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A STUDY ON THE LONGEVITY OF NICU DISCHARGED LOW BIRTH WEIGHT BABIES FROM SECONDARY LEVEL OF CARE INSTITUTIONS IN MAYILADUTHURAI DISTRICT DURING 2021-2022.

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Abstract

BACKGROUND : The low birth babies especially weighing less than 2000 gms admitted at NICU are more at risk for morbidity & mortality during the first year of life after discharged from the NICU due to social, cultural, economic, familial, maternal factors, length of stay etc.

OBJECTIVE : To assess the 'longevity' of low birth weight NICU discharged babies at secondary level of care institutions in Mayiladuthurai district till their first year of life.

METHODS : A Retrospective study was conducted using purposive sampling and the study setting was Hospitals (secondary level of care institutions in Mayiladuthurai GH & Sirkali GH) and Community (Data from the obstetrical records and immunization records). Sample size was 102. Data were collected and analyzed using the Descriptive and Inferential Statistics such as percentage and chi square.

RESULTS : The study shows that 98 were alive and there is a significant association between the Duration of stay, Readmission after NICU discharge, Immunisation with Hepatitis B vaccine, Immunisation with all vaccines up to the age and the Longevity of the NICU discharged babies. There was a significant association between the Duration of Stay at NICU, Readmission after discharge from NICU, Immunisation status with Hepatitis B vaccine, Immunisation status with all vaccines (Except Hepatitis B) up to the age and the Longevity of the NICU discharge babies. But there was no significant association between the Maternal Age, High-Risk status of the mother, Nature of Birth, Gestational Age at Birth, Birth Weight of the baby, Sex of the Baby and the Longevity of the NICU discharge babies.

CONCLUSION : The study reveals that the longevity of NICU discharged low birth weight babies for the period of one year after birth was high (96.1%) than the mortality (3.9%). There was association between the longevity and the duration of stay at NICU, Readmission after NICU discharge, Immunisation status of the NISU discharged babies. There was no significant association between the longevity and the maternal age, High-Risk status of the mother, Nature of birth, Gestational age at birth, Birth weight and the Sex of the NICU discharged babies.

KEYWORDS : IMR, Longevity, NICU discharged babies, NMR, PICME.

INTRODUCTION

The world has made substantial progress in child survival since 1990. Globally, the number of neonatal deaths declined from 5 million in 1990 to 2.4 million in 2020.

Globally 2.4 million children died in the first month of life in 2020. According to World Health Organisation, the Neonatal mortality is Number of deaths during the first 28 completed days of life per 1000 live births in a given year or another period. "Number of deaths during the first 28 completed days of life per 1000 live births in a given year or other period". The infant mortality rate is the number of infant deaths for every 1,000 live births.

In India, Neonatal Mortality Rate (NMR) has been declined from 52 to 28 in 2020 and IN Tamilnadu, it has been declined to 9 in 2020 as per Sample Registration System. The SDG (Sustainable Development Goals) says in its Goal 3.2: By 2030, end preventable deaths of newborn and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1000 live births and under-5 mortality to at least as low as 25 per 1000 live births.

The IMR in India is 28 (as per SRS 2020) and in Tamilnadu, IMR is 13 (Rural – 15 and urban -10).

The survival is more endangered during the first year if life among the low birth weight babies[1] and that was evoked the authors of this study to d investigation about the longevity for a period of one year after birth of low birth weight babies who were discharged from NICU.[2]

OBJECTIVES

1. To assess the 'longevity' of low birth weight NICU babies at secondary level of care institutions in Mayiladuthurai district till their first year of life.

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2. To determine the association between the Maternal Age, High-Risk status of the mother, Nature of Birth, Gestational Age at Birth, Birth Weight of the baby, Sex of the Baby, Duration of Stay at NICU, Readmission after discharge from NICU, Immunisation status with all vaccines up to the age and the Longevity of the NICU discharged babies.

