Introducing Standardized Register for Strengthening the Inpatient Management of Newborn and Sick Children: Implementation research in selected health facilities in Bangladesh

Submitted by
Bishal Sarker
Roll of the submitter
JN-1096

Supervised by
Rownok Jahan Tamanna
Lecturer, ISRT

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Declaration

I certify that the intern report entitled as "Introducing Standardized Register for Strengthening the Inpatient Management of Newborn and Sick Children: Implementation research in selected health facilities in Bangladesh" submitted as a partial requirement for the degree of M.S in Applied Statistics is the result of my own research, except where otherwise acknowledged, and that this report in whole or in part has not been submitted for an award, including a higher degree, to any other university or institution.

Name: Bishal Sarker

Signature: .....

Date:.....

Acknowledgement

It is my proud privilege to release the feelings of my gratitude to several persons who helped me directly or indirectly to conduct this project work.

At first I would like to thank Almighty, the most Gracious, Merciful and beneficial, for showing me the way to acquire knowledge in Applied Statistics and helping me to complete this project successfully .

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Dedicated
to
My Parents and My Sister

Preface

icddr,b formerly known as the International Centre for Diarrhoeal Disease Research, Bangladesh is an international health research organisation situated in Bangladesh. icddr,b has been saving lives through research and treatment. In collaboration with academic and research institutions over the world, icddr,b conducts research, training and extension activities, as well as programme-based activities, to develop and share knowledge for global lifesaving solutions. I feel lucky to be able to complete my internship programme with such a reputed organization. I am grateful to ISRT and icddr,b. There is a department named Maternal and Child Health department(MCHD) do research on maternal and neonatal health. I have completed my internship at this department and was assigned to a project named Introducing a Standardized Register for Strengthening the Inpatient Management of Newborn and Sick Children: Implementation research in selected health facilities in Bangladesh". In this project my task was to literature review, analyze descriptive statistics, interpret the findings and help to write the project paper. During my internship period, I tried my best to work sincerely and punctually at that organization and tried to be honest, sincere and devoted to my assigned duties.

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Chapter 1

1.1 Introduction of icddr,b

As a project intern at the International Centre for Diarrheal Disease Research, Bangladesh (ICDDR,B), I was assigned to the study that is the subject of this article. The icddr,b and its goals are briefly described in this chapter. It gives a brief overview of the project's goals and the project to which I was assigned. The exact duties that I was given while working on this project as an intern are also mentioned.

1.2 About icddr,b

The South-East Asia Treaty Organisation (SEATO) Cholera Research Laboratory (icddr,b) was founded in Dhaka in the 1960s. In research on diarrheal diseases, the Cholera Research Laboratory (CRL) quickly gained a reputation on a global scale. The creation, testing, and adoption of oral rehydration solution (ORS), a treatment that is thought to have saved tens of millions of lives globally, was one of its early major accomplishments. The CRL was given a new lease on life in 1978 when it was given the moniker International Centre for Diarrheal Disease Research, Bangladesh. Its sole name in recent years has been icddr,b.In order to address the main public health problems that Bangladesh and

other countries in the global South face, icddr,b continued to extend its research. Numerous research initiatives have been carried out in fields like maternal, neonatal, respiratory, and vaccine testing.

1.3 Major Achievements

Here's a brief list of some major achievements of icddr,b:

- Oral Rehydration Solution
- Zinc Treatment for Diarrhea
- Tetanus Toxoid Vaccine for Mothers
- Guidelines for Treating Severe Malnutrition
- Testing Vaccines
- Family Planning Solutions
- Domestic Violence Legislation
- Mat for Measuring Maternal Blood Loss
- Ultra Low-cost CPAP(Continuous positive airway pressure therapy) Device for se- vere pneumonia
- Supplementary and therapeutic foodstuffs to prevent and treat malnutrition

1.4 Internship Goal

Internships are generally thought of as a way to gain experience in a particular field. However, a wide array of people can benefit from Training Internships in order to receive real world experience and develop their skills. The following are the objectives of my internship:

- Apply statistical knowledge and concepts to real world decision making.

- Increase proficiency in specific statistical disciplines.
- Develop and improve skills in communication,quantitative reasoning,and teamwork.
- Meet professional role models and potential mentors who can provide guidance, feedback, and support.
- Expand network of professional relationships and contacts.
- Learn in details about the healthcare facilities of Bangladesh and how they work.
- Develop a solid work ethic and professional demeanor, as well as a commitment to ethical conduct and social responsibility.

