OUTCOMES OF POST-TERM PREGNANCY: CASE CONTROL STUDY IN THE
THREE AAU TEACHING HOSPITALS (TAH, GMH AND ZMH)

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ADVISOR: SOLOMON KUMBI (MD), ASSOCIATE PROFESSOR OF
OBSTETRICS AND GYNECOLOGY
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ACRONYMS

AAU: - Addis Ababa University
AAU- CHS: - Addis Ababa University College of Health Sciences
ACOG: - American College of Obstetrician and Gynecologists
BPP: - Biophysical Profile
CNS: - Central Nervous System
CI: - Confidence Interval
C/S: - Cesarean section
DRPC: - Department Research Publication Committee
DM: - Diabetes Mellitus
GA: - Gestational Age
GMH: - Gandhi Memorial Hospital
HTN: - Hypertension
LNMPL: - Last Normal Menstrual Period
MAS: - Meconium Aspiration Syndrome
NICU: - Neonatal Intensive Care Unit
OR: - Odds Ratio
SVD: - Spontaneous Vertex Delivery
SOGC: - Society of Obstetricians and Gynecologists of Canada
TAH: - Tikur Anbesa Hospital
U/S: - Ultrasound
ZMH: - Zewditu Memorial Hospital
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ABSTRACT

Background: - Postterm pregnancy is defined as a pregnancy that persists beyond 294 days or 42 weeks of gestation [1, 2]. The incidence of postterm pregnancy is approximately 7% [3]. Postterm pregnancy is associated with significant risks to the pregnant woman, including labor dystocia (9-12% versus 2-7% at term), severe perinatal injury related to macrosomia (3.3% versus 2.6% at term), doubling in cesarean delivery rate with associated endometritis, PPH and thrombophlebitis [5]. Because of the accompanying maternal and fetal complications different centers adopt different strategies to avert these complications.

Hence, identification of postterm pregnancy before delivery by assessing risk factors, accurate dating and proper management plays crucial role in preventing perinatal complications and results in better obstetric outcome.

Objective: - to assess perinatal mortality and feto-maternal morbidities related to post-term pregnancy.

Methods: - this was a hospital based unmatched case control study. The cases were postterm deliveries in the three AAU teaching hospitals that fulfill inclusion criteria, and controls were term deliveries one before and one after the cases (1:2 proportions) and fulfill inclusion criteria.

Data was collected by interns and residents who were assigned in each hospital’s labor ward during the working and duty hours in the study period. The principal investigator supervised the data collection for the utmost quality. All postterm mothers who gave birth and those mothers who gave birth at term and registered just above and below the selected cases in the specified time period that fulfill the inclusion criteria were included. All the necessary information for the study were filled to a prepared structured format from the patients chart and interview. Data entered and cleaned using SPSS version 21.0 software. Analysis was done using chi-square test taking P <0.05 as statistically significant and logistic regression also used for analysis.

Results and Conclusions: - Respondents previous history of postterm pregnancy, induced onset of labor and instrumental delivery were significantly associated with postterm (p<0.05). On the other hand age, neonatal outcome, maternal complications, and Apgar score did not show statistically significant difference between the two study groups (p>0.05).
**Recommendations:** - Woman with history of postterm pregnancy needs early, accurate gestational age determination and follow up. Delivery earlier than 42 weeks may reduce instrumental and cesarean delivery. Conduct similar research with large sample size.
1. INTRODUCTION

Postterm pregnancy is defined as a pregnancy that persists beyond 294 days or 42 weeks of gestation [1, 2]. The incidence of postterm pregnancy is approximately 7% [3]. Postterm pregnancy is associated with significant risks to the pregnant woman, including labor dystocia (9-12% versus 2-7% at term), severe perinatal injury related to macrosomia (3.3% versus 2.6% at term), doubling in cesarean delivery rate with associated endometritis, PPH and thrombophlebitis [5]. Because of the accompanying maternal and fetal complications different centers adopt different strategies to avert these complications.

Accurate assessment of gestational age and diagnosis of postterm gestation, as well as recognition and managements of risk factors may reduce the risk of adverse outcomes [5, 6]. Antenatal surveillance and induction of labor are two widely used strategies that theoretically may decrease the risk of an adverse fetal outcome; maternal risk factor for postterm pregnancy also should be considered [5]. Rarely postterm pregnancy may be associated with placental sulfatase deficiency or fetal anencephaly, male sex and genetic predisposition [5].

Hence identification of postterm pregnancy before delivery by assessing risk factors, accurate dating and proper management plays crucial role in preventing perinatal complications and results in better obstetric outcome.
2. STATEMENTS OF THE PROBLEM

Postterm pregnancy is defined as a pregnancy that persists beyond 294 days or 42 weeks of gestation [1, 2]. The incidence of postterm pregnancy is approximately 7% [3]. The incidence of postterm pregnancy varies depending on whether the calculation is based on the history and clinical examination alone, or whether early pregnancy ultrasound examination is used to estimate gestational age [4,5].

Postterm pregnancy is associated with significant risks to the pregnant woman, including labor dystocia (9-12% versus 2-7% at term), severe perinatal injury related to macrosomia (3.3% versus 2.6% at term), doubling in cesarean delivery rate with associated endometritis, PPH and thrombophlebitis [5]. The majority of postterm pregnancies have no known cause. Primigravidity and prior postterm pregnancies are the most common identifiable risk factors [5]. After one postterm pregnancy, the risk of another such pregnancy in the subsequent birth is increased two-to three-fold; the risk of recurrence is quadrupled after two prior postterm pregnancies [1, 6].

Postterm pregnancy is associated with significant risks to the fetus. The perinatal mortality rate (still birth plus early neonatal deaths) at greater than 42 weeks of gestation is twice than at term (4-7 deaths verses 2-3 deaths per 1000 deliveries and increase six fold or more at 43 weeks of gestation and beyond. Uteroplacental insufficiency, meconium aspiration and intrauterine infection lead to increased rate of perinatal deaths [5]. Postterm pregnancy is also an independent risk factor for low umbilical artery pH levels at delivery and low 5-minute APGAR scores. Fetal macrosomia with its complications, IUGR, and metabolic complications are also common [5].

Accurate assessment of gestational age and diagnosis of postterm gestation, as well as recognition and managements of risk factors may reduce the risk of adverse outcomes. Antenatal surveillance and induction of labor are two widely used strategies that theoretically may decrease the risk of an adverse fetal outcome; maternal risk factor for postterm pregnancy also should be considered [5]. Rarely, postterm pregnancy may be associated with placental sulfatase deficiency or fetal anencephaly, male sex and genetic predisposition [5].

