

**A STUDY TO EXAMINE MORBIDITY AND MORTALITY IN VLBW
(VERY LOW BIRTH WEIGHT) NEONATES ADMITTED TO NICU IN
CHANDIGARH**

Dissertation Submitted to



Institute of Health Management Research, Jaipur

The IIHMR University, Jaipur

for the partial fulfilment for the award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management

by

Sukhsimran Kaur

Under the Supervision and Guidance of

Dr. Goutam Sadhu

**MBA Hospital and Health Management
2019-2021**

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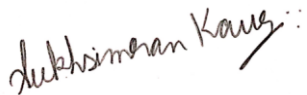
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DECLARATION BY STUDENT

I hereby declare that this dissertation “A study to examine morbidity and mortality in VLBW (very low birth weight) neonates admitted to NICU in Chandigarh” is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

A handwritten signature in black ink, reading "Sukhsimran Kaur" with a stylized flourish at the end.

Sukhsimran Kaur

INTERNSHIP CERTIFICATE

This is to certify that Sukhsimran Kaur in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur has successfully completed her internship at Fortis Hospital, Mohali during April 12, 2021, to June 11, 2021.

Place: Mohali
Date: 11-06-2021



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Reg. No. 34763
Head Quality Assurance
Fortis Hospital, Mohali (Pb.)

CERTIFICATE

This is to certify that dissertation “A study to examine morbidity and mortality in VLBW (very low birth weight) neonates admitted to NICU in Chandigarh” is a record of the research work undertaken by Sukhsimran Kaur in partial fulfilment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and her approach to the research study has been sincere, scientific, and analytical.

Faculty Guide

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Date:

School Dean

IIHMR University, Jaipur

Date:

ABSTRACT

Background – Prematurity (where a gestational period is less than 37 weeks) is the significant reason for morbidity in neonates particularly in the neonates of very low birth weight (VLBW). The prevalence of very low birth weight subsists globally in the whole community. The current study would assist with recognizing variables to add to morbidity pattern as well as to the mortality especially with the exceptional cases of admission of low-birth-weight neonates in the Neonatal Intensive Care Unit (NICU). Essential advances can be taken to lessen mortality in VLBW neonates.

Methodology – The existing research accentuates the study to examine neonates' mortality and morbidity pattern admitted to NICU in VLBW (very low birth weight) in Chandigarh, India. The current study is the retrospective study majorly conducted to estimate the potential determinants ascertaining the neonates' death. The total number of neonates as per the standards taken for the inclusion criteria is 70 throughout the time from January 2019 to December 2019.

Result – A total of 70 responses has been recorded for the study described further in details. On the whole, from the current sample size of neonates of very low birth weight neonates, 38 (54.3%) were females and 32 (45.7%) were males. The outcomes of the present study, among the sample size of 70 neonates, 84.2% survived while 15.7% could survive. Moreover, it has been observed that among preterm neonates there is 93% of mortality on contrasting term neonates with 7%. Additionally, the common risk factors for maternal that could be a link with very low birth weight and mortality among neonates is first, gestational hypertension (n= 37, 52.9%) accompanied by anaemia (n= 28, 40%). In the present study, the dominant conditions about fatality and morbidity against neonates existing with VLBW are 32.9% with sepsis followed by 22.9% with RDS.

Conclusion – A clear picture has been observed for the factors accountable for mortality and morbidity in VLBW neonates at the time of birth. Risk is high for mortality among VLBW neonates. The chief reason for the very low birth weight among neonates is early delivery and high prevalent mortalities and morbidities are sepsis followed by respiratory distress syndrome, further transient tachypnoea of new-born, hypoglycemia, neonatal hyperbilirubinemia, asphyxia, meningitis, intraventricular haemorrhage. There is an urgency for an efficient precautionary strategy so as to prevent early gestational deliveries and also to minimize the degree of morbidity rate and mortality rate in the union territory. It has been concluded that the gestational age for the majority of the very low birth weight neonates was between the week of 28-32 and 32-34 weeks. The common risk factors for maternal that could be a link with very low birth weight and mortality among neonates is first, gestational hypertension accompanied by anaemia. In order to diminish such circumstances, there is a necessity to increase the monitoring of prenatal check-ups and counselling sittings required to follow the suggestive advice as directed by the gynaecologist.

Keywords – Morbidity, Mortality, Neonates, VLBW, Chandigarh.

ACKNOWLEDGEMENT

It gives me immense pleasure to share my gratifying and enriching experience to complete this project. However, it would not have been possible without the kind support of many individuals. I would like to extend my sincere thanks not only to my teachers but also to the technical staff to guide me with their expert advice. Their support provided me with strength and courage during the most difficult times.

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SUKHSIMRAN KAUR

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ABBREVIATIONS

AOP	Apnea of prematurity
ENC	Essential newborn care
GA	Gestational age
GDM	Gestational Diabetes mellitus
GDM	Gestational Diabetes mellitus
HMD	Hyaline membrane disease
IUD	Intrauterine development
IUGR	Intrauterine growth restriction
IVH	Intraventricular haemorrhage
LBW	Low birth weight
NEC	Necrotising enterocolitis
NICU	Neonatal intensive care unit
NICUs	Neonatal intensive care units
NMR	Neonatal Mortality Rate
NNH	Neonatal hyperbilirubinemia
PIH	Pregnancy induced hypertension
RDS	Respiratory distress syndrome
SNCU	Sick new-born care unit
VLBW	Very low birth weight
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

The period of neonates is characterized as up to the initial 28 days of life and in addition, further, it has been classified as very early (birth to less than 24 hours of life), early (birth to less than 7 days), and late neonatal period (between 7 days to less than 28 days).

Prematurity (where a gestational period is less than 37 weeks) is the significant reason for morbidity in neonates particularly in the neonates of very low birth weight (VLBW). Very low birth weight neonates as defined by WHO is the birth weight under 1500g upon birth regardless of gestational time.

Among the results of perinatal, neonatal, and postnatal, the main determinant is birth weight. It is subject to the gestation length and the foetus intrauterine development (IUD). Globally, it is under 2% of the birth incidence of VLBW infants. The live births of VLBW in Indian children establish 4 % to 7 % and roughly 30 % is the mortality among the Neonates.

The leading mortality, as well as morbidity, among the neonates of very low birth weight, proceeds to be an influential public health obstacle in India. The prevalence of very low birth weight subsists globally in the whole community. Among maternal health and child health, in both developed as well as developing nations, one of the numerous severe provocations is low birth weight. It may direct to dangerous bodily and psychic impairment in those who sustain. The major reason among half the population of prenatal and mortality in infants is one-third is due to low birth weight.

Neonatal Mortality Rate (per 1000 livebirths)

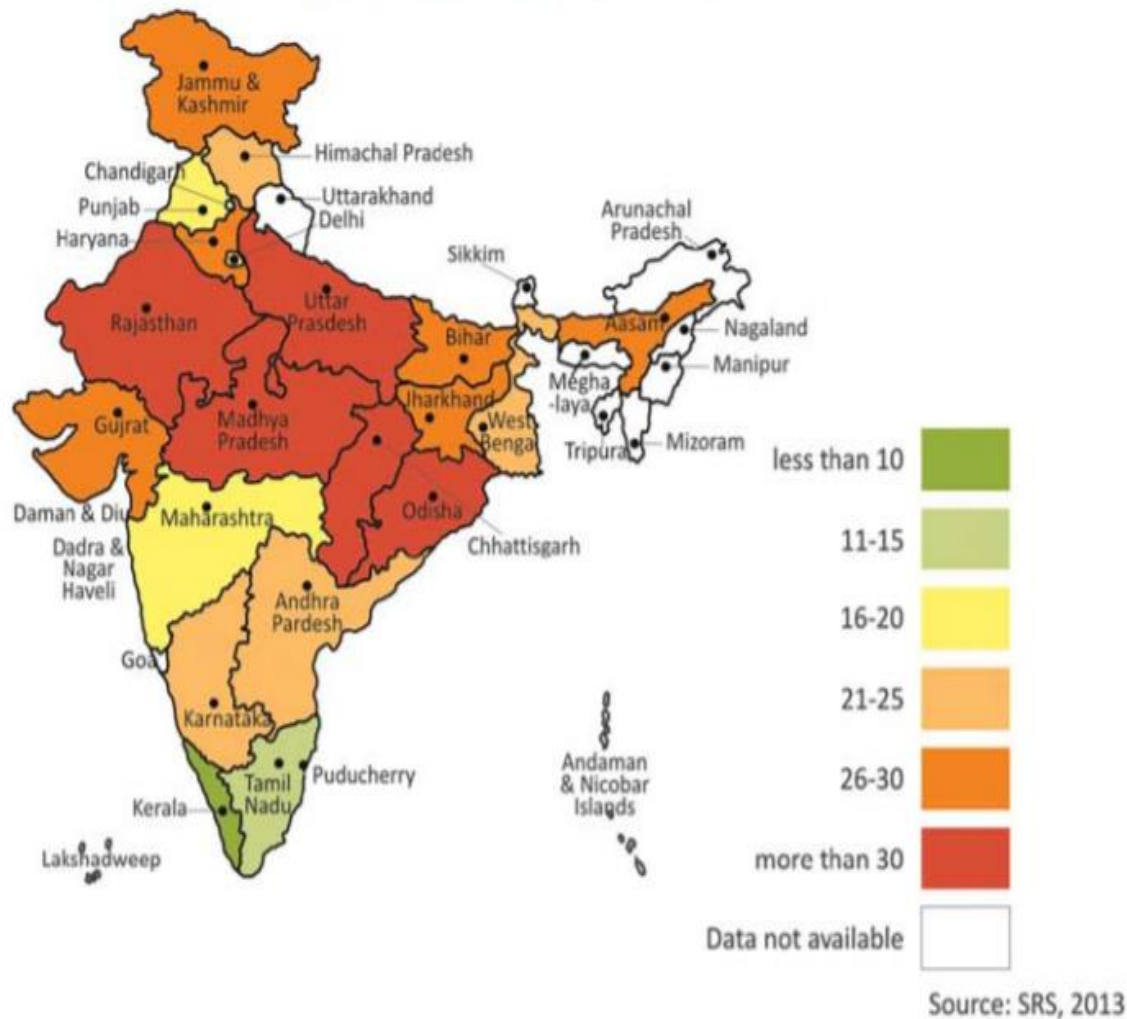


Figure 1. State-wise distribution of NMR in India

Developing countries like India, where there is a need to increase the investment in health by different sectors of government. It is important to take the factors into account which are influencing the NMR (Neonatal Mortality Rate) in great numbers is unacceptable. There is a need for an hour to strengthen the health systems that involve the procurement of an ample number of supplies with all the essential equipment for health amenities moreover

besides equivalent expanse to suffice the needs at the local level. Each woman in each community should reach out for health amenities during the administration of pregnancies that are not complicated and deliveries.

The precise indicator for the rate of infant mortality is the VLBW rate. VLBW new-born children represent more than half of neonatal mortality. The neonatal death rate is a significant contributing element for the under-five death rate. The phase of neonates is the weakest stage of an individual's life, and the morbidities and mortalities values are extremely high also largest of these can be cured. It has been assessed those 130 million neonates are born each year furthermore, out of these, 4 million dies in the initial 28 days of their life.

Among the world for high number in Neonatal Mortality Rate (NMR), India ranks first. It has been estimated that on an annual basis the death of children is 1.09 million. Though the data vary by the state the overall NMR rate is reported to be 43 per 1000 live births. In a view to designing the blueprint so as to lessen NMR and resources need to be prioritized, it remains crucial to understand the participation of several factors in neonate mortality.

Among the neonates of VLBW, the fundamental explanation behind expanding morbidity and mortality is expected to their immaturity in metabolic and physiologic. These neonates are inclined to high danger of hypoglycaemia, jaundice, contamination, and the chances of re-hospitalization can occur at the period of neonatal. Among the challenges in the nations like who are still developing is perhaps VLBW for Maternal and Child Health.

Almost 50% of neonates who endure discharge from the face difficulties later which will influence the nature of their life. Despite the neonatal care and related facilities improvement, mortality for neonates elevated, especially in developing nations. The morbidity and mortality pattern for the VLBW can be lessened in neonates by contemplating the variables related to the neonatal motif of mortality and morbidity.

Of all the live births there is an aggregation of neonates with very low birth weight is roughly 4%–7%. Also, to add to that for their care there is a necessity for a superior portion of resources, time, and effort. Notwithstanding this recognition, this group has been observed a rise in mortality. The contribution to the deaths of early neonates is 30%. There has been a saying that there is a direct association in survival with their respective birth weights. Also, there is an inverse correlation between the gestational age and the gravity of the ailment. Nevertheless, these circumstances solely are inadequate in describing the wide disparities in mortality in neonates among numerous neonatal intensive care units (NICUs).

Consequently, the study that current would assist with recognizing variables to add to morbidity pattern as well as to the mortality especially with the exceptional cases of admission of low-birth-weight neonates in the Neonatal Intensive Care Unit (NICU). Essential advances can be taken to lessen mortality in VLBW neonates.

CHAPTER 2

CONCEPTUAL FRAMEWORK

The reason for selecting the mentioned research problem for my study is “Premature birth” which could be a leading factor for the mortality and morbidity among VLBW neonates. Premature birth is where gestational period is less than 37 weeks or as defined by WHO is the birth weight under 1500g during birth regardless of gestational time.

To carry on the current study, a neonate Intensive care unit at a tertiary care hospital in Chandigarh have been identified where all the VLBW neonates admitted there would be examined from January 2019 – December 2019 with certain inclusion and exclusion criteria which has been discussed further in the document.