1.5 My Assignmentment

During the internship period I was a member of a team at MCHD department. Our task was to find out if there is any trend in the improved sanitation condition of Bangladesh using available BDHS data of 2007 to 2017/18 and also point out the factors behind the trend if any. Following responsibilities were assigned to me as an intern :

- Literature review for analysis
- Make an analysis plan
- Analyze the descriptive statistics
- Creating dummyt tables
- Interpret the findings
- Help to write the final report

Chapter 2

2.1 Introduction of the study

Pneumonia and serious infections are leading cause of under-five death in Bangladesh. More than 30,000 under-five death are occured due to these reason. WHO recommended to follow Integrated management of childhood illness(IMCI) to manage these serious diseases in outpatient departments. For IMCI, there is a dedicated service register, monthly reporting form and DHIS2 report to track the progress. IMIC guidelines suggests that child pneumonia and serious infection referred to higher level facilities for indoor management. But there is no dedicated register, monthly reporting form and DHIS2 report in Bangladesh. As a result, taking proper policy becomes difficult. So introducing a standardized register can keep a positive impact here and can be helped to improve skil of healthcare providers.It is important to track management to achieve the SDG target of reducing under-five deaths and neonatal deaths.a national technical committee was formed to develop a standardized register system.The National Newborn Health and IMCI programme helps to demonstrate the inpatient register in selected districts to inform evidence-based scale up.

2.2 Objectives of the study

The objective of the study is to assess the usability, acceptability , adoption , fidelity, utility and impatient register for managing sick newborns and children in selection facilities of Bangladesh.

2.3 Literature review

Wong and Bradley [2009]did a study on medical records accessibility and completeness and physician satisfaction in Ethiopia. Schmidt et al. [2014] shows that (Civil Registration System) CRS allows for technically easy, cost-effective, and unambiguous individual-level record linkage of Danish registers. Pavlovic et al. [2021] studies aimed to detect the factors that influence the acceptance of electronic health record(EHR). Wilkins [2009] detected all factors that influenced acceptance of electronic health record(EHR). Lakbala and Dindarloo [2014] explored physicians, attitude and perceptions for different functions of electronic medical records(EMR). Ludwick and Doucette [2009] explored the acceptance of electronic medical records(EMR) in primary care in seven countries.

2.4 Study design

A research study was conducted where the national newborn health and IMIC programmed designed, developed and demonstrated a standardized impatient for newborn and sick-children. Icddr,b provided implementation facilitation support and assessments.

2.5 Study setting

The study was conducted in Kushtia and Dinajpur district of Bangladesh. The standardized register was introduced in the pediatric department of district hospitals and all sub-district hospitals of kushtia and Dinajpur district.

2.6 Introduction of the register

2.6.1 Development

The national newborn health and IMIC programme designed and developed the register system. To do this, a technical committee was formed under leadership of the national newborn health and IMIC programme.The team at first visited one district hospital and one sub district hospital to explore the existing methods / documents practices in the health facilities system and they mainly focus on the pediatric inpatient department. After that, they extract data from the pediatric department to understand the different types of caseloads and their management. They also reviewed different national and global guidelines, strategies, case recordings forms and others available there.

Four workshop were organizd by the technical committee to develop the register and they take some decisions from these discussions such as ,

- Population : under five
- Cover all diseases but with special focus on pneumonia and serious infection
- Follow WHO pocket book for hospital care of children

- The register should allow tracking of use of antibiotics in inpatient department.
- Use ICD-10 code for diagnosis
- Develop monthly reporting form based on the register
- Register to be filled by nurses from case-record forms

2.6.2 Implementation

The study is implemented in

- District and facility sensitization workshop
- ToT for doctors
- Training of nurses
- Supply register and reporting forms
- Monitoring and evaluation

2.7 Study participants

In that study, data are collected from sick newborn and under-five children admitted in the pediatric inpatient department. Service providers(doctors and nurses) and their supervisors, Facility managers, district and sub-district health managers, national level health workers and policy makers.

2.8 Sampling

Sample size for each of the primary research questions based on the benchmark set of successful demonstration.

2.9 Data collection

Data is collected from November 2022 to January 2023 (3 months duration).In that data collection process, at first data is collected from under five patients in the pediatric indoor department by nurse. After that, the nurse of icddr,b also collected data what is called case-recording. Total 11737 data are collected and case-recording data are 5062.

Chapter 3

Analysis

In that paper mainly focused on descriptive data analysis. Descriptive analysis is calculated for different questions vs different groups. These analysis gives us a overview of the new system and it's effectiveness and also helps us to detect the lagging of hospitals and this sytem and it's advantages also.

3.1 Overall table

In that table, a descriptive statistics of all variables is shown. This table gives me a overall idea of the dataset.

Table 3.1: Overall Background

Variable	Background	N	Percentage
Age	0-28 days	1320	11.25
	29-2months	472	4.02
	2 months-1year	4084	34.8
	1 year-5 years	5861	49.94
	Missing	0	0
Sex	Male	6663	59.62
	Female	4486	40.14
	Others	26	0.23
	Missing	562	0
District	Kushtia	8167	69.58
	Dinajpur	3570	30.42
	Missing	0	0
Facility type	DH	604	51.52
	UHC	75690	48.48
	Missing	0	0
Month	November	2881	24.85
	December	4339	37.43
	January	4372	37.72
	Missing	145	0
Disease	Newborn Sepsis	59	0.5
	Birth Asphyxia	270	2.3
	Prematurity and LBW	141	1.2
	Severe Pneumonia	1251	10.66
	Diarrhea	4235	16.08
	Bronchiolitis	661	5.63
Outcome of treatment	Discharge with advice	3982	44.92
	Discharge on request	2529	28.53
	DORB	674	7.6
	Refer	682	7.69
	Absconded	956	10.78
	Death	42	0.47
	Missing	2872	
Overall	Overall	11737	

3.2 Completeness table

Completeness table gives an overview whether, nurses are serious to fill up the register.

