

Experiences Of Neonatal Mechanical Ventillation In Tertiary Care Hospital, Hyderabad

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Abstract: This study was conducted to evaluate indications, most common complications, survival rate in various gestational age groups, various indications, various birth weight groups all the babies which got admitted in NICU both in born and out born were taken into our study out of 95 neonates required ventilation in which 73 babies were selected for study after exclusion criteria All details of babies ventilated were recorded like Name, Age, Sex, Gestational age, Birth Weight. Total duration ventilation, complications occurred, ABG analysis, were observed

According to my study most common indication for ventilation was Hyaline membrane disease, followed birth asphyxia. survival rate was better in HMD compare with other indications. Survival rate improved with increased gestational age and birth weight. (expect in babies more than 2.5 Kgs). complications observed during study were tube block, air leak syndrome, sepsis, ventilator failure, PPHN. survival was poor in babies having complications.

Keywords: Mechanical ventilation, Hyaline membrane disease (HMD), Meconium aspiration syndrome (MAS), Intermittent positive pressure ventilation (IPPV), Hyaline membrane disease (HMD), Arterial blood gas (ABG)

1. Introduction

Objectives of study

- 1 To study various indication for mechanical ventilation in neonates in our hospital
- 2 To study survival rate of ventilated neonates in various gestational age group
- 3 To study survival rate of ventllated neonates in various birth weight groups
- 4 To study the complications which occurred during ventilation
- 5 To study the survival rate according to indications
- 6 To study duration of ventilation

2. Material and Methods:

Study area :study was done in Neonatal intensive care unit of hospital 1,250 bedded multispeciality Hospital, with 40 bedded pediatric unit with 8 bedded NICU cattering both hospital born and out born patients.

This study was conducted to evaluate indications, most common complications, survival rate in various gestational age groups, various indications, various birth weight groups

Sample size : all the babies which got admitted in NICU both in born and out born were taken into our study out of 95

neonates required ventilation in which 73 babies were selected for study after exclusion criteria

Data collection: All details of babies ventilated were recorded like Name, Age, Sex, Gestational age, Birth Weight. Total duration ventilation, complications occurred, ABG analysis, were observed.

Out come was recorded proforma for each baby was maintained.

Data analysis: Data analysis was done using Excel software. Statistical analysis was done using descriptive tests like mean, average, percentage, pie diagram, bar diagram and stastical tests like chi square test.

Conclusion: According to my study most common indication for ventilation was Hyaline membrane disease, followed birth asphyxia. survival rate was better in HMD compare with other indications. Survival rate improved with increased gestational age and birth weight. (expect in babies more than 2.5 Kgs). complications observed during study were tube block, air leak syndrome, sepsis, ventilator failure, PPHN. survival was poor in babies having complications.

3. Results and Discussion:

Table 1 :Gender wise percentage of babies

Sex	No., of subjects (n=75)	
	No.	%
Males	51	68.00%
Females	24	32.00%
Total	75	100.00%

In our study males were 68%, and females were 24%

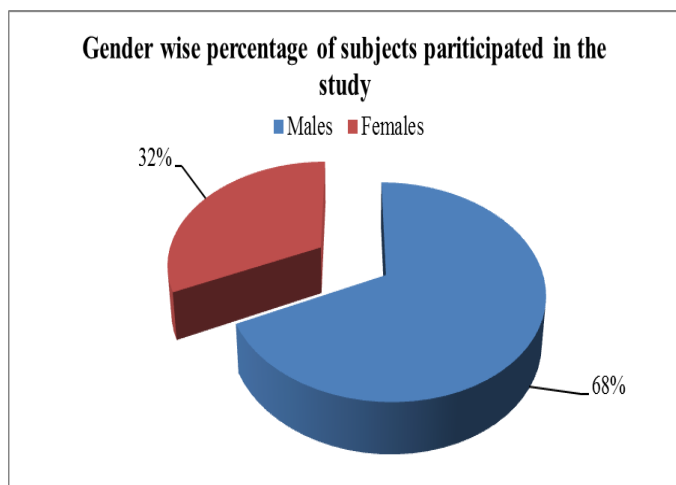


Table 2 :Gender and Birth weight distribution of babies

Birth Weight (Kgs)	Males		Females		Total	
	No.	%	No.	%	No.	%
1 - 1.4	12	23.53%	5	20.83%	17	22.67%
1.5 - 1.9	12	23.53%	4	16.67%	16	21.33%
2 - 2.4	8	15.69%	4	16.67%	12	16.00%
2.5 & more	19	37.25%	11	45.83%	30	40.00%
Total	51	100.00%	24	100.00%	75	100.00%
Degree of Freedom	3					
Chi-Square Value with Yate's Correction	0.723					
P-Vales	0.863					
Inference	Not Significant: No association between Birth Weight & Gender					

40% of babies ventilated belonged to birth weight of 2.5 or more kilograms.