CHAPTER 3

REVIEW OF LITERATURE

<u>Author (year)</u>	<u>Study location</u>	<u>Sample size</u>	<u>Sampling techniques</u>	<u>Salient features</u>
Ballot ³ , Daynia (2015)	Charlotte Maxeke Johannesburg Academic Hospital	562	Retrospective study	This review study meant to survey mortality and morbidity in exceptionally low birth weight (VLBW) new-born children in 2013 contrasted and comparable information from 2006/2007. During this examination, it was discovered that endurance in 2013 resembled that in 2006/2007 (73.4% versus 70.2%, $p = 0.27$). Be that as it may, endurance in youngsters whose weight was recorded as between 750g and 900g showed fundamental improvement with $p = 0.001$ from 20.4% to 52.4% in 2006/2007 to 2013. In 2013 the endurance of release for the primary determinants was resolved to be weight at the time of birth (1.005 is the proportion of the chances and 95% is the certainty stretch between 1.003 and 1.0007, revival upon entering the world (2.673, 1.375–5.197). The significant reason for the mortality

				closed to be outrageous prematurity followed by HMD and NEC.
Jaiswal ¹¹ , A., Murki, S., Gaddam, P. <i>et al.</i> (2011)	Fernandez hospital, Hyderabad	3070	Prospective cohort study	In the examination, late preterm babies (363) and new-born children (2707) were incorporated. 257 (70.8%) of late preterm and 29.1% (788) of new-born children should ask inpatient morbidities affirmation inside the initial life of 7 days. 55.1% were neonatal jaundice that required phototherapy. Following this by the morbidity of 10.5% in respiratory and hypoglycaemic with 8.8% was the morbidity that continually distinguished in late preterm babies. Furthermore, the most generally perceived morbidity in new-born children is neonatal Jaundice with 24.8%. When compared with term infants, it was found out that the risk for the overall morbidity was 5.5 times high among the infants of the late preterm. Other factors that play a vital contribution to the morbidities of neonatal are caesarean delivery, IUGR (Intrauterine growth restriction) and multiple pregnancy status.
Sangama m ²⁴	KMCT clinical school, Kerala	1002	Cross-sectional study	To evaluate mortality, morbidity for perinatal in the low-birth-weight infants and order take the decision

Riza (2015)				related to the factors of socio-segment and maternal wellbeing. The mothers of every child with more than 1000g of birth weight, however under 2500 g were remembered for examination. It was inferred that the chances of greater death rate in the children with less than 1500g of birth weight on comparing with infants with birth weight between 1.5kg and 2.5 kg. The most well-known perinatal entanglement of 16.77% of Hyperbilirubinemia trailed with 14.99% of Hypoglycaemia and 14.86% of Hyaline membrane disease. It has been noted that mostly the maternal confusions concerning LBW anaemia with 43.36% and 17.6% is the problem of hypertension during pregnancy. Mortality of 49 in early neonates were representing live infants with 5.29%. The distinguished significant causes were 3.56% of hyaline membrane sickness and 1.11% of birth asphyxia.
Tim Schindler ² , Louise Koller Smith,	New South Wales, Australia	4454	Retrospective cohort study	Information of live-born babies in 10 NICU's (under 32 weeks of development) showed that there happened 345 (7.7%) deaths out of 4454 live new-born children. The

Kei Lui, Barbare Bajuk ND Srinivas Bolisetty (2017)				most regular reason for death across all gestational gatherings was distinguished as major IVH (Intraventricular haemorrhage) trailed by Intense Respiratory Sickness and Sepsis.
S., Kabilan ²³ & Kumar, Mekalai (2018)	Govt. Stanley Medical College, Chennai, Tamil Nadu	154	Retrospective cross-sectional study	In the study were the VLBW babies enrolled in the medical college was 154, out of which 75 (48.7%) were females and 79 (51.3%) guys, most of which were in the gestational age between 33 weeks and 36 weeks (44.2%, n=68), the maternal sickness was available in 55 moms (33%) and gestational hypertension being the most well-known (9.6%, n=14). The two crucial factors studied in this which are answerable for the VLBW baby's mortality are mechanical ventilation and weight at the time of birth. RDS (respiratory disease syndrome) is the vital cause that has been identified for morbidity (33.6%, n=56) followed by asphyxia and sepsis. A mortality rate of 40.3% (n=62) was seen in this study.
Rather ²² , Ghulam &	Paediatrics and Neonatology	4100	Prospective study	The frequency for late preterm children was 11.58%. Contrasted

Jan, Muzafar & Rafiq, Wasim & Gattoo, Imran & Hussain, Sheikh & Latief, Mohmad. (2015).	Division at G.B. Gasp General Clinic at Jammu and Kashmir			with term babies, late preterm newborn children were discovered to be at altogether higher danger include Hypoglycaemia, Sepsis, Mechanical Ventilation, Jaundice, and Perinatal Asphyxia. Early neonatal mortality in late preterm children was determined to be 2.5% or 25/1000 live births.
Rasania ²¹ , Manish & Muley, Prasad. (2017).	Dhiraj emergency clinic, Gujarat	1193	Retrospective cohort study	It was discovered that out of 122 which were late preterm conceded in the SNCU. It was announced that birth asphyxia is 16.39%, hyperbilirubinemia is about 32.78%, sepsis is 28.6%, and RDS consist of 7.37%. The discovered morbidities to be moderately higher in a neonate born at late preterm.
Kaur ¹⁴ , A., Thapar, K., Chhabra, G., & Jaslean, (2016)	Shri Guru Ram Das Institute of Medical Sciences and Research, Amritsar	75	Observational study	Sepsis (77.3%) was recognized as the significant reason for morbidity in VLBW children followed by HMD (Hyaline membrane disease) (66.7%) and Jaundice (65.3%). Out of the absolute nine mortality, three cases were discovered to be related for p value< 0.001 of IVH. In these three cases, the only point that was analogous with p-esteem <0.001 is pneumothorax.

Basu S ⁴ , Rathore P, Bhatia BD (2008)	University Hospital of the Institute of Medical Science, Banaras Hindu University	75	Retrospective study	The study was to discover the mortality in neonates with VLBW for the paediatrics in India for three years. It has been found that the endurance for the rate of survival rate elevated with an expansion in the age of gestational and birth weight. Asphyxia in perinatal, Apnoea, Shock, and sepsis in neonatal are the elements found for mortality among neonatal and are responsible directly.
N Y Boo ⁶ (1998)	Kuala Lumpur's maternity hospital	329	Prospective and observative study	From the study, the probable conditions for the neonates' mortality and morbidity at early deliveries are 33.2% with respiratory distress syndrome, 17.9% with intraventricular hemorrhage, and 29.6% with septicemia. Furthermore, the rate of fatality was greater and statistically significant, 95% C.I., for the neonates whose weight at the time of birth was lesser than 1000g, accompanied by the below 33 weeks of gestation.
Khan ¹⁵ , Muhamm ad Rehan et al	Aga Khan University Hospital (AKUH), Karachi	1885	Case series	It was found that the usual prevalent morbidity was metabolic derangement in almost 93% of the neonates. Moreover, sepsis has been observed in neonates (43.6%),

				along with RDS (35.5%) and 3.5% with intraventricular hemorrhage.
Mannan ¹⁷ , M A et al (2012)	University of Science and Technology Chittagong, Bangladesh	35	Prospective study	From the study, it has been observed that the common problems that neonates with very low birth weight are 40% with apnea, further, 5.71% with anaemia, 5.71% with IVH, 2.86% with RDS.
Brothwood ⁷ , M., Wolke, D., Gamsu, H., Benson, J., & Cooper, D. (1986).	Department of Child Health and Computer Unit, King's College School of Medicine and Dentistry, London	271	Retrospective study	On examination, it has been concluded that gender has a statistically significant association with morbidity and mortality pattern. VLBW males suffer from more in terms of mortality and complexities of postnatal than females with VLBW. Further, it has been examined that male neonate are suffering more from RDS than female neonates. On top of it, survived male neonates suffer from high difficulties than female neonates.
Baki M ¹ , Haque A, Mohsin F, Nahar J, Akhter S, Begum T, Nahar N (2012)	BIRDEM general hospital, Bangladesh	64	Retrospective study	The study concluded that the mortality rate for the neonates having weight less than 1500g at the time of birth is constituted with 30%. The research further evaluated the association of morbidities for the neonates with preterm and weight at the time of birth less than 1500g. On doing the univariate

				analysis so as to define the risk determinants for the mortality is 45.3% with sepsis followed by 23.4% with respiratory distress syndrome. Moreover, the mortality rate for the vital risk determinants is neonates with a weight less than 1000g along with below 30 weeks of gestational age and respiratory distress syndrome were found in the aforementioned research population.
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CHAPTER 4

RESEARCH GAP

In current patterns, there is a growing infant's number that is born and accompanied by the low weight at the time of birth. Children with these VLBW children are at great risk for acquiring Hypoglycaemia, Sepsis, Respiratory misery, Hyperbilirubinemia, when contrasted with term infants.

Health experts will not only able to anticipate and manage but also will get insight to prevent complications among neonates by scrutinizing the risk determinants commencing for the morbidities of very low weight at birth.

Affirmation of morbidity and mortality in VLBW neonates incline towards the assistant for formulating as well as the interventions to be implemented to decrease the rate for the mortality in neonates.

RESEARCH QUESTION

What are the factors responsible for very low birth weight in neonates during birth leading to their mortality and morbidity?

RESEARCH OBJECTIVE

General Objective: To examine morbidity and mortality in VLBW (very low birth weight) neonates admitted to NICU in Chandigarh.

Specific Objective:

- To assess the association of the baby's sex with the outcome.
- To find out the association of gestational age with the outcome.
- To estimate the association between the gestational age and the time of neonates' death.
- To associate the correlation between the mode of delivery and outcome.

RESEARCH METHODOLOGY

DESIGN – The study is a Prospective Cohort Study. After standard data is gathered, subjects in a prospective study are then followed "longitudinally," i.e., throughout some stretch of time, to decide the exposure status.

PLACE – Tertiary Care Hospital in Chandigarh

POPULATION – All neonates associated with VLBW admitted to Neonatal Intensive Care Unit.

PERIOD – Between January 2019 and December 2019.

CRITERIA FOR SELECTION:

Inclusion:

All the children admitted in NICU with low birthweight between January 2019 to December 2019.

Exclusion:

1. Neonates who are already having serious congenital abnormality.
2. Chromosomal syndromes in neonates that are to be determined by clinically.

All neonates with VLBW will be inclusive for this study only after obtaining consent from their parents on the behalf of their new-borns to clinically correlate the data for the study purpose. Ethical committee clearance will also be obtained.

PLAN OF ANALYSIS

Microsoft Excel 365 would be used for data analysis. Responses from the questionnaire will be tabulated and recorded on Microsoft excel and will be compared accordingly for the desired results.

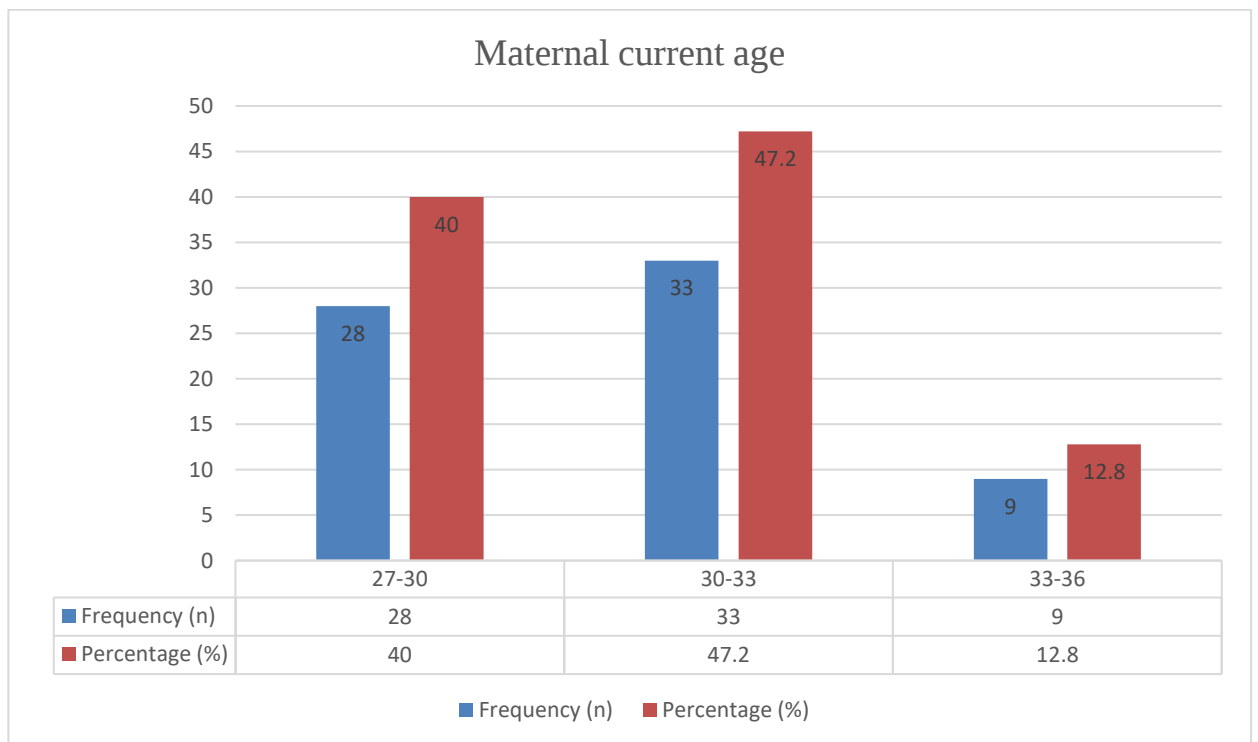
CHAPTER 5

RESULTS

A total of 70 responses has been recorded for the study described further in details.

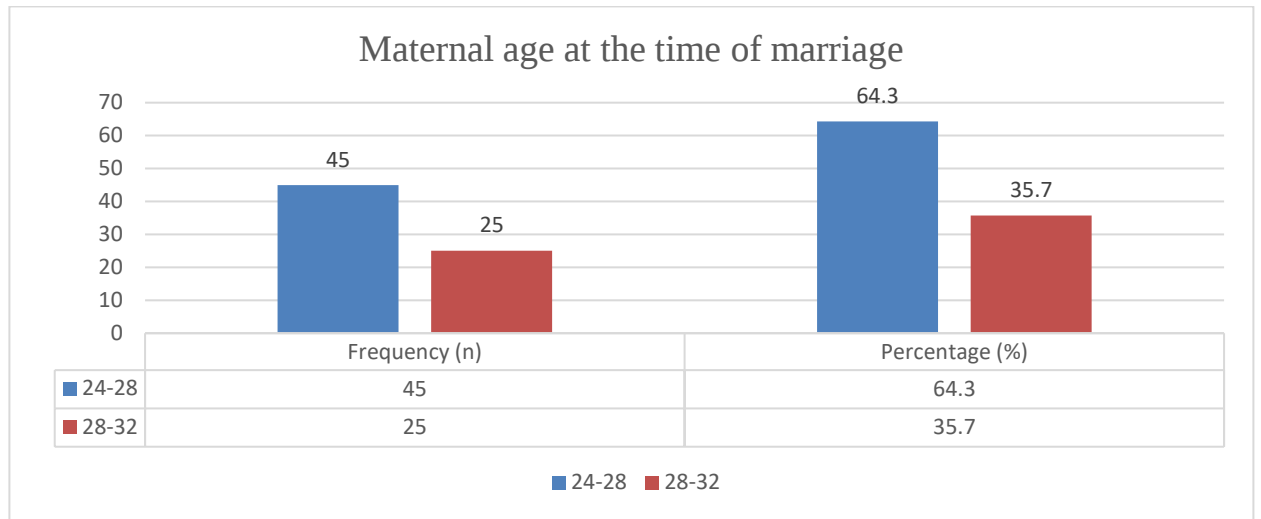
MATERNAL DETAILS:

Table 9.1: Maternal details for the the current age



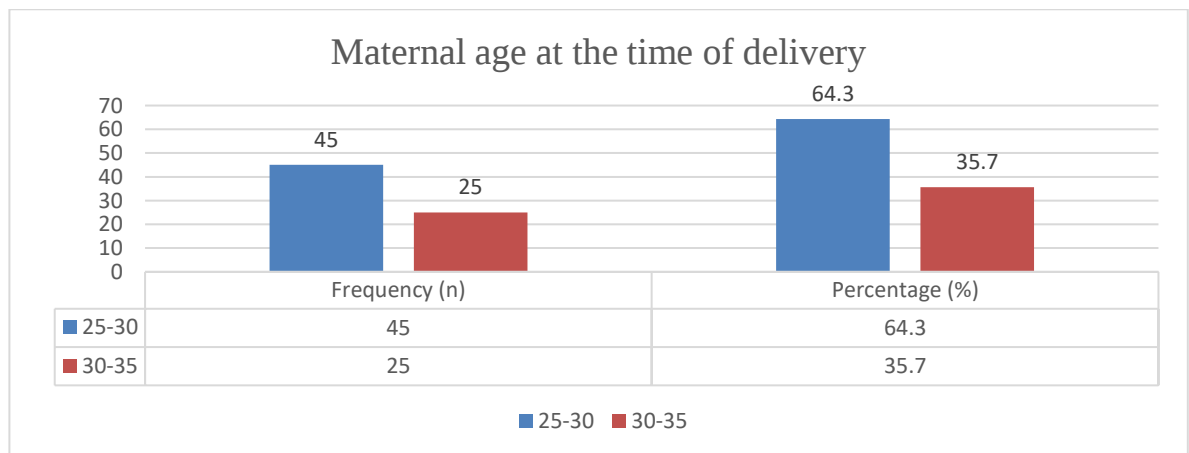
The above graph for the maternal current age depicts that 40% are between the age of 27 years and 30 years, 47.2% are between the age of 30 years and 33 years and for the age between 33 years and 36 years is 12.8%.

