



Daffodil
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Thesis report on

**STATUS OF HEALTH WORKFORCE AND SERVICE
COVERAGE FOR UNDER-FIVE CHILDREN IN BANGLADESH.**

Submitted By

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APPROVAL

This is certifying that **Md. Monir Hossain Shimul** has completed this dissertation entitled “**Status of Health workforce and service coverage for under-five children in Bangladesh**”, in partial fulfillment of the requirement for the Master of Public Health, Department of Public Health, Daffodil International University, Dhaka, Bangladesh my supervision.



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ACKNOWLEDGEMENT

It is pleasure and an opportunity to recall those personalities who are directly supported me to produce this dissertation entitled “**Status of Health workforce and service coverage for under-five children in Bangladesh**”, undertaken for the partial fulfillment of the requirement for the degree of Master of Public Health (MPH).

First of all, I would like to my sincere respect and heartfelt gratitude to the chairman as well as the member of dissertation committee for their valuable guidance and support.

I express my sincere thanks to my Guide **Dr. Salamat Khandker, Professor**, Dept. of Public Health, Daffodil International University for being a constant guiding spirit throughout my study and his guidance and encouragement for this dissertation work.

I am indebted and would like to express my sincere gratefulness to **Dr. ABM. Alauddin Chowdhury Professor and Head**, Dept. of Public Health Daffodil International University for his encouragement, guidance and appreciation throughout my study period.

I would like to acknowledge all staff members of public health department for their support and valuable suggestion, valuable criticism throughout the study period and in the preparation of this dissertation.

I thank the assessors who participated in the data collection procedure without any financial requirements. I would like to thank all the staffs of study hospitals for their support in data collection and all the participants who contributed to this study.

DECLARATION

I hereby humbly declare that the dissertation work titled “**Status of Health workforce and service coverage for under-five children in Bangladesh**”, a requirement for the degree Master of Public Health (MPH) program under the Faculty of Allied Health Sciences, Daffodil International University, Bangladesh was carried out by me under the guidance of Prof. Dr. Salamat Khandker during the study period of October 2023 to May 2024.



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CERTIFICATION

This is to certify that **Md. Monir Hossain Shimul**, Student ID: 232-41-028 has carried out the research work as partial requirement of the degree under my supervision and submitted the dissertation entitled “**Status of Health workforce and service coverage for under-five children in Bangladesh**”. I have the confidence regarding the originality of his data and I also express that the dissertation is up to my satisfaction. It is now ready for submission to the board examiners of Daffodil International University, Dhaka, Bangladesh with my approval.



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DEDICATION

This dissertations dedicated to all of my friends who never stopped me from dreaming.

Abstract

Introduction: Despite the implementation of the Integrated Management of Childhood Illness (IMCI) in 1998, the quality of care for children in Bangladesh remains inadequate. The country faces a severe human resource for health (HRH) crisis, which impacts the standard of care for children younger than five years old. This study assesses the quality of care and service coverage for children in private and government hospitals across six subdistricts of Bangladesh.

Methodology: This cross-sectional study was conducted from October 2023 to May 2024 in six randomly selected subdistricts, including 102 private hospitals and 7 government hospitals. Data collection involved face-to-face meetings with senior hospital staff, direct observations, and the use of adapted WHO hospital assessment tools. Hospitals were scored on various dimensions with respect to WHO guidelines, and data analysis was performed via descriptive statistics.

Result: Out of the 109 hospitals surveyed, 86.27% of private hospitals and all government hospitals had separate pediatric outpatient departments. However, compared with all government hospitals, only 39.22% of private hospitals had separate pediatric inpatient departments. Neonatal intensive care units were present in 6.86% of private hospitals, with none in government hospitals. The employment of pediatricians was significantly lower in private hospitals (10.78%) than in government hospitals (71.43%). Emergency services for children were available 24/7 of 33.33% of private hospitals and all government hospitals.

Conclusion and Recommendation: This study highlights substantial disparities in the availability of healthcare professionals and facilities for children between private and government hospitals in Bangladesh. The findings underscore the need for strategic interventions to improve the HRH crisis and enhance the quality of pediatric care, particularly in private hospitals. Ensuring equitable access to essential healthcare services for children under-five years age is critical for improving child health outcomes in Bangladesh.

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Chapter I

Introduction

1.1 Background

For children's health, it is crucial that emergency medical personnel and healthcare facilities are accessible. This involves a comprehensive network of emergency medical personnel and healthcare facilities equipped to address the diverse health challenges that children face. Multiple studies conducted in low-income countries, including Bangladesh, have highlighted significant deficiencies in the quality of hospital care provided to severely ill children. Despite the government's implementation of the Integrated Management of Childhood Illness (IMCI) strategy in 1998, aimed at reducing child mortality and enhancing development, the quality of pediatric care remains substandard¹⁻⁶.

Since gaining independence in 1971, Bangladesh has made substantial progress in developing both public and private health infrastructure. However, the country still faces considerable challenges in establishing a sufficient health workforce to cater to children under five years of age. This issue is prevalent across Southeast Asian countries, where concerns about health workforce shortages, skill mixes, migration, work environments, and knowledge bases are extensively discussed. Bangladesh is among the 58 countries identified by the World Health Organization (WHO) as experiencing a severe HRH crisis. The health workforce, comprising pediatricians, general practitioners, child disease experts, emergency medical officers, trained nurses, and paramedics, is a critical component of the healthcare system influencing the standard of care. A shortage of qualified staff at local health centers can lead to inadequate healthcare, misdiagnosis, delayed diagnosis, ineffective emergency management, and poor referral procedures for children⁷⁻¹⁰.

The quality of health services for children at the grassroots level remains a significant concern, as children form the foundation of every nation. Infrastructure for hospital and child care, other vital support systems and medications, neonatal care, triage procedures, clinical case management, and monitoring are just a few of the many areas where hospital care for children falls short. Recent assessments of district and subdistrict hospitals have reported poor conditions in outdoor and indoor services for children in public hospitals in Bangladesh^{11,12}.

In Bangladesh, Upazila Health and Family Planning Officers manage medical professionals who provide emergency maternity and child health (MCH) services in Upazila Health Complexes (UHCs). District hospitals offer both indoor and outdoor facilities for child health services with varying degrees of efficiency and quality. The public health sector in Bangladesh is structured into primary, secondary, and tertiary care, with UHCs representing the primary level of care. Despite efforts to decentralize health services and enhance the capacity of UHCs, significant gaps remain in service provision and quality¹³⁻¹⁵.

Bangladesh's healthcare system has a number of structural issues, such as low infrastructure, low budget, and a shortage of human resources. These issues are compounded by a lack of proper training and supervision of healthcare providers, leading to suboptimal care for children. The IMCI strategy, while beneficial, has not been fully integrated into the healthcare system, resulting in inconsistent implementation and outcomes. Additionally, the rapid population growth and high burden of infectious diseases in Bangladesh place further strain on the healthcare system, necessitating comprehensive and sustainable interventions to improve child health outcomes^{16,17}.

Despite these challenges, there have been some improvements in child health indicators in Bangladesh over the past few decades. The under-five mortality rate has declined significantly, and vaccination coverage has increased. However, these gains are unevenly distributed, with rural and disadvantaged populations experiencing poorer health outcomes than their urban counterparts do. Addressing the disparities in child health services and outcomes requires a multifaceted approach, including strengthening the health workforce, improving healthcare infrastructure, and ensuring equitable access to quality care for all children¹⁸⁻²⁰.