Among males 37.25% and among females 45.83% were females belonged to more than 2.5 kilograms.

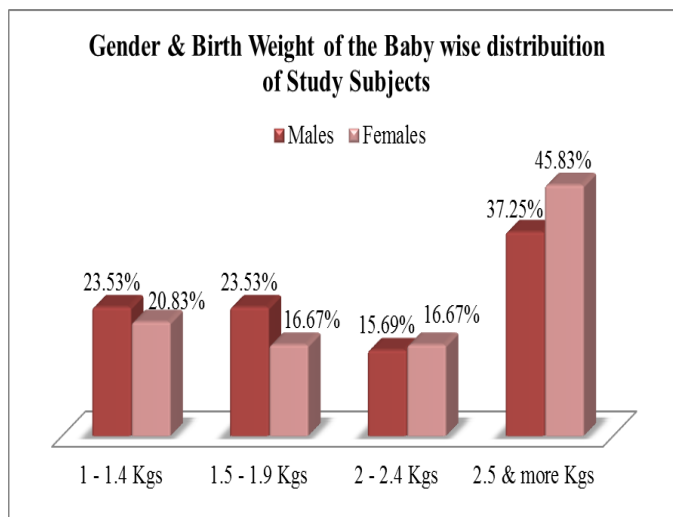


Table 3:Gestational age Gender wise distribution in study

Gestational Age (Weeks)	Males		Females		Total	
	No.	%	No.	%	No.	%
< 32	13	25.49%	5	20.83%	18	24.00%
32 - 34	13	25.49%	5	20.83%	18	24.00%
34 - 37	3	5.88%	6	25.00%	9	12.00%
> 37	22	43.14%	8	33.33%	30	40.00%
Total	51	100.00%	24	100.00%	75	100.00%
Degree of Freedom	3					
Chi-Square Value with Yate's Correction	5.66					
P-Vales	0.13					
Inference	Not Significant: No association between Gestational Age & Gender					

40% of babies ventilated were mor than 37 weeks gestational age

Among males 43.14% and among females 33.33% were more than 37 weeks

There is significant association between gestational age and gender with respect to ventilation(p>0.05)

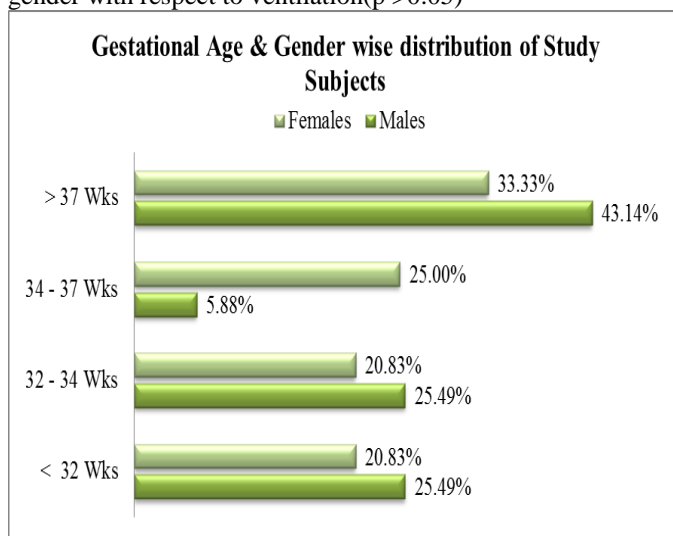


Table 4: Birth weight wise survival in study:

Birth Weight (Kgs)	Survived						Expired						Grand Total (n=71)*	
	Males		Female		Total		Males		Females		Total			
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
1 - 1.4	6	35.3	2	11.8	8	47.1	6	35.3	3	17.6	9	52.9	17	100
1.5 - 1.9	4	28.6	1	7.1	5	35.7	6	42.9	3	21.4	9	64.3	14	100
2 - 2.4	5	41.7	3	25.0	8	66.7	3	25.0	1	8.3	4	33.3	12	100
2.5 & more	9	32.1	5	17.9	14	50.0	10	35.7	4	14.3	14	50.0	28	100
Total	24	33.8	11	15.5	35	49.3	25	35.2	11	15.5	36	50.7	71	100

* Excluding LAMA i.e., 2 under Males and 2 under Females
 At D.f. = 3 Chi-Square Value = 2.52 & P-Value = 0.471;
 Not Significant: No association between Birth Weight & Survival Rates

Survival rate in my study was 49.3% (35 out of 71)

Survival rate was highest among 2 -2.4 kgs babies (66.7%), followed by 2.5 kgs and more (50%)

Survival rate among males was highest among 2-2.4 kgs babies (41.7%), followed by 1-1.4 kgs (35.3%)