It is well established that risks are increased in postterm pregnancy, what has received less attention is whether and to what extent these risks increase before 42 weeks of gestation [8,9].
Despite intensive research, management of postterm pregnancy is still controversial and varies, not only among different countries and hospital units, but also among different clinicians in the same unit. It was only in the 1970s that it became apparent that perinatal mortality was significantly increased in prolonged pregnancies, and that fetal surveillance combined with selective use of induction of labor might result in improved perinatal outcome [10].

Hence, identification of postterm pregnancy before delivery by assessing risk factors, accurate dating and instituting appropriate management play crucial role in preventing obstetric complications (on the fetus and the mother) and resulting in better obstetric outcome.

Numerous studies have been done to assess outcomes of postterm pregnancy in different parts of the world, majority being in the developed world and few studies in Africa. African Americans and Mexican Americans have greater postterm delivery than whites; community level risk factors (maternal age, education, parity and perinatal care) account for most of the disparity [11].

A cross-sectional comparative study of pregnancy outcome among term and postterm mothers was done in our department nine years back. Results showed that fetal distress, perinatal asphyxia and consequent cesarean delivery rate were much higher than other series which was explained by lack of antenatal care and poor referral system. The recommendation was that, in all pregnant women (individualization is possible) with 42 completed weeks of gestation, the pregnancy should be terminated for better fetal outcome [12]. So, this study will help to see the differences in perinatal outcomes of postterm pregnancy and to develop our own guidelines on the management of postterm pregnancy based on local evidence. Taking into consideration the various studies and recommendations by different centers, the complications of postterm pregnancy on the fetus, mother and the cost of managing this complications is huge burden on the country’s economy. It is highly recommended to conduct such research in our set up and come up with the various strong risk factors and see changes in outcomes of postterm pregnancy, which will enable as to improve the obstetric outcome.
2.1 Significance of the study

It is well established that the complications of postterm pregnancy on the fetus, mother are increased, what has received less attention is whether and to what extent these risks increase before 42 weeks of gestation. Despite intensive research, management of postterm pregnancy is still controversial and varies among different countries and hospital units. The complications of postterm pregnancy on the fetus, mother and the cost of managing this complication is huge burden on the country’s economy. Hence, it is highly recommended to conduct such research in our set up to see the changes of perinatal outcomes of post-term pregnancy and provide base line information on outcomes of postterm pregnancy. This study will also help us to revise the existing management protocol of postterm pregnancy at the department.
3. LITERATURE REVIEW

The term postterm pregnancy implies a pregnancy that persists beyond 294 days or 42 weeks of gestation [1]. The longest pregnancy ever recorded for human being was in 1945, a young woman gave birth after 375 days. The woman, Beulah Hunter, was 25 years old when she gave birth. The length of this pregnancy was accurate from the day of urine HCG determination as well as from her LNMP [7].

The incidence of prolonged pregnancy varies depending on the criteria used to define gestational age at birth. It is estimated that 4 to 19 percent of pregnancies reach or exceed 42 weeks gestation and 2 to 7% complete 43 weeks gestation [8]. In a study done in TAH and GMH in 2006, the proportion of postterm pregnancy was found to be 8.8% [12].

Risk factors: The majority of postterm pregnancies have no known cause. Some of the identified risk factors include:

1. Wrong dates
2. Biologic variability
3. Maternal factors: previous prolonged pregnancy, primiparity
4. Fetal factors: congenital anomalies (e.g., adrenal hypoplasia, anencephaly), male fetus
5. Placental factors: sulfatase deficiency

It is clear that the most common cause of prolonged gestation is an error in determining the patient's due date. Using the LMP for the determination of gestational age is fraught with inaccuracy. Patients' failure to recall accurately the date of the first day of their LMP combined with the varying duration of the luteal and follicular phases of the menstrual cycle may result in an overestimation of gestational age [10].

When prolongation of pregnancy is adequately documented, its cause is often undetermined and the most likely etiology is biologic variability of the duration of pregnancy [10]. Various fetal and placental abnormalities may predispose to prolongation of pregnancy. The increase in the incidence of fetal anomalies among women who deliver beyond their due date is generally
explained by abnormalities of the fetal hypothalamic-pituitary-adrenal axis. Indeed, major central nervous system (CNS) abnormalities (such as anencephaly) have long been associated with loss of the normal mechanisms that initiate labor at term. It appears that positive feed forward systems in the mother and fetus drive an exponential increase in placental CRH production as gestation advances. Increased placental CRH production, in turn, instigates a change in fetal cortisol concentrations, fetal lung maturation, amniotic fluid proteins, phospholipids, and myometrial receptor expression, which combine, through a set of independent activating pathways, to precipitate labor and delivery. [1, 10, 13].

Primigravidity and prior postterm pregnancy are the most common identifiable risk factors [1, 10]. After one postterm pregnancy, the risk of another such pregnancy in the subsequent birth is increased two- to three-fold; the risk of recurrence is quadrupled after two prior postterm pregnancies [1].

Maternal genetic factors likely play a role. Concordance for postterm pregnancy is slightly higher in monozygotic than dizygotic twin mothers [14]. Initiation of labor is provided by the X-linked recessive deficiency of placental sulfatase, which leads to abnormally low estrogen production in affected male fetuses with a subsequent prolongation of pregnancy and difficulties in both cervical ripening and labor induction [10].

Fetal and maternal complications:

Perinatal mortality (stillbirths plus early neonatal deaths) at ≥42 weeks of gestation is twice than at term (4 to 7 versus 2 to 3 per 1000 deliveries) and increases four-fold at 43 weeks and five- to seven-fold at 44 weeks [1,5]. Divon et al evaluated fetal and neonatal mortality rates in 181,524 accurately dated term and prolonged pregnancies. A significant increase in fetal mortality was detected from 41 weeks' gestation onward (OR of 1.5, 1.8, and 2.9 at 41, 42, and 43 weeks, respectively) [15]. Infants born beyond 41 weeks of gestation experience one-third greater neonatal mortality than term infants born at 38 to 40 weeks of gestation [1]. Asphyxia, meconium aspiration, and intrauterine infection all contribute to the excess perinatal deaths [1].

