# PREVALENCE, OUT COME AND FACTORS ASSOCIATED WITH OPERATIVE VAGINAL DELIVERY AMONG WOMEN WHO GAVE BIRTH IN TERCHA GENERAL HOSPITAL, SNNPR REGIONAL STATE, DAWRO ZONE, ETHIOPIA. A THREE YEAR RETROSPECTIVE STUDY.

**A THESIS SUBMITTED TO THE HEALTH REASERCH AND GRADUATE STUDIES COORDINATING OFFICE JIMMA UNIVERSITY MEDICAL CENTER INSTITUTE OF HEALTH, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE MASTERS DEGREE IN INTEGRATED EMERGENCY SURGERY AND OBSTETRICS.**

**BY**

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## ABSTRACT

**Background:** Assisted vaginal delivery, with the use of forceps and vacuum extraction, offers the option to accomplish safe delivery for the mother and the clinician. A successful assisted vaginal delivery avoids caesarean section, its attendant uterine scar and its implications for future pregnancy. The present study was designed to determine prevalence and feto maternal outcome by comparing vacuum with forceps.

**Objectives**: To determine prevalence, outcome and factor associated among mothers who gave birth by operative vaginal delivery in Tercha General Hospital during the study period January 1, 2014 to December 31, 2016.

**Methods:** Facility based cross-sectional retrospective study was conducted by reviewing available data or hospital records of mothers who gave birth from January1, 2014 to 31 December 2016. The data was checked for its completeness. Then it was coded, entered, cleaned and analyzed using SPSS version 22.0. Descriptive statistics was run to explore the data and multiple logistic regressions were used to see the association and strength between dependent & independent variables. A p-value of less than 0.05 was considered statistically significant in all tests of association.

**Results:** During the 3 years' study period, the prevalence of operative vaginal delivery was 6.2 % from the total of 2,647 deliveries, and proportion of vacuum and forceps delivery was 4.2%and 2% respectively**.** Operative vaginal deliveries were more commonly employed on primi gravida 67.1%compared to multiparas and the most common indication was delayed second stage of labor for vacuum, 70.5% and non-reassuring fetal heart rate in the forceps group 57. 7%. Forceps and vacuum-assisted deliveries were both associated with maternal and newborn complications. Vaginal laceration, 11.6% for mothers, and cephalhematoma, 10.9%for newborns were the commonest complication of operative vaginal delivery. Mothers were from rural are high risk to develop complication than those mothers came from urban with, (AOR,4.4;95%CI: 1.52,12.7). Newborn who had birth weight >4000gram 38.5 times more likely to have unfavorable outcome as compared to newborn who had birth weight 2500-3999gram with 95%CI of 4.1,362.3.

**Conclusion:** Operative vaginal delivery rates in this center are comparable to other centers as are the possible complications. Furthermore, in this study maternal complication has shown to be significantly higher in those who come from rural area and lack of antenatal care. Additionally, birth weight 4000gram and above were associated with unfavorable maternal and neonatal outcome. A trial of labor and careful use of forceps or vacuum extraction are acceptable for most fetuses suspected to be macrosomic because there is no precise method for determining which mothers have macrosomic infants prior to delivery.



**Key words:** Operative vaginal delivery, forceps, vacuum and unfavorable maternal and new born outcome.

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# Table of Contents

## LIST OF FIGURES

# LIST OF TABLES

**List of abbreviations and acronyms**

| | |
|---|---|
| ACOG | American College of Obstetricians and Gynecologist |
| ANC | Antenatal Care |
| AOR | Adjusted odds ratio |
| BEOC | Basic emergency obstetric care |
| COR | Crude odds ratio |
| CPD | Cephalic pelvic disproportion |
| EDHS | Ethiopia Demographic and Health Survey |
| ENND | Early Neonatal Death |
| GP | General Practitioner |
| HO | Health Officer |
| IEOS | Integrated emergency obst/gyn and surgery |
| JUSH | Jimma University specialized hospital |
| MDG | Millennium Development Goal |
| MMR | Maternal Mortality Rate |
| NICU | Neonatal intensive care unit |
| NRFS | Non Reassuring Fetal Status |
| OVD | Operative Vaginal Delivery |
| PPH | Postpartum hemorrhage |
| RCOG | Royal College of Obstetricians and Gynecologist |
| SD | Standard deviation |
| SPSS | Statistical package for Social Studies |

# INTRODUCTION

## 1.1 Background

Operative vaginal delivery refers to the application of either forceps or a vacuum device to assist the mother in effecting vaginal delivery of a fetus (1). The past 20 years have seen a progressive shift away from the use of forceps in favors of the vacuum extractor as the instrument of choice (2, 3). Although the overall rate of operative vaginal delivery has been declining, the proportion of vacuum-assisted deliveries has been increasing and now accounts for almost four times the rate of forceps-assisted vaginal births (4). Vacuum extraction which is a common technique of assisted vaginal delivery was preferred to forceps assisted vaginal delivery because the skill is easily acquired compared to the forceps and is considered safer (5, 6).