Survival rate among females was highest among 2-2.4 kgs babies (25%), followed by 2.5 kgs and more (17.9%)

There is no statistically significant association between birth weight and survival rates (p >0.05)

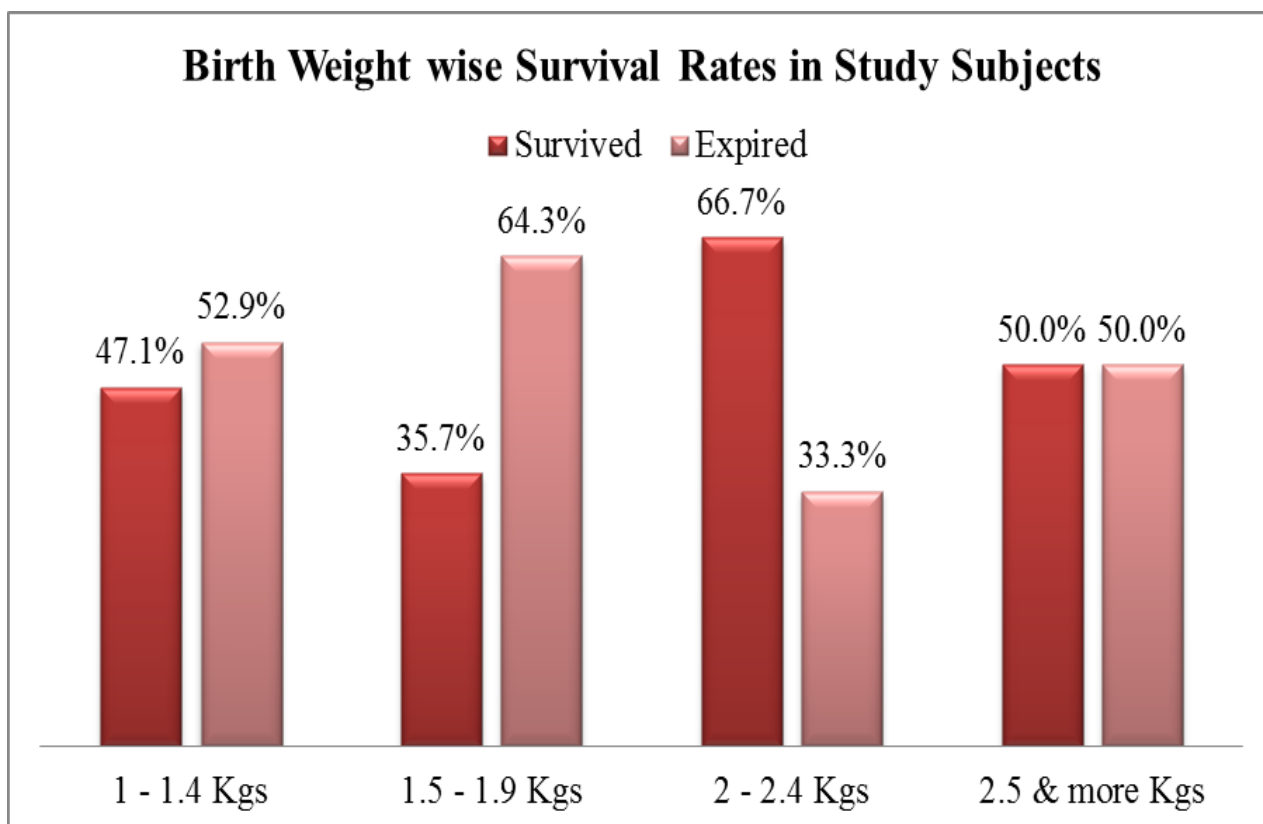


Table 5 : Gestational age wise survival

Gestational Age (Weeks)	Survived						Expired						Grand Total (n=71)*	
	Males		Female		Total		Males		Females		Total			
	No	%	No	%	No	%	No	%	No	%	No	%	No.	%
< 32	5	27.8	2	11.1	7	38.9	8	44.4	3	16.7	11	61.1	18	100
32 - 34	7	46.7	4	26.7	11	73.3	4	26.7		0.0	4	26.7	15	100
34 - 37	1	11.1	3	33.3	4	44.4	2	22.2	3	33.3	5	55.6	9	100
> 37	11	37.9	2	6.9	13	44.8	11	37.9	5	17.2	16	55.2	29	100
Total	24	33.8	11	15.5	35	49.3	25	35.2	11	15.5	36	50.7	71	100

* Excluding LAMA i.e., 2 under Males and 2 under Females

At D.f. = 3 Chi-Square Value = 4.56 & P-Value = 0.207;

Not Significant: No association between Gestational Age & Survival Rates

Survival rate was highest among 32 -34 week gestational age babies (73.3%), followed by babies of more than 37 weeks (44.8%).