On the other hand, approximately 20 percent of postterm fetuses have "fetal dysmaturity (postmaturity) syndrome," a term used to describe infants with characteristics of chronic
intrauterine malnutrition [1, 16, and 17]. These pregnancies are at increased risk of umbilical
cord compression due to oligohydramnios, nonreassuring fetal antepartum or intrapartum
assessment tests, meconium aspiration, short-term neonatal complications (eg, hypoglycemia,
seizures, respiratory insufficiency), and whether such infants also are at risk of long-term
neurologic sequelae is not known [5].

Postterm infants tend to be larger than term infants, with a higher incidence of macrosomia
(≥4500 g) (2.5-10 versus 0.8-1 percent at term) [1, 18]. Increased in labor dystocia (9-12% versus 2-7% at term), an increase in severe perinatal injury related to macrosomia (3.3% versus 2.6% at term) and a doubling in the rates of cesarean delivery [1, 5].

In a study done in our setting there were 99(26.3%) fetal distress in the postterm group compared
to 50(11.2%) among term deliveries (p<0.001). The cesarean rate for postterm mother was
89(23.7%) compared to term mothers of 47(12.5%) p<0.001. The neonatal intensive care unit
admission rate for postterm mothers was 25(6.7%) compared with 1(2.9%) term mother
(p<0.05). No significant differences in the rates of perinatal mortality, congenital anomalies,
macrosomia and low birth weight and third stage complications were observed between the two
groups, though most were relatively frequent in postterm [12].

Postterm pregnancy is associated with significant risks to the pregnant woman, including labor
dystocia (9-12% versus 2-7% at term), severe perinatal injury related to macrosomia (3.3% versus 2.6% at term), doubling in cesarean delivery rate with associated endometritis, PPH and thrombophlebitis [5]. The majority of postterm pregnancies have no known cause. After one
postterm pregnancy, the risk of another such pregnancy in the subsequent birth is increased two-
to three-fold; the risk of recurrence is quadrupled after two prior postterm pregnancies [1, 6]. To
minimize all the above fetal and maternal complications different studies suggest different
management plans.

Clinical interventions:

Accurate dating on the base of ultrasonography performed early in pregnancy can reduce the
incidence of pregnancies diagnosed as postterm (odds ratio [OR].0.68; 95%CI, 0.57-0.82 and
thereby minimize unnecessary interventions [5].
The data regarding striping of the membrane at term to reduce postterm pregnancy are conflicting: some studies show a benefit. Whereas others have found no difference in the incidence of postterm pregnancy [19].

Not surprisingly, several studies have reported that a third-trimester measurement of the cervical length is a useful predictor of the likelihood of a successful induction of labor. In this study both bishop score and sonographic cervical length were obtained in pregnancies at 37 to 42 week. The results indicated that cervical length was a better predictor of a successful induction than the Bishop score (with a sensitivity and specificity of 87 and 71 percent versus 58 and 27 percent respectively). The best cut-off level in the prediction of a successful induction was a cervical length of less than 28 mm [10].

No randomized controlled trials have demonstrated an improvement in perinatal outcome attributable to fetal surveillance between 40 and 42 weeks of gestation [5]. There is insufficient evidence to indicate whether routine antenatal surveillance of low risk patients between 40 and 42 weeks of gestation improves perinatal outcome [20].

Induction:

Induction of postterm pregnancy rather than expectant management is supported by several lines of evidence. A meta-analysis of 19 randomized trials showed routine labor induction at ≥41 weeks of gestation was associated with a significantly lower rate of perinatal mortality than expectant management (1/2986 versus 9/2953, OR 0.3, 95% CI 0.09-0.99) and no significant increase in the cesarean birth rate (OR 0.92, 95% CI 0.76-1.12 with induction at 41 weeks, and OR 1.12, 95% CI 0.72-1.31 with induction at 42 weeks) [1, 21]. Based on these and other confirmatory data, routine induction at 41 weeks of gestation has fetal benefit without incurring additional maternal risks from a higher rate of cesarean delivery. However, this conclusion has not been universally accepted.
Expectant management:

Postterm pregnancy is a universally accepted indication for antenatal fetal monitoring, because perinatal morbidity/mortality increases with advancing gestational age. Fetal well-being can be monitored by nonstress testing with amniotic fluid volume assessment, the biophysical profile (BPP) or modified BPP, the oxytocin challenge test, or a combination of these modalities; no single method has been shown to be superior [5]. The optimal gestational age for beginning monitoring has not been determined.

The American College of Obstetricians and Gynecologists states that it is reasonable to initiate antepartum fetal surveillance between 41 and 42 weeks of gestation (287 to 294 days). Most experts would advise twice weekly testing, including some evaluation of amniotic fluid volume [5]. The American College of Obstetricians and Gynecologists no longer describes any specific upper limit of gestational age for expectantly managed pregnancies. Many physicians now induce labor between 41 and 42 weeks and virtually all do not allow pregnancy to extend beyond 43 weeks of gestation [1].

The department’s protocol (AAU Obstetrics and Gynecology Department) for the management of postterm pregnancy has two options; the first one is direct termination (induction) at 42 completed weeks in all cases of favorable cervix, 42 completed weeks by ripening if unfavorable and 43 weeks of gestation irrespective of cervical status. The second option is expectant management between 42-43 weeks of gestation with unripe cervix but reassuring fetal condition using BPP, NST, and CST [22]. ACOG and SOGC guide line suggests that, induction should be offered at 41+0 to 42+0 weeks of gestation, as the present evidence reveals a decrease in perinatal mortality without increased risk of caesarean section [23, 24].

Taking in to consideration the various studies and recommendations by different centers, the complications of postterm pregnancy on the fetus, mother and the cost of managing these complications is huge burden on the country’s economy. It is highly recommended to conduct such research in our set up and come up with the various strong risk factors and see in outcomes of postterm pregnancy, which will enable us to improve the obstetric outcome.
3.1 Conceptual frame work

Fig.A conceptual framework for the association between postterm pregnancy and feto-maternal outcome

4. OBJECTIVE

4.1 General objective
- To assess perinatal mortality and feto-maternal morbidities related to post-term pregnancy at AAU-CHS teaching hospitals.

4.2 Specific objectives
- To assess perinatal, maternal outcomes
- To determine cesarean section rate
- To assess NICU admission
- To determine rate of fetal macrosomia
5. MATERIALS AND METHODS

5.1 Study Area

The study was conducted in the labor and delivery units of the three teaching hospitals: Tikur Anbesa Hospital, Gandhi Memorial Hospital and Zewditu Memorial Hospitals which are found in Addis Ababa, Ethiopia. These hospitals serve as central referral teaching hospitals and all obstetric emergencies including high risk pregnancies are referred to these hospitals from Addis Ababa and its vicinity.

