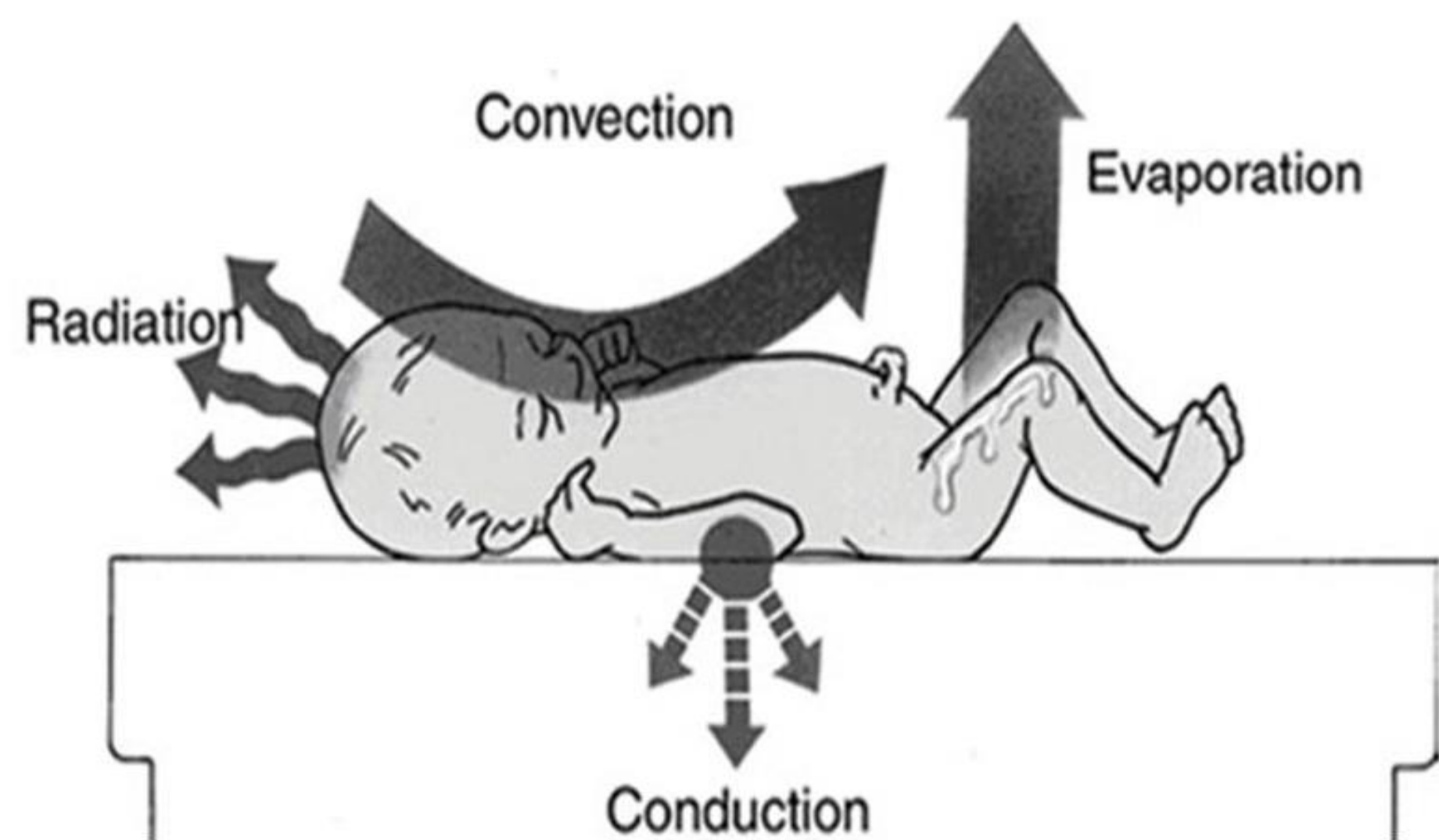


Introduction

- Neonatal hypothermia is an irregular thermal condition in which a neonate's core body temperature falls below 36.5°C (97.7°F), leading to different adverse clinical situations and increasing morbidity and mortality in neonates.
- According to the World Health Organization (WHO), the normal body temperature of a new born should be within 36.5°C - 37.5°C . If the temperature drops from 36.5°C , a new born is known to have hypothermia. Moreover, hypothermia could be classified as a cold stress or mild hypothermia (36°C - 36.4°C), moderate hypothermia (32°C - 35.9°C) and severe hypothermia.
- Neonates develop hypothermia soon after birth due to their underdeveloped thermoregulation mechanism at the time of birth and large body surface area, as compared to their weight.
- Neonates develop hypothermia through the mechanism of conduction, convection, radiation, and evaporation. There are other factors that also play an important role in developing hypothermia in neonates.
- According to the United Nations International Children Emergency Fund (UNICEF) (2017), the neonatal mortality rate in Pakistan is 46 deaths among 1000 live births. Studies suggest that hypothermia causes morbidity and mortality in neonates, and the drop in the body temperature of neonate results in an increased hospital stay due to various complications

Newborn can lose heat in four ways



Objectives

- To identify the frequency of hypothermia in preterm neonates (≤ 34 weeks of gestation) during transportation from the labour room to the Neonatal Intensive Care Unit (NICU), at a tertiary care hospital, Karachi.
- To identify the temperature drop of a neonate at different time intervals after birth, until the transfer to the NICU.
- To identify the factors associated with hypothermia in neonates.

Methodology

- A sample of 107 preterm neonates (≤ 34 weeks of gestation) were recruited, who were admitted directly from the labour room to the NICU.