Survival rate among males was highest among 2-2.4 kgs babies (41.7%), followed by 1-1.4 kgs (35.3%)

There is no statistically significant association between gestational age and survival rates (p >0.05).

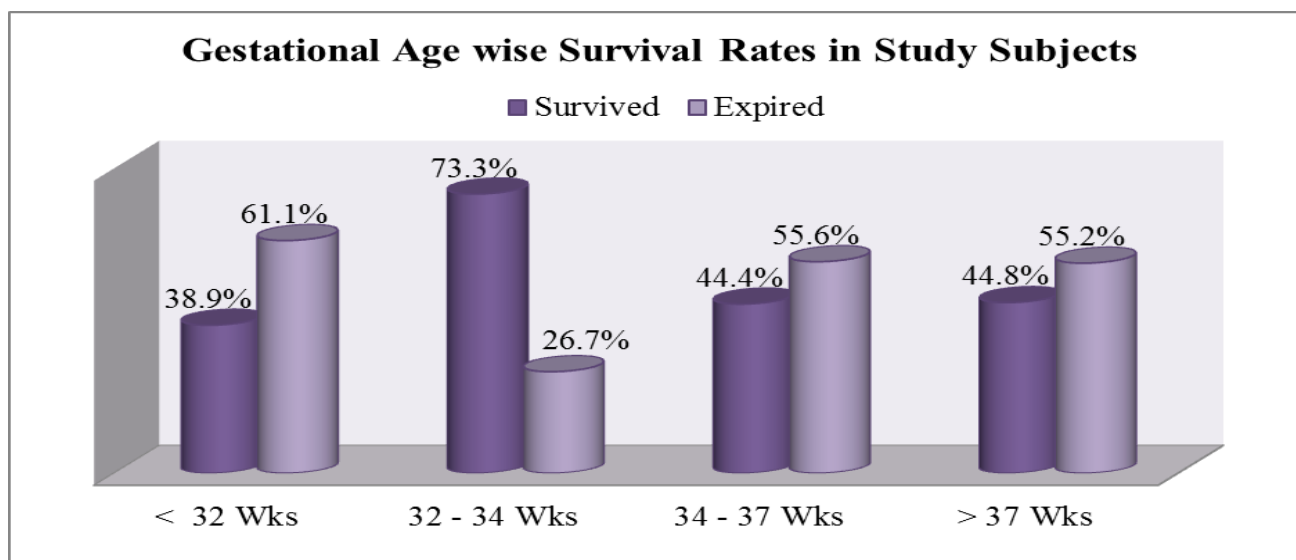


Table 6: Duration of ventilation and survival

Duration of Ventilation (Hours)	Survived						Expired						Grand Total (n=71)*	
	Males		Female		Total		Males		Females		Total			
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
10-29	2	13.3	2	13.3	4	26.7	7	46.7	4	26.7	11	73.3	15	100
30-49	13	40.6	4	12.5	17	53.1	10	31.3	5	15.6	15	46.9	32	100
50-69	5	31.3	2	12.5	7	43.8	7	43.8	2	12.5	9	56.3	16	100
70-89	3	50.0	2	33.3	5	83.3	1	16.7	0	0.0	1	16.7	6	100
90 & above	1	50.0	1	50.0	2	100.0	0	0.0	0	0.0	0	0.0	2	100
Total	24	33.8	11	15.5	35	49.3	25	35.2	11	15.5	36	50.7	71	100
Mean	47.83						38.67						43.18	
Range	18 - 100						12 - 72						12 - 100	
Unpaired t - statistic	2.55													
P -Value	0.01													
Inference	Significant													
* Excluding LAMA i.e., 2 under Males and 2 under Females														

Survival was highest among neonates ventilated between 70-89 hours (83.3%), followed by 30-49 hours of ventilation (53.1%)

