding of the BHU regarding the community's health and nutrition status.

2) Household level

Among the two homes we visited , it was observed that no family planning practices prevailed. There is provision of a vaccinator however, the focus is only on Polio vaccination with no education provided on the other EPI vaccines. When asked about health seeking behavior of the community, one of the female respondents reported that they do not "trust" the government hospital's quality of care (bharoso kon ahae). In another case, we observed that despite extreme poverty, the woman delivered at a private hospital due to perhaps a similar reason. There was no concept of regular antenatal care (check-up during pregnancy) or prenatal supplements (folic acid/iron/calcium) as recommended by WHO. However, some pregnant women visit a private

- A major gap that we observed was that there was a total lack of understanding regarding weaning and the children are not introduced solid foods until two or later years of age when the woman becomes pregnant again. Likewise pregnant women did not receive any

education about dietary needs during pregnancy nor did they receive any of the much needed nutritional supplements. An alarming finding was that all women during pregnancy experience night blindness which indicates severe Vitamin A deficiency and there is an urgent need to address this major public health problem along with other health concerns.

- WASH conditions were deplorable, water is being purchased for drinking purposes and pit latrines are used. Children were not likely to be exposed to smoke as the kitchens are separate from the area where the child is likely to be kept.

5) **Individual-level factors:** Discussed on a per case basis under the narrative for each child.

Table 4: Depicts contributing factors identified through Social Autopsy tool

S.No	Deceased Child	Social factors identified through Social Autopsy tool
1.	Varsha F: Gharvo M: Sughar	-Extreme poverty -Lack of education -Uncovered LHW area -Lack of trust in the health system (public sector)
2.	Khalique F: Hanif M: Wilayat	-Extreme poverty -Long distance to health care facility
3.	Aasifa F: Kamil M: Marium	-Extreme poverty -Lack of awareness -Trust in traditional medicines -Transport facilities were not available -Long distance to health facility -Undernourished
4.	Shehbaz F: Yar Mohd M: Surriya	-Access to health care difficult due to long distance from any form of health facility
5.	Unknow F: Alam Chand M: Kaveeta	--Pre term birth in a basic health unit that does not have resources to manage a preterm outcome -Lack of awareness of the family for referral to a tertiary care unit for delivery

Health Facility Assessment

Gaps identified by the committee at Civil Hospital Mithi

1) Structural Readiness:

Following deficiencies were identified in structural readiness across various clinical and ancillary areas in the facility at Mithi:

i) Outpatient –Clinical Areas:

Equipment: Basic equipment such as weight and height scales were present but not used by health care providers. The reason cited was that there was no assistant available to measure growth (height, weight, mid-arm circumference) and vitals (heart rate, respiratory rate, blood pressure). This service was previously being provided by an NGO that was no longer working in the hospital.

Infection Control: There were no sinks or tapped water for facilitation of hand washing in any of the out patient clinical areas except one female OPD. The washrooms were far away from the clinics further discouraging hygienic practices.

Record Keeping: A register was maintained with patient's name, age, gender and diagnosis by the physician in the OPD. Prescriptions were given without weight based dosage. Majority of medicines were available and dispensed by hospital pharmacy.

Human Resources: There were 2 medical officer who conducted the OPD together and referred cases to pediatrician that is only available for one hour. The number /volume of out-patients recorded in the register reflected the adequacy of human resources.

Guidelines: TB dosage chart was displayed on the wall. However without any weight, the drugs dispensed were likely to be under-dosed or over-dosed. Pakistan Pediatric Association (PPA) TB clinical scoring was not available. Common childhood illnesses like pneumonia, and diarrhea were not given standard prescriptions as per WHO. The physicians were not aware that UNICEF had provided zinc and ORS as a single packet to be dispensed to all patients under 5 with acute diarrhea. There was no protocol for identifying child with nutrition rehabilitation needs and referring to inpatient nutrition stabilization center as this requires weight and height measurement and plotting on z score charts. Detailed history were not taken at the outpatient including vaccination status of children and an important opportunity to administer catch up vaccination was lost.

ii) Labour room and Operating Room:

Equipment: There was no cardiotochography (CTG) machine or fetoscope for monitoring of fetal heart sounds during labour. Essential recording tools such as partograms were not available. An ultrasound machine was present and being used to establish presence of fetal heart sounds to differentiate between a still birth and live fetus. No guidelines for management of high risk delivery were available. No cardiac monitor or pulse oximetry were available for monitoring maternal oxygen saturation or vitals. Mothers were being transfused Blood without any monitoring.