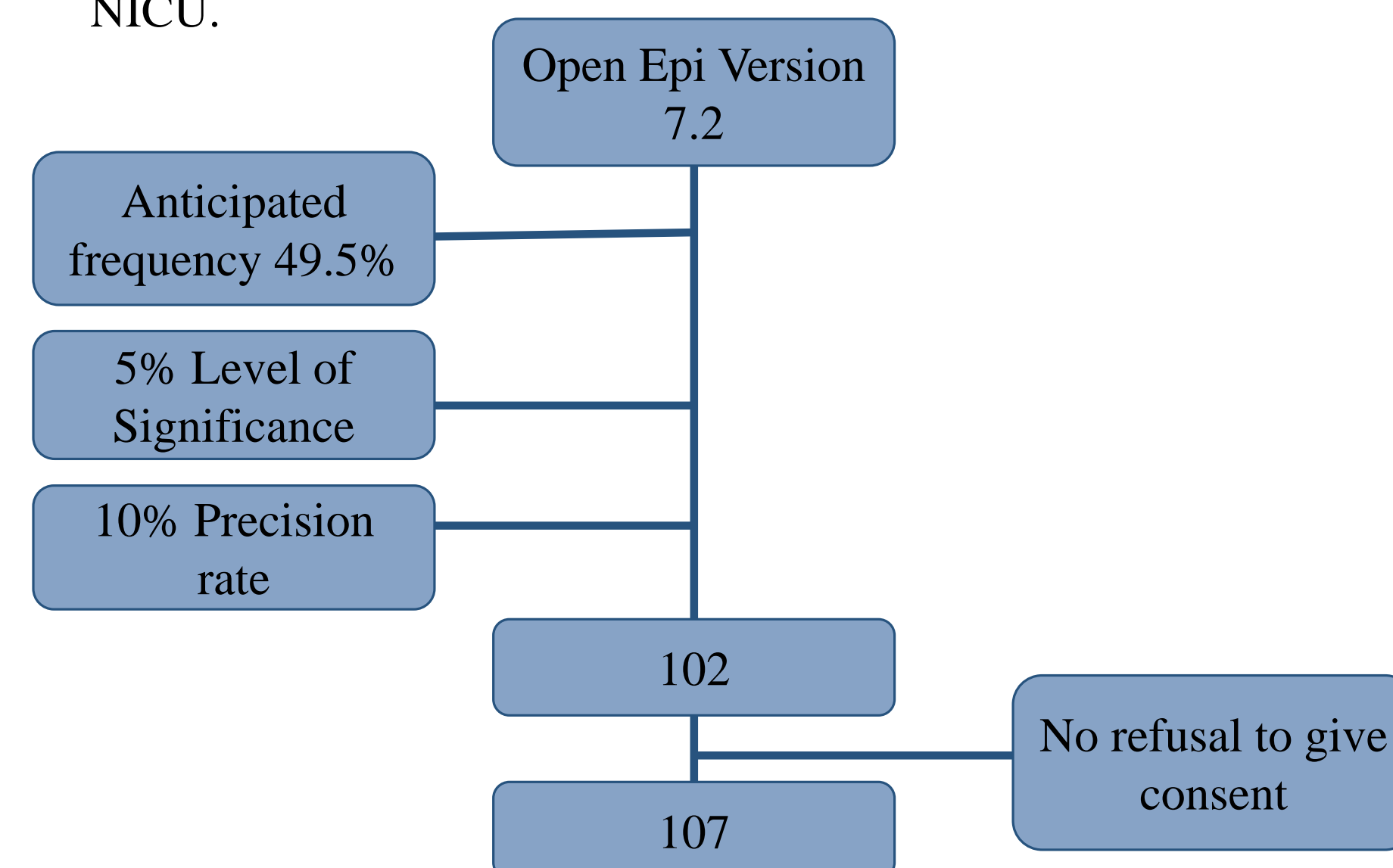


Figure 1. Sample Size Calculation

- It is a cross-sectional study design used to determine the frequency of hypothermia in preterm neonates (≤ 34 weeks of gestation) during transportation from the labour room to the Neonatal Intensive Care Unit (NICU).
- Data were analysed using SPSS v. 20.
- The descriptive analysis for continuous variables were reported as mean and standard deviation/median (IQR) and were assessed by t-test/Wilcoxin rant sum test (Mann Whitney test).
- For other categorical variables, percentages were reported and were assessed by Chi-square/Fisher's exact test to determine the relationship of different factors with hypothermia in neonates.
- Moreover, means of body temperature of neonates were also measured at four different intervals (i.e. from one minute of birth till arrival at the NICU), which was assessed by Repeated Measure ANOVA and post hoc test (Bonferroni).

