International Journal Dental and Medical Sciences Research
Volume 3, Issue 5, Sep-Oct 2021 pp 161-167 www.ijdmsrjournal.com ISSN: 2582-6018

Comparative Study of Morbidity Pattern of In-born and Out-bornNeonates admitted in SNCU of Tertiary Care Hospital in Western Himalayan Region

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Submitted: 01-09-2021 Revised: 04-09-2021 Accepted: 08-09-2021

ABSTRACT
Background: Sick Newborn Care Units (SNCU) are a specialized newborn unit of a hospital meant primarily to provide specialized care to all, ill newborn and has a significant potential for reducing neonatal mortality and morbidity. This study was undertaken to compare the Morbidity Pattern in Inborn and Outborn neonates admitted to the SNCUs of tertiary care teaching hospital of Shimla city of Himachal Pradesh, in the Western Himalyan Region.

Methods: Retrospective review of medical records of all neonates admitted to the Specialized Neonatal Care Unit of pediatric ward of IGMC, Shimla& Kamla Nehru Hospital (KNH) covering the period January 2016 to December 2020 was conducted. The most important causes of admission and its associated factors were analyzed.
Results:A total of 4018 neonates were admitted in Outborn SNCU of pediatric ward of IGMC, Shimla. Among them, 2440(60.73%) were males and 1578(39.27%) were females. While 6607 neonates were admitted in Inborn SNCU of KNH from January 2016 to December 2020 and among them, 3655(55.32%) were males and 2952 (44.68%) were females. Among the total outborn admissions at SNCU of IGMC, the maximum 1354(33.7%) were neonates having Jaundice which required phototherapy followed by neonates with Sepsis 744(18.52%) and Moderate-severe Birth Asphyxia 269(6.69%) while in the inborn SNCU of KNH, a maximum of Inborn 2840(42.98%) neonates had Jaundice which required phototherapy followed by Respiratory Distress syndrome 1420(21.49%) and Moderate-severe Birth Asphyxia 530 (8.02%). Among the total Outborn admissions at SNCU of IGMC, 307(7.64%) neonates died while at Inborn SNCU of KNH, 366(5.54%) neonatesdied .
Conclusion: In our study, inborn newborns admissions were more in number as compared to outborn newborns.Malesoutnumbered the females,Neonatal Jaundice was the most common morbidity in both SNCUs and was a major cause of admission to these SNCUs, over the past 5yrs.

Keywords:Trends, Neonatal Morbidity, SNCU, Outborn, Inborn, IGMC, KNH

I. INTRODUCTION

The perinatal period is a very crucialas well as vulnerable period for any neonate. Perinatal morbidity is influenced by prenatal, maternal & fetal conditions andby the factors surroundingdelivery.Most of the causes of perinatal morbidity could be prevented if the already proven interventions are implemented effectively, and at an appropriate time in the peripartum and neonatal period.[1,2,3]

Sick Newborn Care Units (SNCU) are a specialized newborn unit meant primarily to provide specialized care to all ill newborns Inborn as well as Outborn, toreduce the perinatal and neonatal fatality rateand improve the survival of sick neonate, including home deliveries within first 28 days of a baby's life. Effective Implementations of neonatal care interventions have had a significant impact upon the survival of neonates in developing countries like India.[4]SNCU is one of the implemented interventions that is helping to ensure a safe passage through the first 1000 days of life for thousands of children in India. The aim of these SNCUs is to ensure better survival and health of newborns, their growth &development.[5]

SNCUs are generally established in the vicinity of the labour room, or at the referral centres, to provide specialized care for sick neonates. These

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Volume 3, Issue 5, Sep-Oct 2021 pp 161-167 www.ijdmsrjournal.com ISSN: 2582-6018

SNCUs are expected to provide the services like routine care for normal newborns at birth, Resuscitation of high risk (asphyxiated, preterms,with maternal and fetal risk factors) newborns, Managing sick newborns, Kangaroo mother care, post-natalcare, Follow-up of high-risk newborns,Referral services, Immunization services etc.[6]