Table 3.2: Completeness of Registration Number

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	99.22	98.97	99.43	6000
	UHC	99.30	99.04	99.50	5650
District	Kushtia	99.12	98.90	99.31	8095
	Dinajpur	99.58	99.31	99.76	3555
Month	November	99.76	65.07	67.90	2874
	Decmber	99.61	99.37	99.77	4322
	January	99.22	98.91	99.47	4338
Supervised	Yes	99.23	99.00	99.42	6964
	No	99.30	98.10	98.82	4686
Overall	Overall	99.26	99.08	99.41	11650

Table 3.3: Completeness of Date of Admission

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	98.46	98.12	98.76	5954
	UHC	99.09	98.80	99.32	5638
District	Kushtia	98.42	98.13	98.68	8038
	Dinajpur	99.55	99.27	99.74	3554
Month	November	100.00	65.23	68.06	2881
	Decmber	100.00	99.92	1.00	4339
	January	100.00	99.92	1.00	4372
Supervised	Yes	98.53	98.22	98.80	6915
	No	99.11	98.80	99.36	4677
Overall	Overall	98.76	98.55	98.96	11592

Table 3.4: Completeness of Time of Admission

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	88.80	87.98	89.59	5370
	UHC	86.99	86.10	87.86	4950
District	Kushtia	89.47	88.78	90.12	7307
	Dinajpur	84.40	83.17	85.57	3013
Month	November	90.42	68.80	61.74	2605
	Decmber	88.78	87.80	89.70	3852
	January	87.79	86.78	88.74	3838
Supervised	Yes	88.71	87.95	89.45	6226
	No	86.76	85.76	87.71	4094
Overall	Overall	87.93	87.32	88.51	10320

Table 3.5: Completeness of Name

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	99.74	99.57	99.85	6031
	UHC	99.58	99.37	99.73	5666
District	Kushtia	99.71	99.56	99.81	8143
	Dinajpur	99.55	99.27	99.74	3554
Month	November	99.58	64.95	67.79	2869
	Decmber	99.61	99.37	99.77	4322
	January	99.75	99.55	99.87	4361
Supervised	Yes	99.74	99.59	99.85	7000
	No	99.53	99.30	99.71	4697
Overall	Overall	99.66	99.54	99.76	11697

Table 3.6: Completeness of Age

Variable	Category	Percentage	n
Facility Type	District	100	6047
	UHC	100	5690
District	Kushtia	100	8176
	Dinajpur	100	3570
Month	November	100	2881
	Decmber	100	4339
	January	100	4372
Supervised	Yes	100	7018
	No	100	4719
Overall	Overall	100	11737

Table 3.7: Completeness of Sex

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	93.95	93.32	94.54	5681
	UHC	96.56	96.05	97.01	5494
District	Kushtia	94.67	94.17	95.15	7732
	Dinajpur	96.44	95.78	97.03	3443
Month	November	95.59	62.27	65.16	2754
	Decmber	95.02	94.33	95.65	4123
	January	95.24	94.57	95.85	4164
Supervised	Yes	94.37	93.80	94.90	6623
	No	96.46	95.89	96.97	4552
Overall	Overall	95.21	94.81	95.59	11175

3.3 Quality of care

This tables gives an overview whether register system has benefit or not.

Table 3.8: Completeness of District

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	97.80	97.40	98.16	5914
	UHC	96.40	95.88	96.87	5485
District	Kushtia	96.72	96.31	97.10	7899
	Dinajpur	98.04	97.53	98.47	3500
Month	November	97.85	63.78	66.65	2819
	Decmber	96.91	96.35	97.41	4205
	January	96.91	96.36	97.40	4237
Supervised	Yes	98.01	97.65	98.32	6878
	No	95.80	95.20	96.36	4521
Overall	Overall	97.12	96.80	97.42	11399

Table 3.9: Completeness of Investigation Done

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	19.51	18.52	20.54	1180
	UHC	1.56	1.26	1.92	89
District	Kushtia	14.13	13.38	14.90	1154
	Dinajpur	3.22	2.67	3.85	115
Month	November	16.94	10.36	10.27	488
	Decmber	9.26	8.42	10.17	402
	January	8.33	7.52	9.18	364
Supervised	Yes	17.07	16.20	17.97	1198
	No	1.50	1.18	1.89	71
Overall	Overall	10.81	10.26	11.39	1269

Table 3.10: Completeness of Care Received during admission

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	69.03	67.84	70.19	4174
	UHC	74.11	72.95	75.25	4217
District	Kushtia	69.84	68.83	70.84	5704
	Dinajpur	75.27	73.82	76.67	2687
Month	November	71.82	46.37	49.37	2069
	Decmber	70.78	69.40	72.13	3071
	January	72.44	71.08	73.76	3167
Supervised	Yes	69.75	68.66	70.82	4895
	No	74.08	72.81	75.33	3496
Overall	Overall	71.49	70.67	72.31	8391