Table 9.2: Maternal age at the time of marriage



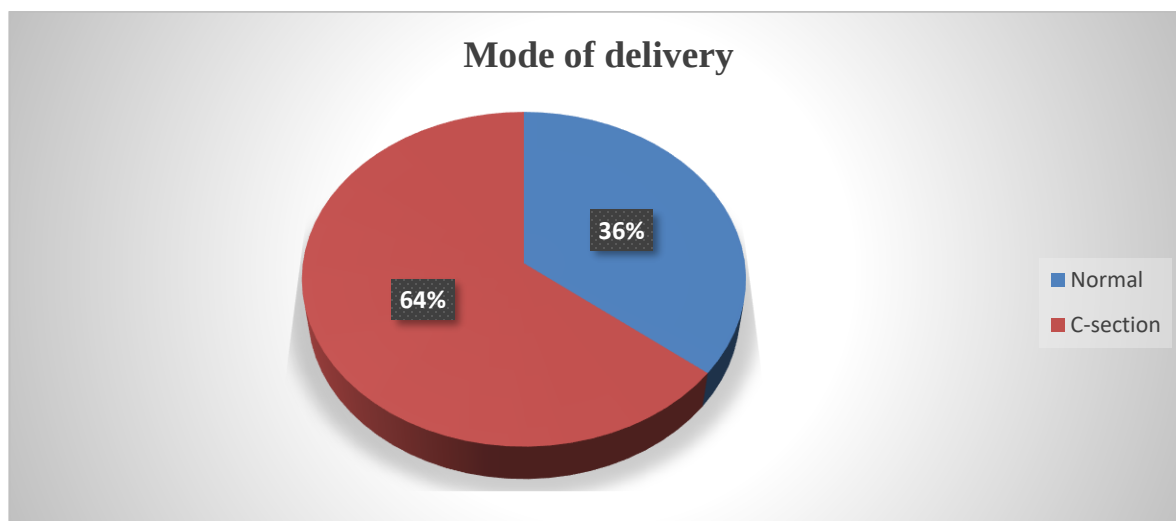
The prediction for the maternal age at the time of marriage found out that 64.3% are between the age of 24 years and 28 years and 35.7% are between the age of 28 years and 32 years.

Table 9.3: Maternal age at the time of delivery



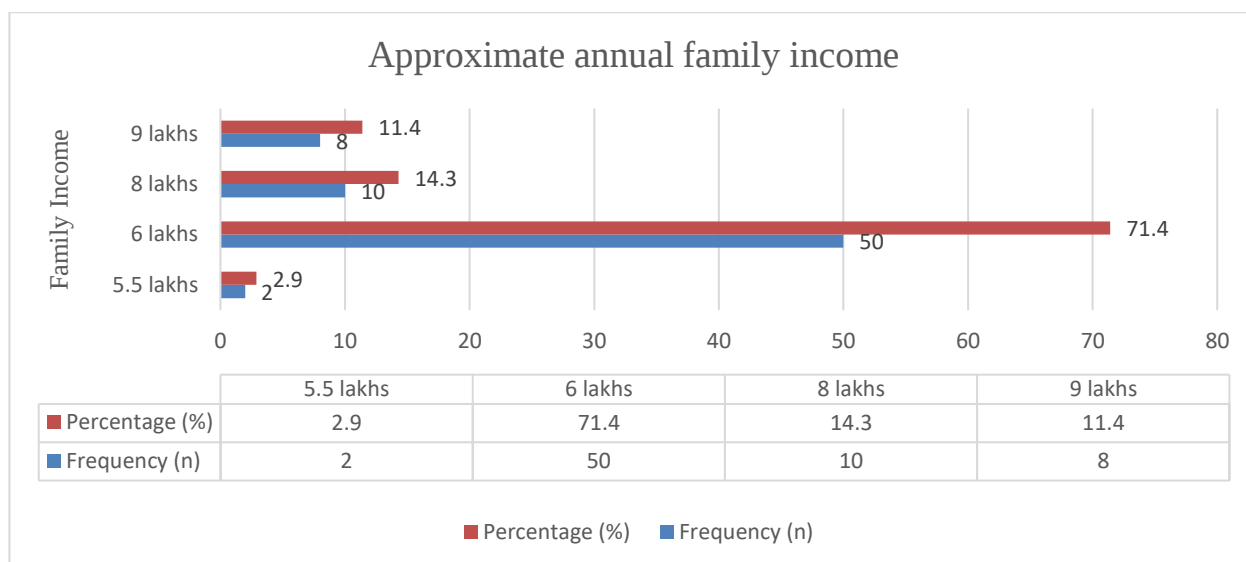
The graph about the maternal age at the time of delivery depicts that 64.3% are between the age of 24 years and 28 years and 35.7% are between the age of 28 years and 32 years.

Table 9.4: Mode of delivery



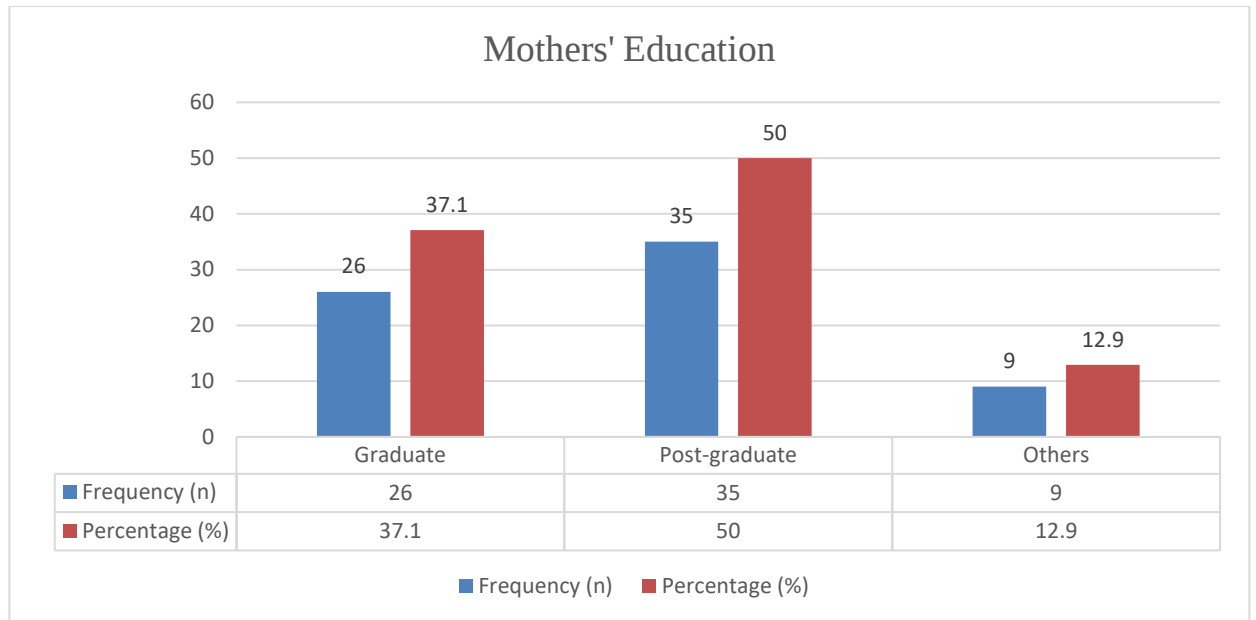
The findings from the pie chart for the normal delivery mode from the sample size is 36% and 64% is for the C-section.

Table 9.5: Approximate annual family income (in Rupees)



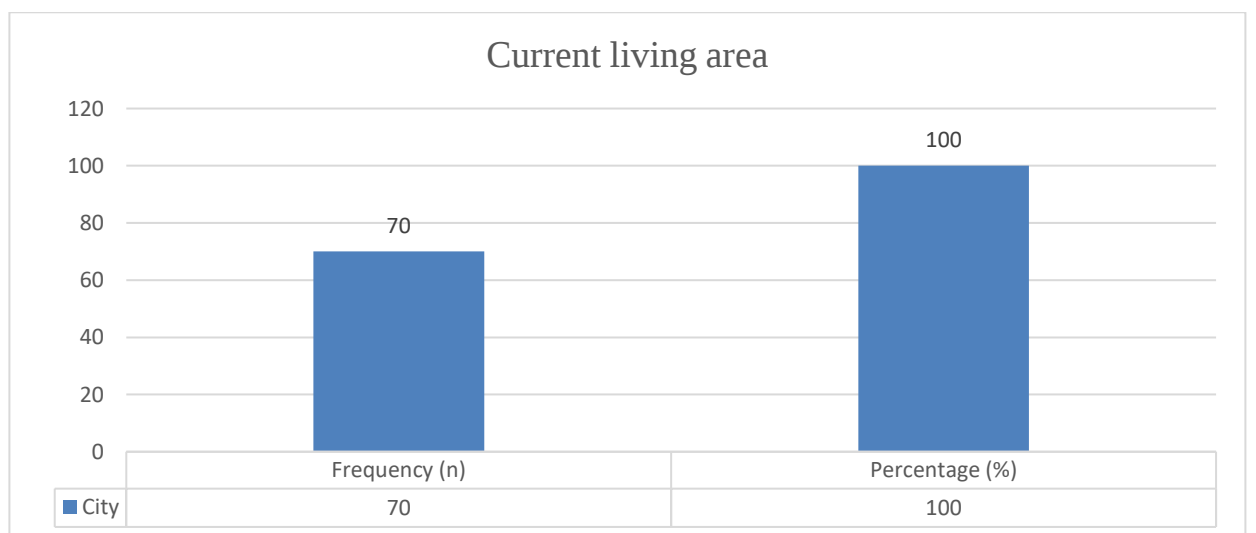
The approximate annual family income among the sample size came out to be 2.9% with 5.5 lakhs, 71.4% with 6 lakhs, 14.3% with 8 lakhs and 11.4% with 9 lakhs.

Table 9.6: Mothers' Education



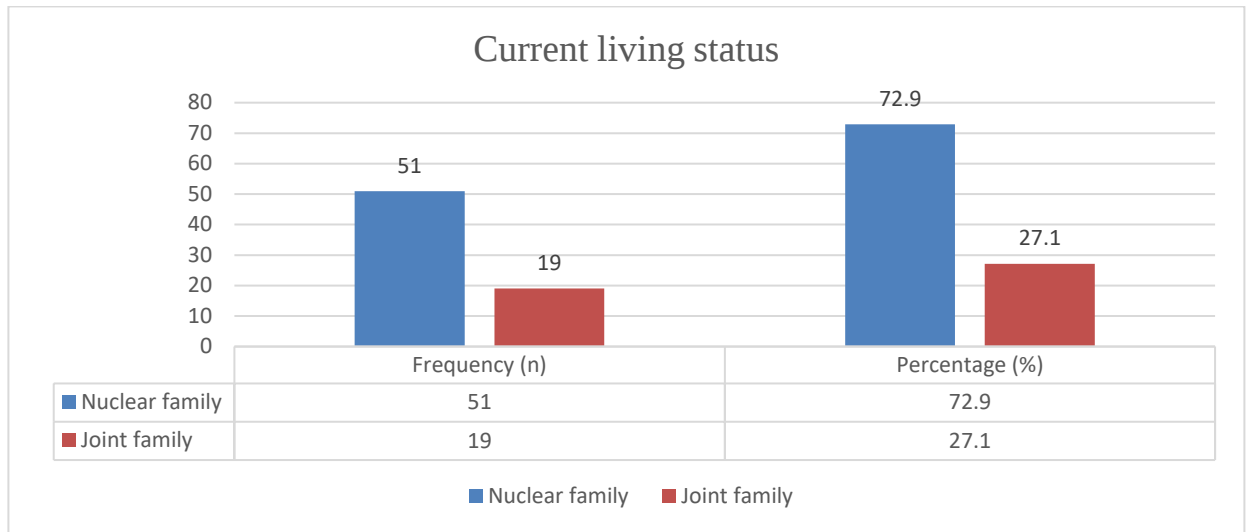
Result for the above graph depicts that most of the mothers' qualification is post-graduates with 50%, while graduates with 37.1% and others with 12.9%.

Table 9.7: Current living area



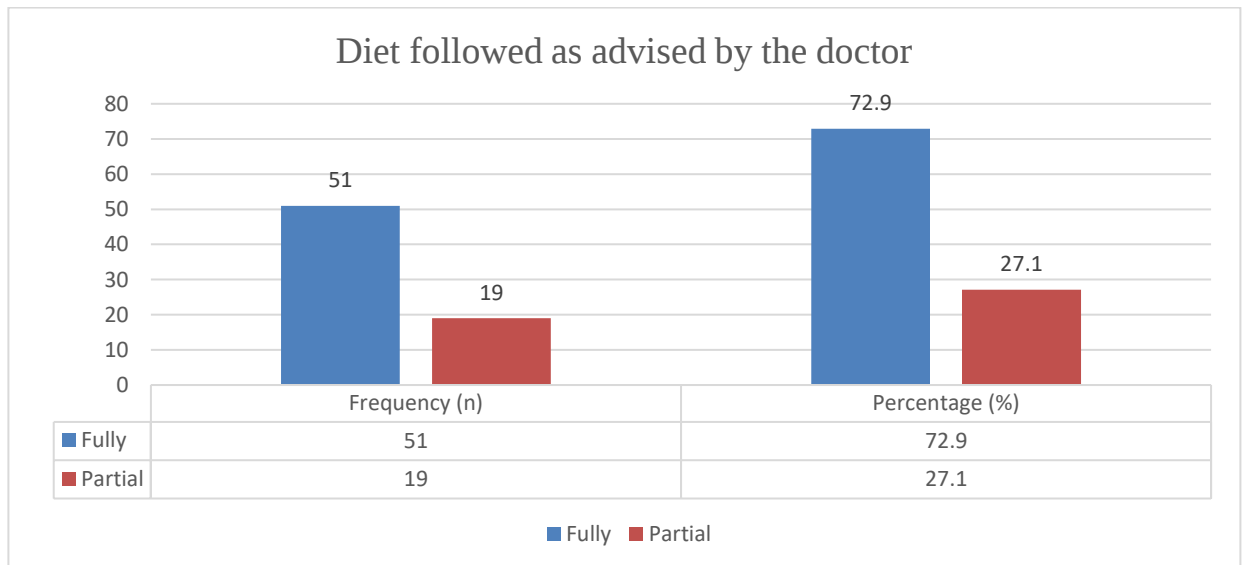
The graph displays that the individuals of the sample size are entirely from the city.