The Sick Newborn Care Unit (SNCU) in Indira Gandhi Medical College (IGMC) and Kamla Nehru Hospital (KNH) in Shinla city in the Western Himalyan Region,caters as a referral centre to all 12 districts of Himachal Pradesh. In KNH it provides care to all inborn neonates while in IGMC it provides all services to outborn neonates. Most of the neonates admitted at IGMC were referred from smaller peripheral government hospital in hilly areas, while at KNH, they were high risk deliveries referred from the periphery in view of lack of adequate maternal and neonatal services at the peripheral centres. Both these SNCUs are well equipped with radiant warmers, phototherapy units, and ventilators, KMC units and growing nursery. They also provide facility for resuscitation, surfactant administration, exchange transfusion, and neonatal ventilation all 24 hours.[7,8] There is a paucity of published data concerning neonatal morbidity both for inborns as well as out-borns in SNCUs in the hilly states of North India. Therefore, the study was needed to assess the level of specialized SNCU neonatal care in a tertiary referral centre of IGMC & KNH and further analyze its shortcomings which may further provide caregivers and health planners with basic real data, necessary for further interventions to reduce the neonatal morbidity. Thus, the present study was done to compare the Socio-demographic and Morbidity Pattern of Inborn and Outborn neonates admitted to the sick neonatal intensive care unit (SNCU) of IGMC & KNH of Shimla district of Himachal Pradesh, India

Objectives of the Study

To compare the trends of Neonatal Morbidity in Inborn and Outborn Specialized Neonatal Care Unit of Kamla Nehru Hospital (KNH) &Indira Gandhi Medical College and Hospital, Shimla from the year 2016 to 2020.

Research Methodology

- Research Approach-Descriptive survey
- Study Design- A retrospective review
- Setting of the study-Kamla Nehru Hospital &Indira Gandhi Medical College and Hospital, Shimla
- Study duration- Between Jan2016- December 2020
- Study population-Neonates admitted to the Specialized Neonatal Care Unit of pediatric ward of IGMC&KNH,Shimla
- Sample size- All Neonates admitted to the Specialized Neonatal Care Unit of Kamla Nehru Hospital & Indira Gandhi Medical College and Hospital, Shimlabetween Jan2016- December 2020
- Permission- obtained from the concerned authorities of Kamla Nehru Hospital & Indira Gandhi Medical College and Hospital, Shimla
- Data analysis - The data were collected from the record files of admitted neonates, compiled and entered in MS Excel, and analyzed using appropriate statistical tools in software Epi info V7 by applying appropriate statistical test in terms of frequencies and percentage

II. RESULTS

Retrospective review of medical records of all neonates admitted to the Specialized Neonatal Care Unit of Kamla Nehru Hospital & Indira Gandhi Medical College and Hospital, Shimla, covering the period January 2016 to December 2020 was conducted.

A total of 4018 neonates were admitted in Outborn SNCU of pediatric ward of IGMC, Shimla while 6607 neonates were admitted in Inborn SNCU of Kamla Nehru Hospital Shimla from January 2016 to December 2020. Among the SNCU of pediatric ward of IGMC, Shimla, 2440(60.73%) were males and 1578(39.27%) were females while in SNCU of Kamla Nehru Hospital Shimla from, 3655(55.32%) were males and 2952 (44.68%) were females.

	IGMC (Outborn)		KNH(Inborn)	
Total number	Frequency	%	Frequency	%
Admission in the unit	4018	100.00	6607	100.00
Male	2440	60.73	3655	55.32
Female	1578	39.27	2952	44.68

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TOTAL GENDER	4018	100.00	6607	100.00
>=2500gm	2096	52.17	3208	48.55
1500-2499gm	1536	38.23	2483	37.58
1000-1499gm	341	8.49	752	11.38
<1000gm	45	1.12	164	2.48
Total Birth Weight	4018	100.00	6607	100.00
>37 weeks	2429	60.45	2877	43.54
34-37 weeks	1030	25.63	2392	36.20
<34 weeks	559	13.91	1338	20.25
Total Gestation	4018	100.00	6607	100.00