There are about 65 beds in TAH obstetrics and gynecology wards, about six beds in the labor ward for stabilization and managing laboring mothers. Twelve beds in the post natal ward for mothers with uncomplicated vaginal deliveries .The average monthly delivery rate ranges from 250-300. In GMH, there are a total of 79 beds in postnatal, obstetrics and gynecology wards of which seven beds are in labor ward for stabilization and managing laboring mothers. The average delivery rate ranges from 500-550/month. Zewditu Memorial Hospital has a total of 46 beds in obstetrics, gynecology and postnatal wards. The average monthly delivery rate ranges from 210-280.

5.2 Study Population

Reference population: All deliveries in Addis Ababa and the surroundings

Source Population: All deliveries in TAH, GMH and ZMH

Study population: All postterm and term deliveries in TAH and GMH

5.3 Study Design

The study design was a hospital based unmatched pair case control study. The cases were postterm deliveries in the three hospitals which fulfill the inclusion criteria, and controls were term deliveries before and after the cases (1:2 proportion) and fulfill the inclusion criteria.

5.4 Inclusion and Exclusion Criteria

Inclusion criteria for the cases were:

- Uncomplicated singleton postterm pregnancy
- No contraindication for vaginal delivery
- GA calculated from known LNMP or early ultrasound before 20 weeks of gestation
- Delivery in the three hospitals
- Willing to participate and giving consent

Inclusion criteria for the controls:
- Uncomplicated singleton, term pregnancy
- No contraindication for vaginal delivery
- GA calculated from known LNMP or early ultrasound before 20 weeks
- Delivery in the three hospitals
- Willing to participate and giving consent

Exclusion criteria for both the cases and controls were:
- Twin pregnancy
- Previous cesarean section
- Other medical illness (DM, HTN…)
- Unknown LNMP
- GA calculated from early ultrasound after 20 weeks of gestation
- Contraindications for vaginal delivery
- Unable or unwilling to give consent

5.5 Sample Size and Sampling Technique
A double proportion sampling technique was used using EPI 7 stat-calc taking rate of cesarean section as main predictor which is having rate of 23.7% among the case and 12.5% among the controls [12]. The sample size was calculated to get a minimum odds ratio of 2.17, with 95%CI, power of 80% and the ratio of case to control was taken as 1:2. The sample size for the cases were 147 and for the controls 293 making total sample size of 440.
5.6 Data collection methods
Data was collected on the day of delivery or on discharge by interns and residents who were assigned in each hospital’s labor ward during the working and duty hours in the study period. The principal investigator supervised the data collection for the utmost quality. All mothers who gave birth postterm, and at term were interviewed one before and one after the selected cases in the specified time period that fulfills the inclusion criteria were used.

All the necessary information for the study was filled to the prepared structural format from patient interview and her chart.

5.7 Study variables

Dependent variables
- Perinatal mortality (defined as stillbirth or early neonatal death before hospital discharge)
- NICU admission
- Cesarean section rate
- Fetal macrosomia
- Fetal distress
- APGAR score and third stage complication

Independent variables
- Wrong date-Gestational age
- Congenital anomaly
- Previous history of postterm
- Parity and male sex-Age
- Booking states
- Place of ANC
- Spontaneous labor
5.8 Operational definitions

1. Postterm-those pregnancies which extends for more than 42 completed weeks (294 days) from reliable LNMP.
2. Term delivery- a delivery that has occurred between 37 weeks-42 weeks.
3. Perinatal mortality- defined as stillbirth or early neonatal death before hospital discharge.
4. Early ultrasound-gestational age by ultrasound before 20 weeks of gestation.
5. Booked-those with at least one ANC visit.
6. Macrosomia-newborns weighing 4000gm or more irrespective of gestational age.

5.9 Data management

Editing of the questionnaires was done to determine completeness manually. Data entry, cleaning and analysis was performed using SPSS version 21.0. The responses in the completed questionnaires were coded and entered into a data entry template. Summary tables and charts were used for describing data. A relationship among the major variables were described by chi-square test, significant level P<0.05. Logistic regression (using P<0.05) was used to examine the relationship between the proposed dependent and independent variables. For each regression odds ratios (with the accompanying p-values and confidence intervals) of the relationship was reported.

6. ETHICAL CLEARANCE

The proposal was approved by the Ethical Review Committee of Department of Obstetrics and Gynecology Research and Publication Committee Addis Ababa University. Permission was requested from each selected hospitals to access the clients included in the study. Informed oral consent was obtained from each participant before the start of data collection. To ensure confidentiality of respondents, their names were not indicated on the questionnaire. And it was assured that their responses will be kept strictly confidential.

7. RESULT DISSEMINATION

Results will be presented to the Department of Obstetrics and Gynecology research and publication Committee Addis Ababa University. Subsequently, attempts will be made to present
it on scientific conferences and publish it on scientific journals. A copy of manuscript will be submitted to the Ministry of Health, Addis Ababa University and other relevant bodies.

8. RESULTS

During the study period a total of 440 respondents, of which 147 postterm and 293 term deliveries were collected. The common age group was between 24 to 29 years in the cases and control groups. The mean age of the respondents was 26.4±4.5 SD. All of the participants were from Addis Ababa. Majority of participants in both group were married. Most of them were house wives in both groups. Both cases and controls were predominantly orthodox Christians, more than half were Amharas and attended primary school and above. (Table 1).

Table 1 - Comparison between cases and controls on maternal socio-demographic variables in AAU teaching hospitals (GMH, TAH, and ZMH) from May 1 to July 30/ 2014.