Table 3.11: Completeness of Drug received during admission

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	81.48	80.48	82.45	44927
	UHC	93.39	92.72	94.02	5314
District	Kushtia	84.90	84.11	85.67	6934
	Dinajpur	92.63	91.73	93.47	3307
Month	November	85.70	55.63	58.61	2469
	Decmber	88.08	87.08	89.03	3822
	January	87.85	86.50	88.80	3841
Supervised	Yes	82.46	81.55	83.34	5787
	No	94.38	93.69	95.02	4454
Overall	Overall	87.25	86.64	87.85	10241

Table 3.12: Completeness of Final diagnosis

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	61.50	60.26	62.73	3719
	UHC	79.26	78.18	80.30	4510
District	Kushtia	64.52	63.47	65.55	5269
	Dinajpur	82.91	81.64	84.13	2960
Month	November	70.77	45.68	48.68	2039
	Decmber	71.12	69.75	72.47	3086
	January	69.56	68.16	70.92	3041
Supervised	Yes	63.89	62.76	65.02	4484
	No	79.36	68.18	80.51	3745
Overall	Overall	70.11	69.28	70.94	8229

Table 3.13: Completeness of outcome of treatment

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	68.46	67.28	69.63	4140
	UHC	83.04	82.04	84.00	4725
District	Kushtia	71.43	70.44	72.41	5834
	Dinajpur	84.90	83.68	86.06	3031
Month	November	79.76	51.67	54.67	2298
	Decmber	76.35	75.06	77.61	3313
	January	72.67	71.32	73.98	3177
Supervised	Yes	71.79	70.72	72.84	5038
	No	81.10	79.95	82.20	3827
Overall	Overall	75.53	74.74	76.30	8865

3.4 Adoption table

There are 12 questions in the register system those are must fill up questions.This table shows an overview how much these questions are

Table 3.14: Completeness of All items

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	12.02	11.21	12.87	727
	UHC	0.74	0.53	1.00	42
District	Kushtia	8.75	8.15	9.39	715
	Dinajpur	1.51	1.13	1.97	54
Month	November	9.82	5.83	7.33	283
	Decmber	6.04	5.35	6.79	262
	January	5.12	4.49	5.82	224
Supervised	Yes	10.50	9.79	11.24	737
	No	0.68	0.46	0.96	32
Overall	Overall	6.55	6.11	7.01	769

Table 3.15: Completeness of at least 10 items

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	65.11	63.89	66.31	3937
	UHC	77.15	76.04	78.24	4390
District	Kushtia	67.38	66.35	68.40	5503
	Dinajpur	79.10	77.73	80.43	2824
Month	November	74.49	48.15	51.15	2146
	Decmber	71.19	69.82	72.54	3089
	January	70.38	69.00	71.73	3077
Supervised	Yes	67.13	66.01	68.23	4711
	No	76.63	75.39	77.83	3616
Overall	Overall	70.95	70.12	71.77	8327

Table 3.16: Quality of care SpO2(Oxygen)

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	66.67	38.38	88.18	10
	UHC	14.67	9.42	21.36	22
District	Kushtia	19.72	13.52	27.22	28
	Dinajpur	17.39	4.95	38.78	4
Month	November	25.00	16.37	35.37	22
	Decmber	13.46	5.58	25.79	7
	January	12.50	2.66	32.36	3
Supervised	Yes	24.68	15.56	35.82	19
	No	14.77	8.11	23.94	13
Overall	Overall	19.39	13.66	26.26	32

filled up by the nurses.

Table 3.17: Quality of care Newborn Sepsis(Inj Antibiotics)

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	56.41	39.62	72.19	22
	UHC	15.00	3.21	37.89	3
District	Kushtia	57.89	40.82	73.67	22
	Dinajpur	14.29	3.04	36.34	3
Month	November	34.48	17.94	54.33	10
	Decmber	47.83	26.82	69.41	11
	January	57.14	18.40	90.10	4
Supervised	Yes	45.28	31.56	59.55	24
	No	16.67	0.42	64.12	1
Overall	Overall	61.02	47.44	73.45	36

Table 3.18: Quality of care Severe Pneumonia(oxygen)

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	56.85	53.37	60.27	465
	UHC	16.70	13.03	20.23	71
District	Kushtia	51.65	48.45	54.84	500
	Dinajpur	12.72	9.07	17.17	36
Month	November	37.33	43.10	53.45	140
	Decmber	47.01	14.68	59.85	181
	January	43.60	24.92	33.18	211
Supervised	Yes	52.58	49.38	55.77	509
	No	9.54	6.38	13.58	27
Overall	Overall	42.85	40.08	45.64	536

Table 3.19: Quality of care Severe Pneumonia(Inj Antibiotics)

Variable	Category	Percentage	Lower CI	Upper CI	n
Facility Type	District	38.75	35.40	42.19	317
	UHC	47.34	42.55	52.17	205
District	Kushtia	39.26	36.17	42.41	380
	Dinajpur	50.18	44.20	56.15	142
Month	November	50.93	45.75	56.10	191
	Decmber	43.64	38.61	48.75	168
	January	33.26	29.08	37.66	161
Supervised	Yes	41.63	38.50	44.81	403
	No	42.05	36.23	48.04	119
Overall	Overall	41.73	38.98	44.52	522