Infection control: Autoclaves were present in Labour Room and Operation Theatre but no record was being maintained by auxiliary services like bio-med engineering. Basic infection control measures such as hand washing facilities (soap and water source) was not available. There was no concept of sterile gloves and they were not available for delivery and handling of the baby. Sterile clothing was not available for patients undergoing c-sections or surgery. Patients were operated upon in their home clothes with no documentation of skin sterilization technique used.

Record Keeping: There was inadequate/absent documentation of progress of labour and monitoring for fetal well being during labour. No partographs were maintained. No vitals were documented for fetus or mother in labour. Only weight, gender and vital status (dead/alive) was documented for hospital born babies in a labour room register as birth outcome. The babies were not registered as hospital patients and therefore did not have a chart on which formal examination could be documented in which congenital abnormalities of heart, chest or Gastrointestinal tract could be recognized. Newborn vital status was also not recorded in the maternal file. No record was available on vitamin k administration at birth. The babies were not referred for BCG vaccination at birth because as per EPI center, BCG was only given on one day in the week (Monday). Clinical area caregivers did not consider referring hospital born babies for BCG vaccination to EPI centre except on Mondays.

There was no concept of discharge follow up and advise with respect to nutrition, breast feeding, jaundice or vaccinations.

Human Resources: Two of 3 obstetrician posts and some WMO posts were vacant. This had led to non-availability of 24/7 obstetrician coverage. All c-sections in evening hours were referred to private practitioners since 2 months as the only obstetrician employed in the hospital had been excused from night calls due to health reasons.

Guidelines and Competency of Health care providers providing Maternal and Newborn care

The female MOs lacked knowledge on basic guidelines and protocol on monitoring and management of second and third stage of labor. However the LHV were knowledgeable with respect to management protocol, but they also were not practicing safe delivery. There was

no understanding of the importance of documentation during labour and delivery. There was no fetal monitoring during labour except intermittent use of ultrasound probe to assess if fetal heart beat was present. Woman medical officers (WMOs) were not trained for instrumental (forceps and vacuum) deliveries. Even the specialist was not confident in applying forceps. There was also no clear understanding of the indications of C-Section in some patients. The staff was not aware of importance of post-operative/post-delivery care. Catheter tubes and urine bags were being used without aseptic precautions further enhancing (hospital acquired infections).

iii) Nursery and Newborn Care

Equipment: There were no instruments to intubate a sick newborn such as laryngoscope and appropriate sizes of endotracheal tubes and blades. There were 4 phototherapy machines in the nursery but no record of maintenance found and no capacity for regular bio-engineer checks to ensure proper functioning of lights. There was no glucometer for glucose monitoring in the unit, although hypoglycemia is one of the most common complications seen in Low birth Weight and sick babies. There were no guidelines or charts to guide health care providers to initiate and stop phototherapy light based on bilirubin levels. There were no stethoscopes seen to examine newborn babies in labour room. A crash cart was present in the nursery with essential resuscitation drugs and an unused ambu bag. However Central line oxygen was available with cardiac monitors to monitor vitals. A portable X-ray machine was available in the hospital but rarely used for x-ray of newborn babies in Nursery. Majority of health cadre were not aware of the availability of the portable machine in the hospital reflecting the disinterest and disconnect from patient care.

Infection Control: There was a sink in the nursery but no running water and soap for hand washing. There was no protocol for cleaning stethoscopes and instruments shared between patients. There were shoe covers available but an understanding of hand washing practices as a major intervention for prevention of infection was lacking and hand washing practices were not practiced.

Record Keeping: Detailed history was not available in any of the medical records reviewed in the nursery. Weight was only taken once at the time of admission. There were no wall mounts or any feeding protocol observed in nursery. Babies were being administered gavage (OG /NG feeds) milk without any calculations.

Human Resources: Medical officers worked in 3 shifts (8am-2pm, 2pm-8pm and 8pm to 8am). Medical officers are adequate for current patient load of the facility.