<table>
<thead>
<tr>
<th>Socio-demographic variables</th>
<th>Cases N (%)</th>
<th>Controls N (%)</th>
<th>(\chi^2)-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-19</td>
<td>6(4.0)</td>
<td>11(3.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-24</td>
<td>48(32.7)</td>
<td>94(32.1)</td>
<td>0.01</td>
<td>0.95</td>
</tr>
<tr>
<td>25-29</td>
<td>63(42.9)</td>
<td>119(40.6)</td>
<td>0.01</td>
<td>0.94</td>
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<td>30-34</td>
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<td>50(17.1)</td>
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<td>&gt;35</td>
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<td>19(6.5)</td>
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<td>AA</td>
<td>147</td>
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<tr>
<td>Marital status</td>
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<tr>
<td>Married</td>
<td>140(95.2)</td>
<td>282(96.2)</td>
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<tr>
<td>Others</td>
<td>7(4.8)</td>
<td>11(3.8)</td>
<td>1.42</td>
<td>0.23</td>
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<tr>
<td>Occupation</td>
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</tr>
<tr>
<td>House wife</td>
<td>96(65.3)</td>
<td>201(68.6)</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Private employee</td>
<td>33(22.5)</td>
<td>52(17.7)</td>
<td>1.24</td>
<td>0.26</td>
</tr>
<tr>
<td>Governmental employee</td>
<td>8(5.4)</td>
<td>21(7.2)</td>
<td>0.29</td>
<td>0.58</td>
</tr>
<tr>
<td>Daily laborer</td>
<td>6(4.1)</td>
<td>10(3.4)</td>
<td>1.17</td>
<td>0.28</td>
</tr>
<tr>
<td>Student</td>
<td>3(2)</td>
<td>7(2.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>1(0.7)</td>
<td>2(0.7)</td>
<td>0.00</td>
<td>0.99</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthodox</td>
<td>115(78.2)</td>
<td>215(73.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muslim</td>
<td>24(16.2)</td>
<td>55(18.8)</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Protestant</td>
<td>8(5.4)</td>
<td>21(7.2)</td>
<td>0.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Catholic

Ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Cases N (%)</th>
<th>Controls N (%)</th>
<th>χ² Value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amhara</td>
<td>79(53.7)</td>
<td>171(58.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oromo</td>
<td>29(19.7)</td>
<td>41(14)</td>
<td>0.01</td>
<td>0.91</td>
</tr>
<tr>
<td>Tigre</td>
<td>4(2.7)</td>
<td>20(6.8)</td>
<td>0.21</td>
<td>0.64</td>
</tr>
<tr>
<td>Gurage</td>
<td>32(21.8)</td>
<td>55(18.8)</td>
<td>1.04</td>
<td>0.30</td>
</tr>
<tr>
<td>Others</td>
<td>3(2)</td>
<td>6(2)</td>
<td>0.04</td>
<td>0.83</td>
</tr>
</tbody>
</table>

Educational level

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Cases N (%)</th>
<th>Controls N (%)</th>
<th>χ² Value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>58(39.5)</td>
<td>103(35.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>28(19)</td>
<td>51(17.4)</td>
<td>0.07</td>
<td>0.78</td>
</tr>
<tr>
<td>Secondary</td>
<td>51(34.7)</td>
<td>114(38.9)</td>
<td>0.70</td>
<td>0.40</td>
</tr>
<tr>
<td>Unable to read and write</td>
<td>10(6.8)</td>
<td>25(8.5)</td>
<td>0.51</td>
<td>0.47</td>
</tr>
</tbody>
</table>

All pregnant mothers had ANC follow up and health center was the commonest level of facility followed by teaching hospitals. Both cases and controls were predominantly primiparous. History of postterm pregnancy is significantly associated with index pregnancy accounting 16(10.9%) and 8(2.8%) of cases and controls respectively. (Table 2)

Table 2 - Comparison between cases and controls on maternal obstetric variables in AAU teaching hospitals (GMH, TAH, and ZMH) from May 1 to July 30/ 2014.

<table>
<thead>
<tr>
<th>Maternal obstetric variables</th>
<th>Cases N (%)</th>
<th>Controls N (%)</th>
<th>χ² Value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booking status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Booked</td>
<td>147(100)</td>
<td>292(99.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unbooked</td>
<td>0(0)</td>
<td>1(0.3)</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>147</td>
<td>293</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANC place</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching hospital</td>
<td>25(17)</td>
<td>55(18.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private hospital</td>
<td>4(2.7)</td>
<td>4(1.4)</td>
<td>1.11</td>
<td>0.29</td>
</tr>
<tr>
<td>Other hospital</td>
<td>2(1.4)</td>
<td>2(0.7)</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Health center</td>
<td>116(78.9)</td>
<td>232(79.2)</td>
<td>0.93</td>
<td>0.30</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>98(66.7)</td>
<td>182(62.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4</td>
<td>39(26.5)</td>
<td>99(33.8)</td>
<td>0.96</td>
<td>0.33</td>
</tr>
<tr>
<td>≥5</td>
<td>10(6.8)</td>
<td>12(4.1)</td>
<td>1.89</td>
<td>0.16</td>
</tr>
<tr>
<td>Previous postterm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>16(10.9)</td>
<td>8(2.7)</td>
<td>10.88</td>
<td>0.01*</td>
</tr>
<tr>
<td>NO</td>
<td>131(89.1)</td>
<td>285(97.3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P<0.05
Majority of postterm and term deliveries had spontaneous onset of labor; the remaining were induced. Spontaneous vertex delivery was the most common route of delivery in both cases and controls followed by cesarean section which accounted 67 (45.6%) in the cases.

The commonest indication for cesarean section was NRFHRP in the cases and controls followed by dystocia and failed induction respectively. Most of them had no complication during delivery but some had PPH, third and fourth degree tear and shoulder dystocia. Significant association was found between postterm pregnancy and labor induction and cesarean delivery. (Table 3).

Table 3. Labor and delivery issues between cases and controls in AAU teaching hospitals (GMH, TAH, and ZMH) from May 1 to July 30/ 2014.

<table>
<thead>
<tr>
<th>Labor and delivery issues</th>
<th>Cases N (%)</th>
<th>Control N (%)</th>
<th>χ2 Value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset of labor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spontaneous</td>
<td>105(71.4)</td>
<td>280(95.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Induced</td>
<td>42(28.6)</td>
<td>13(4.4)</td>
<td>40.74</td>
<td>0.00*</td>
</tr>
<tr>
<td>Mode of delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SVD</td>
<td>68(46.3)</td>
<td>207(70.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrumental</td>
<td>12(8.2)</td>
<td>31(10.6)</td>
<td>32.62</td>
<td>0.00*</td>
</tr>
<tr>
<td>C/S</td>
<td>67(45.6)</td>
<td>55(18.8)</td>
<td>8.83</td>
<td>0.01*</td>
</tr>
<tr>
<td>Indication for C/S</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macrosomia</td>
<td>3(4.5)</td>
<td>3(5.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dystocia</td>
<td>7(10.4)</td>
<td>15(27.3)</td>
<td>0.61</td>
<td>0.43</td>
</tr>
<tr>
<td>NRFHR</td>
<td>50(74.6)</td>
<td>30(54.5)</td>
<td>0.03</td>
<td>0.87</td>
</tr>
<tr>
<td>Failed induction</td>
<td>5(7.5)</td>
<td>2(3.6)</td>
<td>2.70</td>
<td>0.10</td>
</tr>
<tr>
<td>Others</td>
<td>2(3)</td>
<td>5(9.1)</td>
<td>2.39</td>
<td>0.12</td>
</tr>
<tr>
<td>Complication during delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No complication</td>
<td>136(92.5)</td>
<td>288(98.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPH</td>
<td>6(4.1)</td>
<td>3(1)</td>
<td>4.07</td>
<td>0.04*</td>
</tr>
<tr>
<td>Shoulder dystocia</td>
<td>2(1.4)</td>
<td>0(0)</td>
<td>0.00</td>
<td>0.99</td>
</tr>
<tr>
<td>3rd or 4th degree tear</td>
<td>3(2)</td>
<td>2(0.7)</td>
<td>1.58</td>
<td>0.26</td>
</tr>
</tbody>
</table>