Table 3.20: Adoption Table

Variable	Category	Percentage	95% Confidence interval	
			Lower CI	Upper CI
Facility	Kustia DH	79.14	77.88	80.36
	Kumarkhali UHC	99.76	99.14	99.97
	Dinajpur DH	91.26	89.08	93.12
	Hakimpur UHC	100.00	0.00	0.00
Facility type	District	81.07	79.96	82.14
	UHC	99.79	99.25	99.97
District	Kushtia	82.55	81.47	83.58
	Dinajpur	92.59	90.72	94.17
Month	November	89.93	88.41	91.30
	Decmber	83.84	82.21	85.38
	January	79.70	77.93	81.38
Overall	Overall	84.12	83.18	85.04

3.4.1 Accuracy

Suppose nurses filled up all of the questions. But there is a question whether they filled up all correct information of not.So their filled up questions are matched with icddr,b nurses.This summarization is printed in the accuracy table.

Table 3.21: Accuracy of CBC and Electrolyte

Variable	Category	CBC		Electrolyte	
		n	Percentage	n	Percentage
Facility	Kustia DH	1616	77.36	1856	88.85
	Kumarkhali UHC	594	95.19	623	99.84
	Dinajpur DH	517	95.92	532	98.70
	Hakimpur UHC	2	100.00	2	100.00
Facility type	District	2133	81.16	2388	90.87
	UHC	596	95.21	625	99.84
District	Kushtia	2210	81.46	2479	91.37
	Dinajpur	519	95.93	534	98.71
Month	November	814	81.48	942	94.29
	Decmber	978	83.95	1070	91.85
	January	917	86.27	975	91.72
Overall	Overall	2729	83.81	3013	92.60

Table 3.22: Accuracy of Blood Suger and Chest X-ray

Variable	Category	Blood Suger		Chest X-ray	
		n	Percentage	n	Percentage
Facility	Kustia DH	2003	95.88	1622	77.64
	Kumarkhali UHC	623	99.84	600	96.15
	Dinajpur DH	539	100.00	523	97.03
	Hakimpur UHC	2	100.00	2	100.00
Facility type	District	2542	96.73	2145	81.62
	UHC	625	99.84	602	96.17
District	Kushtia	2626	96.79	2222	81.90
	Dinajpur	541	100.00	525	97.14
Month	November	970	97.10	837	83.78
	Decmber	1128	96.82	981	84.10
	January	1043	98.12	911	85.70
Overall	Overall	3167	97.33	2747	84.37

Table 3.23: Accuracy of Oxygen and IV fluid

Variable	Category	Oxygen		IV fluid	
		n	Percentage	n	Percentage
Facility	Kustia DH	1422	68.07	1697	81.24
	Kumarkhali UHC	577	92.47	503	80.61
	Dinajpur DH	367	68.09	447	82.93
	Hakimpur UHC	2	100.00	2	100.00
Facility type	District	1789	68.07	2144	81.58
	UHC	579	92.49	505	80.67
District	Kushtia	1999	73.68	2200	81.09
	Dinajpur	369	68.10	449	82.99
Month	November	685	68.57	384	78.48
	Decmber	892	76.57	953	81.80
	January	776	73.00	891	83.82
Overall	Overall	2368	72.73	2649	81.39

Table 3.24: Accuracy of Injectable antibiotics and Inj Ampicilin

Variable	Category	Injectable antibiotics		Inj Ampicilin	
		n	Percentage	n	Percentage
Facility	Kustia DH	819	39.21	2077	99.43
	Kumarkhali UHC	367	58.81	615	98.56
	Dinajpur DH	377	69.94	536	99.44
	Hakimpur UHC	2	100.00	2	100.00
Facility type	District	1196	45.51	2613	99.43
	UHC	369	58.95	617	98.56
District	Kushtia	1186	43.72	2692	99.23
	Dinajpur	379	70.06	538	99.45
Month	November	555	55.56	994	99.50
	Decmber	558	47.90	1157	99.31
	January	439	41.30	1052	98.97
Overall	Overall	1565	48.07	3230	99.26

Table 3.25: Accuracy of Inj Gentamicin and Inj Ceftriaxone

Variable	Category	Inj Gentamicin		Inj Ceftriaxone	
		n	Percentage	n	Percentage
Facility	Kustia DH	1876	89.80	1841	88.13
	Kumarkhali UHC	573	91.83	570	91.35
	Dinajpur DH	538	99.81	388	71.99
	Hakimpur UHC	2	100.00	2	100.00
Facility type	District	2414	91.86	2229	84.82
	UHC	575	91.85	572	91.37
District	Kushtia	2449	90.27	2411	88.87
	Dinajpur	540	99.82	390	72.09
Month	November	909	90.99	852	85.29
	Decmber	1066	91.50	1010	86.70
	January	990	93.13	916	86.17
Overall	Overall	2989	91.83	2801	86.03

