CHAPTER – 2

2. LITERATURE REVIEW

The investigator has done the extensive literature review includes text books journals, reports, published and unpublished thesis, web and editorial information. To have a logical sequence and easy understanding the review of literature has been organized and described under the following headings.

This chapter consists of 3 sections.

2.1 SECTION–I : Theoretical literature

2.2 SECTION-II: Empirical literature is presented under the following headings

2.2.1 Part A: Studies related to freedom of movements

i. Studies related to effect of movements and positions on pain and comfort

ii. Studies related to effect of movements and position on uterine contraction.

iii. Studies related to effect of movements and positions on fetal descend and rotation of the fetal head

iv. Studies related to movements and positions on labour outcome

v. Studies related to freedom of movement on maternal satisfaction

vi. Studies related to freedom of movement on child birth experience

vii. Studies related to freedom of movement on fetal outcome

2.2.2 Part B : Studies related to Complimentary/ Alternative Medicine (CAM) used during labour

2.3 SECTION - III: Conceptual Framework

Weidenbach’s Helping Art on Clinical nursing theory adopted for conceptual frame work.
2.1 SECTION–I: THEORETICAL LITERATURE

Definition of labour

**Irene M. Bobak** says that ‘Labor is a process of moving the fetus, placenta and membranes are expelled out of the uterus through the birth canal.’[81]

Childbirth usually begins spontaneously, about 280 days after conception, but it may be started by artificial means if the pregnancy continues past 42 weeks gestation. The average length of labor is about 14 hours for a first pregnancy and about eight hours in subsequent pregnancies. However, many women experience a much longer or shorter labor.

Stages of labour

According to **Adele pillitteri** labour is classified into 4 stages which is described under the following headings. [82]

**First stage of labor**

Begins with regular uterine contractions and ends with complete cervical dilatation at 10 cm. It is divided into a latent phase and an active phase. The latent phase begins with mild, irregular uterine contractions that soften and shorten the cervix. Cervical effacement is the thinning and stretching of the cervix. The degree of cervical effacement may be felt during a vaginal examination. A 'long' cervix implies that effacement has not yet occurred. Latent phase ends with the onset of active first stage, and this transition is defined retrospectively. The active phase usually begins at about 3-4 cm of cervical dilation and is characterized by rapid cervical dilation and descent of the presenting fetal part. Contractions become progressively more rhythmic and stronger.

During effacement, the cervix becomes incorporated into the lower segment of the uterus. During a contraction, uterine muscles contract causing shortening of the upper segment and drawing upwards of the lower segment, in a gradual expulsive motion. The presenting fetal part then is permitted to descend. Full
dilation is reached when the cervix has widened enough to allow passage of the baby's head, around 10 cm dilation for a term baby.

The duration of labour varies widely, but active phase averages some 8 hours for women giving birth to their first child ("primiparae") and shorter for women who have already given birth ("multiparae"). Active phase prolongation is defined as in a primigravid woman as the failure of the cervix to dilate at a rate of 1.2 cm/hr over a period of at least two hours. This definition is based on Friedman's Curve, which plots the typical rate of cervical dilation and fetal descent during active labour. Some practitioners may diagnose "Failure to Progress", and consequently, propose interventions to optimize chances for healthy outcome.

**Second stage of labor**

Begins with complete cervical dilatation and ends with the delivery of the fetus. In nulliparous women, the second stage should be considered prolonged if it exceeds 3 hours with regional anesthesia is administered or 2 hours in the absence of regional anesthesia. In multiparous women, the second stage should be considered prolonged if it exceeds 2 hours with regional anesthesia or 1 hour without it.

**Third stage of labor**

It is the period between the delivery of the fetus and the delivery of the placenta and fetal membrane. Delivery of the placenta often takes less than 10 minutes, but the third stage may last as long as 30 minutes. Expectant management involves spontaneous delivery of the placenta.

**Fourth stage**

The "fourth stage of labour" is the period beginning immediately after the birth of a child and extending for about six weeks. Another term would be postpartum period, as it refers to the mother (whereas postnatal refers to the infant). Less frequently used is puerperium.
Machanism of labour

According to BenettRurh.V & Brown mechanism of labour is described under the following six sequence movements. [83]

1. Engagement of the fetal head in the transverse position. The baby's head is facing across the pelvis at one or other of the mother's hips.

2. Descent and flexion of the fetal head.

3. Internal rotation. The fetal head rotates 90 degrees to the occipito-anterior position so that the baby's face is towards the mother's rectum.

4. Delivery by extension. The fetal head passes out of the birth canal. Its head is tilted forwards so that the crown of its head leads the way through the vagina.

5. Restitution. The fetal head turns through 45 degrees to restore its normal relationship with the shoulders, which are still at an angle.

6. External rotation. The shoulders repeat the corkscrew movements of the head, which can be seen in the final movements of the fetal head.

Assessment

Emily Slone says the nursing management which includes following assessment should be done if the mother entered in to the labour ward with labour symptoms. [84]

Initial assessment

The initial assessment of labor should include a review of the patient's prenatal care, including confirmation of the estimated date of delivery. Frequency and time of onset of contractions, Status of the amniotic membranes , Fetal movements, Presence or absence of vaginal bleeding, regular rhythmic contraction may start as infrequently as every 10-15 minutes, but usually accelerate over time, increasing to contractions that occur every 2-3 minute lead to cervical change.
Physical examination

The physical examination should include assessment of maternal vital signs, fetal presentation, assessment of fetal well-being, frequency, duration, and intensity of uterine contractions, abdominal examination with leopold maneuvers, per vaginal examination to determine the degree of dilatation, which ranges from 0 cm (closed or fingertip) to 10 cm (complete or fully dilated), effacement (consistency i.e., soft or firm) which can be reported as a percentage, position (i.e., anterior or posterior), station of the fetal head assessed by palpation of the presenting part of the fetus allows the examiner to establish its station, by quantifying the distance of the body (-5 to +5 cm) that is presenting relative to the maternal ischial spines, where 0 station is in line with the plane of the maternal ischial spines.

Pain management

Dicson says that pain management during childbirth classified in to non-pharmacological and pharmacological management. [85]

a) Non pharmacological management

Comfort measures that provide natural pain relief can be very effective during labor and childbirth. Breathing techniques such as patterned breathing, relaxation, and visualization can increase the production of endogenous endorphins that bind to receptors in the brain for pain relief. Other methods of comfort therapy such as effleurage (light rhythmic stroking of the abdomen), massage, emptying the bladder and hydrotherapy can provide pain relief and reduce the need for narcotic analgesia or anesthesia by naturally creating competing impulses in the central nervous system that can prevent the painful stimuli of labor contractions from reaching the brain. Some women like to have someone to support them by their partner, a family member or a friend or a doula during labour. Complimentary or Alternative medicine also play a key role in elevating pain and sufferings such as acupuncture, acupressure, TENS unit use, hypnosis, hydrotherapy, music therapy or aromatherapy.
**Movement and positions during labour**

Laboring women tend to find upright positions most comfortable such as sitting, standing, and walking. Many choose a lying down position as labor advances. Moving about during labor is usually more comfortable than staying still and can help labor progress by the simple effects of gravity and the changing shape of the pelvis. It may also relieve pain by shifting pressure and allowing the baby to move.

Combining movement with positions can help encourage a productive labor while helping to cope with the stress and pain of contractions. Walking, swaying and rocking hips are especially helpful because they make it easier for the baby to move through your pelvis. Specific movements can be used to achieve specific goals. For example, pelvic rocking can reduce the pain of a sore back. Understanding which movements and which positions help to encourage specific outcomes can help labor move as quickly as problem free as possible.

**b) Pharmaceutical management**

Different medications for pain have varying degrees of success and side effects to the woman and her baby. Some of these medications are inhaled nitrous oxide gas for pain control, especially as 50% nitrous oxide and 50% oxygen known as Entonex, Pethidine may be used early in labour, as well as other opioids such as fentanyl, but if given too close to birth there is a risk of respiratory depression in the infant. Popular medical pain control includes the regional anesthetics epidurals(EDA), and spinal anesthesia. Epidural analgesia is a generally safe and effective method of relieving pain in labour, but is associated with longer labour, more operative intervention (particularly instrument delivery), and increases in cost.

**Intrapartum management**

Dawn, C.S. [86] describes the intrapartum management under the following headings

i) Management of first stage of labor

A pictorial form of (partograph) should be monitored once the labour is established
- Periodic assessment of the frequency and strength of uterine contractions and changes in cervix and in the fetus' station and position by performing fourth hourly vaginal examination

- Monitoring the fetal heart rate at least every 15 minutes, particularly during and immediately after uterine contractions; in most obstetric units, the fetal heart rate is assessed continuously

- Ongoing consideration should be given to the woman’s emotional and psychological needs, including her desire for pain relief.

**Active management**

Active management of labour consists of a number of care principles, including frequent assessment of cervical dilatation. If the cervix is not dilating, oxytocin is offered. According to NICE clinical guide 55 intra partum care the package known as active management of labour (one-to-one continuous support; strict definition of established labour; early routine amniotomy; routine 2-hourly vaginal examination; oxytocin if labour becomes slow) should not be offered routinely. In normally progressing labour, amniotomy should not be performed routinely. Combined early amniotomy with use of oxytocin should not be used. [87]

**ii) Management of second stage of labor**

All observations should be documented on the partograph include, recording hourly blood pressure and pulse, vaginal examination offered hourly in the active second stage, half-hourly documentation of the frequency of contractions, frequency of emptying the bladder, ongoing consideration of the woman’s emotional and psychological needs. In addition assessment of progress should include maternal behavior, effectiveness of pushing and fetal wellbeing, taking into account. With complete cervical dilatation, the fetal heart rate should be monitored or auscultated at least every 5 minutes and after each contraction. Women should be discouraged from lying supine or semi-supine in the second stage of labour and should be encouraged to adopt any other position that they find most comfortable. Women should be informed that in the second stage they should be guided by their own urge to push. If
pushing is ineffective or if requested by the woman, strategies to assist birth can be used, such as support, change of position, emptying of the bladder and encouragement.

A routine episiotomy should not be carried out during spontaneous vaginal birth. Where an episiotomy is performed, the recommended technique is a medio-lateral episiotomy originating at the vaginal fourchette and usually directed to the right side. The angle to the vertical axis should be between 45 and 60 degrees at the time of the episiotomy. An episiotomy should be performed if there is a clinical need such as instrumental birth or suspected fetal compromise. (NICE clinical guideline 55 – intrapartum care).

**iii) Management of third stage**

Observations by a midwife of a woman in the third stage of labour include general physical condition, as shown by her color, respiration and observation of vaginal blood loss. In addition, in the presence of hemorrhage, retained placenta or maternal collapse, frequent observations to assess the need for resuscitation are required. Physiological management of the third stage involves a package of care which includes all of these three components such as no routine use of uterotonic drugs, no clamping of the cord until pulsation has ceased delivery of the placenta by maternal effort. Changing from physiological management to active management of the third stage is indicated in the case of haemorrhage, failure to deliver the placenta within 1 hour. Active management often involves prophylactic administration of oxytocin or other uterotonics (prostaglandins or ergot alkaloids), cord clamping/cutting, and controlled traction of the umbilical cord.