Table 9.8: Current living status



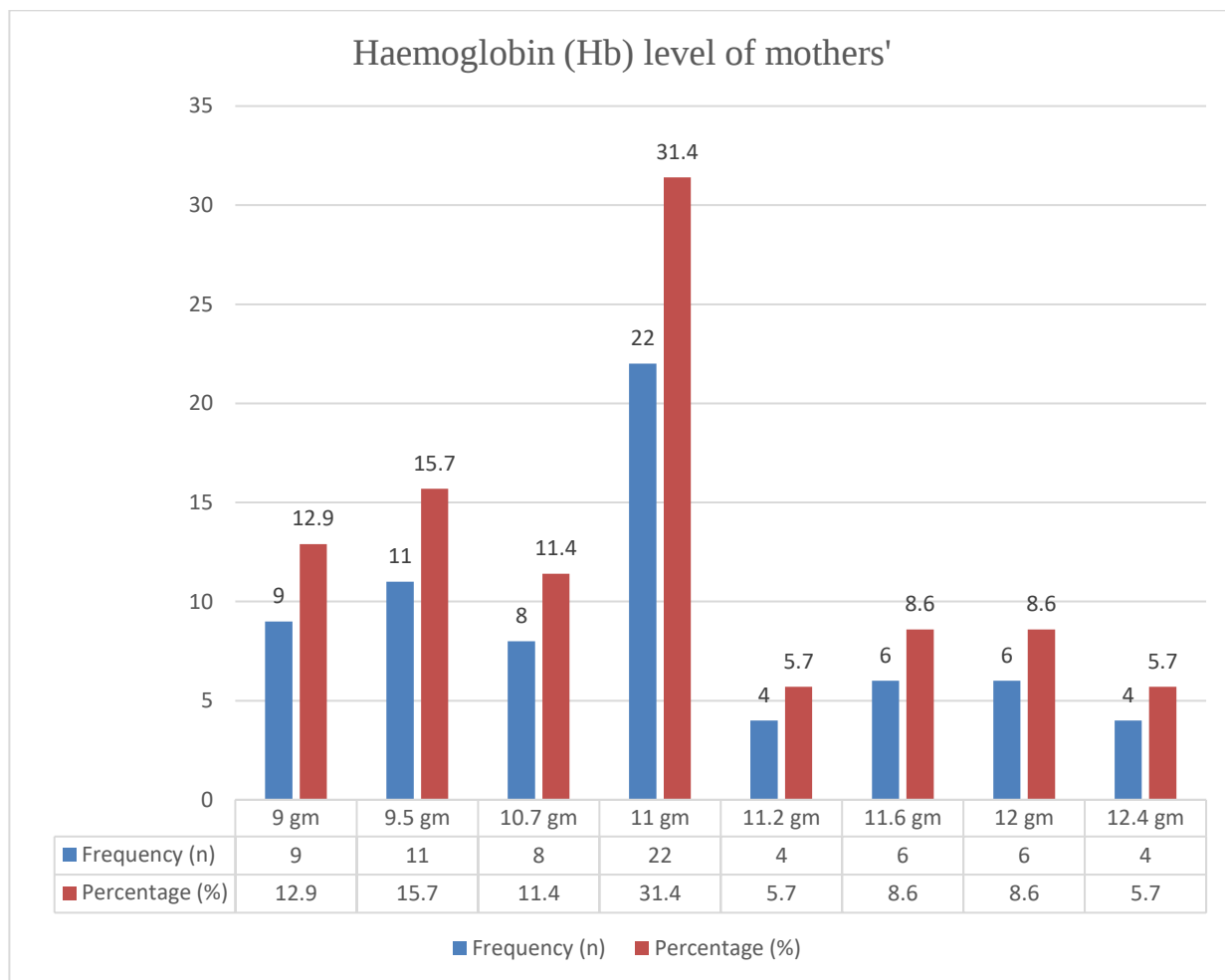
The graph for the current living status shows that the per cent of sample living in a nuclear family is 72.9% and 27.1% are with joint family.

Table 9.9: Diet followed as advised by the doctor



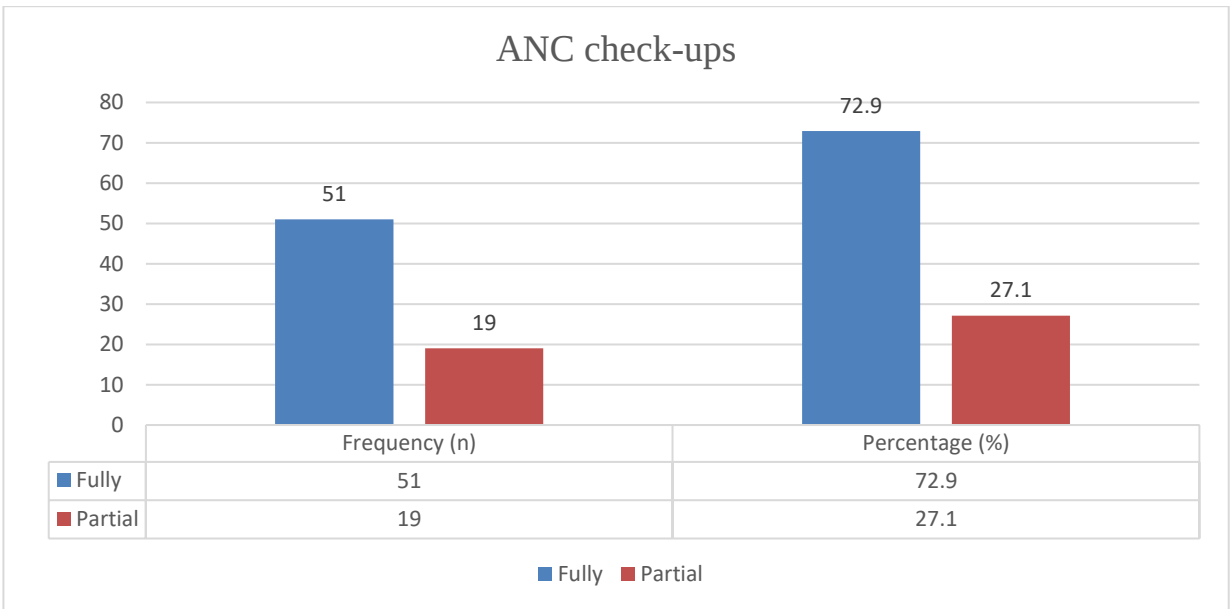
From the graph it can be predicted that 72.9% have fully followed the diet as advised by the doctor and 27.1% have followed partially.

Table 9.10: Haemoglobin (Hb) level of mothers'



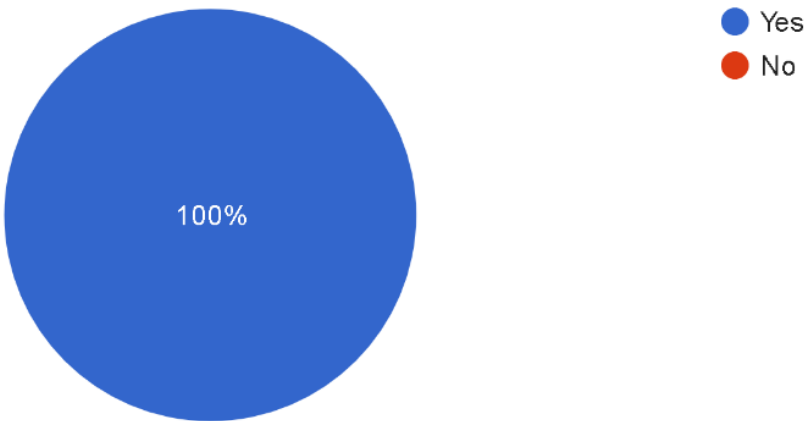
The above data about the haemoglobin level of the mothers' found to be as 12.9% with 9gm, 15.7% with 9.5gm, 11.4% with 10.7 gm, 31.4% with 11gm, 5.7% with 11.2 gm, 8.6% with 11.6 gm, 8.6% with 12 gm, 5.7% with 12.4 gm.

Table 9.11: ANC check-ups



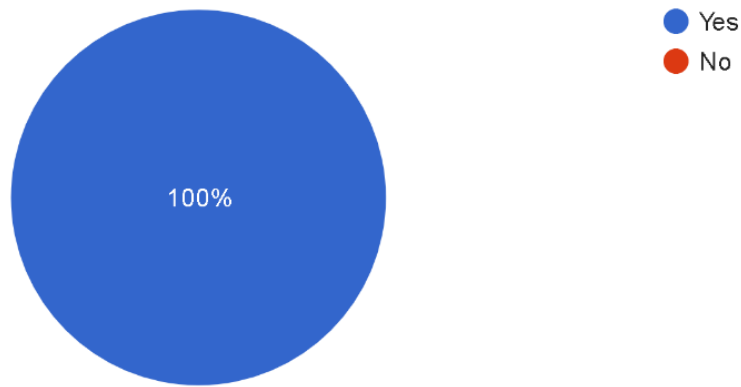
ANC checp-ups bar graph depicts that 72.9% have undergone with fully ANC check-ups and 27.1% have followed partially ANC check-ups.

Table 9.12: Consulted doctors during pregnancy



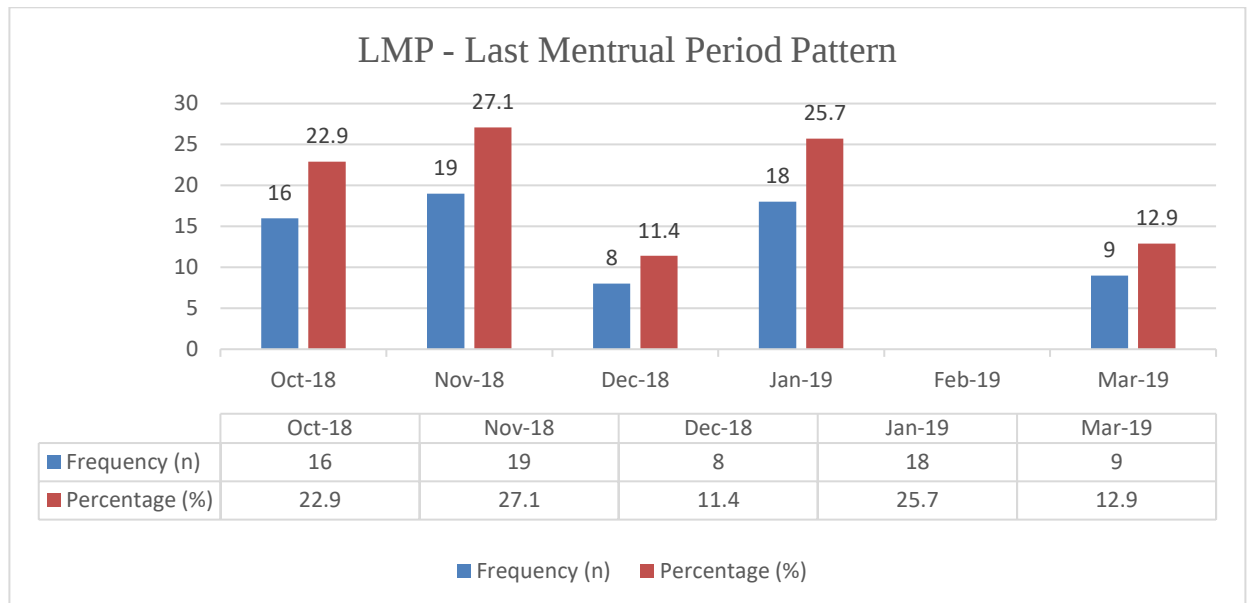
Findings from the pie chart showcases that 100% of the sample size have consulted doctors during pregnancy.

Table 9.13: Surveillance for pregnancies done at every 5 weeks



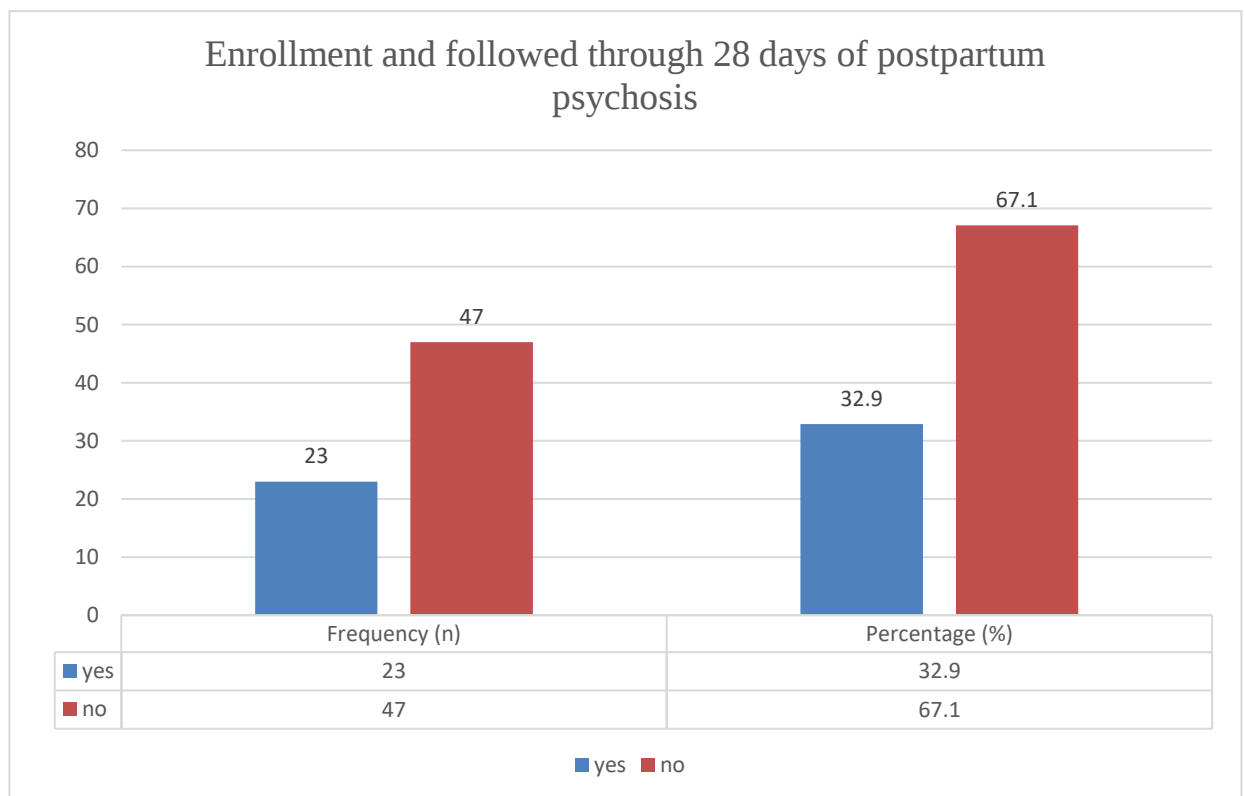
The above pie chart for the Surveillance for pregnancies done at every 5 weeks predict that 100% of the sample size has undergone surveillance for pregnancies done every 5 weeks.

Table 9.14: LMP - Last Mentrual Period



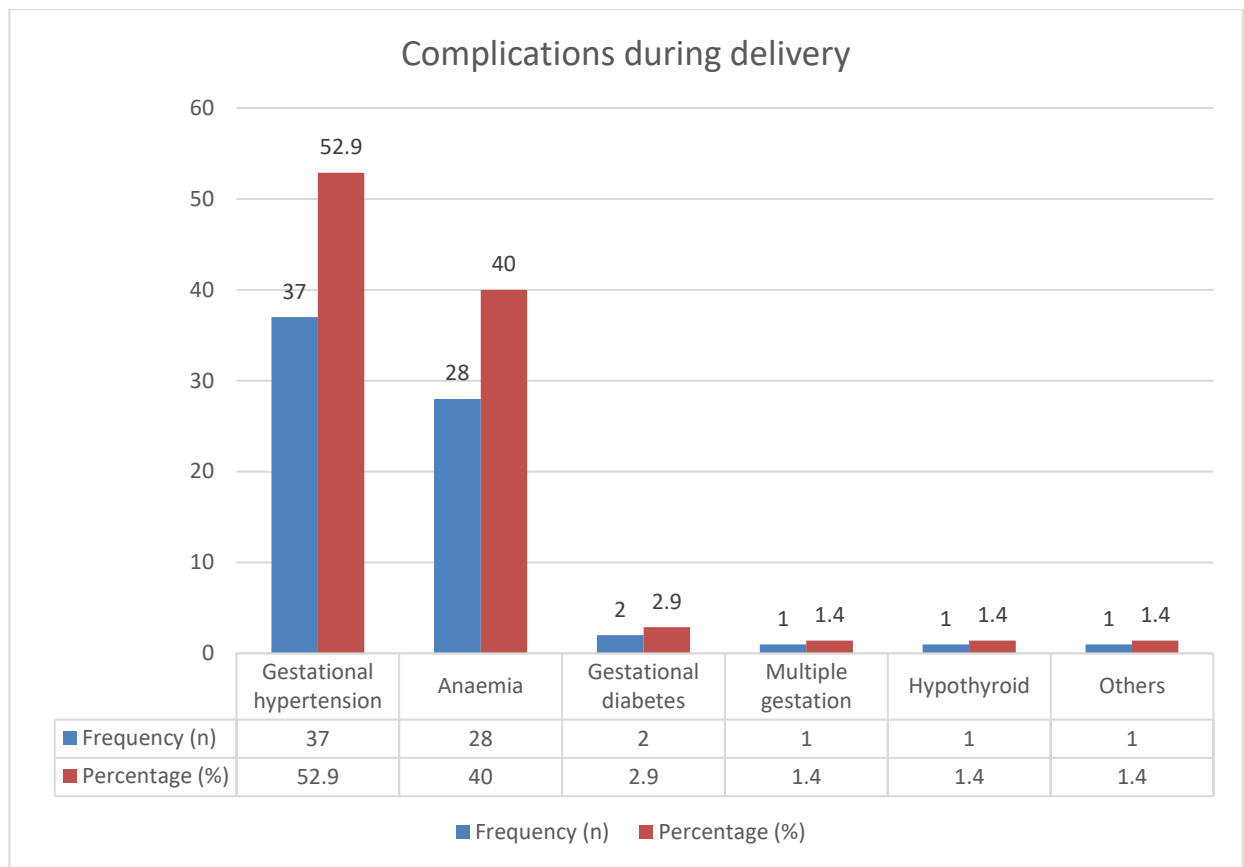
From the above graph, it came out that the pattern for the LMP is 22.9% for October -2018, 27.1% for November -2018, 11.4% for December-2018, 25.7% for January-2019 and 12.9% for February-2019.