In recent years, the government, along with various international organizations, has focused on enhancing the healthcare system. Notable initiatives include the expansion of primary healthcare services, improved training for healthcare workers, and better access to essential medical supplies. For example, collaboration between UNICEF, the UNFPA, and the Canadian government has targeted underserved rural areas to bolster healthcare access and reduce maternal and child mortality^{21, 22}.

The role of nongovernmental organizations (NGOs) and international agencies in supporting child health services in Bangladesh is also noteworthy. These organizations have played crucial roles in supplementing government efforts by providing technical assistance, funding, and implementing community-based health programs. Collaboration efforts among the government, NGOs, and international agencies have the potential to increase the effectiveness of child health interventions and achieve sustainable improvements in child health outcomes^{23,24}.

This study conducted a baseline evaluation of the quality of care for children under five in both private and public hospitals across six subdistricts of Bangladesh, as these facilities are where sick children typically receive their initial treatment. No prior research has examined the availability of pediatric health staff in both sectors and the quality of care in private hospitals. Additionally, the study aimed to compare current practices in these hospitals with evidence-based guidelines from the WHO's pocket book of hospital care for children, with the goal of initiating improvements in healthcare quality. Through this, the study aimed to identify critical areas in need of enhancement and offer recommendations for potential solutions.

1.2 Justification of the research

The concentration of certified health workers worldwide is strongly linked to important health outcomes for children under five, including access to primary healthcare services and survival rates for infants and young children³.

In rural areas of Bangladesh, there is a severe lack of qualified healthcare workers. Inadequate emergency indoor and outdoor case management, a shortage of essential medications, equipment, and laboratory support, as well as a greater likelihood of infant mortality are all factors. These factors discourage parents from seeking treatment. The study findings of SE Arifeen et al. (2005) demonstrated that there is an urgent need for interventions to the quality of care for sick under-fives children in first-level health facilities in Bangladesh. Across a 2012 study, Dewan ME et al. evaluated the standard of pediatric treatment across eighteen public district and sub-district hospitals in Bangladesh. There was no mention about the service quality of private hospitals and availability of health workforce for children in both studies or any other study^{5,6}.

Data on HRH and service coverage for children in Bangladesh's formal and unofficial sectors are not comprehensive or nationally representative. This is crucial for creating a minimum service coverage and HRH strategy and plan, as well as for their implementation, in order to satisfy the population's evolving health demands and create an equitable, effective, and efficient healthcare system for children.

1.3 Operational definition

Children: Newborn to five years old.

Pediatrician: Physician having Bangladesh Medical and Dental Council (BMDC) recognized post-graduation degree in pediatrics.

Child Disease Experts: Physician having minimum 6 months training on pediatrics from any recognized institutions or medical college hospitals.

Trained Nurses or Paramedics: Nurse or paramedic having minimum 6 months training on pediatric from any recognized institutions or medical college hospitals.

Hospitals: Government and Private Hospitals registered by Director General of Health Services (DGHS) in study area.

1.3 Research Questions

1. What is the status of service coverage for under-five children in private and public hospitals in Bangladesh?
2. What is the status of availability of health workforce for under-five children care in private and public hospitals of Bangladesh?

1.4 Objectives

General objective:

To determine the availability of healthcare professionals and service coverage for under-five children in authorized private and public health facilities in selected sub-districts of Bangladesh.

Specific objective:

1. To find out the hospital infrastructure, the essential equipment, laboratory services, and drugs for child patients.
2. To ascertain the quality of case management effectiveness and monitoring services as well as newborn care.
3. To identify the availability of child health professionals and their service coverage.
4. To contrast the hospital facilities and standard of care provided to kids in public and private healthcare facilities.

Chapter-II

Literature review

The literature on child health services in Bangladesh reveals a complex landscape marked by significant achievements and persistent challenges. Several studies have documented the progress made in reducing child mortality rates and improving vaccination coverage. For instance, the Bangladesh Demographic and Health Survey (BDHS) reports a significant decline in the under-five mortality rate over the past few decades, attributing this improvement to increased immunization and better management of common childhood illnesses^{20, 26}.

Despite these achievements, the literature highlights substantial disparities in health outcomes between different population groups. Rural and disadvantaged populations often face poorer health outcomes compared to their urban counterparts. Factors contributing to these disparities include inadequate healthcare infrastructure, a shortage of skilled healthcare workers, and limited access to essential health services. The World Health Organization (WHO) has identified Bangladesh as one of the countries facing a critical shortage of healthcare workers, particularly affecting rural areas^{8, 18, 19}.

Bangladesh is facing significant HRH crisis, marked by a shortage of qualified healthcare providers, an imbalance in the distribution of skills, and unequal allocation across regions. Recent data also highlight the role of international collaborations in improving health outcomes. The partnership between UNICEF, UNFPA, and Canada has focused on addressing critical gaps in the healthcare system, particularly in underserved areas. These collaborative efforts have been instrumental in reducing maternal and child mortality rates, although challenges remain in achieving the SDG targets³¹.

According to the WHO, cohesive efforts and dedicated financing across multiple sectors are essential for improving child health outcomes. Recent initiatives, such as the Health System Strengthening for Primary Health Care project, have made strides in improving healthcare access in rural areas. In addition to IMCI, the literature emphasizes the importance of a well-functioning healthcare infrastructure and support systems. Studies have identified deficiencies in hospital and child health infrastructure, essential support systems, and clinical case management as major barriers to quality child health services. These deficiencies are particularly pronounced in district and sub-district hospitals, where the quality of care often falls short of national standards^{11,27,31}.

Several factors contribute to the challenges of workforce availability and service coverage for children in Bangladesh, such as policy and funding, education and training, infrastructure, and socioeconomic factors. Addressing the existing gaps in healthcare delivery and workforce distribution is essential for ensuring the well-being of the country's youngest population³⁰.

Chapter-III

Methodology

3.1 Study area

Study was conducted in Dhamrai Upazila and Savar Upazila from Dhaka dictrict, KapasiaUpazila from Gazipur district, ManikganjSadarUpazila and SaturiaUpazila from Manikganj district and NangalkotUpazila from Cumilla district. Total surface area of study area is 1393.18 km². According to population and housing census 2011, total population of study area are 1,994,293.

Table-1: Study area and number of hospitals in study area.

Study Area	District	Total number of the hospitals
Savar Upazila	Dhaka	43
Dhamrai Upazila	Dhaka	13
SaturiaUpazila	Manikganj	03
ManikganjSadarUpazila	Manikganj	36
KapasiasUpazila	Gazipur	09
NangalkotUpazila	Cumilla	05

3.2 Study design

This study was a cross-sectional study carried out to observe the availability of health workers and hospital service coverage for children in six sub-districts of Bangladesh.

3.3 Study period

Study was conducted from October, 2023 to May, 2024.

3.4 Sample size

This study was conducted in 102 private hospitals and 07 government hospitals in the study area.

3.5 Sampling technique

Simple random sampling was used to select the study sub-districts. Out of 495 upazilas in Bangladesh, six subdistricts or upazilas were chosen at random to be included in the study. Every one of the 495 upazilas was given a number. Six upazilas were then chosen at random by a computer program that generated random numbers. A total 102 private and 7 public authorized hospitals of those six upazilas were included in the assessment.

3.6 Eligibility criteria

Inclusion criteria:

1. Hospitals are registered by the Director General of Health Services (DGHS)
2. Hospitals have both general indoor and outdoor services.
3. Tertiary-level hospitals such as district hospitals, and medical college hospitals in the study area.
4. General hospitals and child disease specialized hospitals.

Exclusion criteria:

1. Hospitals not registered by the Director General of Health Services.
2. Diagnostic centers where general indoor services are not available.
3. Community Clinics, Union Health Centers.
4. Community clinics or diagnostic centers run by nongovernment organizations.
5. Specific diseases or age-related specialized hospitals other than child specialized hospitals.