Table 3.26: Accuracy of Newborn Sepsis and Birth Asphyxia

Variable	Category	Newborn Sepsis		Birth Asphyxia	
		n	Percentage	n	Percentage
Facility	Kustia DH	2044	97.81	1930	92.39
	Kumarkhali UHC	621	99.52	623	99.84
	Dinajpur DH	528	97.96	479	88.87
	Hakimpur UHC	2	100.00	2	100.00
Facility type	District	2572	97.87	2409	91.67
	UHC	623	99.52	625	99.84
District	Kushtia	2665	98.23	2553	94.10
	Dinajpur	730	97.97	481	88.91
Month	November	971	97.20	927	92.79
	Decmber	1148	98.58	1091	93.60
	January	1050	98.78	990	93.13
Overall	Overall	3195	98.19	3034	93.24

Table 3.27: Accuracy of Prematurity and LBW and Severe Pneumonia

Variable	Category	Prematurity and LBW		Severe Pneumonia		Refer	
		n	Percentage	n	Percentage	n	Percentage
Facility	Kustia DH	2003	95.88	1846	88.37	1971	94.35
	Kumarkhali UHC	624	100.00	576	92.31	622	99.68
	Dinajpur DH	533	98.89	471	87.38	535	99.26
	Hakimpur UHC	2	100.00	2	100.00	2	100.00
Facility type	District	2536	96.50	2317	88.17	2506	95.36
	UHC	626	100.00	578	92.33	624	99.68
District	Kushtia	2627	96.83	2422	89.27	2593	95.58
	Dinajpur	535	98.89	473	87.43	537	99.26
Month	November	969	97.00	892	89.29	966	96.70
	Decmber	1141	97.94	1031	88.50	1114	95.62
	January	1026	96.52	951	89.46	1025	96.43
Overall	Overall	3162	97.17	2895	88.94	3130	96.19

Chapter 4

Results of Analysis

The overall table shows that in the register, about 50% of the data are from the 1–5-year-old age group. About 60% of the data is collected from male groups; about 68% of the data is from Kushtia district; and almost 50–50% of the data is collected from both the district hospital (DH) and the Upazila health complex (UHC). Collected data is increasing month by month. The first month has the lowest collected data, and January has the highest collected data. Diarrhoea and Pneumonia patient's data are collected from respectively 16.08% and 10.66%. 44.92% of patients are discharged with advice only. The completeness table shows that among 11737 participants, 11650 registration numbers are filled up, which is about 99.26%. The table shows that in District hospitals, the completeness of registration numbers is quite lower than at UHC. Dinajpur district has a very high completeness of registration numbers, but there is a decreasing trend in the completeness of registration numbers by month. 99.30% of the data are collected without supervision. The completeness table shows that among 11737 participants, 11592 participants with dates of admission are filled up, which is about 98.76%. The table shows that in District hospitals, the completeness of the date of admission is quite lower than at UHC. Dinajpur

district has a high completeness of registration numbers, and in every month of admission completion, the rate is 100%. 99.11% of the data are collected without supervision. The completeness table shows that among 11737 participants, 10320 at the time of admission were filled up, which is about 87.93%. The table shows that in District hospitals, the completion time of admission is quite higher than at UHC. Dinajpur district has a very low completeness of time of admission, but there is a decreasing trend in the completeness of time of admission by month. 86.76% of the data were collected without supervision. The completeness table shows that among 11737 participants, 11697 names are filled up, which is about 99.66%. The table shows that in District hospitals, the completeness of names is quite higher than at UHC. Dinajpur district has a low completeness of name, but there is an increasing trend in the completeness of name by month. 99.53% of the data were collected without supervision. The completeness table shows that all the participants ages are filled up. The completeness table shows that among 11737 participants, 11175 participants sexes are filled up, which is about 95.21%. The table shows that in District hospitals, the completeness of sex is quite lower than at UHC. Dinajpur district has a high completeness of sex, and in November, the completion of sex is high. 96.46% of the data were collected without supervision. The completeness table shows that among 11737 participants, 11399 districts are filled up, which is about 97.12%. The table shows that in District hospitals, the completeness of the district is quite higher than at UHC. Dinajpur district has a high completion rate, and in November, the completion rate of the district is high. 95.80% of the data are collected without supervision. The completeness table shows that among 11737 participants, 1269 have "investigaton done," which is about 10.81% of the overall population. The table shows that in District hospitals, the completeness of "investigation done" is much higher