METHODOLOGY

STUDY DESIGN: A Descriptive Retrospective Study.

STUDY DURATION: 01.09.2020 to 31.08.2021

STUDY POPULATION: Low birth weight babies discharged from NICU at Mayiladuthurai GH & Sirkali GH with inclusion criteria.

STUDY AREA: Secondary care institutions in Mayiladuthurai District (Mayiladuthurai GH & Sirkali GH) and Community (Community based Data from PHC Registers, RCH registers, Immunization records, PICME online entry and discharge summary)

SAMPLE SIZE: 102

SAMPLING TECHNIQUE: : Purposive Sampling – After collecting the line list of NICU discharged babies from hospitals, the babies who met the inclusion criteria (102) were taken for the study.

INCLUSION CRITERIA:

1. Low birth weight babies who were admitted at NICU and discharged from Mayiladuthurai GH & Sirkali GH.
2. Low birth weight babies whose birth weight is less than 2000 gms at birth.
3. Low birth weight babies were admitted in NICU of Mayiladuthurai GH and Sirkali GH irrespective of their birth place and discharged during the period taken for the study.
4. The parents of low birth weight babies who accepted to participate in the study and gave informed consent.
5. The NICU discharged babies who are resident of Mayiladuthurai district only were included in the study.

EXCLUSION CRITERIA:

1. Low birth weight babies whose birth weight was more than 2000 gms.
2. The parents of low birth weight babies who were not willing to participate in the study.

METHOD OF DATA COLLECTION

Written Permission was obtained from the JDHS and DDHS for the line list of NICU discharged babies during 01.09.2020 to 31.08.2021. The line list and necessary details of all the low birth weight babies who were admitted at NICU of Mayiladuthurai GH and Sirkazhi GH was taken. A total of 616 NICU discharged babies from Mayiladuthurai GH and 172 from Sirkazhi GH were line listed and only total of 102 low birth weight babies were taken for the study who met the inclusion criteria. The data needed for the study were collected from the NICU discharged line list and Community based Data were collected from Primary Health Centres (PHC) Registers, Reproductive Child Health (RCH) Registers, Immunization records, Pregnancy Infant Cohort Monitoring and Evaluation (PICME) online entry and discharge summary to know about the survival status. In this study, the authors verified the survival status through telephonic interview and also through the direct visit to their homes to know about the longevity. The associated factors were collected from the NICU discharged line list, summary report of the NICU discharged babies, the immunisation registers at the PHC, RCH registers maintained by the Village Health Nurses and the PICME (Pregnancy Infant Cohort Monitoring and Evaluation) online portal data.

PICME :

PICME is the Pregnancy Infant Cohort Monitoring and Evaluation PICME is an online portal which is used for the pregnancy registration at Tamilnadu. The Tamil Nadu Government is trying to provide special care to the mothers as well as newborns by registering the pregnant mothers. As per PICME registration, an RCH ID (Reproductive and Child Health Identification Number) is provided to the pregnant mothers once they register their pregnancy in PICME online web portal through self-registration or registration at Common Service Centres or at Government hospital such as GH, Medical college hospitals and Primary Health Centres or through Village Health Nurses (VHN). It is a must for every pregnant woman in the state. After successful registration, one will get a PICME /RCH ID number. PICME number is a 12 digit number specific to every pregnant woman. The healthcare assistants (VHN) will soon get in touch with the pregnant mothers and provide them with RCH ID which can only be acquired through PICME number. And it is mandatory to register the pregnancy in Tamilnadu to get birth certificate in Tamilnadu.

All these modes were used to collect the data of longevity and the associated factors in this study. The study proforma included the residential status, contact details of the parents, Survival of those babies till the completion of first year of their life, maternal age, High-Risk status of the mother, nature of birth, gestational age at birth, birth weight of the baby, sex of the baby, duration of stay at NICU, readmission at any health facility after NICU discharge and Immunisation status of the baby.