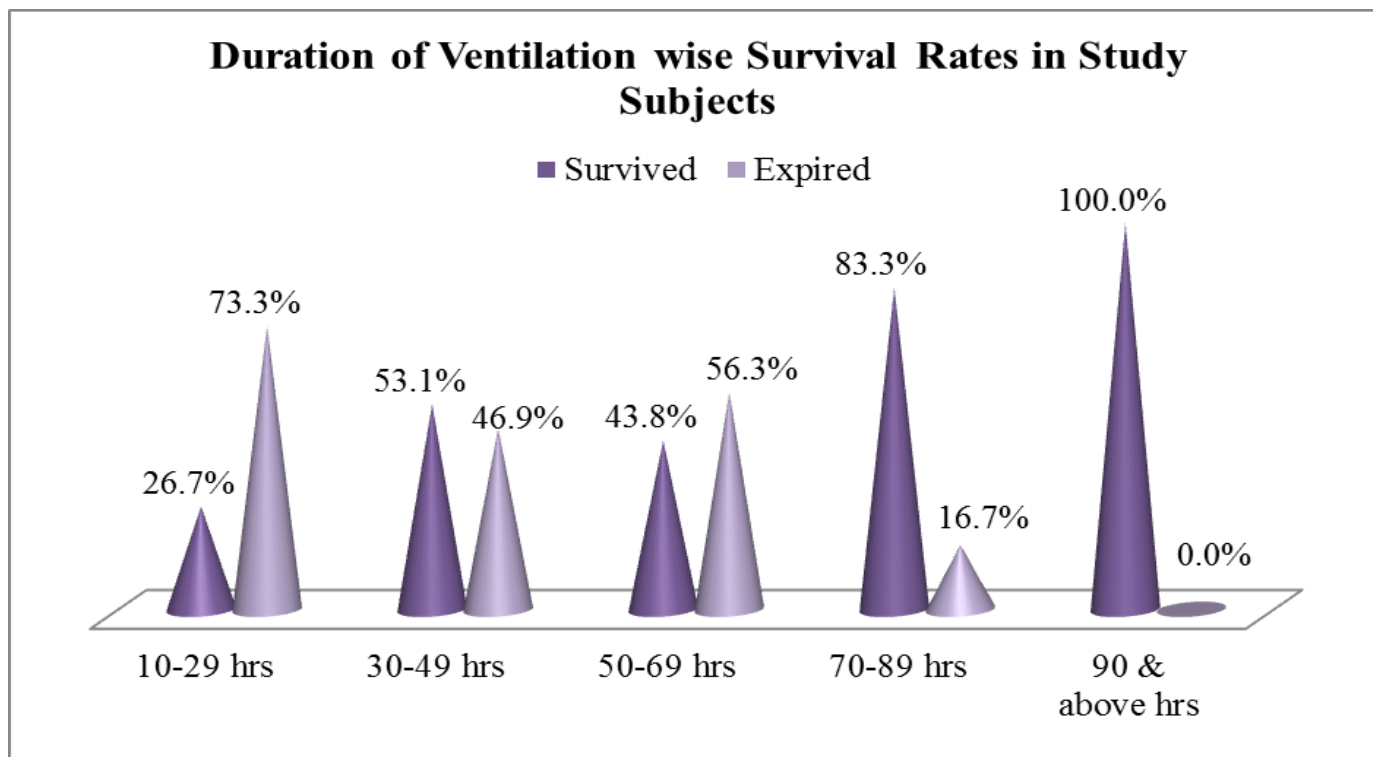


Table 7: indication wise survival

Indications	Survived						Expired						Grand Total	
	Males		Females		Total		Males		Females		Total			
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Birth Asphyxia	4	16.7	1	9.1	5	14.3	1	4.0	1	9.1	2	5.6	7	10.7
Hyaline Membrane Disease	8	33.3	4	36.4	12	34.3	8	32.0	4	36.4	12	33.3	24	33.3
Meconium Aspiration	3	12.5	3	27.3	6	17.1	9	36.0	2	18.2	11	30.6	17	24.0
Pneumonia	1	4.2	0	0.0	1	2.9	3	12.0	1	9.1	4	11.1	5	6.7
APNEA	3	12.5	0	0.0	3	8.6	1	4.0	1	9.1	2	5.6	5	6.7
Persistent Pulmonary Hypertn.,	1	4.2	1	9.1	2	5.7	1	4.0	1	9.1	2	5.6	4	6.7
Post Operative	2	8.3	1	9.1	3	8.6	1	4.0		0.0	1	2.8	4	5.3
Others	2	8.3	1	9.1	3	8.6	1	4.0	1	9.1	2	5.6	5	6.7
Total	24	100	11	100	35	100	25	100	11	100	36	100	71	100

* Excluding LAMA i.e., 2 under Males and 2 under Females

Most common indication for ventilation in our study was hyaline membrane disease(33%),followed by meconium aspiration which was (24%).

Survival was highest for neonates ventllated for hyaline membrane disease (34.3%),followed by meconium aspiration (17.1%).