Statistical Package for Social Sciences (SPSS) version 20.0

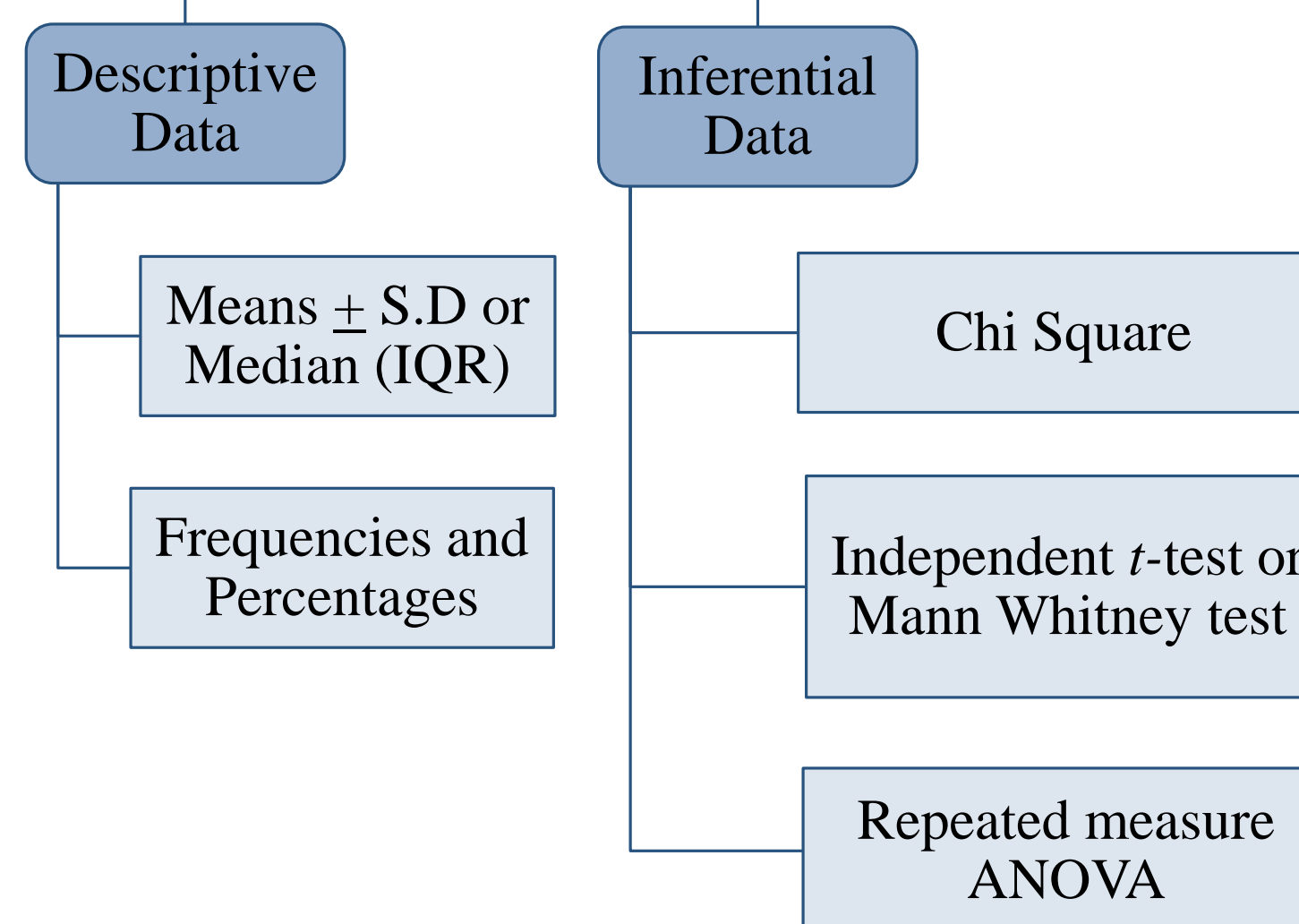
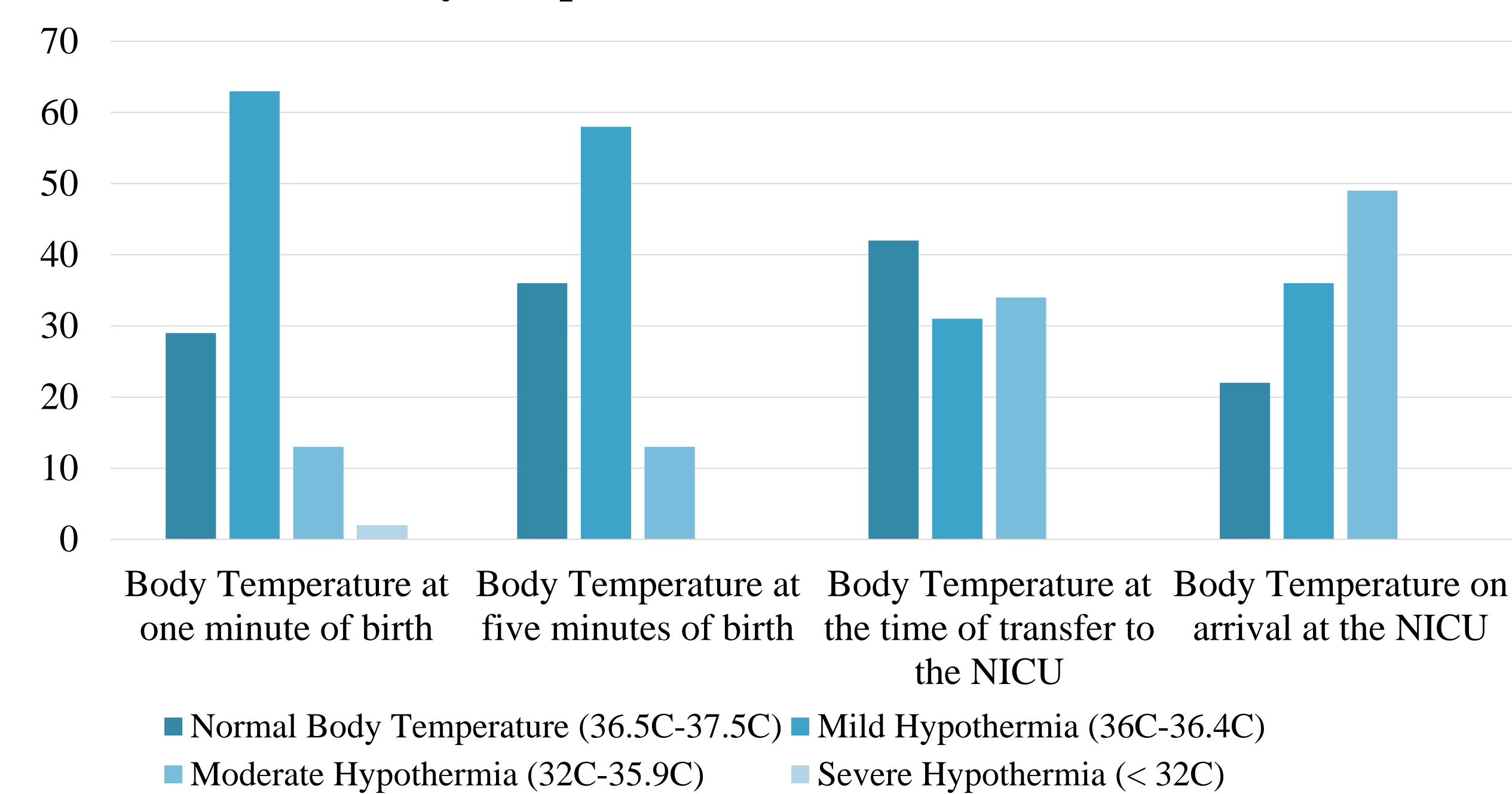