The sample was calculated by the formula as follows;

Sample size $n = \frac{Z^2 \times P \times (1 - P)}{d^2}$

Z is the standard normal z-value for a significance level α = 0.05 (95% confidence), which is 1.96. d = Error < 5in this study. P= Prevalence and it was taken as 95.

$$= \frac{1.96 \times 1.96 \times 93.4 \times 6.6}{5 \times 5}$$

$$= 94.72$$

$$= 95 \text{ (Rounded value)}$$

In this study, sample size was 102. Hence the study sample size is more than the calculated sample size.

EXCLUSION CRITERIA:

Data was entered in MS EXCEL and analysed using Despricitive statistics (percentage) was used to describe. A Chi-square test was used to determine the statistical significance.

OPERATIONAL DEFINITIONS:

NICU Discharged low birth weight Babies: The low birth weight babies who were born at any health facility and were admitted in NICU and discharged from Mayiladuthurai GH and Sirkazhi GH.

Low Birth Weight Babies: As per WHO, low birth weight babies are who weigh less than 2500gms at birth. But in this study, the babies who weighed less than 2000 gms at birth only taken as they need intensive care at secondary level than the babies weigh between 2000gms and 2500 gms.

Longevity: The living status of the babies discharged from NICU for the period of one year (01.09.2021 to 31.08.2022).

RESULTS

Table 1: Association between maternal age at delivery and the longevity of NICU Discharged Babies

MATERNAL AGE AT DELIVERY					
	TEENAGE	**20-29YRS**	**>30YRS**	**TOTAL**	**CHI SQUARE VALUE**
LIVE CHILDREN	2 (2%)	80 (81.6%)	16 (16.3%)	98 (96.1%)	0.0108
DEAD CHILDREN	0	3 (75%)	1(25%)	4 (3.9%)	0.2651
TOTAL	**2 (1.9%)**	**83 (81.3%)**	**17 (16.8%)**	**102 (100%)**	**0.2759**

The P value at < 0.05 level of significance,

The Calculated value is less than the table value (0.2759<3.84).

That there is no significant difference between the Mother's Age and the Longevity of the NICU discharged babies.

Table 2 :Association between high-risk status of the mother and the longevity of NICU Discharged Babies

HIGH RISK STATUS OF THE MOTHER				
	HIGH RISK	**NON-HIGH RISK**	**TOTAL**	**CHI SQUARE VALUE**
LIVE CHILDREN	36(36.7%)	62 (63.3%)	98 (96.1%)	0.0934
DEAD CHILDREN	3(75%)	1(25%)	4 (3.9%)	2.2894
TOTAL	**39 (38.2%)**	**63 (61.8%)**	**102 (100%)**	**2.3828**

The P value at < 0.05 level of significance,

The Calculated value is less than the table value (2.3828 <3.84).

That there is no significant difference between the HIGH-RISK status and the Longevity of the NICU discharged babies.

Table 3 :Association between nature of birth and The longevity of NICU Discharged Babies

NATURE OF BIRTH				
	LSCS	**NORMAL**	**TOTAL**	**CHI SQUARE VALUE**
LIVE CHILDREN	57 (58.2%)	41 (41.8%)	98 (96.1%)	0.0041
DEAD CHILDREN	2 (50%)	2 (50%)	4 (3.9%)	0.1009
TOTAL	**59 (57.8%)**	**43 (42.2%)**	**102 (100%)**	**0.1050**

The P value at < 0.05 level of significance,

The Calculated value is less than the table value (0.1050<3.84).

That there is no significant difference between the Nature of Birth and the Longevity of the NICU discharged babies.