*p<0.05

Majority of neonates delivered alive in both groups. Male neonates were higher in number than female neonates in both groups. The highest percentage of birth weight lies between 2500gm to 3999gm in both groups. Macrosomia was found in 12 (8.2%) of the postterm and 14(4.8%) of
the term deliveries. More than one third of cases and control had first minute Apgar score above seven. No congenital anomaly was seen in the postterm group. In summary no significant difference was observed in neonatal outcomes, sex of the new born, birth weight, Apgar score, and congenital anomaly. (Table 4).

Table 4- Comparison between cases and controls on outcomes of labor and delivery in AAU teaching hospitals (GMH, TAH, and ZMH) from May 1 to July 30/ 2014.

<table>
<thead>
<tr>
<th></th>
<th>Case N (%)</th>
<th>Control N (%)</th>
<th>χ² Value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonatal outcome on discharge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alive</td>
<td>144(98)</td>
<td>283(96.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dead</td>
<td>3(2)</td>
<td>10(3.4)</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>74(50.3)</td>
<td>152(51.9)</td>
<td>0.09</td>
<td>0.76</td>
</tr>
<tr>
<td>Female</td>
<td>73(49.7)</td>
<td>141(48.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth weight (gm.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000-1499</td>
<td>0(0)</td>
<td>1(0.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500-2499</td>
<td>9(6.1)</td>
<td>14(4.8)</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>2500-3999</td>
<td>126(85.7)</td>
<td>264(90.1)</td>
<td>0.24</td>
<td>0.62</td>
</tr>
<tr>
<td>≥4000</td>
<td>12(8.2)</td>
<td>14(4.8)</td>
<td>2.06</td>
<td>0.15</td>
</tr>
<tr>
<td>APGAR score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st min.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥7</td>
<td>92(62.6)</td>
<td>187(63.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4–7</td>
<td>51(34.7)</td>
<td>95(32.4)</td>
<td>0.16</td>
<td>0.52</td>
</tr>
<tr>
<td>&lt;3</td>
<td>4(2.7)</td>
<td>11(3.8)</td>
<td>0.25</td>
<td>0.61</td>
</tr>
<tr>
<td>5th min.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥7</td>
<td>133(90.5)</td>
<td>255(2.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-7</td>
<td>11(7.5)</td>
<td>30(10.2)</td>
<td>0.01</td>
<td>0.97</td>
</tr>
<tr>
<td>&lt;3</td>
<td>3(2)</td>
<td>8(2.7)</td>
<td>0.23</td>
<td>0.63</td>
</tr>
<tr>
<td>Congenital malformation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>0(0)</td>
<td>2(0.7)</td>
<td>0.00</td>
<td>0.99</td>
</tr>
<tr>
<td>No</td>
<td>147(100)</td>
<td>291(99.3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Postterm pregnancy was significantly associated with maternal complications, PPH, referral to NICU. More than half of NICU referral in the postterm group was because of meconium aspiration syndrome. (Table 5 and 6)
Table 5. Comparison between cases and controls on maternal complications in AAU teaching hospitals (GMH, TAH, and ZMH) from May 1 to July 30/2014.

<table>
<thead>
<tr>
<th></th>
<th>Case N (%)</th>
<th>Control N (%)</th>
<th>( \chi^2 ) Value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal complication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>8(5.4)</td>
<td>4(1.4)</td>
<td>5.26</td>
<td>0.02*</td>
</tr>
<tr>
<td>No</td>
<td>139(94.6)</td>
<td>289(98.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identified complications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No complication</td>
<td>136(92.5)</td>
<td>288(98.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPH</td>
<td>6(4.1)</td>
<td>3(1)</td>
<td>4.08</td>
<td>0.04*</td>
</tr>
<tr>
<td>3(^{rd}) or 4(^{th}) degree tear</td>
<td>3(2)</td>
<td>2(0.7)</td>
<td>1.58</td>
<td>0.20</td>
</tr>
<tr>
<td>Shoulder dystocia</td>
<td>2(1.4)</td>
<td>0(0)</td>
<td>0.00</td>
<td>0.99</td>
</tr>
</tbody>
</table>

*P<0.05

Table 6. Comparison between cases and controls on fetal complications in AAU teaching hospitals (GMH, TAH, and ZMH) from May 1 to July 30/2014.

<table>
<thead>
<tr>
<th></th>
<th>Case N (%)</th>
<th>Control N (%)</th>
<th>( \chi^2 ) Value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referral to NICU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>37(25.2)</td>
<td>45(15.4)</td>
<td>6.10</td>
<td>0.01*</td>
</tr>
<tr>
<td>No</td>
<td>110(74.8)</td>
<td>248(84.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reason for referral</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAS</td>
<td>21(14.2)</td>
<td>32(10.9)</td>
<td>4.64</td>
<td>0.03*</td>
</tr>
<tr>
<td>Macrosomia</td>
<td>7(4.7)</td>
<td>7(2.3)</td>
<td>0.70</td>
<td>0.40</td>
</tr>
<tr>
<td>Others</td>
<td>9(6)</td>
<td>6(2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P<0.05

Using multivariate analysis, statistical significant difference was found between previous history of postterm pregnancy and current postterm pregnancy. But with other variables like age, parity, sex and congenital anomalies did not show statistically significant difference between the two study groups in the crude analysis and adjustment (P>0.05).(Table 7).
Table 7. Bivariate and multivariate analysis of cases and controls on the bases of risk factors, AAU teaching hospitals (GMH, TAH, and ZMH) from May 1 to July 30/2014.