than at UHC. Dinajpur district has a very low completeness of "investigaton done," and on November, completion of "investigaton done" is high, and then it decreases. Only 1.50% of the data is collected without supervisors. The completeness table shows that among 11737 participants, 8391 "care received during admission" are filled up, which is about 71.49% of the overall population. The table shows that in UHC hospitals, the completeness of "care received during admission" is much higher than at District hospitals. Dinajpur district has a high completeness of "care received during admission," and in January, the completion of "care received during admission" was high. 74.08% of the data were collected without supervision. The completeness table shows that among 11737 participants, 10241 "drug received during admission" are filled up, which is about 87.25% of the overall population. The table shows that in UHC hospitals, the completeness of "drug received during admission" is much higher than at District hospitals. Dinajpur district has a high completeness of "drug received during admission," and in January, the completion of "drug received during admission" was high. 94.38% of the data were collected without supervision. The completeness table shows that among 11737 participants, 8229 have "final diagnosis," which is about 70.11% of the overall population. The table shows that in UHC hospitals, the completeness of the "final diagnosis" is much higher than at District hospitals. Dinajpur district has a high completeness of "final diagnosis," and in December, the completion of "final diagnosis" is high. 79.36% of the data were collected without supervision. The completeness table shows that among 11737 participants, 8865 "outcomes of treatment" are filled up, which is about 75.53% of the overall population. The table shows that in UHC hospitals, the completeness of the "outcome of treatment" is much higher than at District hospitals. Dinajpur district has a high completion rate of outcome of treatment, and in November, the completion rate of

"outcome of treatment" was high. 81.10% of the data were collected without supervision. The completeness table shows that among 11737 participants, 769 "all items" are filled up, which is about 6.55% of the overall population. The table shows that in District hospitals, the completeness of "all items" is much higher than at UHC. Dinajpur district has a very low completeness of "all items," and on November, completion of "all items" is high, and then it decreases. 10.50% of the data are collected under supervision. The completeness table shows that among 11737 participants, 8327 "at least 10 items" are filled up, which is about 70.95% of the overall population. The table shows that in District hospitals, the completeness of "at least 10 items" is much lower than at UHC. Dinajpur district has a high completeness of "at least 10 items," and in November, the completion of "at least 10 items" is high, and then it decreases. 76.63% of the data were collected without supervision. The "Quality of Care" table shows that only 32 patients got oxygen saturation care among those whose oxygen saturation level is less than 93%, which is only 19.39% of the overall oxygen-need population. Tables show that of patients whose oxygen saturation level is less than 93%, 66.67% got this facility in District, which is about 5 times better than UHC. Both in Kustia and Dinajpur districts, it is low, but in Dinajpur district, it is quite higher than in Kushtia, and this facility is increasing by the month, with 45.28% of people getting it under supervisors. The "Quality of Care" table shows that only 36 patients got "Antibiotic Injection," which is 61.02% of the overall population that needs this facility. Tables show that "antibiotic Injection" is given more in District hospitals, and it is about 3.5 times greater than UHC. In Kushtia district, it is four times higher than in Dinajpur district, and this percentage is gradually increasing by the month. 45% of people get it from supervisors. The "Quality of Care" table shows that among those who had severe pneumonia and needed oxygen facilities, 536

patients got oxygen facilities, which is about 43% of that population. District hospitals provided more oxygen to pneumonia patients than UHC, and it was about three times higher. In Kushtia district, pneumonia patients got more oxygen facilities than in Dinajpur district, and it was about 4 times higher. In December, patients got high oxygen facilities under supervision. 52.58% of people got oxygen, which is about 6 times higher than without supervisors. The "Quality of Care" table shows that among those who had severe pneumonia and needed "Antibiotic Injection, 522 patients got this facility, which is about 42% of that population. UHC provided more"antibiotic injections" to pneumonia patients than district hospitals. In Dinajpur district, pneumonia patients got more "antibiotic Injection" than in Kushtia district, and it decreased gradually by month. Without supervisors, 42% got this facility. The adoption table shows a summary of the completion of 12 must-fill-up questions. The table shows that 84.12% of questions must be filled out by the nurses. The table shows that Hakimpur UHC filled up all questions, Kumarkhali UHC has the second position by filling up 99.76% of all questions, and Kushtia DH has the lowest percentage by filling up only 79% of questions. UHC filled up 99.79% of the questions, and the district hospital filled up 81%. In Dinajpur district, 92.59% of questions are filled up, and in Kushtia district, 82.55% are filled up 82.55%.The percentage of must-fill-up questions is decreasing by month, and in January it was the lowest (79.79%). The Accuracy of CBC and Electrolyte" table shows that Hakimpur UHC has a higher CBC accuracy as it has only 2 registered data points. Dinajpur DH has 95.92% accuracy on recording CBC. District hospitals have a much higher population than UHC, and as a result, district hospitals have a lower accuracy on recording CBC than UHC, and the accuracy is increasing month by month. Overall, CBC accuracy is 83.31%. In the case of electrolyte accuracy, it is high in Kumarkhali UHC, and this