Table 4 :Association between gestational age at birth(weeks) and The longevity of NICU Discharged Babies

GESTATIONAL AGE AT BIRTH(WEEKS)					
	<28WEEKS	**29-36WEEKS**	**>36WEEKS**	**TOTAL**	**CHI SQUARE VALUE**
LIVE CHILDREN	2 (2%)	90 (91.3%)	6 (6.1%)	98 (96.1%)	0.086147
DEAD CHILDREN	0	3 (75%)	1 (25%)	4 (3.9%)	2.110599
TOTAL	**2 (2%)**	**93 (91.2%)**	**7 (6.8%)**	**102 (100%)**	**2.196746**

The P value at < 0.05 level of significance,

The Calculated value is less than the table value (2.1967 < 5.99).

That there is no significant difference between Gestational Age at Birth and the Longevity of the NICU discharged babies.

Table 5 :Association between birth weight at delivery and The longevity of NICU Discharged Babies

BIRTH WT (GMS)				
	<1500	**1500-2000**	**TOTAL**	**CHI SQUARE VALUE**
LIVE CHILDREN	24 (24.5%)	74 (75.5%)	98 (96.1%)	0.0000
DEAD CHILDREN	1 (25%)	3 (75%)	4 (3.9%)	0.0005
TOTAL	**25 (24.5%)**	**77 (75.5%)**	**102 (100%)**	**0.0005**

The P value at < 0.05 level of significance,

The Calculated value is less than the table value (0.0005 <3.84).

That there is no significant difference between the Birth of the baby and the Longevity of the NICU discharged babies.

Table 6 :Association between sex of the baby and The longevity of NICU Discharged Babies

SEX OF THE BABY				
	MALE	FEMALE	TOTAL	CHI SQUARE VALUE
LIVE CHILDREN	47 (48%)	51 (52%)	98 (96.1%)	0.0441
DEAD CHILDREN	3 (75%)	1 (25%)	4 (3.9%)	1.0804
TOTAL	**50 (49%)**	**52 (51%)**	**102 (100%)**	**1.1245**

The P value at < 0.05 level of significance,

The Calculated value is less than the table value (1.1245 <3.84).

That there is no significant difference between the Sex of the Baby and the Longevity of the NICU discharged babies.

Table 7 :Association between duration of stay at NICU and The longevity of NICU Discharged Babies

DURATION OF STAY AT NICU				
	<10 DAYS	> 10 DAYS	TOTAL	CHI SQUARE VALUE
LIVE CHILDREN	78 (79.6%)	20 (29.4%)	98 (96.1%)	0.2572
DEAD CHILDREN	1 (25%)	3 (75%)	4 (3.9%)	6.3010
TOTAL	**79 (77.5%)**	**23 (22.5%)**	**102 (100%)**	**6.5582**

The P value at < 0.05 level of significance,

The Calculated value is more than the table value (6.5582 > 3.84).

That there is a significant difference between the Duration of stay at NICU and the Longevity of the NICU discharged babies.

Table 8 :Association between Readmission and The longevity of NICU Discharged Babies

READMISSION				
	READMISSION	NO READMISSION	TOTAL	CHI SQUARE VALUE
LIVE CHILDREN	13 (13.3%)	85 (86.7%)	98 (96.1%)	0.1621
DEAD CHILDREN	2 (50%)	2 (50%)	4 (3.9%)	3.9724
TOTAL	**15 (14.7%)**	**87 (85.3%)**	**102 (100%)**	**4.1346**

The Calculated value is more than the table value (4.1346 >3.84).

That *there is a significant difference* between the Readmission and the Longevity of the NICU discharged babies

Table 9 :Association between Immunisation status and The longevity of NICU Discharged Babies

IMMUNISATION STATUS (all vaccines up to age except Hep B)				
	IMMUNISED	NOT IMMUNISED	TOTAL	CHI SQUARE VALUE
LIVE CHILDREN	98 (100%)	0	98 (96.1%)	2.969697
DEAD CHILDREN	1 (25%)	3 (75%)	4 (3.9%)	72.75758
TOTAL	**99(97.1%)**	**3 (2.9%)**	**102 (100%)**	**75.72727**

The P value at < 0.05 level of significance,

The Calculated value is more than the table value (75.7273>3.84).