**iv) Management of fourth stage of labour**

**Initial assessment of the woman following birth**

Observations taken following the birth of the baby should include, maternal observation such as temperature, pulse, blood pressure, uterine contraction, lochia examination of placenta and membranes – assessment of their condition, structure, cord vessels and completeness, early assessment of maternal emotional /
psychological condition in response to labour and birth, successful voiding of the woman’s bladder, and perineal care.

**Initial assessment of the newborn baby**

The Apgar score at 1 and 5 minutes should be recorded routinely for all births. Women should be encouraged to have skin-to-skin contact with their babies as soon as possible after the birth. Initiation of breastfeeding should be encouraged as soon as possible after the birth, ideally within 1 hour. Head circumference, body temperature and birth weight should be recorded soon after the first hour following birth. An initial examination should be undertaken by a healthcare professional to detect any major physical abnormality and to identify any problems that require referral.

2.2 **SECTION II: EMPIRICAL LITERATURE**

2.2.1 **Part A: Studies related to freedom of movements on maternal and fetal outcome**

i) **Studies related to effect of movements and positions on pain and comfort**

A study conducted by Miquelutti on “vertical position during labour: pain and satisfaction” to evaluate the vertical position adopted by nulliparous women during labor in terms of pain and satisfaction with the position. The study was based on a secondary efficacy analysis of data from 107 nulliparous women enrolled in a randomized controlled trial in which the vertical position adopted during the dilation phase of labor was evaluated. The analysis involved comparing the median percentages of the duration for which women remained in the vertical position for each of the variables studied. The Kruskal-Wallis and Mann-Whitney tests were used to determine the differences between the groups. Results of the study shows that there was a statistical significance was found at p<0.05. at 4cm of dilation, the women with a pain score < 5 remained longer in the vertical position during labor compared to those with a score > 7 (p=0.02). At 4 and 6 cm of dilation, the women had satisfaction remained more than 50 % of the time in the vertical position (p=0.02 and p=0.03, respectively) and this study concludes that the vertical position helped relieve labor pain and increased comfort and patient satisfaction. [88]
Adachi K, et al done a study on “The relationship between the parturient’s positions and perceptions of labor pain intensity with the aim of determining if maternal position reduced the intensity of labor pain during cervical dilatation from 6 to 8 centimeters. Pain intensity was measured using the 100mm visual analogue scale (VAS) on 39 primiparous and 19 multiparous women (N = 58) who alternately assumed the sitting and supine positions for 15 minutes during cervical dilatation from 6 to 8 centimeters. The result of the study found that the pain scores for the sitting were significantly lower than those for the supine position. The Wilcoxon signed-ranks test showed the VAS scores for the (a) total labor pain ("total" being defined as both abdominal and lumbar pain) during contraction (p =.011), (b) continuous total labor pain (p =.001), (c) lumbar pain during contraction (p <.001), and (d) continuous lumbar pain (p <.001) in the sitting position (significantly lower than in supine position). The largest decrease occurred in lower back pain. No significant differences were found for abdominal pain scores in either the sitting or supine positions and concluded that the sitting position offers an effective method to relieve lower back labor pain during cervical dilatation from 6 to 8 centimeters. Similar relief was experienced for women who reported pain only on contraction as well as those with continuous pain. [89]

A clinical prospective observational study was done by Waisblot V on effect of rocking motion on labour pain before epidural catheter insertion in the sitting position. Pain scores (numerical scale: 0-10) were recorded in 50 laboring women in three consecutive positions: lying down, sitting and then rocking back and forth while seated. The overall satisfaction (0-10) and any comment related to the rocking procedure were also recorded. Results show that one woman refused to rock during the procedure and five alternated moving and still periods. Pain scores were similar in the lying and sitting position, whereas they significantly decreased while rocking. Satisfaction associated with rocking chair motion was high. This study concluded that within the limits of an observational and preliminary study, we observed that rocking movements during the procedure was associated with a significant decrease in labour pain and that patient satisfaction was high. [90]
In Taiwan a randomized control trial conducted by Gau ML, et al on effects of birth ball exercise on pain and self-efficacy during childbirth. The main objective of the study was to examine the effectiveness of a birth ball exercise programme during childbirth by measuring childbirth self-efficacy and labour pain. One hundred and eighty-eight expectant mothers were recruited and were allocated by block randomization into the two arms of the study, but only 48 intervention and 39 control group participants completing the trial. All members of the experimental group were asked to practice the exercises and positions at home for at least 20 minutes three times a week for a period of 6-8 weeks. Each woman in the experimental group was given a birth ball for use during labour and encouraged every hour to choose the most comfortable positions, movements and exercises. Both the experimental and control groups were received standard nursing and midwifery care from hospital staff nurses in all aspects of pregnancy and childbirth. When cervical dilations were four centimeters and eight centimeters, the women completed demographic and obstetrics information, the childbirth self-efficacy inventor, and the short form of the MCgill pain questionnaire. Our study revealed that birth ball exercises provided statistically significant improvements in childbirth self-efficacy and labour pain. Specifically, self-efficacy had a 30-40% mediating effect on relationships between birth ball exercises and childbirth pain. The study concluded that mothers in the experimental group had shorter first-stage labour duration, less epidural analgesia, and fewer caesarean deliveries than the control group. [91]

Mamede FV, et al done a quasi-experimental study on “the effect of walking on pain during the active phase of labour”. Study participants were 80 primiparous parturient women, who were admitted during spontaneous labour with 37-42 weeks, at the start of the active phase. The data was analyzed by using Spearman's correlation test. Results depicts that the parturient women walked an average distance of 1,624 meters, 63.09% of the active phase of labour and during an average time of five hours. Pain scores increase along with the advance in cervical dilatation. However, we only found a significant positive correlation when 5cm of dilatation had been reached, that is, the more distance the participants walked, the higher the pain scores they reached. [92]
Onah HE, et al. conducted a cross sectional study on Pain perception among parturients in Enugu, South-eastern Nigeria. A total of 250 questionnaires were distributed, out of which 181 were correctly filled and returned for a response rate of 72.4%. Pain was measured by scale of 0 to 10, with 0 representing no pain and 10 representing maximal pain. A total of 40 (22.1%) parturient mothers received some pain relieving drug during their labour while 141 (77.9%) did not. Of the 141 respondents who did not receive intra-partum analgesia, 79 (56.0%) would have liked to have receive analgesia, while 62 (44.0%) would not. Of the 92 women who had their backs rubbed by companions during labour, 67 (72.8%) reported that this practice was helpful in relieving their labour pains, while 25 (27.2%) did not find it helpful. Of the 141 women who had a companion, 103 (73.0%) reported that this was helpful in relieving labour pains, while 38 (27.0%) reported no benefit. Antenatal care, place of residence, ethnicity, religion, marital status, occupational level, receiving intra-partum analgesia, type of analgesia received, having a companion during labour or receiving lectures on labour pains during the antenatal period had no significant impact on pain perception by the respondents (p > 0.05 for each of these variables). There was no significant correlation between pain scores and the respondents' ages and gestational age at delivery (p > 0.05). However, there was a significant positive correlation between the parturient’s pain scores and their educational levels (r = 0.18, p = 0.018) and a significant negative correlation between pain scores and parity (r = -0.23, p = 0.009), with primigravidas having the highest perceived mean pain score compared with multiparas and grandmultiparas. Additionally, those parturients who had their backs rubbed by a companion had a significantly higher mean perceived pain score than their counterparts whose backs were not rubbed. Parturients whose labours were either induced or augmented had a significantly higher perceived mean pain score than those who had spontaneous labour. It was concluded that parturients in Enugu, Eastern Nigeria, perceive labour as a very painful process with only a minority of them receiving any form of intra-partum analgesia. [93]
ii) Studies related to effect of movements and position on uterine contraction

Méndez-Bauer C, et al conducted a study on Effects of standing position on spontaneous uterine contractility and other aspects of labor. The aim of this paper has been to compare the uterine contractility, pain produced by contractions and comfort of the patients between standing and supine position. The study has been performed in twenty normal nulliparous who were changed from supine to standing position and vice versa at intervals of approximately thirty minutes. Intrauterine pressure and fetal heart rate were continuously monitored. Cervical dilatation was evaluated every thirty minutes. No medication was given to the patients. They were asked to assess the pain produced by uterine contractions in each one of both positions and which was the more comfortable. The result found was: 1. the intensity of contractions was significantly higher in 15 out of the 20 patients in standing position. 2. Frequency of contractions diminished significantly in one third of the patients. 3. Uterine activity increased significantly in half of them. 4. Consistently, less pain accompanied uterine contractions in standing position. 5. Patients reported more comfort in this position. The average duration of labor was 3 hrs 55 min. This duration is short, compared with standard clinical experience and with published data. No complications occurred, by the use of standing during labor, on the mother or fetus. It is concluded that there are no clear arguments against the use of standing during labor and that this position should be used more frequently in clinical obstetrics, provided obstetrical conditions are similar to those reported in this paper. [94]

A comparative study on ‘Effects of lateral recumbency and sitting on the first stage of labor’ done by Blackwell J, et al compared uterine activity in lateral recumbency and the sitting position during the first stage of labor in a group of nulliparas. Lateral recumbency was accompanied by more intense, less frequent and more efficient uterine contractions than sitting. Patients preferred sitting for the first half of labor and lateral recumbency for the second. No adverse fetal reaction was noticed in either position, judging from the fetal heart rate. An increase in maternal pulse rate during sitting could have indirectly indicated some compression of the paravertebral vessels. Maternal position clearly affects several parameters of
labor, and its selection should be based upon maternal comfort, uterine contractility and efficiency, and hemodynamic repercussions. [95]

**Roberts RN, et al** conducted a study on ‘The Effects of Maternal Position on Uterine Contractility and Efficiency’ with the aim of to determine the effects of sitting alternated with side-lying and supine alternated with side-lying were compared in terms of contraction intensity and frequency, uterine activity and efficiency, and maternal comfort. The effects of each position were influenced by the position it was alternated with and the phase of labor during which it was used. While contractions were more frequent when sitting, uterine activity and efficiency were greater while side-lying, both in early and late labor. There was no statistically significant difference in uterine activity or efficiency in the side lying position when compared to the supine position although contractions were more intense and less frequent while in side-lying. These results suggest that position change is important in achieving efficient uterine contractions. [96]