Table-1: Admissions, Birthweight and Gestational Age distribution in Admission at SNCU of IGMC & KNH for last 5 years

Among the total admission in the Outborn SNCU of IGMC in the study period, 2096 (52.17%) neonatesweighed>2500 gm, 1536(38.23%) were1500-2499 gm, 341(8.49%) were between 1000-1499gm and 45(1.12%) were <1000gm. Among the total admission in the SNCU of IGMC 2429(60.45%) were >37 weeks of gestation,1030(25.63%) were 34-37 weeks ,559(13.91%) were <34 weeks gestation. Among the total admission in the Inborn SNCU of KNH in the study period, 3208 (48.55%) neonates>2500 gm in weight , 2483(37.58%) were1500-2499 gm , 752(11.38%) were 1000-1499gm and 164(2.48%) were <1000gm .Among the total admission in the SNCU of KNH, 2877(43.54%) were >37 weeks of age,2392(36.20%) were 34-37 weeks,1338(20.25%) were <34 weeks age.(Table-1, Figure-1)

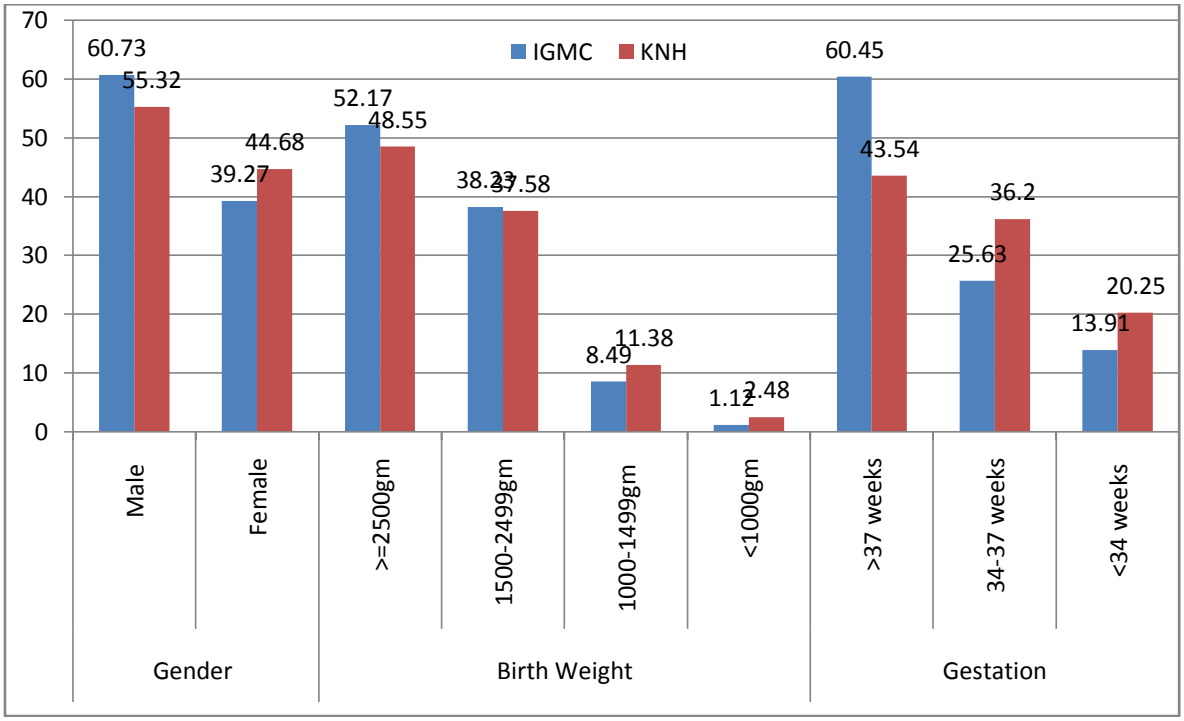

Figure-1: Gender, Birthweightand Gestational Age distribution in Admission at SNCU of IGMC & KNH for last 5 years