That there is a significant difference between the IMMUNISATION STATUS (all vaccines up to age except Hep B) and the Longevity of the NICU discharged babies

Table 10 :The percentage of longevity of the NICU Discharged Babies

SEX OF THE NICU DISCHARGED BABIES	NO. OF DEATH AMONG NICU DISCHARGED BABIES	NO. OF LIVING CHILDREN AMONG NICU DISCHARGED BABIES
MALE	3 (6%)	47 (94%)
FEMALE	1 (1.9%)	51 (98.1%)
TOTAL	**4 (3.9%)**	**98 (96.1%)**

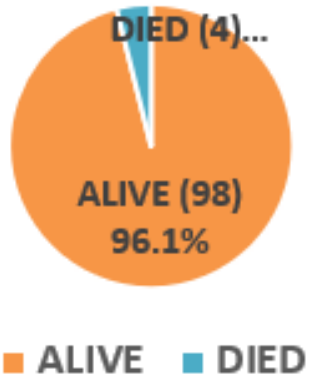

Figure 1 :Survival rate of NICU Discharged Babies

The figure no. 1 shows that the survival rate of the NICU discharged babies was 96.1% (98) and Death rate of the NICU discharged babies was 3.9% (4) out of 102 babies.

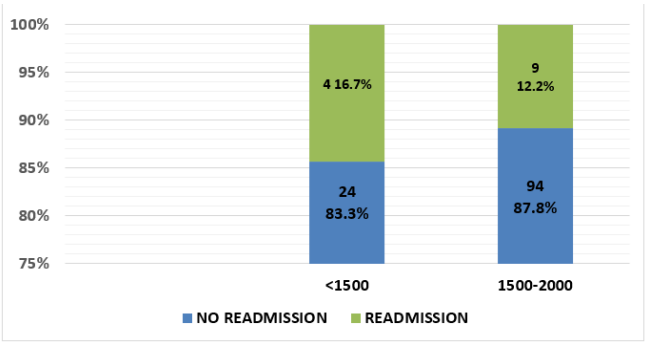

Figure 2 : Birth weight vs Readmission

The table 11 and figure no. 2 shows that the Birth Weight plays a vital role in Readmission for after Discharge from NICU. There was 16.7% (4) of NICU discharged babies who weighed <1500 gms at birth were readmitted and comparatively less number (9) 12.2% of NICU discharged

babies were readmitted among the babies who weighed >1500gms of birth weight.

DISCUSSION

The figure no. 1 shows that the survival rate of the NICU discharged babies was 96.1% (98) and Death rate of the NICU discharged babies was 3.9% (4) out of 102 babies. In this study, 4 NICU discharged babies died out of 102 discharged babies. Two babies died on the 20th day due to Aspiration, another one baby died on the 43rd day due to Sepsis and another one baby died on the 89th day due to Aspiration. The Major cause of death was due to Aspiration than the other causes among the LBW NICU discharged babies. Three babies died of Aspiration and One baby died of Sepsis after the discharge from NICU.

The similar study conducted by Andegiorgish, A.K., Andemariam, M., Temesghen, S. et al. and found that among the 1204 neonates, 79 (6.6%) died and 1125 (93.4%) were alive6 and another similar study conducted at North India by Rajender Singh, Mangla Sood, Parveen Bhardwaj, et al revealed that the death rate was 6.4% in their study.[3]

The figure.2 shows that the Birth weight of the NICU discharged babies have a significant impact on the survival of those babies. The study shows that there is a significant association between the Readmission after NICU discharge and the Longevity of the NICU discharged babies. If there is a smaller number of readmissions, the Longevity is more. The NICU discharged babies who weighed <1500 were readmitted after discharge from NICU during their first year of life was 16.7% and it was only 12.2% among the babies whose birth weight was >1500.