**iii) Studies related to effect of movements on facilitation of fetal descent and rotation of fetal head**

A randomized controlled trial was done by Desbriere R, et al on “Is maternal posturing during labor efficient in preventing persistent occiput posterior position” to evaluate the efficacy of maternal posturing during labor on the prevention of persistent occiput posterior(OP) position. Trial included 220 patients in labor with a single fetus in documented OP position. Main outcome was the proportion of anterior rotation from OP position. The rates of anterior rotation were, respectively, 78.2% and 76.4% in the intervention group and the control group without significant difference (P = .748). Rates of instrumental and cesarean section deliveries were not significantly different between intervention and control groups (18.2% vs. 19.1%, P = .89, and 19.1% vs. 17.3%, P = .73, respectively). In intervention and control groups, persistent OP position rates were significantly higher among women who had cesarean section (71.4% and 89.5%, respectively) and an instrumental delivery (25% and 33.3%, respectively) than among women who achieved spontaneous vaginal birth (5.8% and 2.8%, respectively). In multivariable
analysis, body mass index and parity were found to have significant and independent impact on the probability of baby’s head rotation. This study failed to demonstrate any maternal or neonatal benefit to a policy of maternal posturing for the management of OP position during labor. [97]

**Stremler R, et al** conducted a randomized controlled trial of hands-and-knees positioning for occipitoposterior position in labor. Thirteen labor units in university-affiliated hospitals participated in this multicenter randomized, controlled trial. Study participants were 147 women laboring with a fetus at \( \geq 37 \) weeks' gestation and confirmed by ultrasound to be in occipito-posterior position. Seventy women were randomized to the intervention group (hands-and-knees positioning for at least 30 minutes over a 1-hour period during labor) and 77 to the control group (no hands-and-knees positioning). The primary outcome was occipitoanterior position determined by ultrasound following the 1-hour study period and the secondary outcome was persistent back pain. Other outcomes included operative delivery, baby’s head position at delivery, perineal trauma, APGAR scores, length of labor, and women's views with respect to positioning. Result of the study found that women randomized to the intervention group had significant reductions in persistent back pain. Eleven women (16%) allocated to use hands-and-knees positioning had fetal heads in occipitoanterior position following the 1-hour study period compared with 5 (7%) in the control group (relative risk 2.4; 95% ci 0.88-6.62; number needed to treat 11). This study concluded that maternal hands-and-knees positioning during labor with a fetus in occipitoposterior position reduces persistent back pain improved birth outcomes, further trials are needed to determine if hands-and-knees positioning promote fetal head rotation to occipitoanterior and reduces operative delivery. [98]

**Simkin P** done a systemic review on the fetal occiput posterior position: state of the science and a new perspective. The main aim of this study is to describe nine prevailing concepts that guide labor and birth management with an occiput posterior fetus, and summarize evidence to clarify the state of the science. Search was conducted from the databases of pubmed and the cochrane library. Additional valuable information was obtained from obstetric and midwifery textbooks, books and websites for the public, conversations with maternity care professionals, and
years of experience as a doula. Nine prevailing concepts are as follows: (1) prenatal maneuvers rotate the occiput posterior fetus to occiput anterior; (2) it is possible to detect the occiput posterior fetus prenatally; (3) a fetus who is occiput anterior at the onset of labor will remain in that position throughout labor; (4) back pain in labor is a reliable sign of an occiput posterior fetus; (5) the occiput posterior fetus can be identified during labor by digital vaginal examination; (6) an ultrasound scan is a reliable way to detect fetal position; (7) maternal positions facilitate rotation of the occiput posterior fetus; (8) epidural analgesia facilitates rotation; (9) manual rotation of the fetal head to occiput anterior improves the rate of occiput anterior deliveries. Concepts 1, 2, 3, 4, 5, and 8 have little scientific support whereas concepts 6, 7, and 9 are supported by promising evidence. This study conclude that research studies are needed to examine the efficacy of midwifery methods of identification, and the effect of promising methods to rotate the fetus (simple positional methods and digital or manual rotation). Based on the findings of this review, a practical approach to care is suggested. [99]

Michel SC, etal done a study on “effect of birthing position on pelvic bony dimension. The aim of our study was to measure the impact of supine and upright birthing positions on MR pelvimetric dimensions.MR pelvimetry was performed in 35 nonpregnant female volunteers in an open 0.5-T MR imaging system with patients in the supine, hand-to-knee, and squatting positions. The obstetric conjugate; sagittal outlet; and interspinous, intertuberous, and transverse diameters were compared among positions. With patients in the hand-to-knee and squatting positions, the sagittal outlet (11.8 +/- 1.3 cm and 11.7 +/- 1.3 cm) upright exceeded that in the supine position as did the interspinous diameter. Intertuberous diameter was wider with patients in the squatting position than in the supine position. Only the obstetric conjugate was smaller with patients in the upright squatting position than in the supine position .Transverse diameter did not change significantly in any position. This study conclude that an upright birthing position significantly expands female pelvic bony dimensions, suggesting facilitation of fetal descend during labor and delivery. [100]
Biancuzzo M conducted a study on “the patient observer: does the hands-and-knees posture during labour help to rotate the occiput posterior fetus?” retrospective chart review was conducted for four low-risk women with full-term, healthy fetuses in the occiput posterior position. The first woman pushed for over two hours and delivered a 6 lb, 8 3/4 oz baby by cesarean section. The second woman delivered a 5 lb, 2 3/4 oz baby posteriorly by vacuum extraction and had a third-degree laceration. The third and fourth women both assumed the hands-and-knees posture during labour: their infants weighted 7 lb, 7 3/4 oz and 7 lb, 11 3/4 oz, respectively. Both of these fetuses rotated to the anterior position and were born spontaneously without complications. [101]

iv) Studies related to movements and positions on labour outcome

Lawrence & Lewis L, et al conducted a systemic review on maternal positions and mobility during first stage of labour with the objectives to assess the effects of encouraging women to assume different upright positions (including walking, sitting, standing and kneeling) versus recumbent positions (supine, semi-recumbent and lateral) for women in the first stage of labour on duration of labour, type of birth and other important outcomes for mothers and babies. We searched the Cochrane pregnancy and childbirth group's trials register (31 January 2013). Randomized and quasi-randomized trials comparing women randomized to upright versus recumbent positions in the first stage of labour. Main results interpreted with caution as the methodological quality of the 25 included trials (5218 women) the first stage of labour was approximately one hour and 22 minutes shorter for women randomized to upright as opposed to recumbent position and women who were upright were also less likely to have caesarean section (14 studies, 2682 women) and less likely to have an epidurals (nine studies, 2107 women) and babies of mothers who were upright were less likely to be admitted to the neonatal intensive care unit, however this was based on one trial (one study, 200 women). There were no significant differences between groups for other outcomes including duration of the second stage of labour, or other outcomes related to the wellbeing of mothers and babies. Authors concluded that there is clear and important evidence that walking and in the first stage of labour reduces the duration of labour, the risk of caesarean
birth, the need for epidural, and does not seem to be associated with increased intervention or negative effects on mothers and babies wellbeing. Based on the current findings, we recommend that women in low-risk labour should be informed of the benefits of upright positions, and encouraged and assisted to assume whatever positions they choose. [102]

A systematic review on maternal position during the first stage of labor was done by Joao P Souza, et al to determine the effect of maternal position during the first stage of labor. All randomized controlled trials carried out to assess this effect were taken into consideration in this review. The following electronic databases were accessed to identify studies: MEDLINE, Popline, the Scientific Electronic Library On-line and the Latin American and Caribbean Health Science Information. Nine eligible randomized controlled trials were included in the systematic review. The investigators pooled the data from seven studies in which the length of the first stage of labor and results were in favor of the intervention, but the high level of heterogeneity ($I^2 = 88.4\%$) impaired the meaning of this finding. The intervention did not affect other outcomes studied (mode of delivery, use of analgesia, labor augmentation and condition of the child at birth). This study concluded that adoption of the upright position or ambulation during first stage of labor may be safe, but considering the available and its consistency, it cannot be recommended as an effective intervention to reduce duration of the first stage of labor. [103]

A prospective randomized study done by Ben Regaya L, et al on "Role of deambulation during labour". The main objective of the study was to assess the effects of ambulation during the first stage of labor on the duration of labor and other maternal and infant outcomes. This study was conducted from 1st November 2008 to 31st March 2009 at the department of obstetrics and gynecology, CHU FarhatHached, Sousse, Tunisia. Two hundred mothers with uncomplicated term pregnancies were randomly assigned to one of two groups: first group (100 parturients) authorized to ambulate until 6cm of cervical dilation and a second group (100 parturients) confined to bed in dorsal or lateral recumbence. Upright position reduces significantly (for about 34%) the duration of the first stage of labor.
(P<0.0001), the pain intensity, the oxytocin consumption (P=0.001), the rate of delivery by cesarean section and of instrumental deliveries. Upright position leads also to a net improvement of the maternal outcome (7% side effects versus 13%) and the fetal outcome (net improvement of the Apgar's score at first and fifth minute, and reduction of a factor 5 of the rate of transfer to the neonatology clinical care unit and the study concluded that this study allowed to confirm the benefits of ambulation on labor progress as well as on the maternal comfort and the maternofetal outcome. [104]

**De Jong, et al** conducted a study on randomized trial on ‘comparing the upright and supine positions for the second stage of labour’. The objective of the study is to assess the maternal and neonatal effects of upright compared with recumbent positions during delivery, in terms of defined outcome variables. This study was done in St Monica's nursing home, a midwife based maternity unit in cape Town, South Africa among five hundred and seventeen women of low obstetrical risk assigned to deliver at the nursing home. The results of the study show that women who adopted the upright posture for delivery experienced less pain. Fewer perineal trauma and fewer episiotomies were occurred than those who delivered in the supine position. The study concluded that the data suggest that in women of low obstetrical risk, choice of posture during delivery may be encouraged. [105]

**Park, Seong-Hi** conducted a systemic review on ‘Effect of postpartum outcomes in mother's upright position during the second stage of labor’. The main purpose of this study was to determine whether upright position is effective in labor through systematic review in randomized controlled trials. This study selected 9 references based on inclusion and exclusion criteria and evaluated the quality of references and carried out a meta-analysis. Results shows that the maternal outcomes showed that the duration of their second-stage labor was 2.29 minutes shorter than that of the women in the recumbent position, and were less likely to have episiotomy. The other outcomes, including the mode of delivery, blood loss, hemoglobin level, use of oxytocin, use of analgesics, and perineal laceration, did not differ between the groups. The fetal heart rate abnormality occurred less than in the control group. The Apgar scores of the groups did not differ. The study concluded that there is evidence
that an upright position in the second stage of labor reduces the duration of the second stage of labor, the incidence of episiotomy, and an abnormal fetal heart rate. [106]

**Calvo Aguilar, et al** done a comparative study on ‘obstetric and perinatal outcome of parturient posture vertical versus supine’. Objective of the study was to compare obstetric and perinatal outcomes between supine and vertical position at delivery. Patients and method: We performed a randomized double-blind study including healthy women assigned to the supine or upright posture (vertical) during labor with complications following the delivery in the puerperium stage. The variables were blood loss, pain in the second period of labor and immediate postpartum, duration of the second period of labor, perineal and vaginal tears, need to forceps implement, accommodation in position and perinatal outcome. 164 patients were randomized into two groups, the vertical position (I) and the supine position (II). Results of the showed that the blood losses were 5.4%, and the Caesarean rate was of 4.6%. Difference was found only for vaginal tears in the vertical posture, with a relative risk of 1.4, and shortening of the second period with a significant difference of 10 minutes on average (p < 0.05). Conclusions drawn were the upright posture during childbirth provides no improvement in perinatal outcomes and fewer obstetric conditions. It shortens the second period of labor, but it is a risk factor for vaginal tears. The best position for birth is which offers more comfort to the patient. [107]

