2.2 REVIEW OF LITERATURE

Morphology of umbilical cord has been studied by following researchers

1) In 2016 Mah Paiker and Gyan Prakash Mishra studied 60 umbilical cord with placenta and various parameters like length, diameter, site of insertion and the number of vessels were taken and compared between normal and gestational hypertension statistically and concluded morphological parameters of umbilical cord shows no significant changes in the gestational hypertensive umbilical cord as compared to controlled cases.[8]

2) In 2014 Saswati Tripathy studied umbilical coiling index and its relationship with perinatal outcomes and concluded a significant relationship was found between hypocoiled cords and pregnancy induced hypertension(PIH) in mother and meconium staining (P<0.05). Hypercoiled cord were associated with PIH in mother, preterm delivery and low birth weight (P<0.05). APGAR score at 5 min ≤ 6 was seen in hypocoiled cords (P< 0.05). Abnormal coiling index is associated with adverse perinatal outcomes. [24]

3) In 2013 Alka udainia et.al studied umbilical cord in pregnancy induced hypertension and noted that Eccentric insertion of umbilical cord is the commonest type of insertion in PIH group (70.67%). central insertion 12% in PIH group. Marginal insertion is found in 14.67% cases in PIH group. No cases of velamentous (Membranous) insertion is found in normotensive while 2.66% cases are found in PIH. Whereas PIH group shows both dispersal and magistral type of distribution, in mild PIH 95% placenta shows dispersal type and 5% shows magisterial type
distribution, but in severe PIH 91.43% Placenta show dispersal type and 8.57% placenta show magistral type of distribution. [9]

4) In 2012 Sabnis A.S et.al Studied umbilical cord morphology and its clinical significance and they conclude hypercoiling of umbilical cord is one of the factors responsible adverse pregnancy outcome.[1]

5) In 2012 Manikanat Reddy et.al (2012) Studied variations in placenta attachment of umbilical cord and observed various types of umbilical cord insertion and measured distance from placental margin. Total 110 specimens were observed, of which 83(75.45%) showed normal, 18 (16.36%) were marginal, 8(7.27%) showed furcated and only 1(0.9%) specimen was velamentous insertion [35].

6) In 2011 Chitra et.al .Umbilical coiling index as a Marker of Perinatal outcome. An analytical Study: they measure umbilical coiling index post-natally and studied the association of normocoiling, hypocoiling and hypercoiling to maternal and perinatal outcome. One thousand antenatal women who went in to labour were studied and umbilical coiling index calculated at the time of delivery. Umbilical coiling index was determined by dividing the total number of coils by the total umbilical cord length in centimeters. It is associated with hypertensive disorders abruption placenta, preterm labour, oligo-hydramnios and fetal heart rate abnormalities. Hypercoiling was found to be associated with diabetes mellitus, polyhydramnios, congenital anamolies and respiratory distress of the newborn. Abnormal umbilical coiling index is associated with server antenatal and perinatal adverse feature. [42]
7) In 2010 T.Y.Khong et.al. Clinical significance of hypocoiling & hypercoiling of the umbilical cord is undermined not just by the difficulties presented by the accurate determination of the umbilical coiling index. Coils are sometime not evenly distributed throughout the length of the cord and it is unclear whether determining the coiling index in the most coiled area would better replicate the effect of a bottleneck on blood flow. [50]

8) In 2009. Monika K et.al: studied the umbilical cord coiling and Doppler flow studies in umbilical artery in the third trimester of pregnancy. There was no significant difference between Doppler flow characteristics in umbilical artery in group of patient with hypocoiled, normocoiled and hypercoiled umbilical cord and in group of patient with different direction of twist in umbilical cord. [51]

9) In 2009 P Tantbairojn et.al studied: Gross Abnormalities of the umbilical cord. Related Placental Histology and clinical significance conclude that gross cord abnormalities predispose the fetus to stasis induced vascular ectasia and thrombosis thus leading to vascular obstruction and adverse neonatal outcome, including IUGR and stillbirth. [52]

10) In 2007 De Laat MW et.al studied the Roach muscle bundle and umbilical cord coiling and presence of Roach muscle, a small muscle bundle lying just beside the umbilical artery, contributes to umbilical cord coiling. [53]

11) In 2006 Shalu Gupta et.al studied umbilical coiling index and they conclude. Low umbilical coiling index is an indicator of adverse perinatal outcome. It is associated
with low APGAR score, meconium staining and pregnancy induced hypertension. Antenatal detection of coiling index can identify fetus at risk.

They examined 251 umbilical cords and the umbilical coiling coiling index was calculated as the number of coils divided by the cord length in cm and cords were classified as hypocoiled (UCI<p10), normocoiled(UCIp10-p90) or hypercoiled (UCI>p90). On microscopic examination of a cross section of the cord the results suggested that presence of a Roach muscle bundle contributes to umbilical cord coiling. Given the divergence in umbilical cord coiling within subgroups with or without this muscle, other factors must play a more dominant role. [40]

12) In the year 2005 Mladen predanic studied: An Antenatal umbilical coiling index or umbilical coiling pattern, does not correlate with umbilical cord thickness that a less amount of the umbilical supportive tissue mainly Wharton’s Jelly is not related to an increased umbilical cord coiling pattern. [54]

13) In 1996 Jick-Fuu Wu. Studied Multivariate Analyses of the Relationship between Umbilical Cord Length and Obstetric Outcome and stated that the umbilical cord length no significant correlation between umbilical cord length and fetal well-being.[55]

14) In 1994, Benirschhe studied obstetrically important lesions of the umbilical cord. Many pathologic features of the umbilical cord affect fetal well-being adversely. Excessively long or short umbilical cords may be the cause of hematomas and thrombosis of cord vessels and the placental surface, thus causing fetal death and/or thrombocytopenia. In other cases, fetal hypoxia and central nervous system damage
are possible outcomes. Thrombosis is also frequently induced by velamentous insertion of the cord, as are hemorrhages when the membranous vessels rupture during parturition. Entangling and knotting of the cord, especially of excessively long cords, may lead to similar lesions and fetal death. It was recognized recently that prolonged meconium exposure to the surface of the cord can cause partial necrosis of umbilical vessels and cord ulceration. The noxious moiety of meconium also causes contraction of the umbilical vessels, leading to fetal hypoperfusion and hypoxia. A stricture at the fetal end of the cord and excessive spiralling of a very long umbilical cord are often present in cases of unexplained fetal demise, especially in early pregnancy. Less common abnormalities are obstruction of the circulation by amnionic bands and varices. [56]