Operative vaginal delivery is used to shorten the second stage of labor. It may be indicated for non-reassuring fetal status to prevent hypoxic brain damage or fetal death (7, 8). Maternal conditions where down bearing effort is not encouraged, such as cardiac failure and hypertensive disease in pregnancy are also indications for instrumental delivery (7). However, the decision to perform forceps or vacuum is not always straight forward. Forceps is more preferable where maternal expulsive effort is discouraged. Vacuum extraction requires maternal effort. But even in such situations like hypertensive disorders of pregnancy, vacuum extraction can yield similar result to forceps as it shortens second stage of labor with minimal maternal efforts (9).

Operative vaginal delivery is beneficial for women because it avoids cesarean delivery and its associated morbidities. The short-term risks of cesarean delivery include hemorrhage, infection, prolonged healing time, and increased cost. The long-term morbidities associated with cesarean delivery include the high likelihood of repeat cesarean delivery, the complications that can occur with trial of labor after cesarean delivery, and the risks of placental abnormalities such as placenta accrete. For the fetus showing signs of possible compromise, successful operative vaginal delivery can shorten the exposure to additional labor and reduce or prevent the effect of intrapartum insults (10). Often, operative vaginal delivery can be safely accomplished more quickly than cesarean delivery.

The rate of operative vaginal delivery has decreased over the past few decades, accounting for part of the increase in cesarean birth rates in the United States. As the rate of cesarean

delivery increased over the past two decades, the rate of operative vaginal delivery decreased from 9.01% of all deliveries in 1992 to 3.30% of all deliveries in 2013. (11)

Nonetheless, operative vaginal delivery remains an important part of modern obstetric care and in the appropriate circumstances can be used to safely avoid cesarean delivery. Operative vaginal deliveries are accomplished by applying direct traction on the fetal skull with forceps or applying traction to the fetal scalp by means of a vacuum extractor (12).

A series of criteria all need to be fulfilled before an operative vaginal delivery can be attempted. The cervix should be fully dilated and the membranes ruptured. The head must be engaged in the maternal pelvis, meaning that the bi-parietal diameter must have passed through the pelvic inlet. Fetal lie, presentation, and position should all be documented. The type of operative vaginal delivery is classified according to the station and the degree of rotation of the fetal head with in the pelvis (13, 14).

If the position is unclear on clinical examination which may be seen in upwards of 25% of cases in which operative vaginal delivery is being considered an intrapartum ultrasound can be done to confirm fetal position. Prior to attempting an operative vaginal delivery, clinical pelvimetry should be performed with documentation of adequate mid and outlet pelvic dimensions. The estimated fetal weight should also be documented (14, 15).

## 1.2 Statement of the Problem

Instrumental vaginal delivery is currently widely used among obstetrical practices and leads to significant decrease in fetal mortality and morbidity. However, these practices could be associated with several neonatal and maternal adverse effects. Neonatal mortality is not changed by forceps or vacuum use if no other risk factors are associated. The main neonatal adverse outcomes described with both techniques are extra and intracranial hemorrhages usually, intra-cerebral hemorrhages have good neurological prognosis. Other traumatic complications observed when using forceps (facial nerve palsy, cranial bone fracture) are not associated with long term functional consequences. Many of the most severe neonatal complications are observed when perinatal asphyxia has occurred. Extractor types and quality of use under defined criteria are closely associated with neonatal adverse outcomes in operative vaginal delivery. Forceps deliveries are as safe as vacuum deliveries to the neonate (16).

Maternal and neonatal complications after forceps applications include lacerations of the vaginal and cervix, Pelvic hematomas, urethral and bladder injuries, uterine rupture, minor fetal facial lacerations, forceps marks, facial and brachial plexus palsies, cephalohematoma, skull fractures and intracranial hemorrhage (17).