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	IGMC		KNH	
	Frequency	%	Frequency	%
Respiratory Distress syndrome	231	5.75	1420	21.49
Meconium aspiration syndrome	46	1.14	49	0.74
Other causes of respiratory distress	23	0.57	335	5.07
HIE	27	0.67	16	0.24
Moderate-severe Birth Asphyxia	269	6.69	530	8.02
Sepsis	744	18.52	390	5.90
Pneumonia	80	1.99	34	0.51
Meningitis	23	0.57	26	0.39
Major congenital malformation	104	2.59	242	3.66
Jaundice requiring phototherapy	1354	33.70	2840	42.98
Hypothermia	5	0.12	20	0.30
Hypoglycemia	58	1.44	242	3.66
Others	1054	26.23	463	7.01
Total Morbidity	4018	100.00	6607	100.00

Table-2: Morbidity Pattern of Outborn Vs Inborn Neonates admitted to the SNCUs of IGMC &KNH for last 5 years

Among the total outborn admissions at SNCU of IGMC,maximum 1354(33.7%) were neonates suffering from Neonatal Jaundice for which they required phototherapy followed by Neonatal Sepsis(EONS&LONS) 744(18.52%), Moderate-severe Birth Asphyxia 269(6.69%), Respiratory Distress syndrome 231(5.75%), Major congenital malformation 104(2.59%), Pneumonia 80 (1.99%), Hypoglycemia58(1.44%), Meconium aspiration syndrome 46(1.14%), HIE 27(0.67%), Other causes of respiratory distress 23(0.57%), Meningitis 23(0.57%), Hypothermia 5 (0.12%) and for unspecified others reasons1054 (26.23%).

Among the total Inborn admissions at SNCU of KNH,maximum 2840(42.98%) were neonates suffering from Neonatal Jaundice which required phototherapy followed by Respiratory Distress syndrome 1420(21.49%), Moderate-severe Birth Asphyxia 530 (8.02%), Others 463(7.01%), Sepsis both early & late onset390(5.90%), Other causes of respiratory distress335(5.07%), Major congenital malformation 242(3.66%), Hypoglycemia 242(3.66%),Meconiumaspiration syndrome49(0.74%), Pneumonia 34(0.51%), Meningitis 26(0.39%), Hypothermia 20(0.30%) and HIE 16(0.24%).(Table-2, Figure-2)

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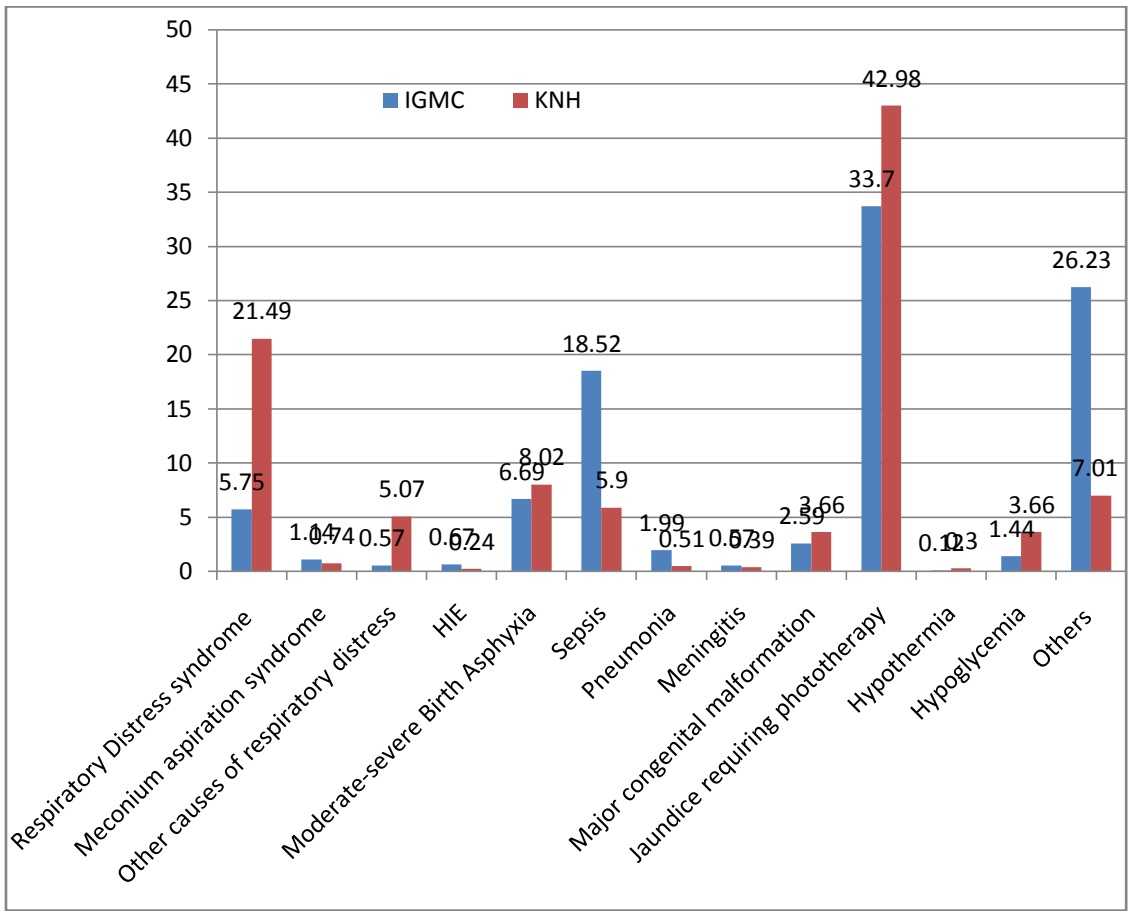