Guidelines: There were no clinical care protocols for 1) neonatal jaundice 2) neonatal resuscitation (helping babies breathe charts were placed on the wall but no one remembered last training done by MCHIP) 3) serious neonatal infections (sepsis, meningitis, pneumonia,

skin and soft tissue infections) 4) neonatal seizures 5) feeding protocol for sick babies and 6) hospital policy of exclusive breastfeeding and baby friendly hospital initiatives. Medical officers had inadequate knowledge of how to manage common newborn illnesses such as neonatal sepsis/seizures/preterm/low birth weight. There were no treatment flowcharts or algorithms for common newborn illnesses or hand washing reminders in the nursery.

iv) Inpatient Pediatrics:

Equipment: There were no pulse oximeters to monitor oxygen saturations of children with respiratory disease or on oxygen for other reasons. There were no weight scales, stadiometers or height scales in any inpatient room for children. A crash cart was present in nutrition stabilization unit which was not appropriately stocked with emergency medicines. An ambu bag was present. There was no equipment to intubate (laryngoscope, endotracheal tubes).

Infection Control: No one was aware of importance of hand sanitization. No one washed hands before or after handling a patient.

Record Keeping: Documentation was very poor. There was no weight and height documented for admitted children and medicine dosages were not calculated as mg per kg body weight. This translated to children at risk of being under- or over-dosed. There were no vital monitoring charts (heart rate, blood pressure, temperature, oxygen saturation) or recorded findings in the daily notes in medical charts. There were no daily round notes. A log was maintained in the nutrition stabilization unit (number of children under treatment).

Human Resources: There are three 19 grade pediatrician posts vacant.

Guidelines: The nutrition stabilization unit contained wall mounted management charts but no clear algorithm for management of patient needing nutrition stabilization. The medical officers could articulate types of formulas given but with no understanding of immediate and long term management. Patients with pneumonia were treated with inappropriate combinations and doses of penicillins and anti-pseudomonal cephalosporins.

TB Meningitis was treated without steroids and documentation of weight appropriate dosage of fixed drug combination (FDC) dispersable tablets provided by National TB Program was not observed in documents. There was no understanding of importance of inquiring into vaccination status of inpatient children and availing the opportunity to refer to the EPI center for catch up vaccination during admission or at point of discharge.

v) Auxiliary Services:

a. Vaccination Center:

Equipment: Freezers, temperature gauges, vaccine cold chain were maintained.

Infection Control: no hand sanitizers or soap and water were available for hand washing. Sharp boxes were available for syringe disposal.

Record Keeping: Manual and electronic logs were maintained of children vaccinated in center. List of LHW/LHV vaccinators doing outreach vaccination was on the wall.

Guidelines: There was no understanding of catch up vaccination, however the vaccinators were willing to vaccinate any unvaccinated or partially vaccinated child referred to them through OPD if less than 2 years of age. They mentioned Mondays for measles and BCG as a reason for not vaccinating all hospital born babies with BCG in a timely fashion.

b. Pharmacy:

Equipment: In stock oral medicines were kept optimally. Intravenous antibiotics and other essential medications were low in number (few vials only).

Infection Control: No sanitizer for handling medication.

Record Keeping: There was a register with inventory however there was no documentation of batch numbers and expiry dates.

Guidelines: There was no Standard Operating Manual for temperature to be maintained in the store room, list of medicines utilization specific to clinical unit, and list of stock outs.

c. TB Laboratory:

Equipment: Appropriate microscopes and instruments for sputum microscopy were available.

Infection Control: There was cross ventilation and an exhaust fan which the laboratory workers correctly used during sample preparation. However no personal protection equipment was available for staff (N-95 masks). No protection was available while induction of sputum in a patient. They were generally taken to the end of the corridor and made to induce sputum in open air. The Xpert lab was across the courtyard and samples for xpert were manually carried to the xpert lab carrying the risk of spillage in cross hospital transport and infecting health care providers and patient alike.

Record Keeping: Sample processing records were well kept.

Guidelines: Pakistan TB Control Program treatment protocol was displayed on the wall. All

patients with positive samples were referred to 2 chest physicians employed by the hospital. We did not visit the chest clinic.

d. Blood Bank:

Equipment: A fridge was available for storage. The temperature gauge was not functional and showed 10°C. There was no cryo-separator so blood products were not available

Infection Control: There was no facility for hand washing.

Record Keeping: A log was maintained of blood collected, screened and dispensed.

Guidelines: These were not available.

e. Radiology:

Equipment: X-ray machines were available (fixed and one portable) with cartridges. Ultrasound facility was available.

Infection Control: No facility was available for hand washing.