<table>
<thead>
<tr>
<th></th>
<th>Cases (N)</th>
<th>Control(N)</th>
<th>Crude OR (95% CI)</th>
<th>Adjusted OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-19</td>
<td>6</td>
<td>22</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>20-24</td>
<td>48</td>
<td>94</td>
<td>0.96(0.27,3.38)</td>
<td>0.98(0.26,3.67)</td>
</tr>
<tr>
<td>25-29</td>
<td>63</td>
<td>119</td>
<td>1.03(0.44,2.39)</td>
<td>1.04(0.41,2.62)</td>
</tr>
<tr>
<td>30-34</td>
<td>20</td>
<td>50</td>
<td>0.99(0.43,2.26)</td>
<td>1.00(0.41,2.41)</td>
</tr>
<tr>
<td>≥35</td>
<td>10</td>
<td>19</td>
<td>1.31(0.52,3.31)</td>
<td>1.24(0.46,3.29)</td>
</tr>
<tr>
<td><strong>Parity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>98</td>
<td>182</td>
<td>0.64(0.27,1.54)</td>
<td>1.63(0.99,2.68)</td>
</tr>
<tr>
<td>2 – 4</td>
<td>39</td>
<td>99</td>
<td>1.36(0.87,2.13)</td>
<td>1.01(0.37,2.73)</td>
</tr>
<tr>
<td>&gt;5</td>
<td>10</td>
<td>12</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>Previous post term</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>132</td>
<td>285</td>
<td>0.50</td>
<td>1.00</td>
</tr>
<tr>
<td>Yes</td>
<td>16</td>
<td>8</td>
<td>4.35(1.81,10.42)*</td>
<td>5.34(2.11,13.52)*</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>73</td>
<td>141</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Male</td>
<td>74</td>
<td>152</td>
<td>0.94(0.63,1.39)</td>
<td>0.88(0.58,1.32)</td>
</tr>
</tbody>
</table>

*P<0.05

Statistical significant difference was noted between cases and controls in rates of instrumental and cesarean delivery as compared to spontaneous vertex delivery.

Induced labor showed statistically significant difference when compared with spontaneous onset of labor (**P<0.05**) in the crude and adjusted analysis. Whereas postpartum hemorrhage showed statistical significant difference compared with shoulder dystocia in crude analysis only. (Table 8)
Table 8. Bivariate and multivariate analysis of cases and controls based on maternal and fetal outcomes, AAU teaching hospitals (GMH, TAH, and ZMH) from May 1 to July 30, 2014.

<table>
<thead>
<tr>
<th></th>
<th>Case (N)</th>
<th>Control (N)</th>
<th>Crude OR (95% CI)</th>
<th>Adjusted OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset of labor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spontaneous</td>
<td>105</td>
<td>280</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>Induced</td>
<td>42</td>
<td>13</td>
<td>8.6(4.4,16.6)*</td>
<td>7.6(3.8,15.3)*</td>
</tr>
<tr>
<td>Instrumental delivery</td>
<td>12</td>
<td>31</td>
<td>3.7(2.3,5.8)*</td>
<td>3.2(1.4,7.4)*</td>
</tr>
<tr>
<td>Cesarean section</td>
<td>67</td>
<td>55</td>
<td>3.1(1.4,6.7)*</td>
<td>2.9(1.8,4.7)</td>
</tr>
<tr>
<td>APGAR score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;3</td>
<td>4</td>
<td>11</td>
<td>0.6(0.2,2.2)</td>
<td>0.7(0.4,1.3)</td>
</tr>
<tr>
<td>4-7</td>
<td>51</td>
<td>95</td>
<td>0.6(0.2,2.3)</td>
<td>0.5(0.0,7.1)</td>
</tr>
<tr>
<td>&gt;7</td>
<td>92</td>
<td>187</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt; min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;3</td>
<td>3</td>
<td>8</td>
<td>1.0(0.2,4.5)</td>
<td>0.5(0.042.3)</td>
</tr>
<tr>
<td>4-7</td>
<td>11</td>
<td>30</td>
<td>0.7(0.2,2.7)</td>
<td>1.0(0.0,69.1)</td>
</tr>
<tr>
<td>&gt;7</td>
<td>133</td>
<td>255</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Maternal complication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; or 4&lt;sup&gt;th&lt;/sup&gt; degree tear</td>
<td>3</td>
<td>2</td>
<td>0.1(0.7,12.8)</td>
<td>0.7(0.6,8.2)</td>
</tr>
<tr>
<td>PPH</td>
<td>6</td>
<td>3</td>
<td>4.2(1.0,17.2)*</td>
<td>3.0(0.6,14.7)</td>
</tr>
<tr>
<td>shoulder dystocia</td>
<td>2</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

*P<0.05

Respondents previous history of postterm, induced onset of labor, and instrumental delivery have revealed significant difference between the two study groups (p<0.05). On the other hand age, neonatal outcome, maternal complication (third and fourth degree tear, shoulder dystocia) and APGAR score did not show statistically significant difference between the two study groups (p>0.05).
9. DISCUSSION

Post term pregnancy is a subject of interest because of its presumed association with increased fetal and maternal mortality and morbidity. Primary outcomes of this study were defined as perinatal mortality and neonatal morbidity. Contrary to other studies, three cases of perinatal death in the post-term group and ten deaths in the term group were not statistically significant. Studies in other settings showed Perinatal mortality (stillbirths plus early neonatal deaths) at ≥42 weeks of gestation is twice than at term (4 to 7 versus 2 to 3 per 1000 deliveries) and increases four-fold at 43 weeks and five- to seven-fold at 44 weeks [1, 5] This may be explained by smaller sample size in our study.

Like other studies, induced onset of labor showed statistical significant association with the outcomes of postterm pregnancy and most of the induced labor in this study ended up in cesarean delivery. Other guide lines also support this, like ACOG and SOGC guide line suggests that, induction should be offered at 41+0 to 42+0 weeks of gestation, as the present evidence reveals a decrease in perinatal mortality without increased risk of caesarean section [23, 24].

Other primary outcomes evaluated in this study was neonatal morbidity like low Apgar, NICU admissions. Despite slight increase in number of babies in the post-term group with a Apgar score of less than 7 at fifth minute (9.5%) compared to the term group (13.2%), this difference was not statistically significant. But in other studies, postterm pregnancy is an independent risk factor for low umbilical artery pH levels at delivery and low 5-minute APGAR scores [5,15]. This may be due to smaller sample size and different methodology.