A Cross-Sectional Epidemiological Survey done by **Briand Valérie** on ‘Maternal and Perinatal Outcomes by Mode of Delivery in Senegal and Mali’. The main aim of the study was to assess the maternal and perinatal adverse outcomes associated with the mode of delivery in 41 referral hospitals of Mali and Senegal(Africa). Study Design was Cross-sectional survey nested in a randomized cluster trial. The associations between intended mode of delivery and (i) in-hospital maternal mortality, (ii) maternal morbidity (transfusion or hysterectomy), (iii) stillbirth or neonatal death before Day 1 and (iv) Neonatal death between 24 hours after birth and hospital discharge were examined and excluded women with immediate life threatening maternal or fetal complication to avoid indication bias.
Results showed that among the 78,166 included women, 2.2% had a pre-labor cesarean section (CS) and 97.8% had a trial of labor. Among women with a trial of labor, 87.5% delivered vaginally and 12.5% had intrapartum CS. Pre-labor CS was associated with a marked reduction in the risk of stillbirth or neonatal death before Day 1 as compared with trial of labor, though we did not show that maternal mortality and neonatal mortality after Day 1, differed significantly between groups. Among women with trial of labor, intrapartum CS and operative vaginal delivery were associated with higher risks of maternal mortality and morbidity, and neonatal mortality after Day, as compared with spontaneous vaginal delivery. Conclusions: In referral hospitals of Mali and Senegal, pre-labor CS is a safe procedure although intrapartum CS and operative vaginal delivery are associated with increased risks in mothers and infants. Further research is needed to determine what aspects of obstetric care contribute to a delay in the provision of intrapartum interventions so that practices may be made safer when they are needed. [108]

Ayesha Nasir KJ conducted a study on “Child birth in squatting position” with the objective of assessing the risks and benefits of squatting position during second stage of labour and its comparison with the supine position. The study was conducted at the Department of Obstetrics and Gynaecology, Jinnah Postgraduate Medical Centre, Karachi. Random selection was done after informed consent and alternately divided into two groups A and B. Both groups were ambulatory during first stage of labour. In second stage, group-A adopted the squatting position, while group-B remained in lithotomy position. The third stage of labour in both the groups was conducted in the supine position. Results found were there was no difference in the application of episiotomies in both groups, however extension of the episiotomy occurred in 7% patients of the non-squatting group (P<0.05). Para urethral tears occurred in 5% patients in squatting group, but all occurred in patients who were not given an episiotomy. Second degree, and third degree perineal tears occurred in 9% patients in the non-squatting group but none in the squatting group (P<0.05). Forceps application was also significantly less in group-A 11% and 24% in group-B (P<0.05). There were two cases of shoulder dystocia in group B but none in the group-A. During the Third stage of labour there were no cases of retained placenta in group A but there were 4% cases of retained
placenta and 1% case of postpartum hemorrhage of more than 500ml due to atony of the uterus in group-B. One patient in the non-squatting position had to have a caesarean section due to persistent occipito posterior position. There was no significant difference in the apgar scores, foetal heart rate patterns or requirement of neonatal resuscitation. Conclusion of the study was squatting position may result in less instrumental deliveries, extension of episiotomies and perineal tears. [109]

Bioelian, et al conducted a study on “influence of maternal mobility on duration of the active phase of labor”. The main purpose of the study was to investigate the influence of the maternal mobility during the active phase of labor. A prospective clinical trial was conducted through comparative analysis among a treatment group (n=50) and a control group (n=50), in the obstetric center of the hospital universitário da universidade de são paulo (usp). The inclusion criteria were primigravidae with a single fetus on cephalic presentation, with 37 to 42 weeks of pregnancy, with two uterine contractions every ten minutes and with cervical dilatation until 4 the patients were assisted during the active phase of labor by the physiotherapist and encouraged for staying in vertical position and movement, according to each dilatation stage and fetus head progression. The control group had obstetric support without the presence of the physiotherapist; it was selected retrospectively, according to the same inclusion and exclusion criteria. results of the study showed that among the patients who were accompanied, the mean of active phase was five hours and 16 minutes, while in the control group it was eight hours and 28 minutes (p<0.001). As for the cervix and uterine contraction, the treatment group showed a smaller period of active phase in association to a thin uterine cervix (p<0.001). In the treatment group, none of the patients used analgesics during the active phase, against 62% of the control group (p<0.001). in this group, all the patients used some kind of anesthesia for delivery; in the treatment group, among those who used anesthesia, 76% did it while the dilatation was 9 or 10 cm and 12% did not use any kind of anesthesia (p<0.05). The average weight of the newborns and the APGAR did not show significant difference rates between the two groups and concluded that the good performance of maternal mobility has positive influences on the labor process was it increases the tolerance to pain, avoids the use of drugs
during labor, improves the evolution of dilatation and reduces the duration of the active phase. [110]

Hodnett, et al conducted a systemic review on continuous support for women during childbirth with the primary objective to assess the effects of continuous, one-to-one intrapartum support compared with usual care and secondary objective to determine whether the effects of continuous support are influenced by: (1) routine practices and policies; (2) the provider's relationship to the hospital and to the woman; and (3) timing of onset. They searched the Cochrane Pregnancy and Childbirth Group's trials register (31 December 2010). Selection criteria was based on all published and unpublished randomized controlled trials comparing continuous support during labour with usual care and they used standard methods of the Cochrane Collaboration Pregnancy and Childbirth Group. They included twenty-one trials involving 15061 women met inclusion criteria and provided usable outcome data. Main results were of random affects analyses, unless otherwise noted. Women allocated to continuous support were more likely to have a spontaneous vaginal birth and less likely to have intrapartum analgesia or to report dissatisfaction. In addition their labour were shorter (mean difference -0.58 hours, 95% , they were less likely to have a caesarean or instrumental vaginal birth, regional analgesia, or a baby with a low 5-minute Apgar score. There was no apparent impact on other intrapartum interventions, maternal or neonatal complications, or on breastfeeding. This study concluded that continuous support during labour has clinically meaningful benefits for women and infants and no known harm and all women should have support throughout labour and birth. [111]

A retrospective comparative study conducted by Kleine-Tebbe A, et al on ‘Upright birthing position–more birth canal injuries?’ This study compared 3 different groups of maternal birthing positions (upright, lateral, mixed birthing position i.e. mainly on the back) concerning the fetal outcome and maternal perineal injury. There was no difference in the Apgar-values and umbilical cord pH. A higher incidence of intermediate and severe laceration as well as higher rates of episiotomy have been found in the mixed group (i.e. mainly on the back birthing position). Regarding this results and considering the literature this study conclude
that the upright birthing position brings no discredit upon newborn or the maternal perineum. [112]

Andrews, etal conducted a study on maternal position, labour and comfort. The purpose of this study was to determine if women who assumed upright positions during the phase of maximum slope would have a shorter phase of maximum slope in their labour and experience more comfort than women who assumed recumbent positions. Forty laboring women were randomly assigned to either an upright or recumbent position group. Subjects assumed the positions of their assigned group during the phase of maximum slope in their labour (cervical dilatation from 4 cm to 9 cm). Every hour during the phase of maximum slope, each subject was examined vaginally to determine her cervical dilatation and assessed for her level of comfort using the maternal comfort assessment Tool. Women in the upright position group had a significantly shorter phase of maximum slope in labour but did not significantly differ in comfort level from women in the recumbent group. Newborn Apgar scores were not significantly different between the two groups. Nurses need to be aware that the upright labour positions have the distinct advantages of facilitating efficient uterine contractions and reducing the duration of the phase of maximum slope in labour with no increase in the discomfort experienced or adverse effect on newborn well-being. [113]

A randomized controlled trial conducted on effect on birth outcome of formalized approach care in hospital labour assessment international units by Hodnett ED, etal to determine if a complex nursing and midwifery intervention in hospital labour assessment units would increase the likelihood of spontaneous vaginal birth and improve other maternal and neonatal outcomes. The study was conducted in 20 North American and UK hospitals among 5002 nulliparous women experiencing contractions but not in active labour; 2501 were allocated to structured care and 2501 to usual care. Usual nursing or midwifery care or a minimum of one hour of care by a nurse or midwife trained in structured care, consisting of formalized approach to assessment of and interventions for maternal emotional state, pain, and fetal position. Primary outcome was spontaneous vaginal birth other outcomes included intrapartum interventions, women's views of their care and
indicators of maternal and fetal health during hospital stay and 6-8 weeks after discharge. Outcome data were obtained for 4996 women. The result found that the rate of spontaneous vaginal birth was 64.0% (n=1597) in the structured care group and 61.3% (n=1533) in the usual care group. Fewer women allocated to structured care (n=403, 19.5%) rated staff helpfulness as less than very helpful than those allocated to usual care (n=544, 26.4%); fewer women allocated to structured care (n=233, 11.3%) were disappointed with the amount of attention received from staff than those allocated to usual care (n=407, 19.7%). None of the other results met prespecified levels of statistical significance. This study concluded that structured approach to care in hospital labour assessment units increased satisfaction with care and was suggestive of a modest increase in the likelihood of spontaneous vaginal birth. [114]

A retrospective cohort study on ‘Incidence of obstetric and foetal complications during labor and delivery’ done by Monjurul Hoque, et al in a Community Health Centre, Midwives Obstetric Unit of Durban, South Africa. The objectives of this were to estimate the incidence of obstetric complications during labor and delivery and their demographic predictors. A total of 2706 pregnant women were consecutively admitted to a midwife obstetric unit with labor pain between January and December 2007 constituted the sample. Among them 16% were diagnosed with obstetrical and foetal complications. The most frequently observed foetal and obstetric complications were foetal distress (35.5/1000) and poor progress of labor (28.3/1000), respectively. Primigravid and grandmultiparity women were 12 and 5 times, respectively, more likely to have complications during labor and delivery. Women without antenatal care had doubled the chance of having complications. Mothers age <20 years was protective of complications during delivery compared to women who were ≥35 years. National and local policies and intervention programmes must address the need of the risk groups of pregnant women during labor and delivery. [115]