Record Keeping: Nominal records were maintained.

Guidelines: None was available.

f. Hospital Administration and Supervision :

The hospital administration did not carry audits or monthly meetings where clinical staff and administration staff presented or discussed mortality/morbidity of admitted patients. The Hospital Lead did not have clarity of what their mortality numbers meant, how they should be deconstructed to reflect gaps in hospital care. This lack of understanding is at least one reason they do not regularly review the numbers and come up with an action plan to redress system issues. The hospital had 7 ambulances at their disposal. However, there was no log or analysis of which unit was referring at a higher frequency, for what indications and to which institution. There were no referral notes found .

Optimal utilization of resources could lead to better understanding of what services need improvement in Civil Hospital Mithi.

2. Organization of Service Delivery: (In patient/ER/ OPD/ referral /EPI)

• **Accountability:**

- There was a mix of organizations providing care within Civil Hospital Mithi, therefore dividing accountability of components of care in every clinical unit. For example:
 - a. Medical/surgical/obstetric care to women and children was under the jurisdiction of MS, Civil Hospital Mithi

- b. PPHI provided nutrition care to inpatients however there was no presence in outpatient clinics to identify children with possible need for nutritional rehabilitation.
- c. HANDS (Local NGO) provided anthropometry services to outpatient clinics but they had discontinued their service in the hospital since a month.
- There was no common forum for all stakeholders in care provision to meet quarterly or monthly and review and address patient care and personnel related problems.
- **Admissions:**
 - Inpatients: The Emergency Room was the main gateway for patient entry into the hospital care system. Most obstetric emergencies and sick children landed in labour room and pediatric units through ER. OPD clinics were the second commonest route.
- **Ambulatory Care:**
 - Emergency Room:
 - Outpatients: Sick patients were assessed and either admitted or referred to relevant sub-specialist in Hyderabad or Karachi. Vitals were mentioned in some records, preliminary management for a child with epilepsy and cerebral palsy was not mentioned in outpatient records.
 - EPI: Measles and BCG administered on one day in the week only. This means patients who are unvaccinated and visiting the facility in OPD clinic or ER remain unvaccinated. Also no inpatient is referred to the EPI center for catch up vaccination. There are 6-8 births daily which means the BCG multi-dose vial can be opened three days a week with minimal wastage for inpatient newborns in labour and post partum ward.

CONCLUSIONS:

- Lack of knowledge, skills and practices of health care providers to provide appropriate essential health care services to pregnant women, sick newborns, and infants presenting to hospital is the main factor contributing to deaths in these five cases.
- There is significant deficiency in the competency of health cadre (nurses and doctors) in the recognition and management of serious and common illnesses across maternal, newborn and child health (MNCH) spectrum in the hospital. They are also unaware of the importance of co-morbidities like delayed initiation of breast feeding, malnutrition lack of vaccination and good hygiene in prevention of infection and general immunity against disease. 2. While we agree that social determinants of health such as poverty and illiteracy contribute to increased morbidity and can lead to mortality, we do not see them as the major underlying causes of death in these cases.
- One of the main reasons identified to seeking care is the remote location of the households. Villages are remotely located and sparsely populated, hence difficult to provide coverage. The availability of health mobile units should be considered both for preventive and curative needs of the population.

RECOMMENDATIONS:

We have categorized recommendations as per gaps identified in the following categories related to MNCH care:

Equipment: The following equipment needs to be made available in care areas mentioned below:

1. Basic equipment for anthropometry (height and weight measurement) in all care areas.
2. Equipment for vitals monitoring (stethoscopes, blood pressure apparatus with cuffs of different sizes and pulse oximeters for oxygen monitoring) in all care areas.
3. Cardiotocography (CTG) machine and fetoscopes for monitoring of fetal heart sounds during labour in labour room.
4. Recording tools such as partograms in labour room.
5. Equipment to intubate a sick newborn and sick infant (laryngoscope and appropriate sizes of endotracheal tubes) in nursery and pediatric unit crash cart.
6. Glucometer for glucose monitoring of sick newborns in nursery.
7. Functional temperature gauge for freezer in blood bank along with a functional cryo-separator for processing blood products especially for obstetric patients with Postpartum hemorrhage.

Infection Control:

There was no existing infection control policy in this hospital and therefore no monitoring of simple hand hygiene and infection control measures.