The similar study conducted by Tamiru Alene Woelile, Getasew Tesfa Kibret, Hailemariam Mekonnen Workie, et al reveals the other predictor variable for the survival rate of LBW was birth weight. Neonates with birth weights of less than 1000 gm were three-point six times the hazard of death compared with neonates with birth weights of 1500–2500 gms[4]. The overall probability of survival decreases as birth weight decreases. Similar to that statement, in this study, it was noted that the readmissions were more among the babies whose weight was less than 1500gms.

In this study, the authors found that 98 were alive and there is a significant association between the Duration of stay at NICU and the Longevity of the NICU discharged babies. The less in number of stay at NICU shows the Longevity which is more.

But, the study conducted by Kanimozhi P., Kumaravel K.S.*, Velmurugan K et al contradicts the present study as follows; the recent advancements in the neonatal care and a massive thrust to neonatal care under the auspices of National Rural Health Mission in India have led to improvement in the survival of premature infants. Following an early discharge from NICU, babies may need readmission to a paediatric intensive care within a few days, whereas keeping them in the NICU a little longer may reduce the mortality.[5]

The present study shows that there is a significant association between the Immunisation status with the vaccines administered during the first year of life as per the Universal Immunisation Programme (UIP) and the Longevity of the NICU discharged babies.

The similar study conducted by Santosh Soans, Attila Mihalyi, Valerie Berlaimont, et al reveals that the routine childhood vaccinations can help reduce or eliminate the burden of VPDs and should be given to preterm and LBW babies, regardless of prematurity or birth weight.[7]

There is no significant difference between the Mother's age, High-Risk status of the Mother, Nature of Birth, Birth Weight, Gestational Age at Birth and the Sex of the Baby and the Longevity of the NICU discharged babies.

The study conducted by Ghana Alhassan Abdul-Mumin , Sheila Agyeiwaa Owusu, Abdulai Abubakari supports this present study as follows: there was no significant association with the maternal age and contradicts the present study as follows; there was a significant association with the gestational age and the birth weight.[8]

CONCLUSION

The present study says that the longevity (96.1%) is more among the low birth weight NICU discharged babies and the mortality (3.9%) was less. And there was a significant association between the longevity and the duration of stay at NICU. The lesser the duration of stay, the more the longevity. There was less a significant association between readmission and the longevity and also the found a significant association with Immunisation status of the low birth weight NICU discharged babies.

The other variables such as maternal age, High-Risk status of the mother, nature of birth, gestational age at birth, sex of the baby, birth weight was not associated significantly.

This study shows that intensive and immediate quality care at birth and the follow up at their homes furtherly for immunisation which usually done after verifying the health status of the babies improves the longevity irrespective of maternal age, high risk status, nature of birth, gestational age at birth, sex of the baby and the birth weight.

RECOMMENDATIONS

We recommend that the studies can be extended by analysing many other factors which may affect the Longevity such as place of birth, treatment modalities, Growth and Development of the babies, Breast feeding practices, Weaning, etc., And it can be done as a Prospective study for monitoring the Babies' survival and other factors influence the morbidity and mortality of these children.

The chances of survival from birth varies widely depending on several factors such as Maternal Age, High-Risk status of the mother, Nature Of Delivery, Birth Weight, Length Of Stay at NICU, Readmission After NICU discharge and Immunization Status of those babies.

The existing child welfare programmes like HBNC, HBYC, SAANS, UIP, etc., are being implemented in a successful way to monitor the low birth weight NICU discharged babies at their homes. Thus, the babies discharged from NICU are to be monitored vigilantly at the field by ASHA/VHN(ANM) to prevent mortality in first year of life. The studies can be conducted to analyse the effectiveness of reorientation and strengthening of the existing child welfare programmes by the field functionaries.

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