The goal of operative vaginal delivery is to mimic spontaneous vaginal birth, thereby expediting delivery with a minimum of maternal or neonatal morbidity. Mid-cavity and rotational deliveries, independent of the type of instrument used, demand a high level of clinical and technical skill and the operator must have received adequate training Inadequate training as a key contributor to adverse outcomes and training is central to patient safety initiatives. Neonatal trauma is associated with initial unsuccessful attempts at operative vaginal delivery by inexperienced operators (18).

Globally, each year, roughly 350,000 women die in pregnancy and childbirth and four million intrapartum and early neonatal deaths occur. In addition to this over 130 million babies are born every year, and more than 10 million infants die before their fifth birthday, almost 8 million before their first day of life (19). Unfortunately, 98% of prenatal and maternal deaths occur in low income countries. At present, one woman in 12 will die of maternal causes in Sub-Saharan Africa, compared with one woman in 4000 in northern Europe with prenatal mortality rates of 10 per 1000 live births (20).

Results from the 2016 EDHS data show a remarkable decline in all levels of childhood mortality in Ethiopia, over the last 16 years. For example, under-5 mortality rates for the 5 years preceding the survey declined from 166 deaths per 1,000 live births to 123 deaths per 1,000 live births in 2005, to reach 67 deaths per 1,000 live births in 2016. Similarly, infant mortality decreased from 97 deaths per 1,000 live births, to 77 deaths per 1,000 live births, and to 48 deaths per 1,000 live births in the same period (21).

Maternal mortality rate was estimated to have declined from 1,400 per 100,000live births in 1990 and 871 in 2000 and 673in 2005, before marginally increasing to 676 in 2011 and declining again to reach 412 deaths per 100,000 live births in the 2016 EDHS. That is, for every 1,000 births in Ethiopia, there are about 4 maternal deaths. This represents a significant decline, but not a high enough one to enable Ethiopia to reach the target of 273 per 100,000 live births in 2016, but now that time has come, and the targets—perhaps in hindsight too ambitious—remain largely unmet (21). The UN has now agreed to new targets, the Sustainable Development Goals, and as currently drafted under Goal 3, *"To ensure healthy lives and promote well-being for all at all ages,"* they propose that by 2030, the overall global MMR should be reduced to less than 70 per 100,000 live births, and preventable neonatal deaths should be eliminated (22).

There are many factors that affect the outcome of pregnancy from the onset of any obstetric complication. The outcome is most adversely affected by inefficient management of delivery and lack of essential care of newborn (23,24).

There has been less research on the effects of instrumental births on the health and wellbeing of women and neonate, a recent reports by American College of Obstetrics and Gynecologist(June,2000) have highlighted the potential for maternal and neonatal complications associated with Operative Vaginal delivery, although the risks associated with alternative procedures also must be considered (ACOG; 2000).On the other hand, although usually lifesaving, cesarean delivery increase maternal and newborn risks and costs (25). In health related to poor socioeconomic and nutritional status is worsened by other co-morbidities. Delays in seeking, accessing, and receiving quality care in facilities also contribute to lower cesarean delivery rates and increase risks of adverse outcomes.

Instrumental vaginal delivery is a key element of essential obstetric care, scaling up its use in resource poor countries through training and supply of appropriate equipment is likely to contribute significantly to reduce maternal and newborn morbidity and mortality (26).

Obstetrical care providers frequently face dilemmas in the management of the second stage of labor. The decision as to whether or not a particular birth requires assistance and the choice and timing of any intervention must involve consideration of the risks of the potential techniques and the skills of the operator, as well as the urgency of the need to expedite the birth process (27).

To reduce the mortality ratio, one of the life-saving services is providing emergency obstetric care at least starting from the health center level. Basic emergency obstetric care (BEOC) is proposed to be delivered at a health center level, whereas comprehensive emergency obstetric care is planned to be carried out at the district hospital level. Emergency obstetric operative interventions (caesarean section and instrumental delivery), in conjunction with other life support measures, are considered to be instrumental to avert prenatal as well as maternal deaths (28).

However, assisted vaginal delivery is one of them underutilized and least available basic signal functions in resource poor countries Unmet training needs, lack of suitable equipment and human resource shortages are some reasons for this. In many resource poor settings vacuum extraction is performed only by medical doctors who may only be regularly available in large urban hospitals (29). Even though OVD in important and has a place in modern obstetrics to decrease maternal and prenatal mortality, complications can happen which can cause maternal and fetal morbidity and mortality. This three-year review will analyze the prevalence and types of complications of operative vaginal deliveries and to determine associated factors.