Figure -2: Comparison of Morbidity Pattern at Outborn vs Inborn admissions at SNCU of IGMC &KNH for last 5 years

Among the Outborn admissions at SNCU of IGMC, the duration of stay for <1 day - 177(4.41%), 1712(42.6%) stayed for 1-3 days, 900(22.40%) remained admitted for 4-7 days and 1229 (30.59%) for more than 7 days. Among the total outborns, 3034(75.51%) were discharged after fully recovery, 305(7.59%) were referred to higher institutions, 372(9.26%) left against medical advice and 307(7.64%) died at the SNCU.

Among the total Inborns SNCU of KNH, 234(3.54%) remained admitted for <1 day,3387(51.26%) stayed for 1-3 days, 1466(22.19%) for 4-7 days and 1520 (23.01%) for more than 7 days. Among the total neonates admitted, 5593(84.65%) were discharged after fully recovery, 313(4.74%) were referred to higher institutions, 335(5.07%) left against medical advice and 366(5.54%) died in the SNCU.(Table-3, Figure-3)

	IGMC (Outborn)		KNH (Inborn)	
	Frequency	%	Frequency	%
Outcome				
Discharge	3034	75.51	5593	84.65
Referral	305	7.59	313	4.74
LAMA	372	9.26	335	5.07
Died	307	7.64	366	5.54
Total duration of admission				

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<1 day	177	4.41	234	3.54
1-3 days	1712	42.61	3387	51.26
4-7 days	900	22.40	1466	22.19
> 7 days	1229	30.59	1520	23.01
	4018	100.00	6607	100.00