Crowley PA done a systemic review on interventions for preventing or improving the outcome of delivery at or beyond term. The objective of the study was to assess the effects of interventions aimed at either reducing the incidence or
improving the outcome of post-term pregnancy. The cochrane pregnancy and childbirth group trials register was searched. Selection criteria include randomized and quasi-randomized trials of interventions involving the intention to induce labour at a specified gestational age. Twenty-six trials of variable quality were included. There were four trials of routine early pregnancy ultrasound, two of nipple stimulation, nineteen of routine versus selective induction of labour and one of antenatal fetal monitoring. Routine early pregnancy ultrasound reduced the incidence of post-term pregnancy. Breast and nipple stimulation at term did not affect the incidence of post-term pregnancy. Routine induction of labour reduced perinatal mortality. This benefit is due to the effect of induction of labour after 41 weeks. Routine induction of labour had no effect on caesarean section. The review concluded that routine early pregnancy ultrasound examination and subsequent adjustment of delivery date appear to reduce the incidence of post-term pregnancy. Routine induction of labour after 41 weeks gestation appears to reduce perinatal mortality. There is not enough evidence to evaluate the effects of breast and nipple stimulation, or tests of fetal wellbeing. [116]

A systematic review was conducted by EHC Liu, et al on ‘Rates of caesarean section and instrumental vaginal delivery in nulliparous women after low concentration epidural infusions or opioid analgesia’. The objective was to compare the effects of low concentration epidural infusions of bupivacaine with parenteral opioid analgesia on rates of caesarean section and instrumental vaginal delivery in nulliparous women. Data sources were Medline, Embase, the Cochrane controlled trials register, and hand searching of the International Journal of Obstetric Anesthesia. Study selection was done from randomized controlled trials comparing low concentration epidural infusions with parenteral opioids. Data synthesis was seven trials fulfilled the inclusion criteria for meta-analysis. Result found was epidural analgesia does not seem to be associated with an increased risk of caesarean section but may be associated with an increased risk of instrumental vaginal delivery. Epidural analgesia was associated with a longer second stage of labour. More women randomized to receive epidural analgesia had adequate pain relief, with fewer changing to parenteral opioids than vice versa. The study concluded that epidural analgesia using low concentration infusions of bupivacaine is unlikely to increase the
risk of caesarean section but may increase the risk of instrumental vaginal delivery. Although women receiving epidural analgesia had a longer second stage of labour, they had better pain relief. [117]

A descriptive study conducted by Schiessl B on ‘obstetrical parameters influencing the duration of the second stage of labour’ with the aim to investigate the impact of parameters influencing the duration of the second stage of labour in vaginal deliveries. 1200 consecutive vaginal deliveries were analyzed. Results were the mean length of the second stage was 70 min. In univariate analysis, parity, oxytocin augmentation and epidural analgesia, as well as occipito-posterior presentation were significant parameters associated with a prolonged second stage of labour. No correlation was found for birth weight and maternal age. In multivariate regression analysis, nulliparity and epidural analgesia were the strongest risk factors for a prolonged second stage. The study concluded that the impact of epidural analgesia on the second stage of labour should be considered in obstetrical management. [118]

A systemic review was done by Christine L on ‘Impact of first-stage ambulation on mode of delivery among women with epidural analgesia’. The main aim was to determine the effect of ambulation or upright positions in the first stage of labour among women with epidural analgesia on mode of delivery and other maternal and infant outcomes. This study undertook a systematic review and meta-analysis of randomized controlled trials (RCT) of ambulation or upright positions versus recumbency in the first stage of labour among women with effective first-stage epidural analgesia in an uncomplicated pregnancy. Trials were identified by searching Medline, Embase and CINAHL databases and the Cochrane Trials Register to March 2004. Results found were five eligible RCT, with a total of 1161 women. There was no statistically significant difference in the mode of delivery when women with an epidural ambulated in the first stage of labour compared with those who remained recumbent: instrumental delivery. There were no significant differences between the groups in use of oxytocin augmentation, the duration of labour, satisfaction with analgesia or Apgar scores. There were not apparent adverse effects of ambulation, but data were reported by only a few trials. This study
concluded that although ambulation in the first stage of labour for women with epidural analgesia provided no clear benefit to delivery outcomes or satisfaction with analgesia, neither were there any obvious harms. [119]

**Lavender T, et al** conducted a study on use of a 2 hour partogram action line instead of a 4 hour action line did not reduce caesarean delivery rate. The article presents a study on the effect of a 2 hour partogram action line on primiparous women in preventing caesarian delivery as compared with a 4 hour action line. The study involved 3,000 primigravid women in spontaneous labor of which duration of labor, use of epidural analgesia or postpartum hemorrhage were identified. The study reveals that the use of a 2 hour action line resulted to a shorter labor duration but more women in the 2 hour group received interventions to augment labor. [120]

**Gourounti, et al** did a systemic study on use of cardiotocograph and risk of caesarian. This study reviewed the Cochrane data base. The author comments on a study by Devane and colleagues which revealed that women allocated to admission cardiotocograph (CTG) were more likely to experience continuous electronic fetal monitoring. The author mentions that the study concluded that admission CTG should not be routinely offered in low-risk women as it increases the risk of caesarean section (CS). She states that the study confirms the recommendations of the current guidelines for selective use of CTG monitoring. [121]

**Ganapathy, et al** conducted a study on ‘Childbirth in Supported Sitting Maternal Position’. The main Objective was to compare the effects of supported sitting versus the supine- lithotomy maternal birthing position in healthy primigravidae on the obstetrical, perinatal outcome and maternal birthing experiences. Design was adopted for this study was two groups randomized interventional design and done at Municipal Maternity Corporation Hospital, Bangalore, Karnataka. Healthy primigravidae [n=200] randomly allocated to supported sitting [n =100] & supine lithotomy[ n =100] maternal birthing position during the second stage of labor. Main outcome measure were Duration of second stage third stage, rate of instrumental delivery, intensity of intrapartal pain, FHR
pattern, APGAR scores of the newborn, amount of blood loss and maternal birthing experiences. Results found that supported sitting position during second stage of labor was associated with a shorter duration of second, third stage of labor, fewer reports of excruciating intrapartal pain, fewer rates of instrumental delivery, irregular FHR pattern, higher APGAR scores, minimal blood loss and favorable maternal birthing experiences. Conclusion: In healthy primigravidae supported sitting position was associated with beneficial obstetrical, perinatal outcome and favorable maternal birthing experiences. [122]

Moore J, et al conducted a study on ‘Factors that influence the practice of elective induction of labor: what does the evidence tell us. The purpose of this investigation was to evaluate current trends in induction of labor scholarship focusing on evidence-based factors that influence the practice of elective induction. A key word search was conducted to identify studies on the practice of elective induction of labor. Analysis of the findings included clustering and identification of recurrent themes among the articles with 3 categories being identified. Under each category, the words/phrases were further clustered until a construct could be named. A total of 49 articles met inclusion criteria: 7 patient, 6 maternity care provider, and 4 organization factors emerged. Only 4 of the articles identified were evidence based. Patient factors were divided into preferences/convenience, communication, fear, pressure/influence, trust, external influences, and technology. Provider factors were then divided into practice preferences/convenience, lack of information, financial incentives, fear, patient desire/demand, and technology. Organization factors were divided into lack of enforcement/ accountability, hospital culture, scheduling of staff, and market share issues. Currently, there is limited data-based information focused on factors that influence elective induction of labor. Despite patient and provider convenience/preferences being cited in the literature, the evidence does not support this practice. [123]

Albers LL conducted a study on ‘The relationship of ambulation in labour to operative delivery’. An abbreviated version of the Nurse-Midwifery Clinical Data Set was used to gather data on all women (n = 3,049) who began intrapartum care with a nurse-midwife in three sites. Demographic information,
intrapartum care, and outcomes were recorded. The association of ambulation in labour with operative delivery was examined in a low-risk sample \((n = 1,678)\) of women who did not receive care measures (epidural anesthesia, oxytocin induction or augmentation) that preclude mobility in labour. Women who ambulated for a significant amount of time during labour (compared with those who did not ambulate) had half the rate of operative delivery \((2.7\% \text{ vs. } 5.5\%)\). [124]

v) Studies related to effect of movements and positions and birth settings on child birth experience

Lugina, et al conducted an exploratory study on ‘mobility and maternal position during childbirth in Tanzania at four government hospital’. In this study, researchers documented current practice rates, explored the barriers and opportunities to implementing these procedures from the provider perspective, and documented women's preferences and satisfaction with care. Method was an exploratory study using quantitative and qualitative methods. Practice rates were determined by exit interviews with a consecutive sample of postnatal women. Provider views were explored using semi-structured interviews (with doctors and traditional birth attendants) and focus group discussions (with midwives). Main outcome measures were practice rates for mobility during labour and delivery position; women's experiences, preferences and views about the care provided; and provider views of current practice and barriers and opportunities to evidence-based obstetric practice. Results found were across all study sites more women were mobile at home \((15.0\%)\) than in the labour ward \((2.9\%)\), but movement was quite restricted at home before women were admitted to labour ward \((51.6\% \text{ chose to rest with little movement})\). Supine position for delivery was used routinely at all four hospitals; this was consistent with women's preferred choice of position, although very few women are aware of other positions. Qualitative findings suggest obstetricians and midwives favored confining to bed during the first stage of labour, and supine position for delivery. This study concluded that the barriers to change appear to be complicated and require providers to want to change, and women to be informed of alternative positions during the first stage of labour and delivery. We believe that highlighting the gap between actual practice and current evidence provides a platform for
dialogue with providers to evaluate the threats and opportunities for changing practice. [125]

Christiaens done a cross national comparison study on ‘Pain acceptance and personal control in pain relief in two maternity care models of Belgium and the Netherlands’. Women were invited to participate in the study by independent midwives and obstetricians during antenatal visits in 2004-2005. Two questionnaires were filled out by 611 women, one at 30 weeks of pregnancy and one within the first 2 weeks after childbirth either at home or in a hospital. However, only women having a hospital birth without obstetric intervention (N = 327) were included in this analysis. A logistic regression analysis has been performed. Results found were Labour pain acceptance and personal control in pain relief render pain medication use during labour less likely, especially if they occur together. Apart from this general result, the study also find large country differences. Dutch women with a normal hospital birth are six times less likely to use pain medication during labour, compared to their Belgian counterparts. Our findings suggest that personal control in pain relief can partially explain the country differences in coping with labour pain. For Dutch women we find that the use of pain medication is lowest if women experience control over the reception of pain medication and have a positive attitude towards labour pain. In Belgium however, not personal control over the use of pain relief predicts the use of pain medication, but negative attitudes towards labour. Conclusions of the study was apart from individual level determinants, such as length of labour or pain acceptance, findings suggest that the maternity care context is of major importance in the study of the management of labour pain. The pain medication use in Belgian hospital maternity care is high and is very sensitive to negative attitudes towards labour pain. In the Netherlands, on the contrary, pain medication use is already low. This can partially be explained by a low degree of personal control in pain relief, especially when co-occurring with positive pain attitudes. [126]