Similar to other studies difference between the admissions to NICU in the post-term group (25.2%) compared to the term one (15.4%) was found to be statistically significant with p<0.05 in the crude analysis. MAS as one of the common complications of postterm pregnancy which is stated in most literature, also seen in this study as a main reason for NICU admission. A study done in our setting nine years back showed similar result that, the neonatal intensive care unit admission rate for post term mothers was 25(6.7%)compared with 1(2.9%)term mother(p<0.05)[12].
Similar to other studies, post term pregnancy was significantly associated with cesarean section and instrumental delivery [1, 5]. The increased cesarean section may be due to the high number of NRFHRP after labor induction in post term group.

In this study previous history of post-term pregnancy has significant association with the current postterm pregnancy. Other references also showed similar result. Primigravidity and prior post-term pregnancies are the most common identifiable risk factors [5]. After one post-term pregnancy, the risk of another such pregnancy in the subsequent birth is increased two- to three-fold; the risk of recurrence is quadrupled after two prior post-term pregnancies [1, 6].

Contrary to other studies, postterm pregnancy in this study did not show statistical significant association with macrosomia. Postterm infants tend to be larger than term infants, with a higher incidence of macrosomia (≥4500 g) (2.5-10 versus 0.8-1 percent at term) [1, 18]. Increased in labor dystocia (9-12% versus 2-7% at term), an increase in sever perinatal injury related to macrosomia (3.3% versus2.6% at term) and a doubling in the rates of cesarean delivery [1, 5]. This may be explained by smaller sample size used in our study.

Maternal complication like PPH did show statistical significant association with postterm pregnancy in the bivariate analysis. Similar study in other setting also show same result [5].

No significant differences were observed in congenital anomalies, macrosomia, fifth minute Apgar between the two groups, though most were relatively frequent in post-terms. Based on the results of this study, we believe that an expanded case-control study on post-term and term group of patients needs to be performed.
10. LIMITATIONS, CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions:
This study was conducted among women of postterm and term deliveries to see their outcomes. Accordingly some of the findings to conclude are

1. Respondents previous history of post-term showed significant association with postterm pregnancy (P<0.05).
2. Post-term pregnancy is associated with higher instrumental delivery rate
3. Post-term pregnancy is associated with higher cesarean section and instrumental delivery rate.
4. Post-term pregnancy is associated with PPH in the crude analysis

10.2 Recommendations:
Woman with history of postterm pregnancy needs early, accurate gestational age determination and follow up. According to this study delivery earlier than 42 weeks may reduce instrumental and cesarean delivery. And at last conduct similar research with large sample size.

10.3 Limitations:
- This study uses those mothers who deliver during the study period but didn’t follow the two groups before delivery starting from early gestation.
- Some of the women’s did not exactly remember their LMP.
11. ANNEXES

I. Questionnaire

Hello, My name is..............................We are conducting a study on the perinatal and feto-maternal outcomes of postterm pregnancy. This will help us in the future to see and improve the outcomes of postterm pregnancy. As part of this, I would like to ask you some questions related with your pregnancy. There’s no risk if you agree to participate in the interview. All the information that you give to me will be kept strictly confidential; your name will not be used and you will not be identified in any way. Your current and future care at this facility will not be affected in any way. This interview will take approximately 15 min to complete. Your participation is absolutely voluntary and there is no penalty for refusing to take part. You are free to ask any questions; you may refuse to take part in the interview; you may refuse to answer any question in the interview; and you may stop the interview at any point.

Do you have any questions for me at this time about this survey? Yes_____ No____

Do you agree to participate in this interview? Yes_____ No_____  

If no, thank the participant and close the interview.
1. Identification and socio-demographic variables

1. Code………………………………..

2. Card number……………………

3. Hospital…………………………..

4. Date of delivery………………..

5. Address
   A. Addis Ababa………………..      B. Outside Addis Ababa……………

6. Maternal age…………………..

7. Religion
   A. Orthodox………B. Muslim     D. Protestant      E. Catholic        F. Others

8. Occupation   A. Student      B. Governmental employee      C. Daily laborer    D. Farmer
   E. Factory worker    F. house wife      G. private employee

9. Educational level
   A. Primary……B. Secondary….  C. University…… D. Unable to read and write   E. No formal education but able to read and write

10. Marital status   A. married   B. divorced      C. Widowed      D. Single

11. Ethnicity
   A. Amhara     B. Oromo    C. Tigre     D. Gurage    E. Others-----------------
II. Obstetric history

12. ANC booking status
   A. Booked………………………. B. Unbooked…………………………

13. Place of ANC
   A. Teaching hospital………………………
   B. Other hospital…………………………
   C .Health center…………………………
   D. Private set-up…………………………

14. Number of ANC visit……………………

15. Parity of the mother……………………

16. Gestational age at the time of delivery
   A. Known and reliable……………..
   B. Known and unreliable…………

17. If known and reliable, gestational age is
   B.37-40………..
   C.40-41………..
   D.41-42………..
   E.>42………..

18. Previous history of postterm
   A. Yes…………….. B. No……………….
III. Labor and Delivery issues

19. Onset of labor
   A. Spontaneous
   B. Induced

20. Mode of delivery
   A. SVD
   B. Instrumental
   C. C/S
   D. Destructive delivery

21. If C/S delivery, the type of cesarean section
   A. Elective
   B. Emergency

22. The indication of C/S
   A. For suspected macrosomia
   B. For dystocia
   C. For NRFHR pattern
   D. Failed induction
   E. Others

23. Complication during delivery
   A. PPH
   B. Shoulder dystocia
   C. 3rd or 4th degree tears
   D. Others
IV. Outcomes of labor and delivery

24. Neonatal outcome        A. Alive.......................... B. Still birth.........................

25. Sex of the new born A. Male.......................... B. Female.............................

26. Birth weight
A. 1000gm-1499gm………….. B. 1500-2499gm ……….C. 2500-3999gm  
D. ≥4000gm.....................

27. Congenital anomaly A. Yes………… B. No……………. 

28. If yes, type of anomaly..........................

29. APGAR score-1\textsuperscript{st} minute.....................

30. APGAR score-5\textsuperscript{th} minute.....................

31. Fetal complication (like birth injury….)
   A. Yes………… B. No…………

32. If birth injury A. Facial palsy……………… B. Erbs- palsy………….. C. others………………

33. If yes, identified complication
   ........................................

34. Referral to NICU. A. Yes………… B. No…………

35. Reason for referral ......................

36. Maternal complication A. Yes………… B. No…………

37. If yes, identified maternal complication A. PPH……… B. 3\textsuperscript{rd} or 4\textsuperscript{th} degree tear…..  
   C. Others……..
II. References

1. Up To date version 19.3, postterm pregnancy, Sep 2011


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