Table-3: Outcome among all Admission at SNCU of IGMC & KNH for last 5 years

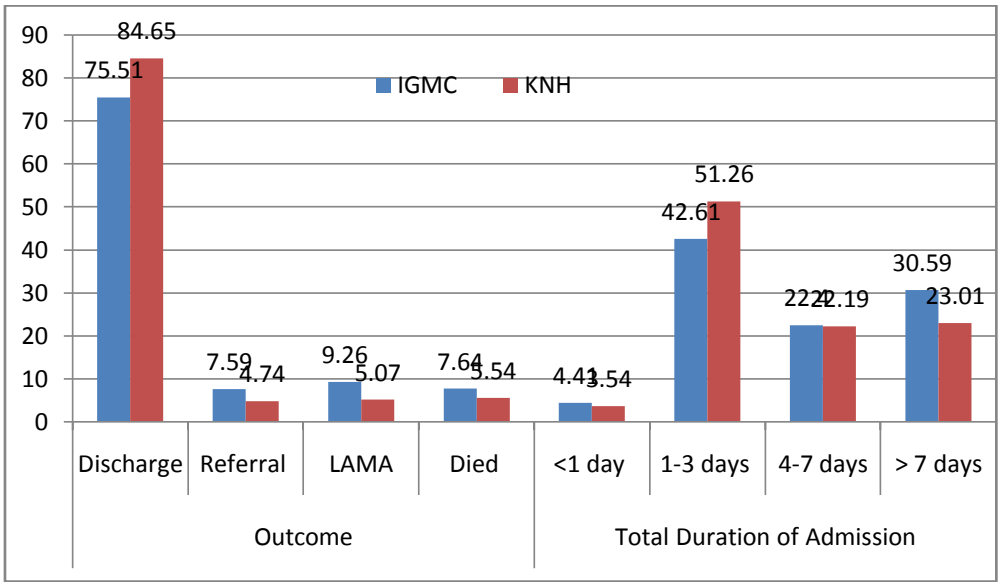

Figure-3: Comparison of Outcome among all Admission at SNCU of IGMC & KNH for last 5 years

III. DISCUSSION

In the present study, a total of 4018 Outbornneonates were admitted in SNCU of pediatric ward of IGMC, Shimla, while 6607 Inbornneonates were admitted in SNCU of Kamla Nehru Hospital Shimla from January 2016 to December 2020. In our study, inborn newborns exceeded the number of outborn newborns admitted, which can be attributed to the large number of deliveries being conducted at KNH hospital, which being a tertiary care hospital and a referral unit, received a huge numberof referred cases from smaller peripheral government hospitals from all over Himachal Pradesh.[6-8]

Among the SNCU of pediatric ward of IGMC, Shimla, out of the outborns admitted 2440(60.73%) were males and 1578(39.27%) were females while in Inborn SNCU of Kamla Nehru Hospital Shimla, 3655(55.32%) were males and 2952 (44.68%) were females. This study shows a higher male:female ratio. The demographic distribution of (male/female) population in this study is in concordance to National Neonatal-Perinatal Database (NNPD) and other studies in various parts of India**.** In our culture, male preponderance can be caused by social beliefs such that male babies are provided better care by their parents and brought to the health care facilities even with minor complaints, but female babies are usually more neglected and are managed at home even if they are extremely sick. Further studies are needed to determine whether it is due to gender bias prevalent in Himachal Pradesh where male children are given more importance and care, or it was due to greater tendency of male children to face neonatal complications.[9-11]

Neonatal Jaundice was the most common reason for admission in both the IGMC &KNH SNCUs.Other significant causes of morbidities were Sepsis, Birth Asphyxia and Respiratory Distress syndrome. These findings also co-relate to NNPD where systemic infections, hyperbilirubinemia , seizures , hypoglycemia, hypoxic ischemic encephalopathy , anemia , and hypocalcemia were the most common morbidities observed.[9,10] This pattern of morbidity is shared with other developing countries where sepsis, RDS and perinatal asphyxia accounted for more than 60% of admissions.[9-11] In the developed countries, the scenario is different with extreme prematurity,

asphyxia, and congenital anomalies being the chief causes of morbidity, due to a lower birth rate, lesser number of morbidities and mortalities and better antenatal, perinatal and neonatal care available.

Limitations

Because of retrospective nature of the study, diagnosis was determined by the extent and details of information in the official medical records of bothSNCUs.

IV. CONCLUSION

In our study, inborn newborns outnumbered the outborn admissions.Admissions of male babies exceeded that of female babies. Among the total admissions, almost fifty percent newborn admissions were low birth weight and preterm. The most common morbidity responsible for admission in both SNCUs were neonatal jaundice followed by Sepsis, Moderate-severe Birth Asphyxia andRespiratory Distress syndrome. SNCUs with skilled staff and good infrastructure can reduce neonatal mortality and morbidity by early interventions.

Funding: None
Conflict of Interest: None
Ethical Approval: Approved by the concerned Authority.

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