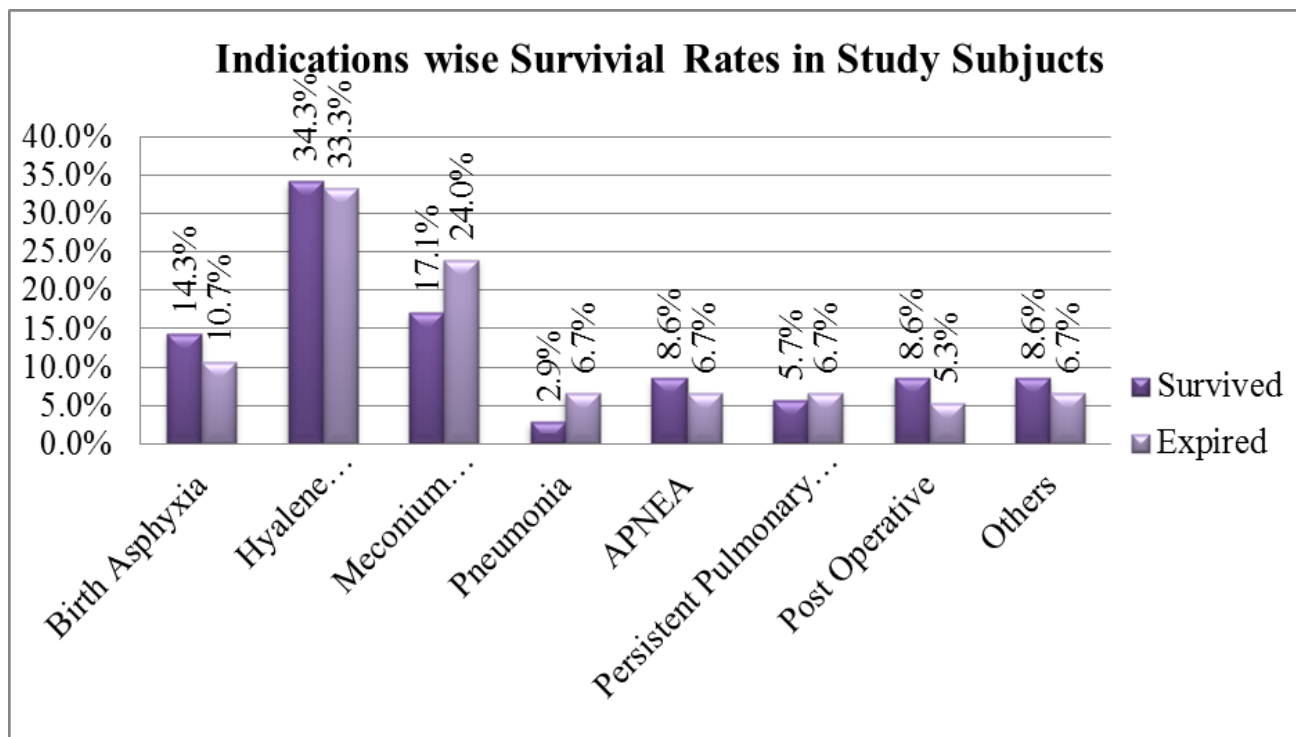


Table 8: Indication wise duration of ventilation

Indications	Duration of Ventilation in hours											
	10-29		30-49		50-69		70-89		90 & above		Grand Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Birth Asphyxia	3	17.6	2	5.9	1	6.3	2	33.3	0	0.0	8	9.9
Hyaline Membranes Disease	5	29.4	12	35.3	7	43.8	0	0.0	1	50.0	25	33.8
Meconium Aspiration	3	17.6	6	17.6	7	43.8	1	16.7	1	50.0	18	23.9
Pneumonia	1	5.9	3	8.8	1	6.3	0	0.0	0	0.0	5	7.0
Apnea	3	17.6	1	2.9	0	0.0	1	16.7	0	0.0	5	7.0
Persistent Pulmonary Hypertension	0	0.0	5	14.7	0	0.0	0	0.0	0	0.0	5	5.6
Post Operative	1	5.9	2	5.9	0	0.0	1	16.7	0	0.0	4	5.6
Others	1	5.9	3	8.8	0	0.0	1	16.7	0	0.0	5	7.0
Total	17	100.0	34	100.0	16	100.0	6	100.0	2	100.0	75	100.0

In our study 34 neonates were ventilated for 30-49 hours , 17 neonates were ventilated for 10-29 hours,16 neonates for 50-59 hours

Among neonates ventilated for 30-49 hours hyaline membrane disease was most common indication (35.3%),followed by meconium aspiration (17.6%)

Among neonates ventilated for 10-29 hours hyaline membrane disease was most common indication (29.4%) followed by birth asphyxia