A phenomenological study was conducted by NurRachmawati & Imami on ‘Maternal reflection on labour pain management and influencing factors’. This study used an interpretive phenomenology approach (hermeneutic
phenomenology) to describe the phenomenon of labour pain management in Indonesia from the mother's perspective. Interviews were conducted using semi-structured questions with field notes with seven women who had recently experienced childbirth. They were also observed during childbirth. Each interview was transcribed and analyzed using the Van Manen method. The results revealed six interrelated themes: the negative experience of labour pain; prior knowledge to alleviate pain; anxiety but pain must be faced; desire to handle labour pain; desire to be accompanied; and awareness of the mother's needs. The findings showed that women handle labour pain in their own ways because of a lack of information about the childbirth process and a belief that pain should be expected. The findings suggest that the maternity service in Indonesia is not sufficiently oriented to the mother. Healthcare providers need to provide a caring relationship and environment to meet the mother's needs. [127]

**Cook, et al** conducted a study on ‘The Impact of Choice and Control on Women's Childbirth Experiences’. This study used a qualitative, descriptive approach to explore how women develop their initial birth plan and how changes made to the plan affect overall birth experiences. Narrative, semi-structured interviews were conducted with 15 women who had given birth in Waterloo Region, Ontario, Canada, and data were analyzed using a phenomenological approach. Findings showed that women relied on many resources when planning a birth and that changes made to a woman's initial birth plan affected her recollection of the birth experience and concluded that women's positive and negative recollections of their birth experiences are related more to feelings and exertion of choice and control than to specific details of the birth experience. [128]

**Fleming** conducted a qualitative descriptive study done by on ‘Grand Multiparous Women's Perceptions of Birthing, Nursing Care, and Childbirth Technology’. This study explored grand multiparous women's perceptions of the evolving changes in birthing, nursing care, and technology. A purposive sample of grand multiparous women (N = 513) from rural, eastern Washington State were interviewed as they shared their 105 birth stories. Eight themes were identified: (1) providing welcome care, (2) offering choices, (3) following birth plans,
(4) establishing trust and rapport, (5) being an advocate, (6) providing reassurance and support, (7) relying on electronic fetal monitors and assessments versus nursing presence, and (8) having epidurals coupled with loss of bodily cues. Results from this study may be used to educate women, intrapartum nurses, and childbirth educators on nursing care and on the evolving use of technology to better manage intrapartum care in hospitals. The results can also add to the extent knowledge of childbirth nursing practices. [129]

Hassan done a study on ‘the paradox of vaginal examination practice during normal childbirth: Palestinian women's feelings, opinions, knowledge and experiences’. The aim of this exploratory qualitative study was to explore women's feelings, opinions, knowledge and experiences of vaginal examinations (VE) during normal childbirth. Authors interviewed 176 postpartum women using semi-structured questionnaire in a Palestinian public hospital. Results of this study whereas compared with WHO recommendations, VE was conducted too frequently, and by too many providers during childbirth. The proportion of women who received a 'too high' frequency of VEs during childbirth was significantly larger in primipara as compared to multipara women (P = .037). 82% of women reported pain or severe pain and 68% reported discomfort during VE. Some women reported insensitive approaches of providers, insufficient means of privacy and no respect of dignity or humanity during the exam. The study concluded that Palestinian women are undergoing unnecessary and frequent VEs during childbirth, conducted by several different providers and suffer pain and discomfort unnecessarily. Practice implications: Adhering to best evidence, VE during childbirth should be conducted only when necessary, and if possible, by the same provider. This will decrease the laboring women's unnecessary suffering from pain and discomfort. Providers should advocate for women's right to information, respect, dignity and privacy. [130]

Ragnar I done a randomized controlled trial on ‘comparison of the maternal experience and duration of labour in two upright delivery positions’. The aim of the study was to compare two upright delivery positions at the second stage of labour in healthy primiparous women with regard to duration of the second stage of labour and maternal experience. Samples selected were Primiparous subjects
(n=271) were randomly allocated to a kneeling (n=138) or a sitting (n=133) position during the second stage of labour. A postpartum questionnaire was answered by 264/271 women (97%) participating in the trial. Primiparous subjects were randomized to a kneeling or sitting delivery position during second stage of labour. Analysis was performed on an intention-to-treat basis. Main outcome measure was duration of the second stage of labour. Results found that, a comparison of the duration of the second stage of labour revealed no significant difference between the groups. A sitting position during the second stage of labour was associated with a higher level of delivery pain (P < 0.01), a more frequent perception of the second stage as being long (P=0.002), less comfort for giving birth (P=0.03) and more frequent feelings of vulnerability (P=0.05) and exposure (P=0.02). There were no significant differences in the frequency of sphincter ruptures although a sitting position was associated with a higher degree of postpartum perineal pain (P < 0.001). [131]

Meharunnisa Khaskheli, et al conducted a research on ‘Subjective pain perceptions during labour and its management’ to investigate women's own labour pain perception, experiences and satisfaction with health care providers’. This is a descriptive study conducted on 400 labouring women at Obstetrics and Gynaecology Department Unit-II and IV Liaquat University Hospital Hyderabad / Jamshoro from January 2000 to July 2006. Four hundred full term labouring women in first stage of labour were included in the study. All the women with associated medical problems were excluded. This study shows an acceptable birth experience in 136 (34%) cases, while 264 (66%) patients found it an exhausting painful experience. Common factors which favour good experience included lower socioeconomic class 67 (57.98%), rural population (54.68%), multiparous women (68.08%), prior knowledge of labour pains (69.31%), spontaneous labour (86.89%), use of pharmacological agents (76.04%) and co-operative staff attitude (89.27%). Those who found labour pains an acceptable process, 87.5% had a positive attitude for future childbearing and concluded that Childbirth can be a good experience with effective antenatal counseling. A highly professional attitude and tender loving care is the key to a pain free labour. [132]
Amanda M, etal conducted a qualitative study on ‘characteristics of a positive experience for women who have unmedicated childbirth’. This qualitative descriptive study determined characteristics that women deem positive in their unmedicated childbirth experience. Seventeen women were interviewed and themes were identified. All of the women reported satisfying births, adding accompanying feelings of empowerment and well-being. An overriding theme in each woman's birth story that made the birth experience positive was the ability to control her body during labor and the ability to influence the environment in which she labored and gave birth. Being able to move and change positions freely were both key factors in determining a positive birth experience. Additionally, the women expressed comfort from the presence of a spouse or trusted individual. They found the help of an experienced woman or doula important. Many were willing to change care providers to gain support for their desire for an unmedicated birth. [133]

Nilsson L, etal conducted a study on “Factors influencing positive birth experiences of first-time mothers. The main objective of this study was to describe first-time mothers' experiences and reflections of their first birth. This study is a part of a larger study which was carried out in southwestern Sweden in 2008. A qualitative method with content analysis was chosen for this study. The unit of data was 14 written narratives from the first-time mothers. Results found were, the theme "To be empowered increases first-time mothers' chances for a positive birth experience" crossed over into all the three categories: "To trust the body and to face the pain" "Interaction between body and mind in giving birth" and "Consistency of support." The study concluded that in order to feel confident in their first childbirth, the women wanted to be confirmed and seen as unique individuals by the professionals and their partner. If professionals responded to the individual woman's needs of support, the woman more often had a positive birth experience, even if the birth was protected or with medical complications. [134]

Dahlen HG, etal conducted a study on ‘The novice birthing: theorising first-time mothers' experiences of birth at home and in hospital in Australia’. The aim was to explore first-time mothers' experiences of birth at home and in hospital in Australia. A grounded theory methodology was used. Data were generated from
in-depth interviews with 19 women in their own homes. Seven women who gave birth in a public hospital and seven women who gave birth for the first time at home were interviewed and their experiences were contrasted with two mothers who gave birth for the first time in a birth center, one mother who gave birth for the first time in a private hospital and two women who had given birth more than once. Findings found were three categories emerged from the analysis: preparing for birth, the novice birthing and processing the birth. These women shared a common core experience of seeing that they gave birth as 'novices'. The basic social process running through their experience of birth regardless of birth setting, was that, as novices, they were all 'reacting to the unknown'. The mediating factors that influenced the birth experiences of these first-time mothers were preparation, choice and control, information and communication, and support. The quality of midwifery care both facilitated and hindered these needs, contributing to the women's perceptions of being 'honoured'. The women who gave birth at home seemed to have more positive birth experiences. This study demonstrates how midwives can contribute to positive birth experiences by being aware that first-time mothers, irrespective of birthsetting, are essentially reacting to the unknown as they negotiate the experience of birth. [135]

Hadjigeorgiou E, etal done a review on ‘Women's perceptions of their right to choose the place of childbirth’. The main objective of this study was to provide a critical synthesis of published research concerning women's experiences in choosing where to give birth. An integrative literature review was conducted using three databases (MEDLINE, CINAHL and Ovid) for 1997-2009. Findings were twenty-one research-based papers met the inclusion criteria, and these used a range of approaches and methods. Four themes were derived from the data: choice of birthplace and medicalization of childbirth; the midwifery model of care and the rhetoric of birthplace choices; perceptions of safety shaped women's preferences; and choice is related to women's autonomy. The medical model remains a strong and powerful influence on women's decisions in many countries. The midwifery model offers birthplace choices to women, while policies and culture in some countries affect midwifery practice. [136]
vi) Studies related to maternal satisfaction

Kannan S, et al conducted a study on ‘Maternal satisfaction and pain control in women electing natural childbirth’. The main aim of the study was to examine how epidural analgesia for labor influences maternal satisfaction in women who initially choose natural childbirth. This study compared pain and maternal satisfaction in women who elected natural childbirth and successfully followed through (n = 23), with those who elected natural childbirth, but requested epidural analgesia during their labor (n = 24). Subjects rated their pain throughout labor and completed pre- and post labor questionnaires. The result shows that women who requested epidural analgesia for pain during labor reported significantly lower pain scores than those women who had natural childbirth (P < .001). However, 88% of women who requested an epidural for pain reported being less satisfied with their childbirth experience than those who did not, despite lower pain intensity. Antenatal survey results suggest that concerns about epidurals and their effect on the baby, greater than anticipated labor pain, perceived failure of requesting an epidural, and longer duration of labor may have accounted for these findings. This study highlights the importance of experience and prelabor expectations on maternal satisfaction with childbirth. [137]

Paech MJ, et al done a survey of parturients using epidural analgesia during labour. In this survey, 350 parturients who had recently used epidurals for labour pain relief in a single maternity unit was asked to complete a questionnaire about their expectations and experience. The response rate was 90%. Prepartum information was most commonly derived from hearsay and least commonly from medical health professionals, 56% of respondents wanted pain to be made tolerable and 34% wanted complete pain relief. Almost half considered unrestricted mobility and delivery without obstetric assistance important. A minority were concerned about possible effects of epidurals on the baby or labour outcome. Anticipated pain during epidural placement was significantly greater than that experienced. Satisfaction with EA was high, although 36% described unpleasant or annoying effects associated with EA. Parent educators and epidural service providers should be aided by knowledge of where parturients obtain information and of consumer views about epidurals. [138]
Dannernbring D, et al conducted a study on predictors of childbirth pain and maternal satisfaction. There is little multivariate, multiphasic research on childbirth pain and satisfaction. This study explored the relationship of demographic, medical, psychological, and environmental variables at different times to multiple indices of pain and satisfaction in 70 primiparae and multiparae. Induced labor, desirability of pregnancy, and coach's helpfulness predicted sensory pain. Duration of labor, depression, and outcome expectancy that childbirth education would facilitate medication-free childbirth predicted affective pain. Physician-anticipated complications, induced labor, and motivation to be medication-free predicted pain intensity. Grade level predicted satisfaction. The results also demonstrated differences between primiparae and multiparae in the pattern of variables that explained pain and satisfaction as well as the temporal sensitivity of pain predictors. [139]