# CHAPTER TWO

## 2.1 Literature Review

Operative vaginal delivery rates have remained stable at between 10% and 13% in the UK, yielding safe and satisfactory outcomes for the majority of mothers and babies. There has been an increasing awareness of the potential for morbidity for both the mother and the baby. The increased risk of neonatal morbidity in relation to operative vaginal delivery is long established although with careful practice overall rates of morbidity are low (30).

In 1998, the US Food and Drug Administration issued a warning about the potential dangers of delivery with vacuum extractor. This followed several reports of infant fatality secondary to intracranial hemorrhage. In addition, there has been a growing awareness of the short-term and long-term morbidity of pelvic floor injury as well as neurodevelopment outcomes for children following operative vaginal delivery. Caesarean section in the second stage of labor is an alternative approach but also carries significant morbidity and implications for future births. The goal should be to minimize the risk of morbidity and, where morbidity occurs, to minimize the likelihood of serious harm while maximizing maternal choice (30).

A Retrospective study done from 1998-1999 in New York: Of 508 operative vaginal deliveries (6.2% of all deliveries), 200(39.4%) were forceps and 308(60.6%) were vacuum assisted. Forceps were used more often than vacuum for prolonged second stage of labor ($P = .001$). There was a higher rate of episiotomies ($P = .01$), maternal third- and fourth-degree perineal ($P < .001$) and vaginal lacerations ($P = .004$) with the use of forceps, whereas per urethral lacerations were more common in vacuum-assisted ($P = .026$) deliveries. More instrument marks and bruising ($P < .001$) were found in the neonates delivered by forceps, whereas there was a greater incidence of cephalic hematomas ($P = .03$) and caput and molding ($P < .001$) in the neonates delivered with vacuum. Multivariable logistic regression analysis showed that forceps use was associated with an increase in major perineal and vaginal tears (odds ratio [OR] 1.85; 95% confidence interval [CI] 1.27, 2.69; $P = .001$), an increase in instrument marks and bruising (OR 4.63; 95% CI 2.90, 7.41; $P < .001$) and a decrease in cephalohematomas (OR 0.49; 95% CI 0.29, 0.83; $P = .007$) compared with the vacuum (31).

. In the United States, 3.6 percent of all deliveries are accomplished via an operative vaginal approach (32). The overall rate of operative vaginal delivery has been diminishing, but the proportion of operative vaginal deliveries conducted by vacuum assisted births has been increasing and is more than four times the rate of forceps assisted births. Forceps deliveries account for 1 percent of vaginal births and vacuum deliveries account for about 4 percent of vaginal births.

A study done in surged hospital, Lahore the analysis revealed that success rate was similar with both instruments (94% with forceps & 92% with vacuum extraction). Majority of mothers were primigravida (74% in forceps 74% in vacuum group). Maternal birth canal injuries (P<0.003), >500 ml blood loss (8%) and infant soft tissue injuries were more common with forceps. No marked difference in 1 & 5 minutes Apgar score. Cephalo hematoma was more common among infants delivered by vacuum. Delay in second stage of labor was more common indication for vacuum delivery (46%) while fetal distress for forceps delivery (44%) (33).

A population based retrospective analysis done in USA in 2009; Neonatal mortality was comparable between vacuum and forceps deliveries in US births (odds ratio0.94, 95% confidence interval 0.79 to 1.12). Vacuum delivery was associated with a lower risk of birth injuries (0.69, 0.66 to 0.72), neonatal seizures (0.78, 0.68 to 0.90), and need for assisted ventilation (< 30minutes 0.94, 0.92 to 0.97; >30 minutes 0.92, 0.88 to 0.98). Among births in New Jersey, vacuum extraction was more likely than forceps to be complicated by postpartum hemorrhage (1.22, 1.07 to 1.39) and shoulder dystocia (2.00, 1.62 to 2.48). The risks of intracranial hemorrhage, difficulty with feeding, and retinal hemorrhage were comparable between both modes of delivery (34).