Indications wise duration of ventilation in Study Subjects

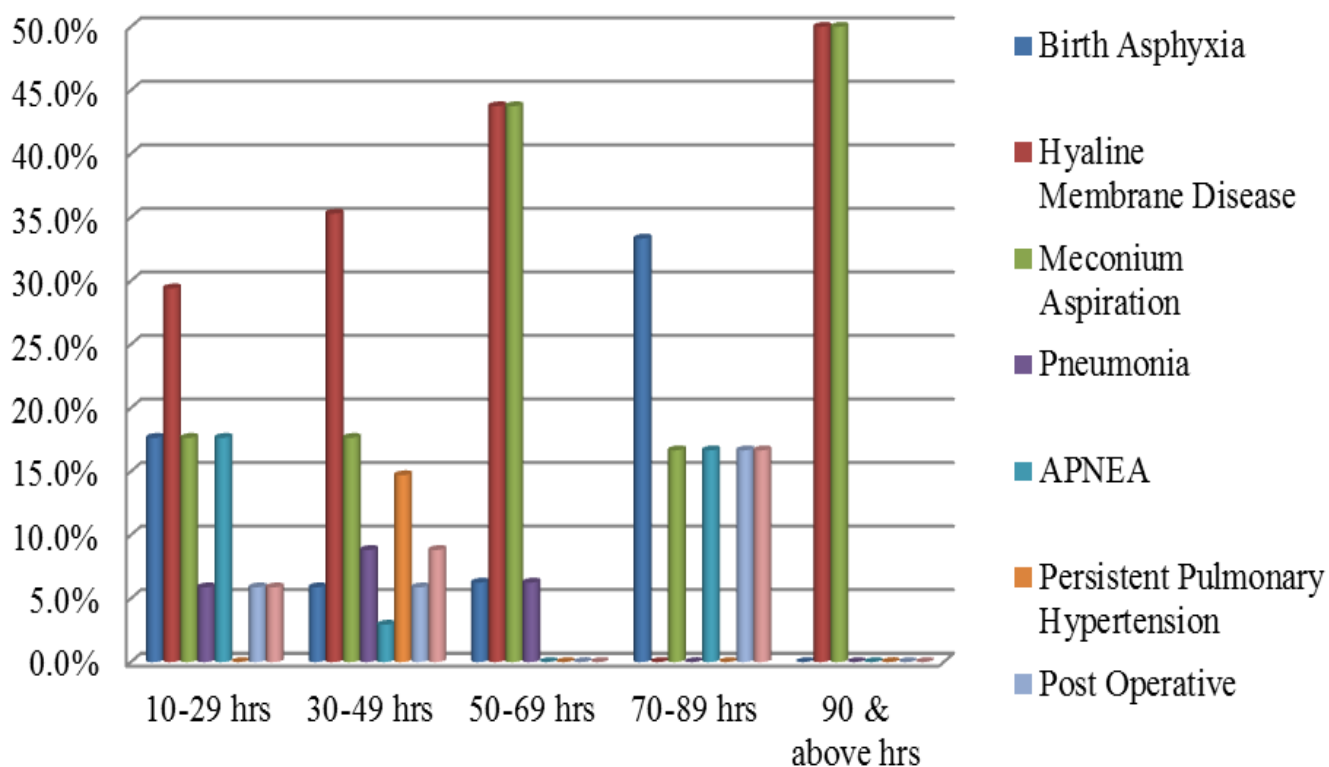


Table 9: Gestational age and duration of ventilation

Gestational Age (Weeks)	Duration of Ventilation in hours											
	10-29		30-49		50-69		70-89		90 & above		Grand Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
< 32 Wks	3	17.6	8	23.5	6	37.5	0	0.0	1	50.0	18	24.0
32 - 34 Wks	5	29.4	5	14.7	4	25.0	3	50.0	1	50.0	18	24.0
34 - 37 Wks	1	5.9	6	17.6	0	0.0	2	33.3	0	0.0	9	12.0
> 37 Wks	8	47.1	15	44.1	6	37.5	1	16.7	0	0.0	30	40.0
Total	17	100.0	34	100.0	16	100.0	6	100.0	2	100.0	75	100.0

In neonates ventilated for 10-29 hours (47.1%) were more than 37 weeks.

In neonates ventilated for 30-49 hours (44.1%) were more than 37 weeks,(23.5%) were less than 32 weeks.

In neonates ventilated for 50-69 hours (37.5%) were less than 32 weeks and (37.5%) were more than 37 weeks.