A correlational descriptive survey done by Goodman P, et al on ‘Factors related to childbirth satisfaction’. The main aim of this study was to examine multiple factors for their association with components of childbirth satisfaction and with the total childbirth experience. This study was conducted with 60 low-risk postpartum women, aged 18-46 years, with uneventful vaginal deliveries of healthy full-term infants at two medical centers in the south-eastern United States. The Labor Agentry Scale, McGill pain Questionnaire and Mackey Childbirth Satisfaction Rating Scale and a background questionnaire were completed by women. Obstetrical data were collected from the medical record. Personal control was a statistically significant predictor of total childbirth satisfaction (P = 0.0045) and with the subscale components of satisfaction (self, partner, baby, nurse, physician and overall). In addition, having expectations for labour and delivery met was a significant predictor of satisfaction with own performance during childbirth. This study concluded that Personal control during childbirth was an important factor related to the women's satisfaction with the childbirth experience. Helping women to increase their personal control during labour and birth may increase the women's childbirth satisfaction. [140]
Christiaens W, et al done a study on assessment of social psychological determinants of satisfaction with childbirth in a cross-national perspective. Two questionnaires were filled out by 605 women, one at 30 weeks of pregnancy and one within the first 2 weeks after childbirth either at home or in a hospital. Of these, 560 questionnaires were usable for analysis. Women were invited to participate in the study by independent midwives and obstetricians during antenatal visits in 2004-2005. Satisfaction with childbirth was measured by the Mackey Satisfaction with Childbirth Rating Scale, which takes into account the multidimensional nature of the concept. Labour pain was rated retrospectively using Visual Analogue Scales. Personal control was assessed with the Wijma Delivery Expectancy/Experience Questionnaire and Pearlin and Schooler’s mastery scale. A hierarchical linear analysis was performed. Results found were. Satisfaction with childbirth benefited most consistently from the fulfillment of expectations. In addition, the experience of personal control buffered the lowering impact of labour pain. Women with high self-efficacy showed more satisfaction with self-, midwife- and physician-related aspects of the birth experience. This finding focuses the attention toward personal control, self-efficacy and expectations about childbirth. This study confirms the multidimensionality of childbirth satisfaction and demonstrates that different factors predict the various dimensions of satisfaction. The model applies to both Belgian and Dutch women. [141]

A randomized controlled trial was done by Sadler LC, et al on maternal satisfaction with active management of labour. Nulliparous women at National Women's Hospital in Auckland, New Zealand, in spontaneous labour at term with singleton pregnancy, cephalic presentation, and without fetal distress were randomized after the onset of labour to active management(n = 320) or routine care (n = 331). Active management included early amniotomy, two-hourly vaginal assessments, and early use of high dose oxytocin for slow progress in labor. Routine care was not prespecified. Maternal satisfaction with labor care was assessed by postal questionnaire at 6 weeks postpartum. Sensitivity analyses were performed, and logistic regression models were developed to determine independent explanatory variables for satisfaction. Results were of the 651 women randomized in the trial, 482 (74%) the returned questionnaires. Satisfaction with labor care was high (77%)
and did not significantly differ by treatment group. This finding was stable when sensitivity analysis was performed. The first logistic regression model found independent associations between satisfaction and adequate pain relief, one-to-one midwifery care, adequate information and explanations by staff, accurate expectation of length of labor, not having a postpartum hemorrhage, and fewer than three vaginal examinations during labor. The second model found fewer than three vaginal examinations and one-to-one midwifery care as significant explanatory variables for satisfaction with labor care. The study concluded that active management did not adversely affect women's satisfaction with labor and delivery care in this trial. Future studies should concentrate on measurement of potential predictors before and during labor. [142]

vii) Studies related to effect of freedom of movement on fetal outcome

Tracy SK, et al conducted a population based study on ‘Birth outcomes associated with interventions in labour amongst low risk women’ aimed to determine the association between interventions introduced during labour with interventions in the birth process amongst women of low medical risk. Sample of the study was all low risk women amongst the 753,895 women who gave birth in Australia during 2000-2002. Adjusted odds ratios (AOR) were calculated using multinomial logistic regression to describe the association between mode of birth and each of four labour intervention subgroups separately for primiparous and multiparous women. Results found that increased rates of operative birth in association with each of the interventions offered during the labour process. For first time mothers the association was particularly strong. This study concluded that underlines the need for better clinical evidence of the effects of epidurals and pharmacological agents introduced in labour. At a population level it demonstrates the magnitude of the fall in rates of unassisted vaginal birth in association with a cascade of interventions in labour and interventions at birth particularly amongst women with no identified risk markers and having their first baby. [143]
Carbonne B, et al conducted a study on ‘maternal position during labour: effects on Fetal oxygen saturation measured by pulse oximetry’. The main objective was to determine the effects of maternal left lateral, right lateral, and supine positions during labour on fetal oxygen saturation measured by pulse oximetry and it was obtained in 15 laboring women randomly and successively adopting left lateral, supine, and right lateral positions for 10 minutes each. Changes in fetal oxygen saturation were observed in different positions. The result was the supine position was associated with a lower fetal oxygen saturation than the left lateral position. One supine hypotensive syndrome occurred and was associated with a drop in fetal oxygen saturation. The study concluded that supine position during labour is associated with a lower fetal oxygen saturation than the left lateral position. [144]

Nikolov A, et al conducted a study on Influence of maternal position during delivery of fetal oxygen saturation. The aim of the study is to investigate the alterations in fetal oxygen saturation during right lateral, supine and left lateral maternal position. Thirty six women at term are included--during the first stage of normally progressing labour. Simultaneous monitoring is carried out of fetal heart rate, uterine contractions, fetal oxygen saturation and maternal arterial blood pressure for a certain period of time in different maternal positions. It was established, that fetal oxygen saturation values are lowest in the supine position, still remaining in physiological ranges--47.1 +/- 10.2. If supine syndrome develops, fetal oxygen saturation values decrease significantly: 23%, 25%. [145]

Schmidt S, et al done a study on ‘Effect of modified labour posture on oxygenation of the fetus’. Fetal oxygen saturation was measured by pulse oximetry among 56 labouring women randomly and successively adopting the sitting and standing position. The statistical analysis addressed the integrated 10 minutes period of SpO2 registrations before versus after adopting the modified position. Furthermore the mean values and the standard deviation (SD) for the total registration periods of different birth position was calculated. Result of the study was while the supine position induced a reduction in oxygen saturation, sitting and prone position was favorable for fetal oxygenation as compared to horizontal position. [146]
Scrafford CG, et al conducted a population based Cohort study on ‘Incidence of and risk factors for neonatal jaundice among newborns in southern Nepal’. The main aim of the study was to quantify the incidence of and risk factors for neonatal jaundice among infants referred for care from a rural and low-resource, Study participants were 18,985 newborn infants born in Sarlahi District in southern Nepal from May 2003 to January 2006. Jaundice was assessed based on visual assessment of the infant by a study worker and referral for care. Adjusted relative risks (RR) were estimated to identify risk factors for referral for neonatal jaundice using Poisson regression. The incidence of referral for neonatal jaundice was 29.3 per 1000 live births (95% confidence interval: 26.9, 31.7). Male sex, high birth weight, breastfeeding patterns, warm air temperature, primiparity, skilled birth attendance, place of delivery, prolonged labour, oil massage, paternal education and ethnicity were significant risk factors (P-values < 0.01). After multivariable adjustment, sex, birth weight, difficulty feeding, prolonged labour, primiparity, oil massage, ambient air temperature and ethnicity remained important factors. Among infants with difficulty feeding, exclusive breastfeeding was a risk factor for neonatal jaundice, whereas exclusive breastfeeding was protective among infants with no report of difficulty feeding. [147]

An Eight Year Retrospective Review done by McgilUgw GI on ‘Incidence of Birth Asphyxia as Seen in Central Hospital and GN Children’s Clinic both in Warri Niger Delta of Nigeria’. The main aim of the study was to determine the incidence and mortality rate of birth asphyxia in Warri Niger Delta of Nigeria. Recovery of case notes of all the newborn babies seen from January 2000 to December 2007 at Central Hospital Warri and GN children’s Clinic, Warri, was undertaken. They were analyzed and those with birth asphyxia were further analyzed, noting the causes, severity of asphyxia, sex of the babies, management given. A total of 864 out of 26,000 neonates seen within this period had birth asphyxia. 525 (28/1000 live births) had mild asphyxia while 32% were severely asphyxiated. 61.5% of the asphyxiated were born at maternities, churches or delivered by traditional birth attendants or at home. Prolonged labour was the commonest cause of asphyxia and asphyxia was more in neonates from unbooked patients. Conclusion of the study was the incidence of birth asphyxia in Warri is 28/1000. Majority of patients are from
prolonged labour and delivery at unrecognized centres. Health education will drastically reduce the burden of asphyxia neonatarum as unsubstantiated religious beliefs have done a great havoc.[148]

A retrospective cohort population based study done by Stock SJ, etal on ‘outcomes of elective induction of labour compared with expectant management’. The objective was to determine neonatal outcomes (perinatal mortality and special care unit admission) and maternal outcomes (mode of delivery, delivery complications) of elective induction of labour compared with expectant management. Consultant and midwife led obstetric units in Scotland 1981-2007 with study participants of 1,271,549 women with singleton pregnancies of 37 weeks or more gestation. Outcomes of elective induction of labour (induction of labour with no recognized medical indication) at 37, 38, 39, 40, and 41 weeks' gestation compared with those of expectant management (continuation of pregnancy to either spontaneous labour, induction of labour or caesarean section at a later gestation). Result found that was at each gestation between 37 and 41 completed weeks, elective induction of labour was associated with a decreased odds of perinatal mortality compared with expectant management (at 40 weeks' gestation 0.08% in the induction of labour group versus 0.18% in the expectant management group. Admission to a neonatal unit was, however, increased in association with elective induction of labour at all gestations before 41 weeks (at 40 weeks' gestation 8.0% in the induction of labour group compared with 7.3% in the expectant management group. Although residual confounding may remain, our findings indicate that elective induction of labour at term gestation can reduce perinatal mortality in developed countries without increasing the risk of operative delivery. [149]