3.7 Data collection procedure

Adapted 'WHO hospital assessment tools and standards' and a structured questionnaire were used for this study²⁵. Information was collected in face-to-face meetings with senior hospital staff and cross-checked by an administrator of the hospital. Several sections on hospital layout, equipment and supplies, laboratory services, pediatric essential drugs, neonatal care, diagnosis and treatment of acute respiratory infections, diarrhea, malnutrition, monitoring systems for ill children, access and quality of care, availability of pediatricians and other child health professionals, and their service coverage were included in the final assessment tool.

3.8 Quality Control

For the purpose of performing hospital assessments and service coverage, eight assessors were chosen. Physicians and public health professionals with expertise in child health served as the assessors. Every assessor took part in field practice sessions and completed online training.

Four teams were assembled, each including a public health professional and a practicing pediatrician from the research area. Evaluations were carried out at a few hospitals during January and March of 2024. The team made two in-person visits to each sample institution to observe clinical case management and other services. In addition, assessors interviewed hospital employees and, in the event that no case could be observed despite the availability of data, utilized simulated cases. An additional source of information was the data extracted from reports of hospital management information system (MIS).

Assessors evaluate hospitals based on current WHO recommendations and standards outlined in the assessment tool, covering various aspects of care in the adapted version. Scores range from 5 to 1 for both individual and overall evaluations: 5 is awarded for practices that fully meet care standards; 4 for practices needing minimal improvement to meet standards; 3 for practices requiring some improvement; 2 for those needing significant improvement; and 1 for practices that either present a life risk or lack service provision altogether.

3.9 Data analysis

Data were analysed via descriptive statistics to present the availability of the health workforce and service coverage. A tailored data entry application was created, incorporating the essential consistency verifications. SPSS version 23.0 was used to analyze the data after they had been entered and cleaned.

3.10 Ethical clearance

The study protocol was submitted to the Research Ethics Committee (REC) of the Faculty of Allied Health Science (FAHS), Daffodil International University (DIU), for review and approval in order to comply with ethical standards. The REC granted approval at the outset of the investigation. The context and goals of the study were explained to participants prior to the start of any interviews. Prior to data collection, authorization was also obtained from the hospital administration. Confidentiality and anonymity were rigorously upheld.

Chapter-IV

Results

The statistical analysis of the study's data and the interpretation of the results were condensed into this chapter. The findings provide information about the design of the facility, the supplies and equipment used there, laboratory services, pediatric critical medications, neonatal care, acute respiratory infection diagnosis and treatment, diarrhea, malnutrition, and infant monitoring systems. The availability of pediatric health specialists and the scope of their services in hospitals were also examined in this study.

General Hospital Information

This study surveyed a total of 109 hospitals, including 102 private hospitals and 7 government hospitals, across six subdistricts of Bangladesh. Savar has the highest number of private hospitals (42), ManikganjSadar has 34, while Saturia has the lowest number of private hospitals (2). Among the 7 public hospitals distributed across the study area, ManikganjSadar has 2 public hospitals, one of which is District Sadar Hospital and the other of which is the government medical college hospital, while the remaining regions (Savar, Dhamrai, Saturia, Kapasia and Nangalkot) each have 1 named upazila health complex (UHC). Specialized healthcare services for children are significantly limited, with only one specialized child hospital located in Savar. All hospitals offer 24-hour services with 24-hour doctor availability. (Table-2)

Table-2: General information about studied hospitals.

Variables	Savar	Dhamrai	Manikganj Sadar	Saturia	Kapasia	Nangalkot	Total
Total Private Hospital	42	12	34	2	8	4	102
Total Public Hospital	1	1	2	1	1	1	7
Specialized Child Hospital	1	0	0	0	0	0	1
24 hours open	43	13	36	3	9	5	109
24 hours doctor availability	43	13	36	3	9	5	109

Hospital design and child health facilities

In terms of pediatric-specific facilities, 86.27% of private hospitals had separate pediatric outpatient departments, whereas to all public hospitals had this feature. However, only 39.22% of private hospitals had separate pediatric inpatient departments, while all public hospitals had this provision. Similarly, a separate ward for admitting newborns was found in only 12.75% of private hospitals, while it was present in all public hospitals.

Table-3: Hospital design and child health facilities

Variables	Private hospitals where variables were found (n=102)	Public hospitals where variables were found (n=7)
Separate pediatric outpatient department	88 (86.27%)	7 (100%)
Separate pediatric inpatient department	40 (39.22%)	7 (100%)
Separate ward for admitting newborns	13 (12.75%)	7 (100%)
Hospital has NICU	7 (6.86%)	0 (0%)
Pediatric surgery facilities	16 (15.69%)	5 (71.43%)
Employment of any pediatrician	11 (10.78%)	5 (71.43%)
Employment of any pediatric surgeon	8 (7.84%)	4 (57.14%)
Employment of trained nurse for child care	33 (32.35%)	7 (100%)
24/7 emergency services for children	34 (33.33%)	7 (100%)
Functioning triage system for emergency services for children	13 (12.75%)	3 (42.86%)

Notably, neonatal intensive care units (NICUs) were scarce, with only 6.86% private hospitals equipped with such facilities, and none of the public hospitals had NICUs. Pediatric surgery facilities were available in 15.69% of private hospitals and 71.43% of public hospitals. The employment of pediatricians was significantly lower in private hospitals, with only 10.78% having at least one pediatrician on staff, whereas 71.43% of public hospitals employed pediatricians. Pediatric surgeons were even rarer, being found in 7.84% of private hospitals and 4 public hospitals.

Nursing care for children was better represented in public hospitals, with all having trained nurses for child care, compared with 32.35% in private hospitals. Emergency services for children were available 24/7 times in 33.33% of private hospitals and all public hospitals, and were provided by on-call doctors, nurses or paramedics. A total of 42.86% of public hospitals have a functioning triage system for pediatric emergencies, and only 12.75% of private hospitals have this system in place. (Table-3)

Hospital support system

All surveyed hospitals, both private and public, had a continuous electricity supply, backup power generators, and sufficient fuel to operate these generators. Running water and safe drinking water were available in all the public hospitals, whereas 88.24% of the private hospitals provided safe drinking water.

Table-4: Availability of hospital support system.

Variables	Private hospitals where variables were found (n= 102)	Public hospitals where variables were found (n= 102)
Electricity available	102 (100%)	7 (100%)
Back-up power supply (generator)	102 (100%)	7 (100%)
Sufficient fuel to power backup generator	102 (100%)	7 (100%)
Availability of running water	102 (100%)	7 (100%)
Provision of safe drinking water	90 (88.24%)	7 (100%)
Colored bins for waste segregation and disposal	82 (80.39%)	7 (100%)
Availability of any functioning fridge for drugs or vaccines	85 (83.33%)	4 (57.14%)
Any complaints box on the hospital premises or a formal way patients can communicate with the hospital	18 (17.65%)	7 (100%)

In terms of waste management, 80.39% of private hospitals had colored bins for waste segregation and disposal, which was a standard feature in all public hospitals. The availability of functioning fridges for drugs or vaccines was noted in 83.33% of private hospitals and 54.14% of public hospitals. However, only 17.65% of private hospitals had a formal complaint system in place for patient feedback, whereas all public hospitals had such a system. (Table-4)

Hospital equipment

Most private (86.27%) and public hospitals had filled with oxygen cylinders and flow meters. Emergency neonatal care equipment, such as incubators and warmers, was less prevalent in private hospitals, with only 14.71% having incubators and 14.71% having warmers. Public hospitals had 57.14% incubators and 57.14% warmers.