Table 9.15: Enrollment and followed through 28 days of postpartum psychosis



The data from the graph for the enrollment and followed through 28 days of postpartum psychosis predict that 32.9% have opted for yes and 67.1% have opted for no.

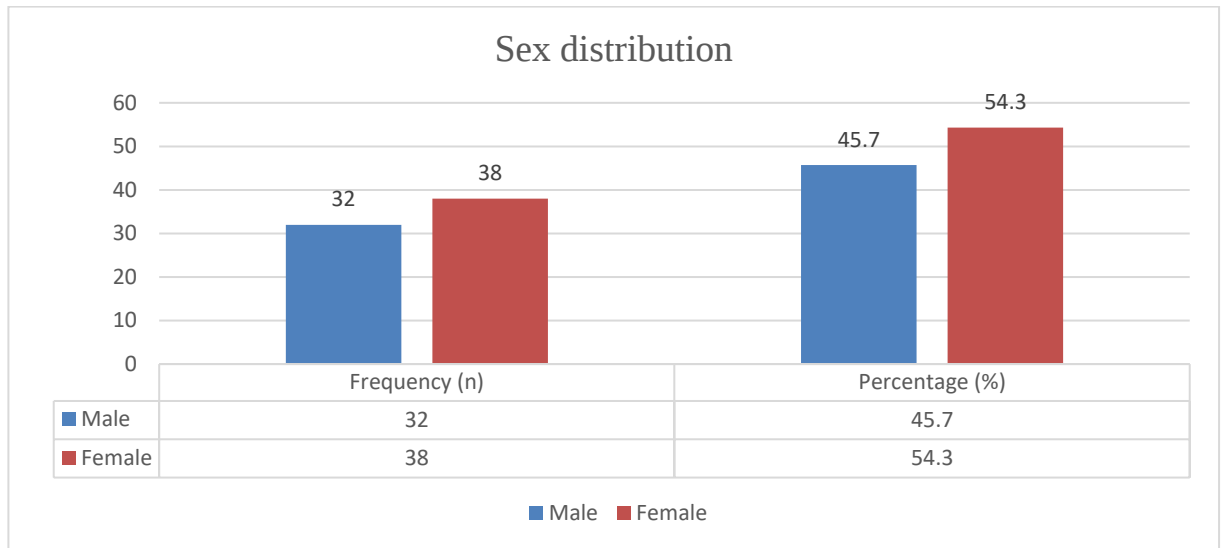
Table 9.16: Complications during delivery



The graph data for the complications during delivery which are further maternal risk factors came to be 52.9% with gestational hypertension followed by 40% with anaemia, a further 2.9% with gestational diabetes, 1.4% with multiple gestation, 1.4% with hypothyroid and 1.4% with others.

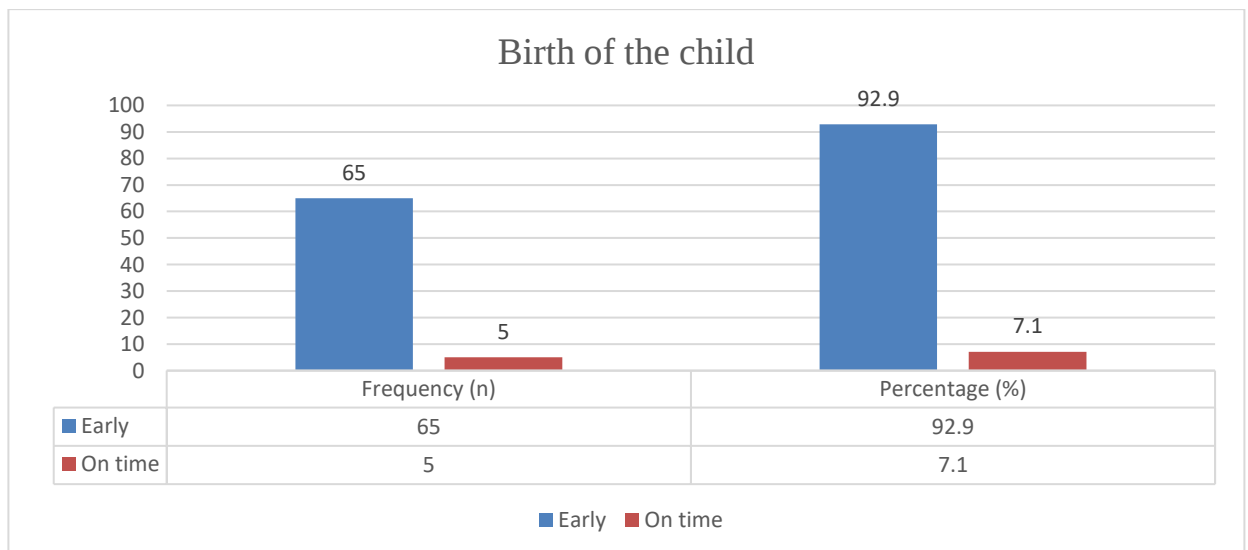
VLBW NEONATES DETAILS:

Table 9.17: Sex distribution



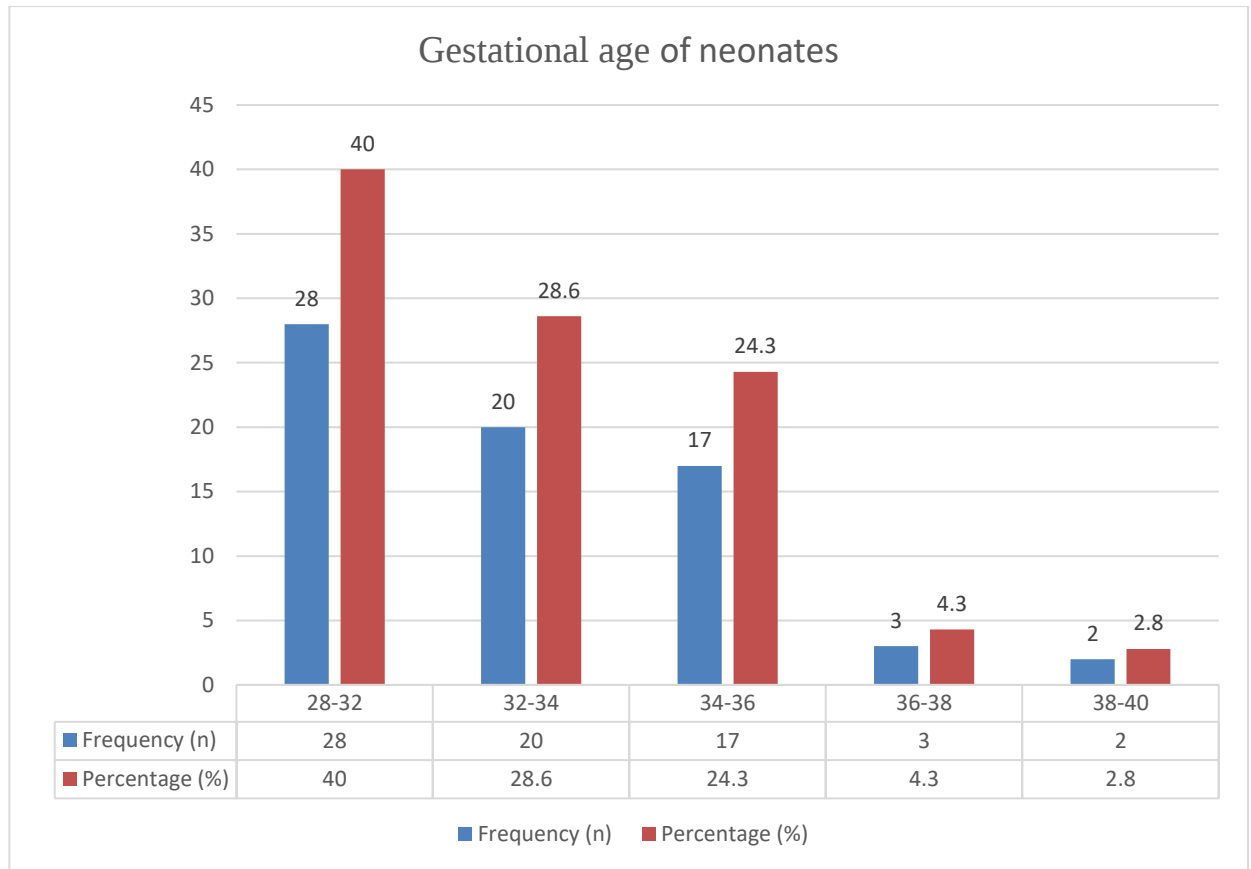
From the bar graph of sex distribution, it came out that 54.3% female and 45.7% male.

Table 9.18: Birth of the child



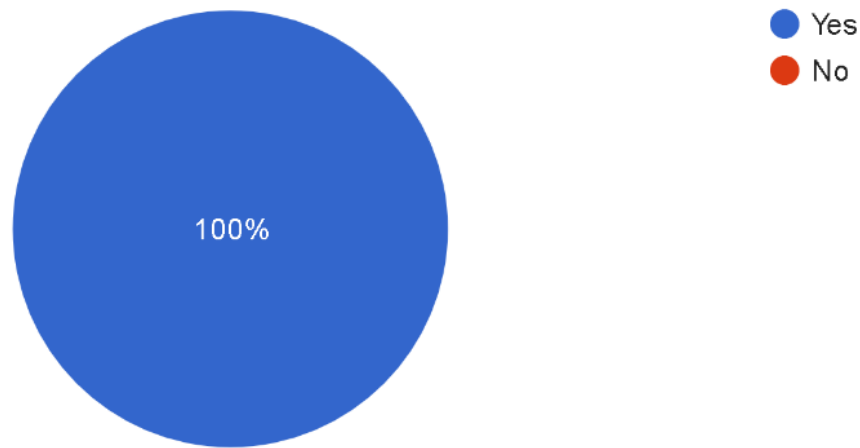
From the above graph, it has been found out that 92.9% birth is early and 7.1% is on time.

Table 9.19: Gestational age of neonates



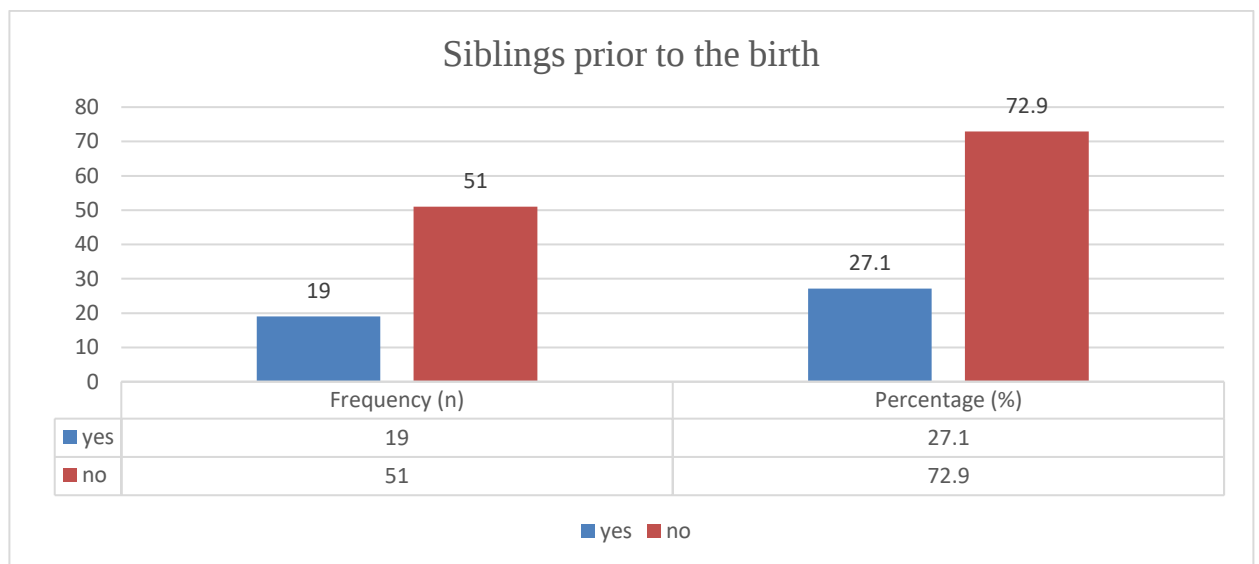
Among the sample size for the gestational age of neonates represented in the bar graph, found out that 40% are between the age of 28 weeks and 32 weeks, 28.6% are between the age of 32 weeks and 34 weeks, for the age between 33 years and 36 weeks is 24.3%, 4.3% are between the age of 36 weeks and 38 weeks and 2.8% are between the age of 38 weeks and 40 weeks.