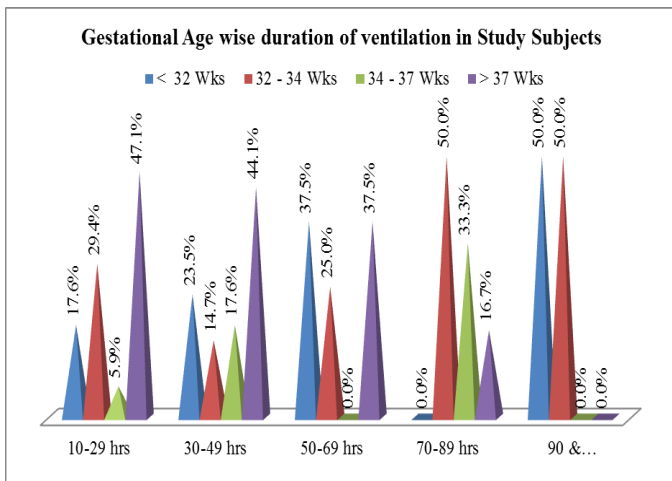
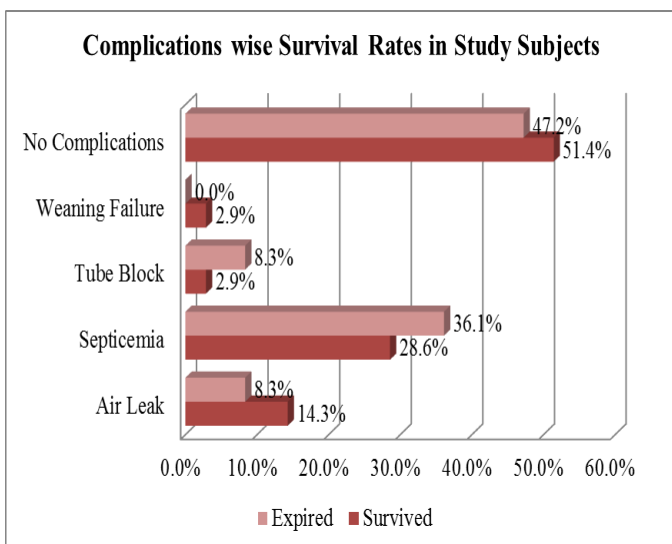


Table 11: complication wise survival in study

Complications	Survived		Expired		Total	
	No.	%	No.	%	No.	%
Air Leak	5	14.3%	3	8.3%	8	11.3%
Septicemia	10	28.6%	13	36.1%	23	32.4%
Tube Block	1	2.9%	3	8.3%	4	5.6%
Weaning Failure	1	2.9%	0	0.0%	1	1.4%
No Complications	18	51.4%	17	47.2%	35	49.3%
Total	35	100.0%	36	100.0%	71	100.0%

* Excluding LAMA i.e., 2 under Males and 2 under Females

Most common complication in our study was sepsis 23 (32.4%), followed by air leak 8 (11.3%). Mortality was also highest in sepsis (36.1%)



In our study out of 1752 admissions 105 babies were ventilated 30 babies are excluded according to exclusion criteria In our study males were 68% and females were 24 % 40 % of babies ventilated were more than 37 weeks gestational age ,among males 43.14% and among females 33.33% were more than 37 weeks,there was no significant association

between gestational age and gender with respect to ventilation (p>0.05).

Survival rate in our study was 49.3% (35/71), survival rate was highest among 2-2.4 kgs (66.7%), followed by 2.5 kgs or more (50%).

Survival among males was highest among 2-2.4 kgs (41.7%), followed by 1-1.4 kgs (35.3%).

Survival rate among female babies was highest among 2-2.5 kgs babies (25%), followed by 2.5 kgs or more (17.9%). There was no statistically significant association between birth weight and survival rates (p>0.05).

Survival rate was highest among 32-34 weeks gestational age babies (73.3%), followed by babies of more than 37 weeks (44.8%).

Survival rate among males was highest among 2-2.4 kgs babies (41.7%), followed by 1-1.4 kgs (35.3%).

Survival was highest among babies ventilated between 70-89 hours (83.3%) followed by 30-49 hours of ventilation (53.1%).

Most common indication for ventilation was hyaline membrane disease (33%), followed by meconium aspiration (24%)

Survival rate was highest for neonates ventilated for hyaline membrane disease (34.3%), followed by meconium aspiration syndrome (17.1%).

In our study 34 neonates were ventilated for 30-49 hours, 17 neonates were ventilated for 10-29 hours, 16 neonates for 50-59 hours.

Among neonates ventilated for 30-49 hours hyaline membrane disease was most common indication (35.3%), followed by meconium aspiration (17.6%).

Among neonates ventilated for 10-29 hours hyaline membrane disease was most common indication (29.4%) followed by birth asphyxia.

In neonates ventilated for 10-29 hours (47.1%) were more than 37 weeks.

In neonates ventilated for 30-49 hours (44.1%) were more than 37 weeks, (23.5%) were less than 32 weeks.

In neonates ventilated for 50-69 hours (37.5%) were less than 32 weeks and (37.5%) were more than 37 weeks.

Most common complication in our study was sepsis 23 (32.4%), followed by air leak 8 (11.3%). Mortality was also highest in sepsis (36.1%).

Age of initiation of ventilation had no effect on survival.

Recommendations:

1. Ventilate the baby if only strict indication (clinical, biochemical indication).
2. Strict monitoring of clinical features like blood pressure, oxygen saturation
3. Minimum invasive procedures like blood pricks for Arterial blood gas analysis etc
4. Good endotracheal toilet, chest physiotherapy to prevent ventilator associated pneumonia
5. Minimum pressure required to be set, minimum duration of ventilation i.e. early weaning as soon as possible
 1. Strict handwashing technique, 1:1 ratio of nursing staff
 2. Early detection of air leak syndromes improves outcome.

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