Table-5: Availability of hospital equipments.

Variables	Private hospitals where variables were found (n= 102)	Public hospitals where variables were found (n= 102)
Filled oxygen cylinder	88 (86.27%)	7 (100%)
Flow meters for cylinders of oxygen	88 (86.27%)	7 (100%)
Incubators for urgent treatment of newborns	15 (14.71%)	4 (57.14%)
Emergency neonatal care warmers	15 (14.71%)	4 (57.14%)
Scale for weighing in the inpatient area	102 (100%)	7 (100%)
Measuring board to measure length and height	89 (87.25%)	7 (100%)
IV-giving sets with chambers for pediatric use	40 (39.22%)	7 (100%)
Butterflies and/or cannulas of pediatric size	40 (39.22%)	7 (100%)
NG-tubes, pediatric size	13 (12.75%)	5 (71.43%)
Suction equipment	100 (98.04%)	7 (100%)
Nebulizer for administration of salbutamol	102 (100%)	7 (100%)
Is all the equipment cleaned regularly and sanitary?	86 (84.31%)	6 (85.71%)
Is all the equipment kept in good working order?	82 (80.39%)	5 (71.43%)

Basic diagnostic tools such as weighing scales were universally available, and measuring boards for length and height were found in 87.25% of private hospitals and all public hospitals. Pediatric-specific equipment such as IV-giving sets, pediatric-sized butterflies, cannulas, and NG-tubes are less frequently available in private hospitals (39.22%). Essential suction equipment and nebulizers were widely available across all surveyed hospitals.

However, the regular cleaning and maintenance of this equipment varied, with 84.31% of private hospitals and 85.71% of public hospitals maintaining regular cleaning protocols, and 80.39% of private hospitals and 71.43% of public hospitals ensuring that their equipment was in good working order. (Table-5)

Essential drugs

All surveyed hospitals, both private and public, stocked basic IV fluids such as normal saline and oral rehydration solutions, but 10% IV glucose fluid was available in only 73.53% privates and 85.71% public hospitals. Injectable antibiotics and vitamins are widely available, with slight variations. For example, injectable ampicillin and tablet cotrimoxazole were available in 78.43% and 85.71%, injectable phenobarbital and any form of anticonvulsant were available in 84.31% and 85.71%, private and public hospitals respectively, while injectable ceftriaxone was universally available.

Table-6: Availability of essential drugs.

Variables	Private hospitals where variables were found (n= 102)	Public hospitals where variables were found (n= 102)
Normal Saline IV	102 (100%)	7 (100%)
Glucose 10% IV	75 (73.53%)	7 (100%)
Cholera Saline IV	102 (100%)	7 (100%)
Oral rehydration solution	102 (100%)	7 (100%)
Corticosteroids IV or oral	102 (100%)	7 (100%)
First line anticonvulsant: Diazepam / Paraldehyde IM, IV, Suppository	86 (84.31%)	7 (100%)
Phenobarbital IM, IV	86 (84.31%)	6 (85.71%)
Injectable Ampicillin	80 (78.43%)	6 (85.71%)
Injectable Amoxicillin	89 (87.25%)	7 (100%)
Injectable Gentamicin	92 (90.20%)	6 (85.71%)
Injectable Ceftriaxone	102 (100%)	7 (100%)
Injectable Vitamin K	102 (100%)	7 (100%)
Injectable Epinephrine (Adrenaline)	75 (73.53%)	7 (100%)
Paracetamol syrup, tablet, suppository	102 (100%)	7 (100%)
Amoxicillin syrup	100 (98.04%)	7 (100%)
Co-trimoxazole tablet	80 (78.43%)	6 (85.71%)
Availability of Zinc syrup, tablet	90 (88.24%)	7 (100%)
Availability of Nebulizer solution	100 (98.04%)	7 (100%)

Paracetamol in various forms was consistently available across all hospitals. The availability of zinc tablets or syrup was high, with 88.24% of the hospitals being private and all public hospitals stocking them. Nebulizer solutions are also widely available. However, there are gaps in the availability of some critical drugs, with only 73.53% of private hospitals having injectable epinephrine. (Table- 6)

Laboratory Systems and Others

Essential laboratory tests were available 24/7 in 58.52% of private hospitals and 57.14% of public hospitals. Supplies for basic diagnostic tests such as blood glucose, haemoglobin, haematocrit (PCV), bilirubin, full blood count, electrolytes, malaria microscopy, blood grouping and cross-matching, and HIV tests are uniformly available across most hospitals surveyed, both private and public.

Table-7: Availability of Laboratory System and others.

Variables	Private hospitals where variables were found (n= 102)	Public hospitals where variables were found (n= 102)
24/7 availability of essential laboratory tests	60 (58.82%)	4 (57.14%)
Supplies for blood glucose test	102 (100%)	7 (100%)
Supplies for haemoglobin test	102 (100%)	7 (100%)
Supplies for haematocrit (PCV)	86 (84.31%)	5 (71.43%)
Supplies for Bilirubin	69 (67.65%)	5 (71.43%)
Supplies for Full blood count	102 (100%)	7 (100%)
Supplies for Electrolytes	28 (27.45%)	3 (42.86%)
Supplies for microscopy of malaria	82 (80.39%)	6 (85.71%)
Materials for blood cell microscopy	102 (100%)	7 (100%)
Supplies for urine cell microscopy	102 (100%)	7 (100%)
Materials for cross-matching and blood grouping	96 (94.12%)	5 (71.43%)
Supplies for HIV test	79 (77.45%)	6 (85.71%)
X-ray machine	102 (100%)	7 (100%)
Conducting laboratory tests in compliance with standard operating procedures	86 (84.31%)	5 (71.43%)
Upkeep of safety precautions in laboratories	88 (86.27%)	6 (85.71%)

X-ray machines are universally available in both private and public hospitals. Adherence to standard operating procedures for laboratory tests was reported in 84.31% of private and 71.43% of public hospitals. The majority of hospitals, both private (86.27%) and public (85.71%), maintain essential laboratory safety measures. (Table – 7)

Availability and quality of neonatal care

Guidelines for newborn resuscitation and care were known and used by staff in 46.08% of private hospitals and 42.86% of public hospitals. Availability of staff capable of performing neonatal resuscitation was limited, with only 23.53% of private hospitals and 57.14% of public hospitals having adequately trained staff.

Table-8: The quality and accessibility of neonatal care.