Hannah ME, etal conducted a randomized controlled trial on ‘Induction of labor as compared with serial antenatal monitoring in post-term pregnancy’. They studied 3407 women with uncomplicated pregnancies of 41 or more weeks' duration. The women were randomly assigned to undergo induction of labor or to have serial antenatal monitoring and spontaneous labor unless there was evidence of fetal or maternal compromise, in which case labor was induced or cesarean section was performed. In the induction group, labor was induced by the intracervical application
of prostaglandin E2. Serial antenatal monitoring consisted of counts of fetal kicks, nonstress tests, and assessments of amniotic-fluid volume. The outcomes we measured were the rates of perinatal mortality, neonatal morbidity, and delivery by cesarean section. Among the 1701 women in the induction group, 360 (21.2 percent) underwent cesarean section, as compared with 418 (24.5 percent) of the 1706 women in the monitoring group (P = 0.03). This difference resulted from a lower rate of cesarean section performed because of fetal distress among the women in the induction group (5.7 percent vs. 8.3 percent, P = 0.003). When two infants with lethal congenital anomalies were excluded, there were no perinatal deaths in the induction group and two stillbirths in the monitoring group (P not significant). The frequency of neonatal morbidity was similar in the two groups. The study concludes that in post-term pregnancy, the induction of labor results in a lower rate of cesarean section than serial antenatal monitoring; the rates of perinatal mortality and neonatal morbidity are similar with the two approaches to management. [150]

2.2.2 Part B –Studies related to effect of complimentary /alternative therapy (CAM) used during labour

Simkin P conducted systemic review on ‘Update on nonpharmacologic approaches to relieve labor pain and prevent suffering’. Nonpharmacologic approaches toward these goals are consistent with midwifery management and the choices of many women. They undertook a literature search of scientific articles cataloged in CINAHL, PUBMED, the Cochrane Library, and AMED databases relating to the effectiveness of 13 non-pharmacologic methods used to relieve pain and reduce suffering in labor. Suffering, which is different from pain, is not an outcome that is usually measured after childbirth. We assumed that suffering is unlikely if indicators of satisfaction were positive after childbirth. Adequate evidence of benefit in reducing pain exists for continuous labor support, baths, intradermal water blocks, and maternal movement and positioning. Acupuncture, massage, transcutaneous electrical nerve stimulation, and hypnosis are promising, but they require further study. The effectiveness of childbirth education, relaxation and breathing, heat and cold, acupressure, hypnosis, aromatherapy, music, and audioanalgesia are either inadequately studied or findings are too variable to draw
conclusions on effectiveness. All the methods studied had evidence of widespread satisfaction among a majority of users. [151]

**Levett KM, etal** conducted a systemic review on ‘Massage, reflexology and other manual methods for pain management in labour’. The main aim of this study was to examine the effects of manual healing methods including massage and reflexology for pain management in labour on maternal and perinatal morbidity. They undertook a literature search of scientific articles cataloged in CINAHL, PUBMED, the Cochrane Library, and AMED database related to randomized controlled trials comparing manual healing methods with standard care, no treatment, other non-pharmacological forms of pain management in labour or placebo. They included six trials, with data reporting on five trials and 326 women in the meta-analysis. We found trials for massage only. Less pain during labour was reported from massage compared with usual care during the first stage of labour and labour pain was reduced in one trial of massage compared with music. One trial of massage compared with usual care found reduced anxiety during the first stage of labour. No trial was assessed as being at a low risk of bias for all quality domains. This review concluded that massage may have a role in reducing pain, and improving women's emotional experience of labour. [152]

A systemic review on ‘Hypnosis for pain management during labour and childbirth’ done by **Madden K, etal** to examine the effectiveness and safety of hypnosis for pain management during labour and childbirth. They searched the Cochrane Pregnancy and Childbirth Group's Trials Register (11 January 2012) and the reference lists of primary studies and review articles. They included seven trials randomizing a total of 1213 women. No significant differences between women in the hypnosis group and those in the control group were found for the primary outcomes: use of pharmacological pain relief spontaneous vaginal birth. The primary outcome of sense of coping with labour was reported in two studies as showing no beneficial effect. For secondary outcomes, no significant differences were identified between women in the hypnosis group and women in the control group for most outcomes where data were available. For example, there was no significant difference for satisfaction with the childbirth experience, admissions to the neonatal
intensive care unit or breastfeeding at discharge from hospital. There was some evidence of benefits for women in the hypnosis group compared with the control group for pain intensity, length of labour and maternal hospital stay, although these findings were based on single studies with small numbers of women. Pain intensity was found to be lower for women in the hypnosis group than those in the control group in one trial of 60 women. The same study found that the average length of labour from 5 cm dilation to birth (minutes) was significantly shorter for women in the hypnosis. This review concluded that there are still only a small number of studies assessing the use of hypnosis for labour and childbirth. Although the intervention shows some promise, further research is needed before recommendations can be made regarding its clinical usefulness for pain management in maternity care. [153]

Deery S, et al conducted a systemic review on ‘Intracutaneous or subcutaneous sterile water injection compared with blinded controls for pain management in labour’. Objective was to determine the efficacy of sterile water injections for relief of pain during labour compared to placebo or non-pharmacological interventions. This study searched the Cochrane Pregnancy and Childbirth Group's Trials Register, MEDLINE, and EMBASE, together with reference lists in retrieved studies and review articles. This study included seven studies, with 766 participants: four used intracutaneous injections, two subcutaneous, and one both. All reported on low back pain in labour only. Methodological quality was good, but four studies were at high risk of bias due to small size of treatment groups, incomplete outcome data, and performance bias. All studies reported treatment group mean or median scores, finding greater reduction in pain for sterile water. One reported the number self-scoring 4/10 cm or more reduction in pain; significantly more had this outcome with sterile water (50% to 60%) than with placebo (20% to 25%). There was no significant difference between sterile water and saline for rates of caesarean section, instrumental delivery, rescue analgesia, timing of delivery, or Apgar scores. Two studies reported that more women treated with sterile water would request the same analgesia in future. No study reported on women's satisfaction with pain relief, women's sense of control in labour, women's satisfaction with the childbirth experience, mother/baby interaction, rates of breastfeeding, maternal morbidity, infant long-term outcomes, or cost. No adverse
events were reported other than transient pain with injection, which was worse with sterile water. The outcomes reported severely limit conclusions for clinical practice. The study found that little robust evidence that sterile water is effective for low back or any other labour pain. Neither did this study find any difference in delivery or other maternal or fetal outcomes. [154]

A systemic review was done by Collins CT, et al on ‘Acupuncture and acupressure for pain management in labour’. The main aim was to examine the effects of acupuncture and acupressure for pain management in labour. They undertook a literature search of scientific articles cataloged in CINAHL, PUBMED, the Cochrane Library, and AMED databases relating to the effectiveness randomized trials comparing acupuncture and acupressure with placebo, no treatment or other non-pharmacological forms of pain management in labour. We included all women whether primiparous or multiparous, and in spontaneous or induced labour. They included 13 trials with data reporting on 1986 women. Nine trials reported on acupuncture and four trials reported on acupressure. Less intense pain was found from acupuncture compared with no intervention reduced use of pharmacological analgesia was found in one trial of acupuncture compared with placebo and compared with standard care, 3 trials found fewer instrumental deliveries from acupuncture were found compared with standard care. Pain intensity was reduced in the acupressure group compared with a placebo control, and a combined control. No trial was assessed as being at a low risk of bias for all of the quality domains. Authors concluded that acupuncture and acupressure may have a role with reducing pain, increasing satisfaction with pain management and reduced use of pharmacological management. [155]

Smith CA, et al conducted a systemic review on Aromatherapy for pain management in labour done by to examine the effects of aromatherapy for pain management in labour on maternal and perinatal morbidity. They undertook a literature search of scientific articles cataloged in CINAHL, PUBMED, the Cochrane Library, and AMED databases relating to the effectiveness of randomized controlled trials comparing aromatherapy with placebo, no treatment or other non-pharmacological forms of pain management in labour. They included two trials (535
women) in the review. The trials found no difference between groups for the primary outcomes of pain intensity, assisted vaginal birth and caesarean section and there were more babies admitted to neonatal intensive care in the control group of one trial but this difference did not reach statistical significance. The trials found no differences between groups for the secondary outcomes of use of pharmacological pain relief spontaneous vaginal delivery or length of labour and augmentation. The risk of bias was low in the trials. Authors' concluded that there is a lack of studies evaluating the role of aromatherapy for pain management in labour. Further research is needed before recommendations can be made for clinical practice. [156]
2.3 CONCEPTUAL FRAMEWORK

The conceptual framework for research study presents the foundation on which the purpose proposed study is based. The framework provides the perspective from which the investigator views the problem.

The study is based on the concept that administration of selected nursing intervention i.e. freedom of movement such as walking, rocking, swaying and semi sitting position to the primi parturient mothers who are in first stage of labour will enable effective management of labour pain perception, comfort, maternal and fetal wellbeing, and enhances the labour process and outcome and maternal satisfaction. The Researcher adopted the Wiedenbach’s helping art Clinical Nursing Theory (1964) as the base for developing the conceptual framework. This is a perspective theory which directs action toward an explicit goal. Wiedenbach proposes a helping art clinical nursing theory in 1964 for nursing, which describes a desired situation and way to attain it. This theory consists of 3 factors.

1. Central purpose
2. Prescription
3. Realities

A nurse develops a prescription based on a central purpose and implements it according to the realities of the situation.

1. **Central purpose:** It refers to what nurse wants to accomplish. It is the overall goal towards which the nurse strives.

2. **Prescriptions:** It refers to plan of care for a patient. It will specify the nature of action that will fulfill the nurse’s central purpose.

3. **Realities:** It refers to the physical, psychological, emotional and spiritual factors that come in to play in situation involving nursing action. The five realities identified by Wiedenbach are agent, recipient, goal, means and framework.

The conceptualization of nursing practice according to this theory three steps as follows:

- Step 1: Identifying the need for help
- Step 2: Ministering the needed help
- Step 3: Validating the need for help
Step 1: Identifying the Need for Help

This step involves identifying the primiparturient mothers based on screening, demographic variables (age, religion, education, occupation, type of work, residence, type of family, support system, information regarding freedom of movement, source of information, body mass index, gestational age, dietary pattern, and sleeping pattern), inclusive and exclusive criteria and simple random technique was used to assign the primiparturient mothers to experimental and control group.

Step 2: Ministering the needed help

It refers to the provision of required help to fulfill the identified need. It has the following components.

a) Prescription: It refers to plan of care to achieve the purpose which includes, freedom of movements such as walking, rocking, swaying and semi sitting position was given to study group of primiparturient mothers.

b) Realities: It refers to the factors that influence the nursing action in the particular situation.

   Agent: Researcher
   Recipient: Primigravid mothers
   Means: Freedom of movement intervention
   Goal: Enhances positive outcome
   Framework: labour room

Step 3: Validating the Need for Help

It refers to the collection of evidence that shows needed help have been met as a direct result of action. This is explored by means of post assessment of maternal and fetal outcome and maternal satisfaction after rendering the freedom of movement intervention.

Based on this, further management modalities will be planned.
Conceptual framework based on Widenbach’s Helping Art Clinical Nursing Theory (1964)