Figure 2. Data Analysis

Results

- The present study findings showed the frequency of hypothermia in preterm neonates (≤ 34 weeks of gestation) on admission to the NICU was; $n=85$ (79.4%).
- A significant association was observed among gestational age, birth weight, and APGAR scores at one and five minutes of birth, and hypothermia on admission to the NICU (p -value <0.05).
- There was a significant difference observed in the incubator/warmer and body temperature at different time intervals; i.e. from one minute of birth till the arrival at the NICU, among preterm neonates (≤ 34 weeks of gestation) (p -value <0.05)

Body Temperature at Different Time Intervals



Association of Gestational Age and Birth Weight with Hypothermia in Preterm Neonates

Variables	Body Temperature on arrival to the NICU (N = 107)						P-Value
	Normal Temperature 36.5 - 37.5°C		Mild Hypothermia 36 - 36.4°C		Moderate Hypothermia 32 - 35.9°C		
	n	(%)	n	(%)	n	(%)	
Prematurity							
Extreme Preterm (< 28 Weeks of Gestation)	0	(0.00)	0	(0.00)	8	(16.33)	
Very Preterm (28-32 weeks of gestation)	3	(13.60)	18	(50.00)	20	(40.82)	< 0.001*
Moderate Preterm (32-34 weeks of gestation)	19	(86.40)	18	(50.00)	21	(42.85)	
Birth Weight							
Less than 1000 grams	0	(0.00)	2	(5.56)	14	(28.57)	
1000-1500 grams	3	(13.64)	18	(50.00)	24	(48.98)	< 0.001*
More than 1500 grams	19	(86.36)	16	(44.44)	11	(22.45)	

Conclusions

- The study concluded that there was a high frequency of hypothermia in preterm neonates (≤ 34 weeks of gestation) during their transportation from the labour room to the NICU.
- The factors that were found to be associated with hypothermia were gestational age, birth weight, and APGAR scores.
- There was a significant difference in the incubator/warmer temperatures at four different time intervals, which may lead to hypothermia in the preterm neonates.

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