Variables	Private hospitals where variables were adequate	Public hospitals where variables were adequate	Private hospitals where some improvement were needed	Public hospitals where some improvement were needed	Private hospitals where major improvement were needed	Public hospitals where major improvement were needed
Availability of guidelines for resuscitation and care of the newborn baby and known and used by staff	47 (46.08%)	3 (42.86%)	38 (37.25%)	3 (42.86%)	17 (16.67%)	1 (14.29%)
24/7 staff available able to appropriately help a newborn baby breathe and to perform resuscitation appropriately	24 (23.53%)	4 (57.14%)	31 (30.39%)	2 (28.57%)	47 (46.08%)	1 (14.29%)
Clean resuscitation bed with a heating source and equipment ready to use	60 (58.82%)	5 (71.43%)	24 (23.53%)	1 (14.29%)	18 (17.65%)	1 (14.29%)
Hygienic and safe ward	28 (27.45%)	4 (57.14%)	12 (11.76%)	2 (28.57%)	62 (60.78%)	1 (14.29%)
Separate unit or room for seriously ill neonates	8 (7.84%)	3 (42.86%)	5 (4.90%)	3 (42.86%)	89 (87.25%)	1 (14.29%)
Encouraging the early start of exclusive breastfeeding when skin contact is ensured.	86 (84.31%)	6 (85.71%)	8 (7.84%)	1 (14.29%)	8 (7.84%)	0 (0%)
Utilizing thermal protection	24 (23.53%)	4 (57.14%)	14 (13.73%)	2 (28.57%)	64 (62.75%)	1 (14.29%)
Availability of immunization	4 (3.92%)	7 (100%)	2 (1.96%)	0 (0%)	96 (94.12%)	0 (0%)
Diagnosis of newborns with low birth weight	63 (61.76%)	6 (85.71%)	21 (20.59%)	1 (14.29%)	18 (17.65%)	0 (0%)
Accurate treatment of LBW babies	27 (26.47%)	4 (57.14%)	24 (23.53%)	2 (28.57%)	51 (50.00%)	1 (14.29%)
Accurate feeding of young infants and LBW newborns	25 (24.51%)	4 (57.14%)	20 (19.61%)	2 (28.57%)	57 (55.88%)	1 (14.29%)

A clean resuscitation bed with a heating source was found in 58.82% of private hospitals and 71.43% of public hospitals, although many hospitals required improvements in maintaining hygienic and safe wards. Separate units for critically ill neonates were rare in private hospitals, with only 7.84% having such facilities, whereas 57.14% had such facilities in public hospitals.

Skin-to-skin contact and early breastfeeding initiation were common in 85.71% of public hospitals and 84.31% of private hospitals. Thermal protection practices were adequate in 23.53% of private hospitals and 57.14% of public hospitals. Immunization services were universally available in public hospitals but highly lacking in private hospitals, with only 3.92% providing these services.

Public hospitals do a better job of correctly diagnosing and treating low-birth-weight babies, but there are still many areas in which both kinds of hospitals need to improve when it comes to feeding procedures for early infants and low-birth-weight babies. (Table- 8)

Case management effectiveness by disease

62.75% of private hospitals and 57.14% of public hospitals have adequate diagnosis and assessment of pneumonia severity. However, 20.59% of private hospitals and 14.29% of public hospitals needed some improvement. The administration of appropriate antibiotics and oxygen therapy when necessary showed similar trends, with the majority of hospitals performing adequately but with notable gaps. Tuberculosis management was particularly weak in private hospitals, with only 6.12% providing adequate diagnosis and treatment. (Table- 9.1)

Table-9.1: Case management effectiveness by disease (Pneumonia)

Pneumonia	Private hospitals where variables were adequate	Public hospitals where variables were adequate	Private hospitals where some improvement were needed	Public hospitals where some improvement were needed	Private hospitals where major improvement were needed	Public hospitals where major improvement were needed
Accurate evaluation and diagnosis of pneumonia's severity	64 (62.75%)	4 (57.14%)	21 (20.59%)	1 (14.29%)	17 (16.67%)	2 (28.57%)
Appropriate use of antibiotics for pneumonia and other respiratory conditions	64 (62.75%)	4 (57.14%)	21 (20.59%)	1 (14.29%)	17 (16.67%)	2 (28.57%)
Correct administration of oxygen when necessary	50 (49.02%)	3 (42.86%)	35 (34.31%)	2 (28.57%)	17 (16.67%)	2 (28.57%)
Appropriate diagnosis and management of tuberculosis	80 (78.43%)	2 (28.57%)	12 (11.76%)	2 (28.57%)	10 (9.80%)	3 (42.86%)

Assessment of dehydration was performed correctly in 40.20% of private hospitals and 71.43% of public hospitals. However, rehydration plans were adequately administered in only 27.45% of private hospitals and 57.14% of public hospitals. The administration of antibiotics for diarrhea treatment was appropriate in 19.61% of private hospitals and 57.14% of public hospitals, but many hospitals showed significant room for improvement. Continued feeding during diarrhea is well practiced in most hospitals. (Table- 9.2)

Table-9.2: Case management effectiveness by disease (Diarrhea)

Diarrhea	Private hospitals where variables were adequate	Public hospitals where variables were adequate	Private hospitals where some improvement were needed	Public hospitals where some improvement were needed	Private hospitals where major improvement were needed	Public hospitals where major improvement were needed
Correct assessment of dehydration	41 (40.20%)	5 (71.43%)	34 (33.33%)	0 (0%)	27 (26.47%)	0 (0%)
Implementing and overseeing rehydration programs based on the degree of dehydration	28 (27.45%)	4 (57.14%)	12 (11.76%)	2 (28.57%)	62 (60.78%)	1 (14.29%)
Appropriate antibiotics administered only when necessary	20 (19.61%)	4 (57.14%)	40 (39.22%)	2 (28.57%)	42 (41.18%)	1 (14.29%)
Continued feeding given during diarrhoea	81 (79.41%)	5 (71.43%)	12 (11.76%)	2 (28.57%)	9 (8.82%)	0 (0%)

The management of malnutrition showed varying levels of adequacy. Nutritional assessment and management of infections were adequate in 39.22% of private hospitals and 57.14% of public hospitals. However, the management of electrolyte imbalances and micronutrients, which are crucial for treating malnutrition, was adequate in only 30.39% of private hospitals and 57.14% of public hospitals. Correct management of dehydration associated with malnutrition was noted in 33.33% of private hospitals and 57.14% of public hospitals.

Table-9.3: Case management effectiveness by disease (Malnutrition)

Malnutrition	Private hospitals where variables were adequate	Public hospitals where variables were adequate	Private hospitals where some improvement were needed	Public hospitals where some improvement were needed	Private hospitals where major improvement were needed	Public hospitals where major improvement were needed
Correct weight for height assessment of nutritional condition, including differential diagnosis	40 (39.22%)	4 (57.14%)	46 (45.10%)	1 (14.29%)	16 (15.69%)	2 (28.57%)
Appropriate management of infection	40 (39.22%)	4 (57.14%)	38 (37.25%)	2 (28.57%)	24 (23.53%)	1 (14.29%)
Appropriate management of electrolyte imbalance and micronutrients	31 (30.39%)	4 (57.14%)	27 (26.47%)	2 (28.57%)	44 (43.14%)	1 (14.29%)
Correct management of dehydration	34 (33.33%)	4 (57.14%)	19 (18.63%)	2 (28.57%)	49 (48.04%)	1 (14.29%)
Hypoglycaemia and hypothermia correctly checked and managed	32 (31.37%)	4 (57.14%)	25 (24.51%)	2 (28.57%)	45 (44.12%)	1 (14.29%)
Correct feeding of severely malnourished children	26 (25.49%)	4 (57.14%)	20 (19.61%)	2 (28.57%)	56 (54.90%)	1 (14.29%)

Management of hypoglycemia and hypothermia was adequate in 31.37% of private hospitals and 57.14% of public hospitals, but many hospitals required significant improvements. Correct feeding practices for severely malnourished children were only adequately followed in 25.49% of private hospitals and 57.14% of public hospitals, indicating a substantial need for improvement in this area. (Table-9.3)

Monitoring and Follow-up

In evaluating the nutritional status of admitted patients, only 15% private hospitals and 28.57% of public hospitals had adequate measures in place. A substantial number of hospitals needed some improvement, with 30% private and 43.86% of public hospitals falling into this category. Major improvements were required in 55% of private hospitals and 28.57% of public hospitals. Similarly, the use of monitoring charts to track the progress of admitted children revealed that 25% of private hospitals and 28.57% of public hospitals were adequate.