Table 9.20: Birth weight record or certificate stating the weight at the time of born



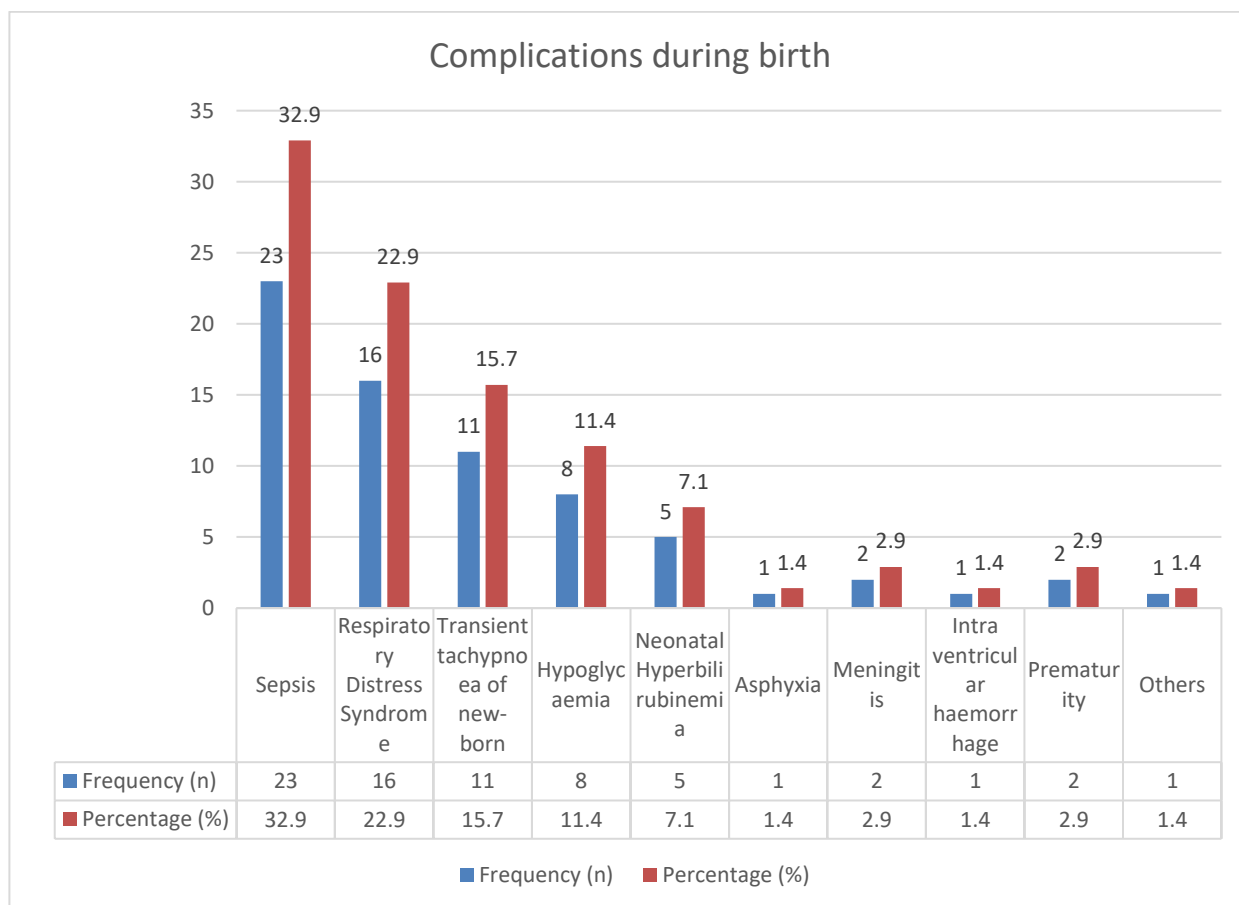
From the pie chart about the birth weight record or certificate stating the weight at the time of born is 100% recorded.

Table 9.21: Siblings prior to the birth



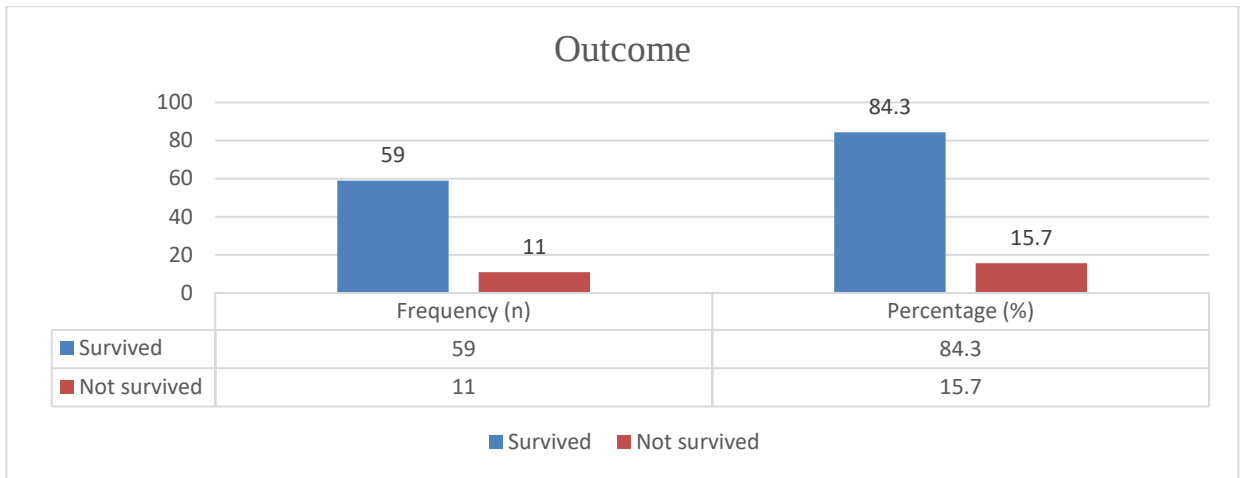
From the graph, it has been found out that 72.9% do not have siblings prior to the birth and 27.1% have siblings and among that 27.1% have a history of 1 sibling before them.

Table 9.22: Complications during birth



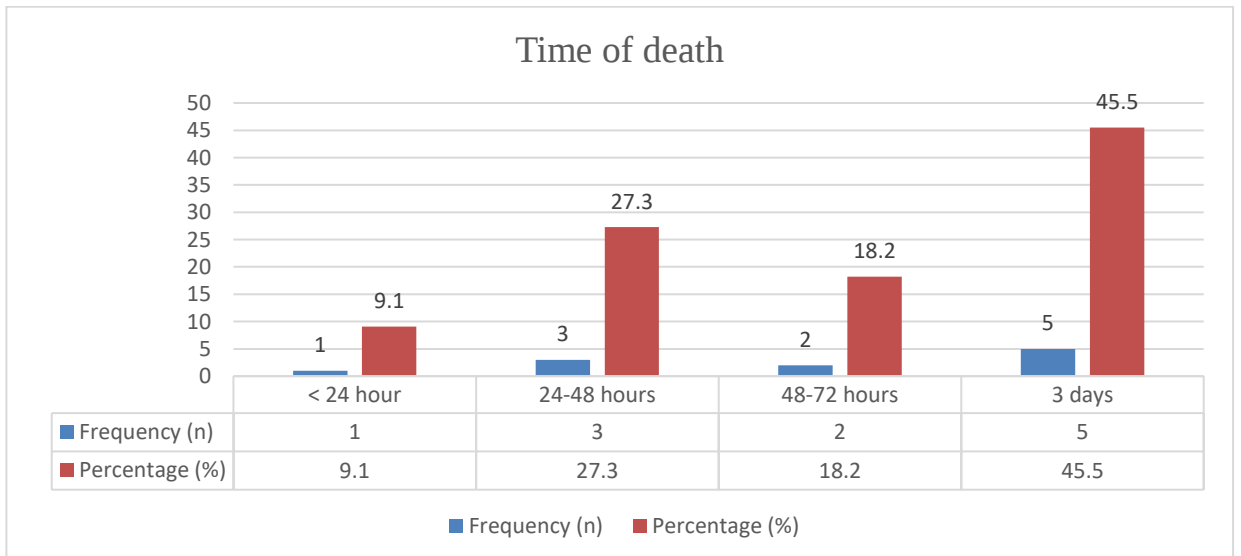
The above graph about the complications during birth came to be 32.9% with sepsis followed by 22.9% with RDS, a further 15.7% with transient tachypnoea of new-born, 11.4% with hypoglycemia, 7.1% with neonatal hyperbilirubinemia, 1.4% with asphyxia, 2.9% with meningitis, 1.4% with intraventricular haemorrhage, 2.9% with prematurity, 1.4% with others.

Table 9.23: Outcome



The graph about the outcome from the sample size, it has been observed that the survival outcome is 84.3%, while the percentage of not survived is 15.7.

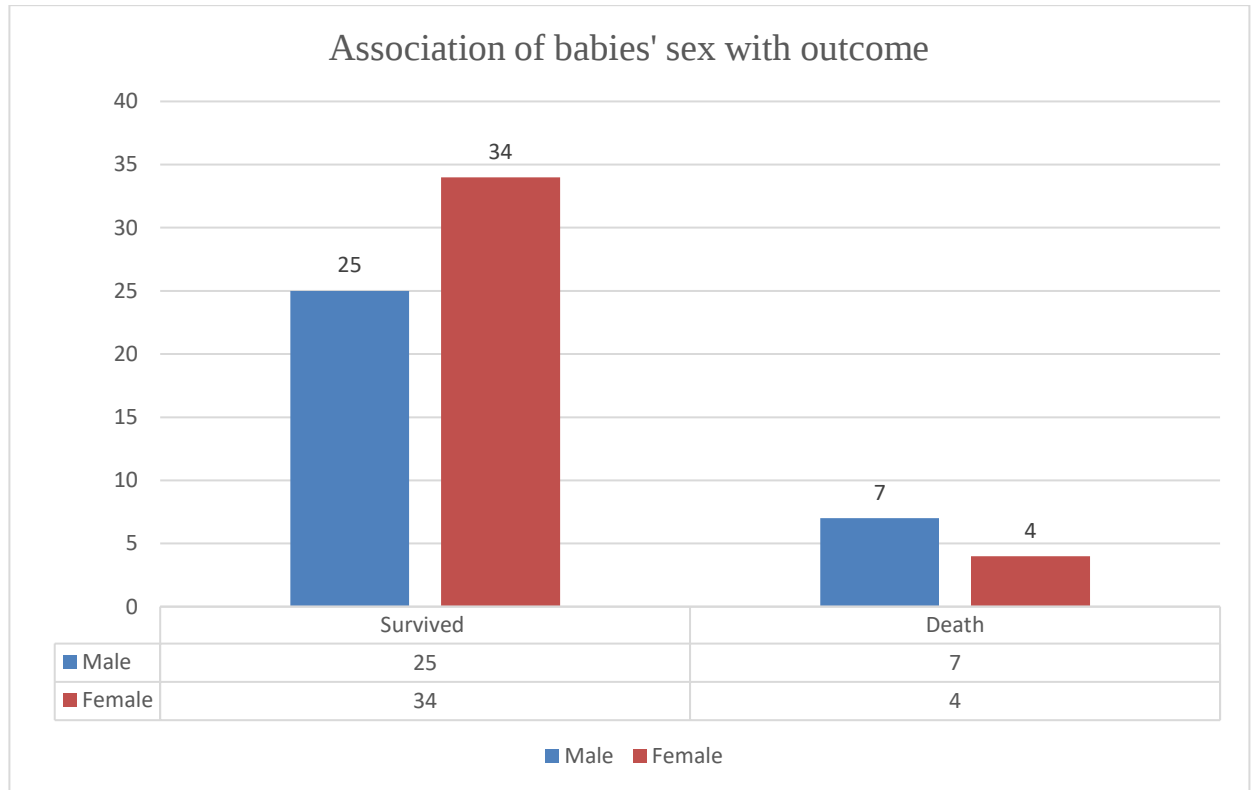
Table 9.24: Time of death



The graph about the time of death from the sample size depicts that 9.1% with < 24 hours, 27.3% for 24 hours -48 hours, 18.2% is for 48 hours-72 hours and 3 days is 45.5%.

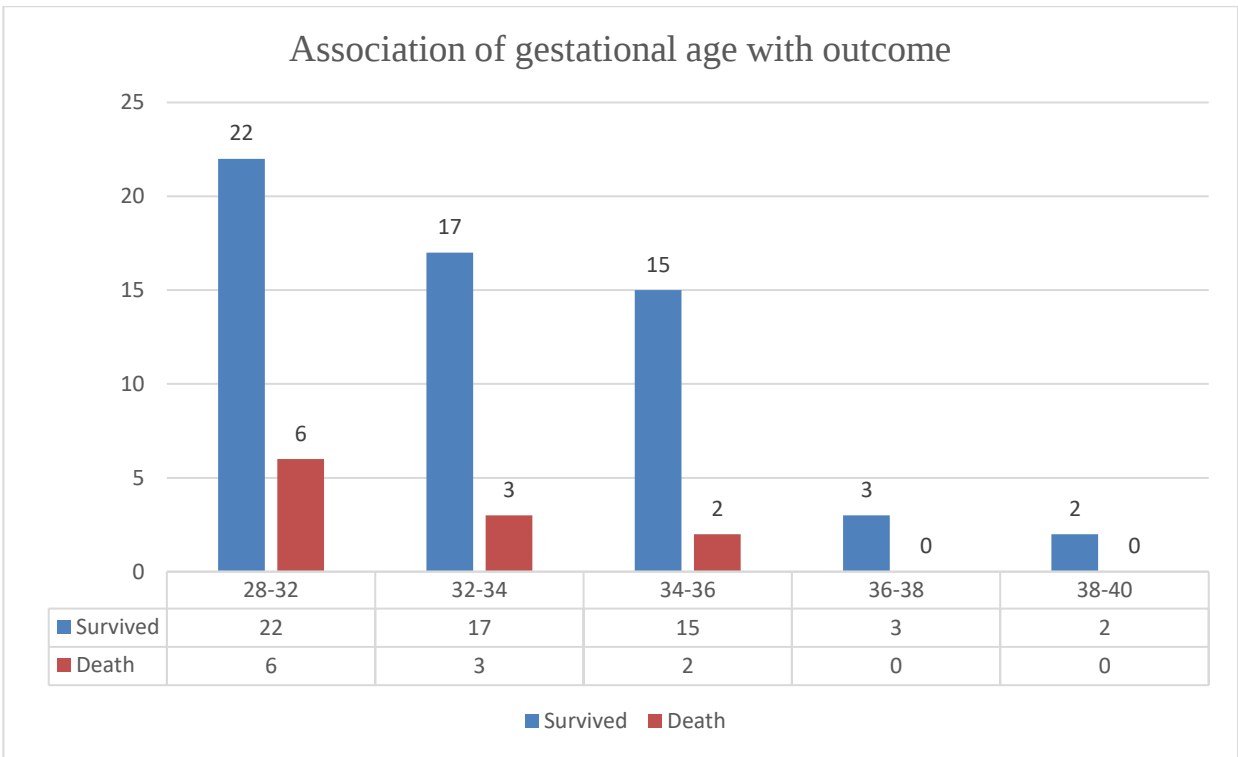
TO FIND THE ASSOCIATION FOLLOWING OBERVATIONS HAS BEEN USED

Table 9.25: Association of babies' sex with outcome



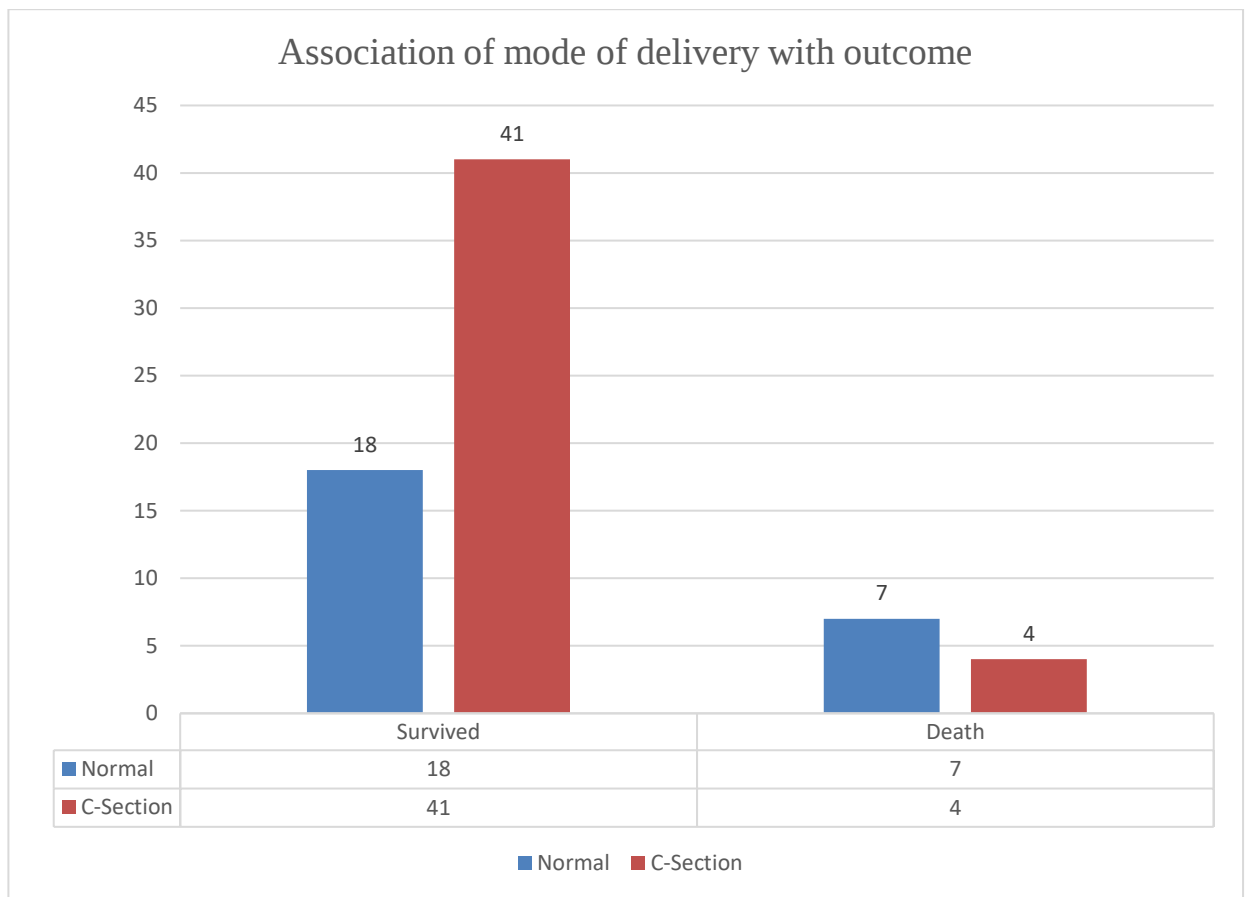
To find out the association between babies' sex and the outcome, bivariate analysis was carried out with the help of t-test in excel. It has been observed that there is no statistic significance in the association of babies' sex with the outcome with 90% of a confidence interval and p came out to be more than 0.1 ($p > 0.1$).