Another Retrospective study done from 2000-2006, Greece shows that, the incidence of 3rd degree lacerations and per urethral hematomas was similar between vacuum and forceps (3.4% vs. 2% and 0.3% versus 0% respectively), while perineal hematomas were more common in forceps compared with vacuum application (2% versus 0.3% respectively). The rate of neonates with Apgar scores $\leq$ 4 at 1 min was significantly higher after forceps compared with vacuum delivery (18% versus 5.2% respectively, p = 0.0003). The same observation was made concerning the neonatal intensive care unit (NICU) admissions (38% versus 11% respectively, p = 0.0001). The rate of neonatal trauma and respiratory distress syndrome did not differ significantly between the two groups. Results of this study indicate

that both modes of IVD and CS are safe but have 12.1%with respect to neonatal complication. However, forceps application increases the risk of neonatal compromise consequently necessitating their admission in the NICU (35).

Study done in 2002, France, revealed that the operative vaginal delivery rate was 11.2% of all live births. Forceps are the primary instruments (6.3%) whereas vacuum delivery rate was 4.9%. One obstetrician never uses forceps while 38 (31%) never use vacuum. Only 29 (24%) report shows using both instruments frequently. During study period no neonatal death related to an operative vaginal delivery was reported while 145 neonatal complications were (3.2%). Major complications were one depressed skull fracture (1/4589) and 14 extensive caput succedaneum (14/4589). Minor complications were coetaneous lesions (124/4589) and facial palsy (6/4589). Vacuum delivery was associated with a significantly higher extensive caput succedaneum rate ($P = 0.018$) while the only depressed skull fracture observed was related to forceps use. Forceps delivery was associated with a significantly higher coetaneous lesions rate ($P < 0.001$) (36).

Study done in India shows mean birth weight in study was $2.80 \pm 0.39$ kg. We observed that birth weight [3.5 kg was significantly common in the forceps group. ($P = 0.015$). The use of instruments is more frequent in infants with higher birth weight and gestational age (37)

A Systematic Reviews on 26 April 1999, ten trials were included. Use of the vacuum extractor for assisted vaginal delivery when compared to forceps delivery was associated with significantly less maternal trauma (odds ratio 0.41, 95% confidence interval 0.33 to 0.50) and with less general and regional anesthesia. There were more deliveries with vacuum extraction (odds ratio 1.69, 95% confidence interval 1.31 to 2.19). Fewer caesarean sections were carried out in the vacuum extractor group. However, the vacuum extractor was associated with an increase in neonatal cephalohematoma and retinal hemorrhages. Serious neonatal injury was uncommon with either instrument (38).

A three-year survey (October 1995- July 1998) by DShah and colleagues in India at 38 centers showed that PMR was in the range of 38-180/1000 live births with mean 53. It revealed an 8.32 times higher chance of a perinatal death with preterm (<37weeks) as compared to term delivery and with increasing gravidity or parity, the perinatal mortality worsened (39**).**

At Amadubello University hospital Zaria Nigeria, in the study period from January 1997 to December 2001 there were 7,327 deliveries, of which 262 (3.6%) were by operative vaginal deliveries. Forceps delivery was most frequently performed (55.7%), while vacuum delivery was found to be in increased use (38.2%). Overall, operative vaginal delivery had a complication rate of 21.6% (11.8% maternal and 9.8% fetal) as compared to a complication rate of 12.7% found among parturient who had spontaneous vaginal delivery. In the case of forceps-assisted deliveries, 15.8% of mothers who had the procedure-developed complications, while for vacuum-assisted deliveries 8% of the mothers sustained a complication. On the other hand, 8.9% of newborns delivered by forceps had complications, while vacuum-assisted delivery was associated with complications in 11% of newborns. Embryology procedures were performed selectively (6.1%) (40).

Study done at Zaria Nigeria shows Operative vaginal deliveries were more commonly employed on primi gravida (78.6%) compared to multiparas (21.4%) and the most common indication was delayed second stage of labor (61%), maternal medical indication (30%) and fetal distress (9%) and for forceps are; maternal medical indication (47.2%), delayed second stage of labor (41.9%), and fetal distress (8.2%). Forceps- and vacuum-assisted deliveries were both associated with maternal and newborn complications. The most severe of the complications were the fetal deaths recorded for vacuum deliveries. However, the deaths may have been due to the severity of the fetal distress that indicated the procedure rather than the procedure itself. Newborn intracranial injuries and shoulder dystocia were other complications associated with operative vaginal deliveries from large reviews. Intracranial injuries documented include epidural, subdural and subarachnoid hemorrhages. The fetus could also develop sub-galial (sub aponeurotic) hemorrhage There was no significant difference in the use of anesthesia between forceps and vacuum deliveries (40).