Table-10: Monitoring and Follow-up

Variables	Private hospitals where variables were adequate	Public hospitals where variables were adequate	Private hospitals where some improvement were needed	Public hospitals where some improvement were needed	Private hospitals where major improvement were needed	Public hospitals where major improvement were needed
Nutritional status is assessed in all admitted patients	6 (15.00%)	2 (28.57%)	12 (30.00%)	3 (42.86%)	22 (55.00%)	2 (28.57%)
Use of monitoring chart for monitoring individual progress of admitted children	10 (25.00%)	2 (28.57%)	12 (30.00%)	3 (42.86%)	18 (45.00%)	2 (28.57%)
Key risk signs are monitored and recorded by a nurse	16 (40.00%)	2 (28.57%)	11 (27.50%)	2 (28.57%)	13 (32.50%)	3 (42.86%)
All patients are re-assessed daily during working days by a doctor	11 (27.50%)	4 (57.14%)	8 (20.00%)	1 (14.29%)	21 (52.50%)	2 (28.57%)
Sick children or new admissions are also reviewed by a physician on weekends and holidays	11 (27.50%)	4 (57.14%)	8 (20.00%)	1 (14.29%)	21 (52.50%)	2 (28.57%)
Reevaluation of every admitted child by a nurse before being released.	24 (60.00%)	4 (57.14%)	6 (15.00%)	1 (14.29%)	10 (25.00%)	2 (28.57%)
Reevaluation of every admitted child by a physician before being released.	7 (17.50%)	3 (42.86%)	10 (25.00%)	1 (14.29%)	23 (57.50%)	3 (42.86%)
Discharge note explaining the conditions and information about follow-up necessities and schedule	26 (65.00%)	3 (42.86%)	9 (22.50%)	1 (14.29%)	5 (12.50%)	3 (42.86%)

The monitoring and recording of key risk signs by nurses revealed that 40% of private and 28.57% of public hospitals were adequate. The daily reassessment of all patients by doctors was adequately performed in 27.5% of private hospitals and 57.14% of public hospitals. Weekend and holiday reviews by physicians showed similar trends, with only 27.5% of private hospitals and 57.14% of public hospitals being adequate. The reassessment of children before discharge by nurses and physicians also revealed discrepancies, with 60% private hospitals and 57.14% public hospitals having adequate nurse reassessments, but only 17.5% private hospitals and 43.86% public hospitals having adequate physician reassessments. The discharge note explanation was found to be adequate in 65% of private hospitals and 43.86% of public hospitals, indicating a greater adherence to this practice. (Table – 10)

Availability of paediatrician in hospitals

The study encompasses 102 private hospitals and 7 public hospitals, revealing varying degrees of pediatrician consultation availability throughout the week.

In private hospitals, the distribution of pediatrician consultation days shows a diverse pattern. A significant portion of these hospitals (13.73%) do not have pediatricians available on any given day. Conversely, a considerable number of private hospitals provide pediatrician consultations on multiple days per week, with 23.53% of hospitals offering consultations on one day, and 29.41% hospitals extending services to two days.

Table-11: Availability of Paediatricians.

Total days of Paediatrician consultation	Number of Private hospitals (n= 102)	Number of Public hospitals (n= 7)
0 day	14 (13.73%)	2 (28.57%)
1 day	24 (23.53%)	0 (0%)
2 days	30 (29.41%)	0 (0%)
3 days	7 (6.86%)	0 (0%)
4 days	12 (11.76%)	1 (14.29%)
5 days	0 (0%)	1 (14.29%)
6 days	11 (10.78%)	2 (28.57%)
7 days	4 (3.92%)	1 (14.29%)
Total number of attending Paediatricians	Number of Private hospitals (n= 102)	Number of Public hospitals (n= 7)
0	14 (13.73%)	2 (28.57%)
1	50 (49.02%)	1 (14.29%)
2	24 (23.53%)	2 (28.57%)
3	6 (5.88%)	0 (0%)
4	6 (5.88%)	0 (0%)
5+	2 (1.96%)	2 (28.57%)

In contrast, public hospitals demonstrate a stark difference in pediatrician availability. Only one (14.29%) of the surveyed public hospitals offered daily pediatrician consultations throughout the week, whereas two (28.57%) public hospitals reported no pediatrician consultation availability on any day.

Moreover, the data reveal that scattered availability of pediatrician consultations across the week in both private and public hospitals. A minority of private hospitals (approximately 11%) offer pediatrician consultations four to six days a week. Similarly, a large fraction of public hospitals provide pediatrician consultations, ranging from four to six days per week.

An overview of paediatrician staffing levels highlights the distribution of hospitals on the basis of the number of attending paediatricians, providing insights into the capacity to deliver specialized health care services for children. In private hospitals, 13.73% of the surveyed facilities report having no paediatricians available. The majority of private hospitals (49.02%) rely on a single paediatrician. Another substantial portion (23.53%) of private hospitals employ two paediatricians. A smaller number of private hospitals (5.88%) have three to four paediatricians, and a minority (1.86%) have five or more paediatricians.

A notable proportion (28.57%) of public hospitals do not have any paediatricians on staff. Among the public hospitals that employ paediatricians, 14.29% hospitals have only one paediatrician available, 28.57% hospitals have paediatricians, and another 28.57% hospitals report five or more paediatricians. (Table -11)

Chapter-V

Discussion

Consistent with previous research in both Bangladesh and other developing countries, this study revealed that the quality of service coverage and availability of health workers for children under five years of age in both the private and public health sectors of Bangladesh are still poor^{4, 5, 26}.

The availability of pediatricians, critical hospital support systems, hospital and child health infrastructure, the standard of neonatal care, the triage system, and clinical case management and monitoring are only a few of the interconnected areas where disparities are seen. This assessment is distinctive in that it covers both public and private hospitals, providing a complete view of the state of child health care in the nation. It makes use of a sample size that is nationally representative and includes all district and subdistrict hospitals.

The substantial gaps in healthcare delivery that still exist in low-resource settings are highlighted by Nolan et al. (2001)'s study on the quality of hospital care for critically ill children in less developed nations. Similarly, the research conducted by Robert et al. (2003) identified the key reasons behind the high mortality rates among children under five, emphasizing the need for improved healthcare infrastructure and a workforce in these regions. These results are consistent with the situation in Bangladesh, where the healthcare system is beset by a number of issues, such as a lack of qualified healthcare professionals and insufficient service coverage^{1, 2}.

The possibility of inaccurate treatment and incomplete assessments among IMCI-trained practitioners was highlighted by Arifeen et al. (2005). In addition, this assessment revealed that although most hospitals employed caregivers with IMCI training, the quality of both indoor and outdoor child care practices was below average. Nonetheless, the application of IMCI standards by nurses was successful in streamlining the identification and care of critically ill children in Brazilian hospitals when combined with a short training program^{6, 28}.

This study demonstrates the necessity of making necessary medications, supplies, and equipment available so that medical professionals can treat patients in accordance with evidence-based protocols. According to Dewan et al. (2012), this support was typically found to be deficient in the hospitals under study. Many hospitals also have inadequate laboratory assistance, which is likely to have an effect on the standard of diagnosis and care. Similarly, a lack of equipment such as weighing machines-compromised accurate assessment and resulted in an incorrect dosage of medicine. Similar circumstances were reported by English et al. (2009) in rural Kenya, where they reported that between 30% and 56% of the supplies required for pediatric care of critically ill infants and neonates were absent^{5, 26}.