Table 9.26: Association of gestational age with outcome



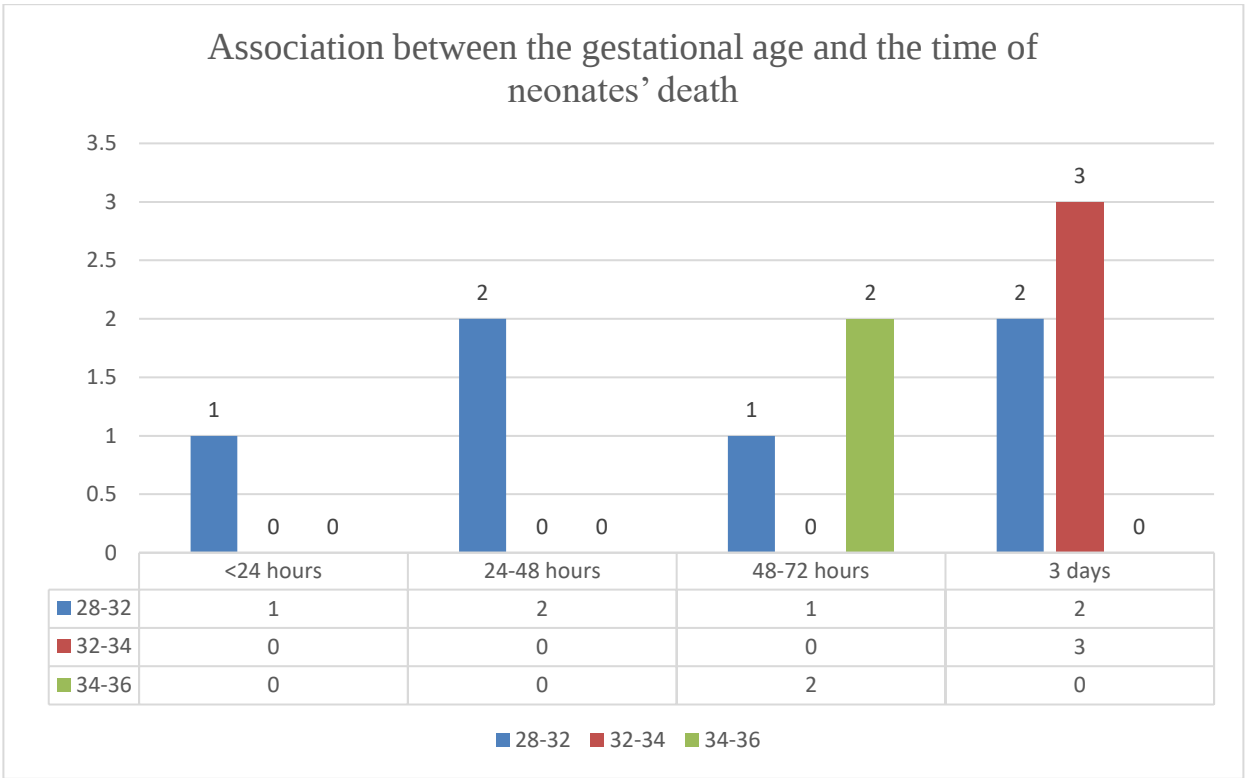
To find out the association between gestational age and the outcome, it has been emerged out from the analysis that gestational age found having statistically significant association ($p < 0.1$) with the outcome.

Table 9.27: Association of mode of delivery with outcome



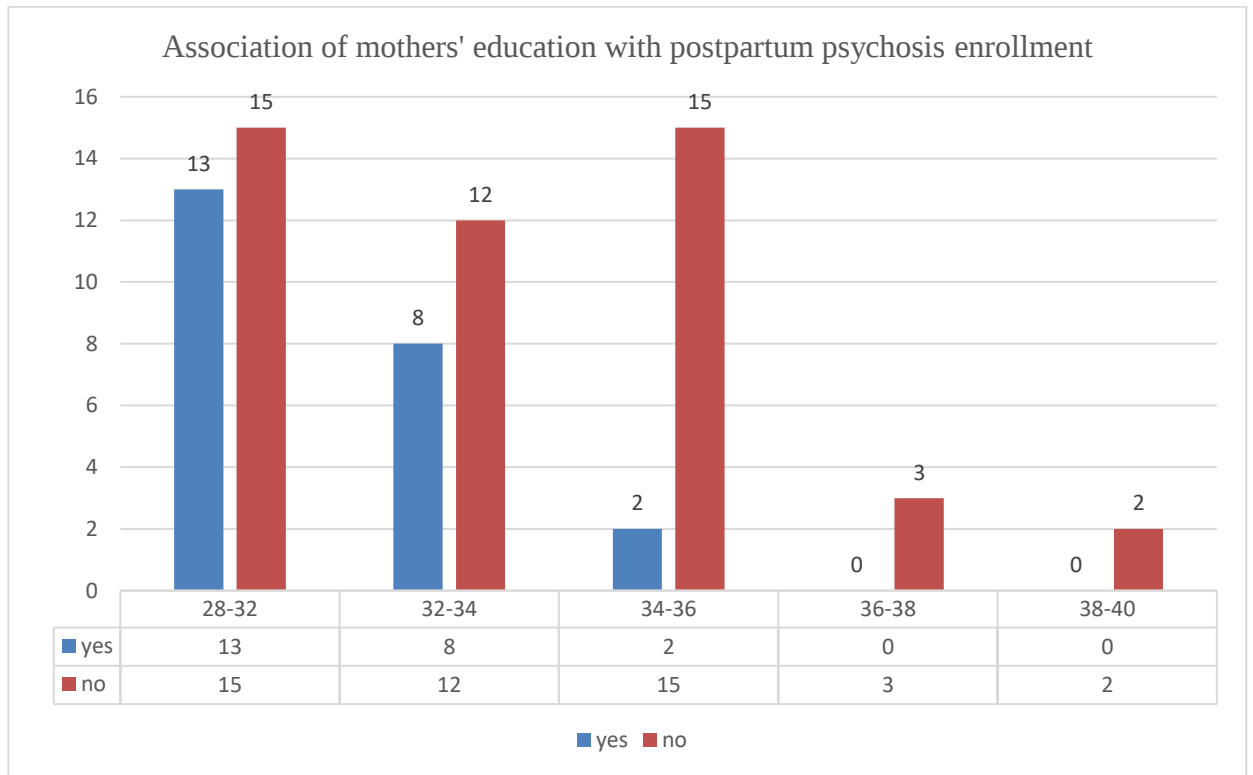
The above bar graph about the association of mode of delivery with outcome depicts that the outcome of the neonates has no statical significance with the mode of delivery ($p>0.1$).

Table 9.28: Association between the gestational age and the time of neonates’ death



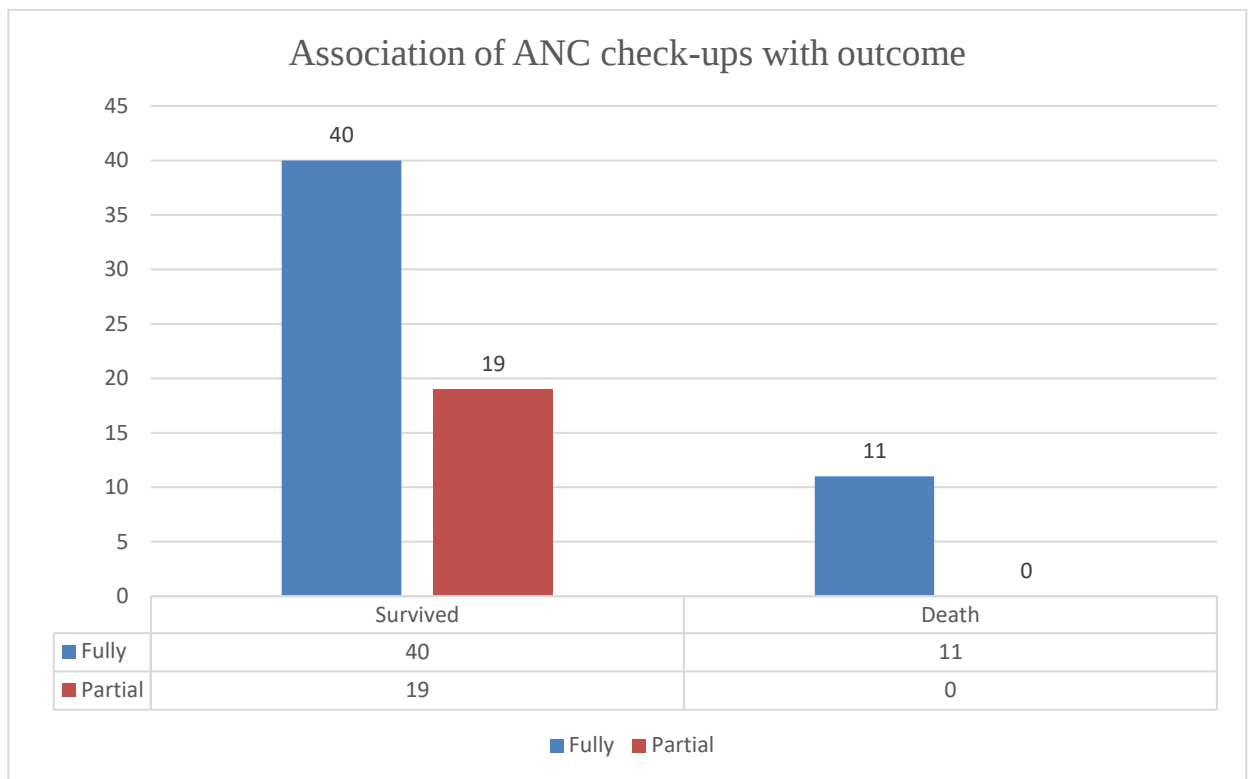
The above graph depicts that there is a statistically significant ($p < 0.1$) association between the gestational age and the time of neonates’ death.

Table 9.29: Association of mothers' education with postpartum psychosis enrollment



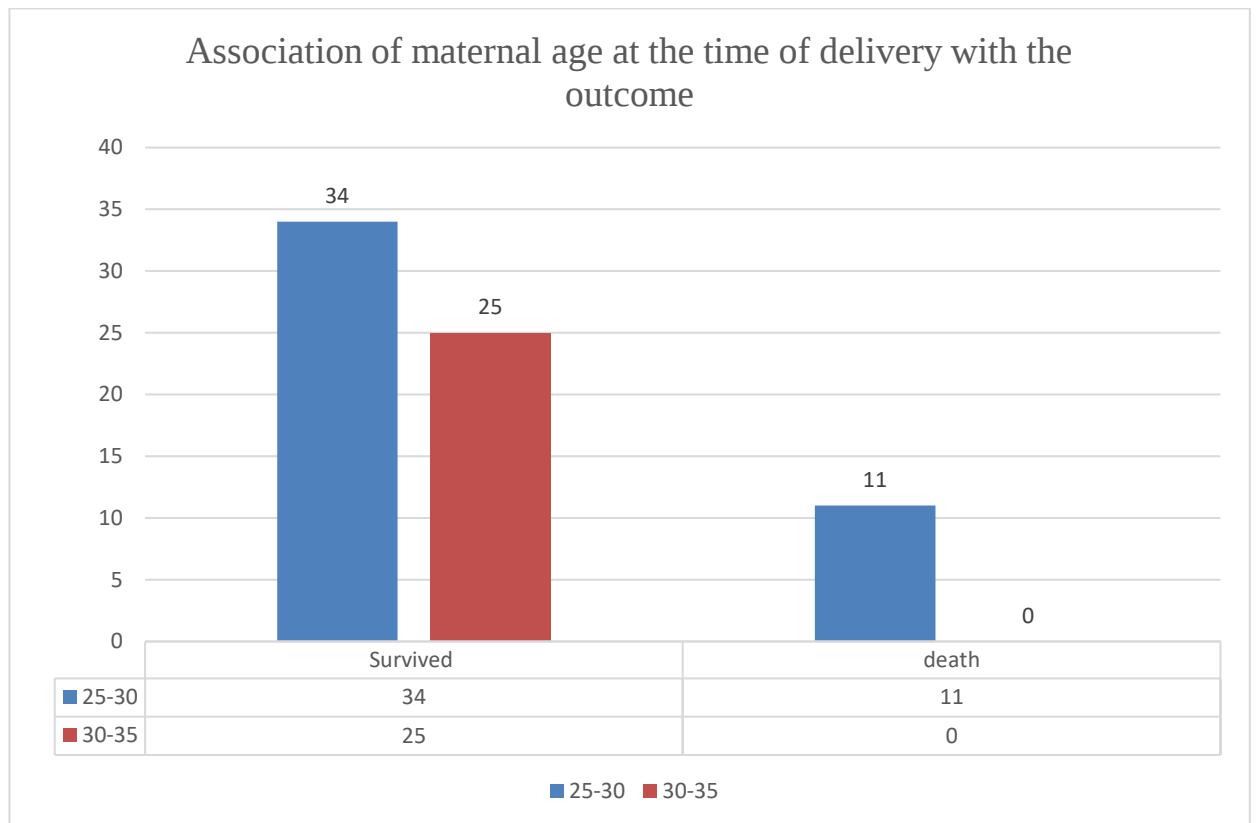
The above bar graph about the association of mothers' education with postpartum psychosis enrollment depicts that it has no statical significance ($p>0.1$).

Table 9.30: Association of ANC check-ups with outcome



The bar graph about the association of ANC check-ups depicts that there is no statical significance ($p>0.1$) with outcome.

Table 9.31: Association of maternal age at the time of delivery with the outcome



The above graph depicts that there is a statistically significant association ($p < 0.1$) between the maternal age at the time of delivery and the outcome.

CHAPTER 6

DISCUSSION

The existing research accentuates the study to examine neonates' mortality and morbidity pattern admitted to NICU in VLBW (very low birth weight) in Chandigarh, India. The current study is the retrospective study majorly conducted to estimate the potential determinants ascertaining the neonates' death. The total number of neonates as per the standards taken for the inclusion criteria is 70 throughout the time from January 2019 to December 2019.

On the whole, from the current sample size of neonates of very low birth weight neonates, 38 (54.3%) were females and 32 (45.7%) were males. Furthermore, it has been observed that the factors for the morbidity and mortality pattern noticed higher among male neonates as contrasted to females.