1. Infection control policy for resource poor settings by WHO should be customized and adopted.
2. Soap and water and hand sanitizers should be available in all areas where patients are dealt with (inpatient, outpatient, ER, OR, Laboratories, Pharmacy, EPI, blood bank, radiology). Sinks and tapped water should be available in all units.
3. Operating of autoclaves needs optimization with maintenance of a maintenance log and dates of running and tuneups.
4. Sterile clothing should be available for surgical patients with adequate skin sterilization.
5. A protocol for safe waste disposal of sharp boxes contents has to be implemented.
6. Personal protection equipment (PPE) should be made available for staff (N-95 masks) working in the TB lab. The xpert machine should be next to Tb lab instead of across the courtyard to prevent chances of spillage and cross contamination.

Record Keeping:

The quality of patient records need s to be improved.

1. Weight must be documented on all patient records (OPD register) and prescriptions.
2. Vitals and partography must be maintained in each patient s file in Labour room.
3. All babies born in labour room or OR must be registered with their own patient file for docuemtnation of examination and treatment given
4. Weight, feeding plan, prescriptions with accurate dosage per kg body weight and accurate antibitoci combinations, vitals charting must eb documented in each patient fiel in nursery and pediatric ward.
5. A discharge plan with follow up instructions to OPD should be provided to all discharged patients to ensure follow up and well being of individual patient.
6. The admin must maintain a monthly or quarterly log of quality and mortality/morbidity meetings to show that there is montiroign of service provided.

Human Resource:

We found a few deficiencies in MNCH services:

1. Two more obstetricians (vacant posts) and WMOs (?) should be hired to provide 24/7 emergency obstetric services.
2. Three 19 grade pediatric specialist posts were vacant and need to be filled.

Guidelines and Relevant Training:

This was a major glaring gap in service provision. There was a general lack of common treatment guidelines available freely by the WHO:

1. Pediatric medical officers and specialists need refresher trainings in:
 - a. Common childhood illnesses like pneumonia and diarrhea
 - b. Identifying nutrition rehabilitation needs and assessing for SAM and MAM.
 - c. Imprtnance of vaccination especially catch up vaccination in unvaccinated children admitted for other reasosn in hospital
 - d. Neonatal resucistation (helping babies breathe, helping babies survive)
 - e. Management of common neonatal conditions like neonatal jaundice, serious neonatal infections (sepsis, meningitis, pneumonia, skin and soft tissue infections) , neonatal seizures, feeding protocol for sick babies and exclusive breast feeding.
 - f. Management of bacterial infecitons in older children (pneumonia, meningitis, urinary infection) and childhood TB.
2. Gynaecology and obstetrics medical officers and specilaists need refresher trainigs on:
 - a. Monitoring and management of second and third stage of labor
 - b. Instrumental (forceps and vacuum) deliveries
 - c. Objective indications of C-Section and principles of safe surgery

d. Post-operative/post-delivery care

3. Auxiliary services

Vaccination:

The Epi Center at CHM should entertain all unvaccinated children identified in OPD or in-patient even if they do not reside in the union councils covered by CHM in an effort to improve overall vaccine coverage in the area. The BCG vaccine should be provided to facility born babies on every day or at least 3 days a week to all inhouse births.

Pharmacy:

The pharmacy must maintain a more detailed log of temperature maintenance in storage area, list of medicines utilization specific to clinical unit, and list of stock outs.

Administration:

There should be an SOP for organization hierarchy and regular meetings between admin and employees to assess performance indicators. KPIs for the institution should be chosen specific to MNCH and reported regularly.

LIMITATIONS:

We visited the affected families and the facility where death took place almost well beyond one calendar year, hence there was an element of recall bias, however for verbal autopsy (events around the death) outcomes this is an acceptable recall time.

We were informed that there have been major infrastructure improvement in the Nursery with provision of central oxygen and incubators over the last year or so ,hence our observations were based on current scenario and not the ones that prevailed at the time these deaths took place.

This was a rapid assessment with limited time allocation for the investigation, hence we could not review all aspects in depth. An indepth analysis would require a major undertaking in terms of resources and time allocation.

Conclusion:

There is significant deficiency in the competency of health cadre (nurses and doctors) in the recognition and management of illnesses across MNCH.

In view of the findings of the Committee, while we agree that socio-cultural factors contribute to increased death and disease ; however, in the subject cases, we do not see these (including malnutrition) to be the predominant causes of death.

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