The hospitals under study have some amenities that help with the case management of sick children; however, many facilities lack some basic supplies, injectable medications, and laboratory support. These shortcomings can also be a reflection of those in the health system. The World Health Organization (WHO) has created recommendations for the clinical management of children with serious diseases at hospitals of first referral in partnership with pediatricians across the globe. Only a few laboratory services are needed for these patients, but

necessary medications are needed. Certain nations have established long-standing treatment protocols for prevalent illnesses that serve as benchmarks for medical care. This study revealed that public hospitals in Bangladesh tend to adhere to WHO guidelines and norms more strictly than private hospitals do. Compared to all public hospitals, only a small portion of private hospitals provide full newborn care, but both lack organized neonatal and pediatric care as well as critical condition management²⁹.

In the last decade, a slightly more attention has been given to improving the standard of child care for a variety of reasons beyond those listed by Duke et al (2003). Investment in private healthcare, improved conditions in public hospitals; and academic opportunities for learning, transportation, and healthcare accessibility are added to the infant mortality ratio. They stated, *'Good quality district hospital care is crucial for reducing child mortality'*. However, the studied district public hospitals, district public medical colleges and private hospitals at the district level have no NICU or other critical management support. *'Referred to Dhaka Child Hospital'* is a very common note found in all studied hospitals³⁰.

Interestingly, although it was identified more than two decades ago, the predominant urban bias in the distribution of formally qualified health care providers has persisted, especially in the child care industry. The lack of resources in Bangladesh is a significant and predictable obstacle to this endeavor. Although the number of pediatricians is increasing, there is a noticeable difference in their availability at the subdistrict level between private and public institutions. A sizable fraction of private hospitals had no paediatricians on staff, not even on an on-call basis. The majority of hospitals had just one paediatrician working for them. The availability of pediatricians is typically greater in private hospitals, with a more varied distribution spanning from those without pediatricians to those with several experts on staff²⁷.

This disparity implies that public hospitals have more staff members who are qualified to care for pediatric patients, which would allow them to offer kids more specialized, higher-quality services. The reason for the shortage in private hospitals could be underinvestment in specialized staff because of lower profit margins or greater operating costs. This shortfall is exacerbated in neglected and rural areas where access to healthcare is already scarce. The paucity of pediatric surgeons in most hospitals makes it more difficult to provide comprehensive pediatric treatment, particularly for patients who require surgery. These results are in line with other study (Arifeen et al., 2005; Dewan et al., 2012) that reveals a severe lack of facilities and qualified healthcare workers in Bangladesh's rural areas. Research continuously demonstrates a chronic issue that necessitates targeted interventions: the underrepresentation of infrastructure and knowledgeable pediatric healthcare professionals^{6,26}.

The findings from this study highlight critical deficiencies in the pediatric healthcare system in Bangladesh, both in the private and public sectors. The severe shortage of pediatricians, inadequate neonatal care facilities, and insufficient essential medical supplies and equipment necessitate immediate intervention. Improving the quality and availability of pediatric healthcare services can significantly reduce child morbidity and mortality rates, especially in rural and underserved areas. the adoption of WHO guidelines and standards, as well as investment in pediatric-specific infrastructure and the workforce, are crucial steps toward enhancing the overall healthcare delivery system for children in Bangladesh.

This study underscores the need for further research to develop a comprehensive understanding of the barriers to effective pediatric healthcare delivery in low-resource settings. Future studies should focus on longitudinal assessments of healthcare interventions, the impact of training programs for healthcare professionals, and the efficacy of policy changes aimed at improving service coverage. Additionally, comparative studies between public and private healthcare sectors can provide deeper insights into best practices and areas requiring targeted improvements.

This study includes both private and public hospitals, and provides a holistic view of the pediatric healthcare landscape in Bangladesh. The use of WHO hospital assessment tools ensures the reliability and comparability of the findings. Random selection of subdistricts and inclusion of all government-authorized hospitals within those areas ensure that the findings are representative of the national scenario. Targeting this vulnerable age group provides critical insights into areas that most significantly impact early childhood health outcomes. The study's cross-sectional nature limits the ability to infer causality or track changes over time. The study focuses on six subdistricts, which, although randomly selected, may not capture all regional variations in healthcare service quality and workforce availability. The study's scope was limited by resource constraints, affecting the depth and breadth of the data collection and analysis.

Chapter-V

Conclusion

This study highlights significant gaps in the availability and quality of health workforce and service coverage for children under-five years of age in Bangladesh's healthcare system. Both private and public hospitals exhibit critical deficiencies in essential medical supplies, equipment, and trained personnel. This situation is exacerbated by a severe shortage of pediatricians, particularly in private hospitals, and inadequate neonatal care facilities. Despite the presence of some amenities that aid in managing sick children, the overall service quality remains substandard, aligning with findings from previous studies in similar low-resource settings.

Recommendations

On the basis of these findings, several recommendations can be made to improve the availability and quality of pediatric healthcare services in Bangladesh:

Increased investment in pediatric facilities: Both the public and private sectors should increase investments in pediatric-specific facilities, such as NICUs and inpatient departments, to provide comprehensive care for children.

Enhance training and employment of pediatric health professionals: There is a need to train and employ more pediatricians, pediatric surgeons, and trained nurses in both sectors to ensure that specialized care is available for all children.

Strengthening hospital support systems: Ensuring that all hospitals, particularly private hospitals, have robust support systems, including safe drinking water and waste management, is crucial for maintaining hygiene and operational efficiency.

Improved availability equipment, drugs, and laboratory services: Both sectors should ensure a reliable supply of proper equipment, essential drugs and laboratory services to facilitate timely diagnosis and treatment.

Adopt and adhere to international standards: Adhering to WHO norms and standards can enhance the quality of care and clinical case management for pediatric crises in private hospitals.

Implement comprehensive neonatal and pediatric care programs: Structured programs for neonatal and pediatric care should be implemented across both sectors to manage common childhood illnesses and nutritional support effectively.

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Appendices

Questionnaire

Part-1: General Hospital Information

S/N	Questions	Response
01	Date of Data collection	
02	Name of the hospital	
03	Address of the hospital	
04	Ownership (Private or Public)	
05	Name of director/manager of hospital	
06	Name and designation of respondent	
07	Number of bed in the hospital	
08	Total number permanent doctors	
09	Total number permanent nurse	
10	Is it specialized child hospital?	Yes- No-
10	Is it open 24 hours?	Yes- No-
11	24 hours availability of doctor.	Yes- No-

Part-2: Hospital layout and child health infrastructure

S/N	Questions	Response
01	Does hospital have a separate pediatric outpatient department?	Yes- No-
02	Does hospital have a separate pediatric inpatient department?	Yes- No-
03	Does the hospital have a separate ward for admitting newborns?	Yes- No-
04	Does the hospital have NICU?	Yes- No-
05	Does the hospital have pediatric surgery facilities?	Yes- No-
06	Does the hospital have any employed pediatrician?	Yes- No-
07	Does the hospital have any employed pediatric surgeon?	Yes- No-
08	Does the hospital have any trained nurse for child care?	Yes- No-
09	Does the hospital have 24/7 availability of emergency services for children?	Yes- No-

10	Does the hospital have functioning triage system for emergency services for children?	Yes- No-
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Part-3: Hospital support system

S/N	Questions	Response
01	Is electricity continuously available?	Yes- No-
02	Is there a back-up power supply (generator)?	Yes- No-
03	Is there sufficient fuel to power backup generator?	Yes- No-
04	Is there running water?	Yes- No-
05	Is there provision of safe drinking water?	Yes- No-
06	Is there colored bins for waste segregation and disposal?	Yes- No-
07	Is there any functioning fridge available for drugs or vaccines?	Yes- No-
08	Is there a complaints box on the hospital premises or a formal way patients can communicate with the hospital?	Yes- No-