accuracy is also higher in UHC than district hospitals. In Dinajpur district, this accuracy is higher than Kushtia, but this accuracy is decreasing by the month. Electrolyte overall accuracy is 92.60%. The Accuracy of Blood Suction and Chest X-ray" table shows that Hakimpur UHC and Dinajpur DH correctly registered all blood suction data, and others also have a high accuracy rate. District hospitals have a much higher population than UHC, and as a result, district hospitals have lower accuracy on recording blood sugar than UHC, but that is not so much different, and the accuracy has an up and down trend. Overall blood sugar accuracy is 97.33%. In the case of chest x-ray accuracy, it is high in Kumarkhali UHC and Dinajpur DH, but Kustia DH performs worse again. This accuracy is higher in UHC than district hospitals, and In Dinajpur district, this accuracy is higher than Kushtia, and this accuracy is increasing by the month. The chest x-ray's overall accuracy is 84.37%. The Accuracy of Oxygen and IV Fluid" table shows that Hakimpur UHC correctly registered all oxygen data and Kumarkhali UHC has an accuracy rate of 92.47%, but the others perform worst. District hospitals have a much higher population than UHC, and as a result, district hospitals have a lower accuracy on recording oxygen data than UHC, and there is a huge difference. The accuracy has a down, up, and down trend. Overall oxygen accuracy is 72.73%. In the case of IV fluid, accuracy is high in Kumarkhali UHC, and others perform almost the same. This accuracy is high in district hospitals, and In Dinajpur district, this accuracy is higher than Kushtia, and this accuracy is increasing by the month. IV fluid's overall accuracy is 81.39%. The Accuracy of Injectable Antibiotics and Injectable Ampicilin" table shows that Hakimpur UHC correctly registered all injectable antibiotic data, Kustia DH performed the worst (39.51%), and other performers were not satisfactory. District hospitals have a much higher population than UHC, and as a result, district hospitals have lower accuracy

on recording injectable antibiotic data than UHC, and in both cases, accuracy is not satisfactory. The accuracy has a decreasing trend by month. Overall, injectable antibiotic accuracy is 48.07%. In the case of injectable Ampicilin, accuracy is high in Kumarkhali UHC, and others perform almost the same with high accuracy. This accuracy is high in district hospitals, and In Dinajpur district, this accuracy is slightly higher than Kushtia, and this accuracy is showing an increasing trend by month. Injectable Ampicilin's overall accuracy is 99.26%. The Accuracy of injectable Gentamicin and injectable Ceftriaxone" table shows that Hakimpur UHC correctly registered all injectable Gentamicin data, Dinajpur DH performs very well (99.81%), and Kustia DH performs less than others (89.80%). District Hospital has a much higher population than UHC, but both of them perform similarly, and Dinajpur District has a high accuracy rate. The accuracy has an increasing trend by the month. Overall injectable Gentamicin accuracy is 91.83%. In the case of injectable Ceftriaxone, accuracy is high in Kumarkhali UHC, and Dinajpur DH performs worst (71.99%). This accuracy is high in UHC (91.37%) and Kustia (88.87%) districts; this accuracy is higher than Dinajpur (72%), and this accuracy has a small but increasing trend by month. Injectable ceftriaxone's overall accuracy is 86.03%. The Accuracy of Newborn Sepsis and Birth Asphyxis" table shows that Hakimpur UHC correctly registered all newborn sepsis data and others performed very well. District hospital has a much higher population than UHC, but both of them perform well, and UHC performs slightly better than district hospital, and Kustia district has a high accuracy rate. The accuracy has an increasing trend by the month. Overall newborn sepsis accuracy is 98.19%. In the case of birth asphyxis, Kumarkhali UHC also has a very high accuracy (99.84%), but Dinajpur DH (88.87%) performs slightly worse than all. This accuracy is high in UHC (99.84%) and In Kustia (94.10%) district; this accuracy is higher

than in Dinajpur (88.91%), and this accuracy has an increasing trend by month. Birth asphyxiation's overall accuracy is 93.24%. The Accuracy of Prematurity and LBW and Severe Pneumonia and Refer" table shows that Hakimpur and Kumarkhali UHC correctly registered all Prematurity and LBW data, and others also performed very well. District hospital has a much higher population than UHC, but both of them perform well; UHC performs exceptionally well with 100% accuracy, and Dinajpur district has a high accuracy rate. The accuracy increases in the first month, but then decreases. Overall Prematurity and LBW accuracy are 97.17%. In the case of severe pneumonia, Kumarkhali UHC has a very high accuracy (92.31%), and others results are satisfactory. This accuracy is high in UHC (92.33%) and In Kustia (89.27%) district; this accuracy is higher than in Dinajpur (87.43%), and this accuracy has an up and down trend by month. Severe pneumonia's overall accuracy is 88.94%. In the case of Kustia DH, she performs slightly poorly, but others perform outstandingly. UHC has higher accuracy than district hospitals. Dinajpur district has a higher accuracy than Kushtia, and there is also an up and down trend. The overall accuracy is 96.19%.

Chapter 5

Conclusion

From the tables,it is seen that in some cases, district hospitals complete more items than upazila health complexes (UHC), and sometimes UHC does better than district hospitals. But in terms of quality of care, district hospitals outperform UHC. Must fill up questions filled most by UHC. In terms of accuracy, UHC performs much better. This is because the population coming to the district hospital is higher than at UHC. Because of this traffic, these problems occur. So these problems can be solved by increasing manpower (nurses), increasing the training of nurses, and solving other problems that arise in hospitals.If this registration system's accuracy increases day by day, then it can be computerised, efficiency can be improved, and we can make a very strong database system that will help our medical system.

Chapter 6

Future works

After these descriptive works, our main goal is to turn it into a model and find out the acceptance ratio of this system by nurses based on different questions. This data is already collected by icddr,b. Now have to implement them and go into the depths of the dataset and try to make a strong policy later.

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