On throwing some ray of information at the outcomes of the present study, among the sample size of 70 neonates, 84.2% survived while 15.7% could survive. Further, to be precise with the neonates who could not survive, 64% were males and 36% were females. Brothwood et al⁷ had authenticated that the “relative vulnerability of boys to perinatal mortality and morbidity”. The study has witnessed an increased mortality rate as well as complexities regarding VLBW (very low birth weights) immediately after birth among the male neonates apart from female neonates.

The chief reason for the very low birth weight among neonates is early delivery. From the recent research done, it has been concluded that the gestational age for the majority of the VLBW neonates was between the week of 28-32 is 28 (40%) and for the weeks of 32-34 is 20 (28.6%). On top of those high prevalent mortalities and morbidities as 32.9% with sepsis followed by 22.9% with RDS, a further 15.7% with transient tachypnoea of new-born, 11.4% with hypoglycemia, 7.1% with neonatal hyperbilirubinemia, 1.4% with asphyxia, 2.9% with meningitis, 1.4% with intraventricular haemorrhage, 2.9% with prematurity,

1.4% with others has been observed among the preterm neonates with very low birth weight than the term neonates. A similar study conducted by Khan et al¹⁵ too discovered that preterm new-born became a high risk for morbidities similar to respiratory distress syndrome, neonatal jaundice, metabolic derangement, intraventricular haemorrhage.

Moreover, it has been observed that among preterm neonates there is 93% of mortality on contrasting term neonates with 7%. A study was done by Mannan et al¹⁷ and in their research, it has been concluded that the mortality rate amongst VLBW neonates and are preterm is more when compared to the term VLBW neonates.

Additionally, the common risk factors for maternal that could be a link with very low birth weight and mortality among neonates is first, gestational hypertension (n= 37, 52.9%) accompanied by anaemia (n= 28, 40%). A similar study conducted by Mannan et al¹⁷, observing a more significant rate of mortality among the neonates born to mothers who had complexities during pregnancy than the neonates born with mothers where no pregnancy complications were observed.

Risk is high for fatality amid VLBW neonates born. Since the birth of the neonates in hospital is 100% and comparison for the morbidities related with the location of the delivery could not be feasible. But, during the observation of data, it came out that the outcome of the neonates has no statistical significance ($p>0.1$) with the mode of delivery either normal or C-section. Another study has been done by Mannan et al¹⁷ in which it has been discovered that neonates specifically who stayed at the hospital due to repetitious difficulties were majorly the neonates with very low birth weight and diverse pattern of mortality has been observed.

In another study conducted by Ballot et al³, the significant condition regarding fatality was due to severe prematurity succeeded by necrotising enterocolitis and hyaline membrane disease. While, in this study, the primary reason among neonates is early delivery and for mortality came out to be sepsis and further accompanied by respiratory distress syndrome.

A review investigation by Schindler et al²⁷ finds out that 35% of sepsis followed by 27% respiratory distress syndrome, 22% of transient tachypnoea of newborn and 12% hypoglycemia are the usual frequent morbidity amongst neonates of very low birth weight also, the common probable reason of mortality is IVH (Intraventricular haemorrhage) trailed by Intense Respiratory Sickness and Sepsis. While, in this study, the significant determinant of mortality existing is first, 32.9% with sepsis followed by RDS of 22.9%.

The two crucial factors studied by Kabilan et al²³ in this which are answerable for the VLBW baby's mortality are mechanical ventilation and weight at the time of birth. RDS (respiratory disease syndrome) is the vital cause that has been identified for morbidity (33.6%, n=56) followed by asphyxia (32.4%, n=54) and sepsis (27.6%, n=46). A mortality rate of 40.3% (n=62) was seen in this study. Further, it has been observed in the study that the incidence rate for the 90% of neonates with very low birth weight is 33.6% followed by the 76% of mortality rate. However, in the present study, the dominant conditions about fatality and morbidity against neonates existing with VLBW are 32.9% with sepsis followed by 22.9% with RDS. Sepsis being considered as the primary basis concerning the mortality within the very low birth weight neonates deems for 32.9%.

Jaundice was found to be the main pattern of morbidity in the Ghulam Nabi et al²² study. But in the current study, it was 1.4% in the category of others that could uphold the cause for the morbidity due to jaundice.

The study done by Rasania M et al²¹ was to contemplate the profile of morbidity and a prompt result of late preterm children contrasted with term neonates. It found to be asphyxia (16.39%) followed by sepsis (28.6%), RDS with 7.37% and hyperbilirubinemia with 32.78%. The requirement for respiratory assistance remained vital and more eminent in 47.8% with average preterm. But, in the current study, complexities came to be 32.9% with sepsis followed by 22.9% with RDS, a further 15.7% with transient tachypnoea of new-born, 11.4% with hypoglycemia, 7.1% with neonatal hyperbilirubinemia, 1.4% with asphyxia, 2.9% with meningitis, 1.4% with intraventricular haemorrhage, 2.9% with prematurity, 1.4% with others.

Banaras Hindu University⁴ has conducted a retrospective study and found out that the endurance for the rate of survival rate elevated with an expansion in the age of gestational and birth weight. Asphyxia in perinatal, Apnoea, Shock, and sepsis in neonatal are the elements found for mortality among neonatal and are responsible directly. However, in the current study, came to be 32.9% with sepsis followed by 22.9% with RDS, a further 15.7% with transient tachypnoea of new-born, 11.4% with hypoglycemia, 7.1% with neonatal hyperbilirubinemia, 1.4% with asphyxia, 2.9% with meningitis, 1.4% with intraventricular haemorrhage, 2.9% with prematurity, 1.4% with others.

Moving on, a prospective cohort study performed by Jaiswal et al¹¹ found out that morbidities in newborns in late preterm which remained the commonly recognized morbidities are 55% who needed photography because of neonatal jaundice tailgated by 10.5% morbidity due to respiration and 8.8% with hypoglycemia. While, on the flip side of the coin, in the current study, primary morbidity observed out to be 32.9% with sepsis followed by 27% respiratory distress syndrome, 15.7% with transient tachypnoea of new-born, and 7.1% with neonatal hyperbilirubinemia. Furthermore, in the study of Jaiswal et al., the risk factors for maternal morbidity found out to be intrauterine growth restriction, multiple gestations, and caesarean deliveries. But in this study, it is 52.9% with gestational hypertension followed by 40% with anaemia, a further 2.9% with gestational diabetes, 1.4% with multiple gestations, 1.4% with hypothyroid and 1.4% with others irrespective of the mode of delivery whether C-section or the normal delivery.

The usual prevalent morbidity in the study done by Sangamam et al²⁴ was first 16.77% with hyperbilirubinemia, secondly, 14.99% with hypoglycemia followed with 14.86% of hyaline membrane disease. The most common maternal complexities affiliated with VLBW continued with 43.36% anaemia, 17.6% with hypertensive disorders during the phase of gestation. Moreover, in this study, it turned to be that the morbidities at the primary level among neonates of VLBW are 52.9% with gestational hypertension followed by 40% with anaemia implying the most prevalent risk factor. Also, morbidity due to hypoglycemia in this study report to be 11.4%.

In the present study, there are several determinants in accordance with the mortalities among the neonates, it has observed that there is no statistical significance in the association of babies' sex with the outcome with 90% of a confidence interval and p came out to be more than 0.1 ($p>0.1$). Further, it has been noticed that there is an association of gestational age with the outcome and a statistically significant association ($p<0.1$). But it has been observed that there is a statistically significant association between the gestational age and the time of neonates' death ($p<0.1$). In comparison study done by Baki MA et al¹, observed that 36% is the rate of mortality. This mortality was associated with the neonates' weight at the time of birth, ventilation required, age at the time of gestation, and respiratory distress syndrome.

The influential account for morbidity in an observational investigation regarding mortality and morbidity done by Thapar K et al¹⁴ is sepsis accompanied by hyaline membrane disease plus Jaundice, mostly with the gestational age between 33 weeks and 36 weeks (44.2%, n=68). Comparable to this, in our study, Morbidity in VLBW neonates is 32.9% with sepsis followed by 22.9% with RDS. Moreover, it has been found out that 40% are between the age of 28 weeks and 32 weeks, 28.6% are between the age of 32 weeks and 34 weeks, for the age between 33 years and 36 weeks is 24.3%, 4.3% are between the age of 36 weeks and 38 weeks and 2.8% are between the age of 38 weeks and 40 weeks.

In the present study, the percentage of mortality among VLBW neonates and admitted to neonatal intensive care unit is 15.7%. In another study, there has been discovered 14% of the mortality to the neonates admitted in NICU done by Khan et al¹⁵.

The current study assumes that among other factors for mortality, Sepsis contributes to the mortality rate with 32.9%. A related study carried by Haque et al¹, states that among the developed countries the portion of mortality because of sepsis is 18%-20%. On the contrary, the section in the developing countries is 80%. Further, the study also gave the knowledge that the percentage for the past 30 years has persisted to be consistent among neonates with very low birth weight.

Moreover, another study was done by Boo⁶, stating that the most frequent reason for neonates' death is sepsis, respiratory distress syndrome, and intraventricular haemorrhage. Therefore, from the present study, the prevalent conditions for neonates' death are to the same degree with different research carried across the globe.

CHAPTER 7

CONCLUSION

A clear picture has been observed for the factors accountable for mortality and morbidity in VLBW neonates at the time of birth. Risk is high for mortality among VLBW neonates. The chief reason for the very low birth weight among neonates is early delivery and high prevalent mortalities and morbidities are sepsis followed by respiratory distress syndrome, further transient tachypnoea of new-born, hypoglycemia, neonatal hyperbilirubinemia, asphyxia, meningitis, intraventricular haemorrhage. There is an urgency for an efficient precautionary strategy so as to prevent early gestational deliveries and also to minimize the degree of morbidity rate and mortality rate in the union territory.

It has been concluded that the gestational age for the majority of the very low birth weight neonates was between the week of 28-32 and 32-34 weeks. The common risk factors for maternal that could be a link with very low birth weight and mortality among neonates is first, gestational hypertension accompanied by anaemia. In order to diminish such circumstances, there is a necessity to increase the monitoring of prenatal check-ups and counselling sittings required to follow the suggestive advice as directed by the gynaecologist.

In the study, it has been observed that among expecting mothers, there is a dire need for counselling at the nutritional front so as to overcome the number of anaemic mothers. This will have a positive effect or lessen down the rate of incidence among infants with very low weight at the time of birth.

Further doing the analysis, it came out that the association of variable with the outcome and it was found statistically significant association ($p < 0.1$) between the maternal age at the time of delivery and the outcome.

CHAPTER 8

LIMITATIONS

The current study was conducted among VLBW neonates and was between the weight of 900 grams and 1500 grams at the time of birth. Had it been a change in inclusion criteria where infants below 900 grams, there would have been different and probably better results to get a clearer picture for the specified objectives. If the current prospective study included data from primary care hospital as well as secondary care hospital then, a more reliable knowledge would have been come out for Chandigarh. To add to it, had it been the size of the sample more, the result would have been in a better picture. Furthermore, due to the small sample size, a 90% of confidence interval has been used to determine the statistical significance.

CHAPTER 9

RECOMMENDATIONS

- To decrease the level of prematurity and VLBW birth rates, relevant practices need to be selected. The services for antenatal care could be strengthened through proper knowledge on health simultaneously, spreading the awareness about the complications among neonates with very low birth weight at the time of birth.
- In order to lessen down the complexities among mothers during pregnancy and neonates with very low birth weight, the need for sufficient care such as practicing ENC (Essential Newborn Care) during the period of antenatal.
- The utilization of ENC has been linked with the sessions for counselling at the time of delivery. At the community level, women empowerment, as well as training of the staff, is highly recommended via promotion of knowledge.
- A proposal for the adviser would work closely so as to acknowledge and examine the emotional stress a parent must be going through and also to survive perinatal mood disorders.
- Proper training and understanding of the methodology of quality improvement would act as a liaison between the current operating standards and the implementation of findings of the research.

CHAPTER 10

FUTURE PERSPECTIVES

- There is a need to imply preventive strategies at different levels of antenatal care and postnatal care, especially emphasizing the detection at an early level and managing effectively PIH (Pregnancy Induced Hypertension).
- In order to foster the criteria for the well-being of neonates, it is a crucial time to act upon the transportation amenities for the neonates.

CHAPTER 11

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CHAPTER 12

APPENDICES

Questionnaire

I am from IIHMR University. I am working on a project concerned with neonates. I would like to talk to you about this. The questionnaire will take about 20 minutes. All the information I obtain will remain strictly confidential and your answers will never be identified.

MOTHER INFORMATION PANEL MI		
MI1. Current Age (in years)	___ _	
MI2. Age at the time of marriage (in years)	___ _	
MI3. Age at the time of delivery (in years)	___ _	
MI4. Mode of delivery	☐ Normal1 ☐ C-Section2	
MI5. Family income per year (Approximate) (in rupees)	Rs _____	
MI6. Mother's education	☐ Never gone to school1 ☐ Till class 102	

	☐ Till class 123 ☐ Graduate4 ☐ Post-graduate5 ☐ Others6	
MI7. Current living area	☐ City1 ☐ Rural2 ☐ Semi-rural3 ☐ Urban4 ☐ Sem-urban5	
MI8. Currently living in	☐ Nuclear Family1 ☐ Joint Family2 ☐ Extended Joint Family3	
MI9. Diet followed as advised by the doctor	☐ No1 ☐ Partial2 ☐ Fully3	If opted 1→MI10.
MI10. Reason for not following the diet plan as advised by the doctor	☐ Restriction from in laws1 ☐ Not sufficient money to purchase the diet2 ☐ Other3	
MI12. Haemoglobin (Hb) level of mother during delivery	____ ____	
MI13. ANC check-ups	☐ Fully Completed1 ☐ Partially Completed2 ☐ Not done at all3	
MI13. Consulted doctors during pregnancy	☐ Yes1 ☐ No2	
MI14. Surveillance for pregnancies done at every 5 weeks	☐ Yes1 ☐ No2	
MI15. Last menstrual period (LMP)	____ ____	

MI16. If pregnant, enrolled and followed through 28 days of pp (Postpartum Psychosis)	☐ Yes1 ☐ No2	
MI7. Complications during delivery	☐ Gestational Hypertension1 ☐ Gestational Diabetes2 ☐ Multiple Gestation3 ☐ Anaemia4 ☐ Hypothyroid5 ☐ Others6	
BABY INFORMATION PANEL		
BI		
BI1. Baby weight as soon as possible after birth (in kg)		
BI2. Gender	☐ Male 1 ☐ Female2	
BI3. When was the child born	☐ Very Early1 ☐ Early2 ☐ On time3 ☐ Late.....4 ☐ Very Late.....5	
BI4. Gestational age	☐ 28-32 weeks 1 ☐ 32-34 weeks2 ☐ 34-36 weeks3 ☐ 36-38 weeks4 ☐ 38-40 weeks5 ☐ 40-42 weeks6	
BI5. Do you have birth weight record or certificate stating the weight at the time of born	☐ Yes1 ☐ No2	

BI6. Any siblings to the prior birth of the current baby	☐ Yes1 ☐ No2	If opted 1→BI7.
BI7. Please specify the child before the current one	☐ 11 ☐ 22 ☐ 33	
BI8. Complications during birth	☐ Sepsis1 ☐ Respiratory Disease Syndrome2 ☐ Transient tachypnoea of new-born3 ☐ Hypoglycaemia4 ☐ Neonatal Hyperbilirubinemia5 ☐ Asphyxia6 ☐ Meningitis7 ☐ Intra ventricular haemorrhage8 ☐ Prematurity9 ☐ Others10	
BI9. Outcome	☐ Survived 1 ☐ Not survived2	If opted 2→BI10.
BI10. Time of death	☐ <24 hours 1 ☐ 24-48 hours2 ☐ 48-72 hours3 ☐ 3 days4	