Part-4: Hospital equipment

S/N	Questions	Response
01	Is there any filled oxygen cylinder?	Yes- No-
02	Is there any flow meters for oxygen cylinder?	Yes- No-
03	Is there any incubators for emergency neonatal care?	Yes- No-
04	Is there any warmers for emergency neonatal care?	Yes- No-
05	Is there any weighing scale in in-patient department?	Yes- No-
06	Is there any measuring board to measure length and height?	Yes- No-
07	Is there any IV-giving sets with chambers for pediatric use?	Yes- No-
08	Is there any Butterflies and/or cannulas of pediatric size?	Yes- No-
09	Is there any NG-tubes, pediatric size?	Yes- No-
10	Is there any Suction equipment?	Yes- No-
11	Is there any Nebulizer for administration of salbutamol?	Yes-

		No-
12	Is all the equipment cleaned regularly and sanitary?	Yes- No-
13	Is all the equipment kept in good working order?	Yes- No-

Part-5: Essential drugs

S/N	Questions	Response
01	Availability of Normal Saline IV	Yes- No-
02	Availability of Glucose 10 % IV	Yes- No-
03	Availability of Cholera Saline IV	Yes- No-
04	Availability of Oral rehydration solution	Yes- No-
05	Availability of Corticosteroids IV or oral	Yes- No-
06	Availability of first line anticonvulsant: Diazepam/Paraldehyde IM, IV, Suppository	Yes- No-
07	Availability of Phenobarbital IM, IV	Yes- No-
08	Availability of injectable Ampicillin	Yes- No-
09	Availability of injectable Amoxicillin	Yes- No-
10	Availability of injectable Gentamicin	Yes- No-
11	Availability of injectable Ceftriaxone	Yes- No-
12	Availability of injectable Vitamin K	Yes- No-
13	Availability of injectable Epinephrine (Adrenaline)	Yes- No-
14	Availability of Paracetamol syrup, tablet, suppository	Yes- No-
15	Availability of amoxicillin syrup	Yes- No-
16	Availability of Co-trimoxazole tablet	Yes- No-
17	Availability of Zinc syrup, tablet	Yes- No-
18	Availability of Nebulizer solution	Yes- No-

Part-6: Availability of Laboratory System and others

S/N	Questions	Response
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01	24/7 availability of all essential laboratory tests	Yes- No-
02	Availability of supplies for blood glucose test	Yes- No-
03	Availability of supplies for haemoglobin test	Yes- No-
04	Availability of supplies for haematocrit (PCV)	Yes- No-
05	Availability of supplies for Bilirubin	Yes- No-
06	Availability of supplies for Full blood count	Yes- No-
07	Availability of supplies for Electrolytes	Yes- No-
08	Availability of supplies for microscopy of malaria	Yes- No-
09	Availability of supplies for microscopy for cells in blood	Yes- No-
10	Availability of supplies for microscopy for cells in urine	Yes- No-
11	Availability of supplies for microscopy for cells in urine	Yes- No-
12	Availability of supplies for blood grouping and cross-matching	Yes- No-
13	Availability of supplies for HIV test	Yes- No-
14	Availability of x-ray machine	Yes- No-
15	Performance of laboratory tests according to standard operating procedures	Yes- No-
16	Maintenance of laboratory safety measures	Yes- No-

Part-7: Availability and quality of neonatal care.

S/N	Questions	Response
01	Availability of guidelines for resuscitation and care of the newborn baby and known and used by staff	Adequate- Some improvement needed- Major improvement needed-
02	24/7 staff available able to appropriately help a newborn baby breath and to perform resuscitation appropriately	Adequate- Some improvement needed- Major improvement needed-
03	Is there a clean resuscitation bed with a heating source and equipment ready to use?	Adequate- Some improvement needed- Major improvement needed-
04	Availability of hygienic and safe ward	Adequate- Some improvement needed- Major improvement needed-

05	Is there any separate unit or room for seriously ill neonates?	Adequate- Some improvement needed- Major improvement needed-
06	Promotion of early initiation of exclusive breastfeeding where skin contact is ensured	Adequate- Some improvement needed- Major improvement needed-
07	Is there any practice of thermal protection	Adequate- Some improvement needed- Major improvement needed-
08	Availability of immunization	Adequate- Some improvement needed- Major improvement needed-
09	Correct diagnosis of low birth weight newborns	Adequate- Some improvement needed- Major improvement needed-
10	Appropriate treatment of low birth weight newborns	Adequate- Some improvement needed- Major improvement needed-
11	Appropriate feeding of young infants and low birth weight newborns	Adequate- Some improvement needed- Major improvement needed-

Part-8: Quality of case management by illness

Pneumonia:

S/N	Questions	Response
01	Correct assessment and diagnosis of the severity of pneumonia	Adequate- Some improvement needed- Major improvement needed-
02	Appropriate administration of antibiotics for pneumonia and other respiratory diagnosis	Adequate- Some improvement needed- Major improvement needed-
03	Correct administration of oxygen when necessary	Adequate- Some improvement needed- Major improvement needed-
04	Appropriate diagnosis and management of tuberculosis	Adequate- Some improvement needed- Major improvement needed-

Diarrhoea:

S/N	Questions	Response
01	Correct assessment of dehydration	Adequate- Some improvement needed- Major improvement needed-
02	Administration and monitoring of rehydration	Adequate- Some improvement needed-

	plans appropriate to the severity of dehydration	Major improvement needed-
03	Appropriate antibiotics administered only when necessary	Adequate- Some improvement needed- Major improvement needed-
04	Continued feeding given during diarrhoea	Adequate- Some improvement needed- Major improvement needed-

Severe Malnutrition:

S/N	Questions	Response
01	Nutritional status assessed by weight for height correctly, including differential diagnosis	Adequate- Some improvement needed- Major improvement needed-
02	Appropriate management of infection	Adequate- Some improvement needed- Major improvement needed-
03	Appropriate management of electrolyte imbalance and micronutrients	Adequate- Some improvement needed- Major improvement needed-
04	Correct management of dehydration	Adequate- Some improvement needed- Major improvement needed-
05	Hypoglycaemia and hypothermia correctly checked and managed	Adequate- Some improvement needed- Major improvement needed-
06	Correct feeding of severely malnourished children	Adequate- Some improvement needed- Major improvement needed-

Part-9: Monitoring and Follow-up

S/N	Questions	Response
01	Nutritional status is assessed in all admitted patients	Adequate- Some improvement needed- Major improvement needed-
02	Use of monitoring chart for monitoring individual progress of admitted children	Adequate- Some improvement needed- Major improvement needed-
03	Key risk signs are monitored and recorded by a nurse	Adequate- Some improvement needed- Major improvement needed-
04	All patients are re-assessed daily during working days by a doctor	Adequate- Some improvement needed- Major improvement needed-
01	Sick children or new admissions are also reviewed by a physician on weekends and holidays	Adequate- Some improvement needed- Major improvement needed-
02	Re-assessment of all admitted children by nurse	Adequate- Some improvement needed-

	before discharge	Major improvement needed-
03	Re-assessment of all admitted children by physician before discharge	Adequate- Some improvement needed- Major improvement needed-
04	Discharge note explaining the conditions and information about follow-up necessities and schedule.	Adequate- Some improvement needed- Major improvement needed-

Part-10: Availability of child health professionals

		Hospital	
		Private	Public
Total days of Paediatrician consultation	0 day		
	1 day		
	2 days		
	3 days		
	4 days		
	5 days		
	6 days		
	7 days		
Total number of attending Paediatrician	0		
	1		
	2		
	3		
	4		
	5+		