A cross-sectional community-based study was conducted in Bugesera District, Rwanda in 2011, according to respondent recall, 3.2% were operative (vacuum or forceps). Another Cross Sectional Epidemiological Survey done in Mali & Senegal from 2007- 2011 showed that OVD rate was 12.5%. OVD (OR = 2.5 [1.54–4.17]) is associated with higher risks of maternal mortality and morbidity, and neonatal mortality after Day 1, as compared with spontaneous vaginal delivery (41).

A retrospective one-year medical record review of major emergency obstetric performance was conducted in Tikur Anbessa specialized hospital by Yifru B. in 2004, Showed that during

the one-year period, the gross and corrected Early Neonatal Death (ENND) rates were 26.1and 22.6/1000 total births (27.4 and 24.1/1000 live births), respectively. Out of 1, 3168 (86.3%) of the babies born in the hospital were from Addis Ababa and the specific early neonatal deaths and stillbirths were lower than those who came from outside Addis Ababa. The specific total perinatal mortality rate of the latter group (261.9/1000 births) (P<0.0005) was about 4-fold of the former one (64.7/1000 births). There were 457 (12.4%) women who didn't have antenatal care follow up, and thus, lack of it had been shown to predispose for about four times raised specific perinatal mortality rate as compared to the attending ones (271.3/1000 births vs 64.6/1000 births). (42)

A study done at Gelemso General Hospital, Oromia Regional State, Eastern Ethiopia from February 1, 2015- January 30, 2016, total of 317 operative delivery mothers, from these operative de 206(65%), 94(29.6%) and 17(5.4%) were CS, forceps and vacuum delivery respectively. Vaginal laceration 31(27.9%) for mothers and minor scalp laceration and bruising 32(28.8%) for newborns were the commonest complication of OVD and at all neonatal complication 51(16%) after operative delivery was found (43).

A total of 208 mothers who had given birth with vacuum assisted vaginal delivery in Arba Minch general hospital were participated in the study. Majority of the study participants, 121 (58.2%) were in the age group of 25 to 34 years, 126 (60.6%) were from urban area and 198 (95.2%) were married and also Concerning obstetric history of mothers, more than half of them, 107 (51.4%) were nulliparous, 199 (95.7%) were at gestational age between 37-42 weeks and 121 (58.2%) with unknown status of pelvic trauma while attending Arba Minch general hospital for vacuum assisted vaginal delivery (44).

Study done at Arba Minch general hospital shows 109 (52.4%) of vacuum assisted vaginal delivery were attended by Integrated Emergency Surgical Officer (IESO). However, general practitioners and midwives were equally attended it in the hospital. In this study, duration of second stage of labor was extended greater than or equals to two hours for 117(56.3%) of mothers. And prolonged labor was the primary indication to use vacuum assisted vaginal delivery in about 98 (47.1%) of mothers followed by fetal distress, 61 (29.3%) in the study setting. Episiotomy was done for 121 (58.2%) mothers to manage second stage of labor and 2(1%) of them developed episiotomy extension as a complication. Finally, the delivery ends up without any maternal complication for about 203 (97.6%) of mothers and only 5(2.4%)

mothers developed complications like wound site infection and preeclampsia at discharge (44).

Study done at the study done at Suhl General Hospital, Shire, North-West Tigray, Ethiopia shows that mothers who residue in rural area were nearly two times higher to develop feto maternal complication than the urban residents (COR 1.58, 95% CI=1.02-2.44). Application of high instrumental vaginal delivery (station above 2) and low instrumentation are having feto maternal complication than out let instrumental delivery (COR 7.4, 95%=3.28-16.6 and COR 1.55, 95% CI=0.94-2.55) respectively. Fetal distress was the most common indication, 160 (44.3%) and Forceps assisted vaginal delivery was also frequently used instrumental delivery, 197 (55.2%) than vacuum. On the other hand fetal weight, type of instrument and indication of instrumental delivery were significant associated with complications (45).

## 2.2 Significance of the Study

Operative vaginal deliveries are vital components of basic emergency obstetric care worldwide and remains an integral parts of the obstetrician's duties. They carry risks for the mother and her infant and should be performed when a clinical indication warrants their use. This research will help to assess the indication, complication & its associated factors of operative vaginal delivery in in Tercha General Hospital. The study also helps to estimate the proportion of immediate maternal and neonatal effects of forceps and vacuum assisted deliveries in similar hospitals in Ethiopia. In addition, it will help for further research as a base line that will be conducted on prevalent and outcome of operative vaginal delivery and its associated factors

## 2.3 CONCEPTUAL FRAME WORK

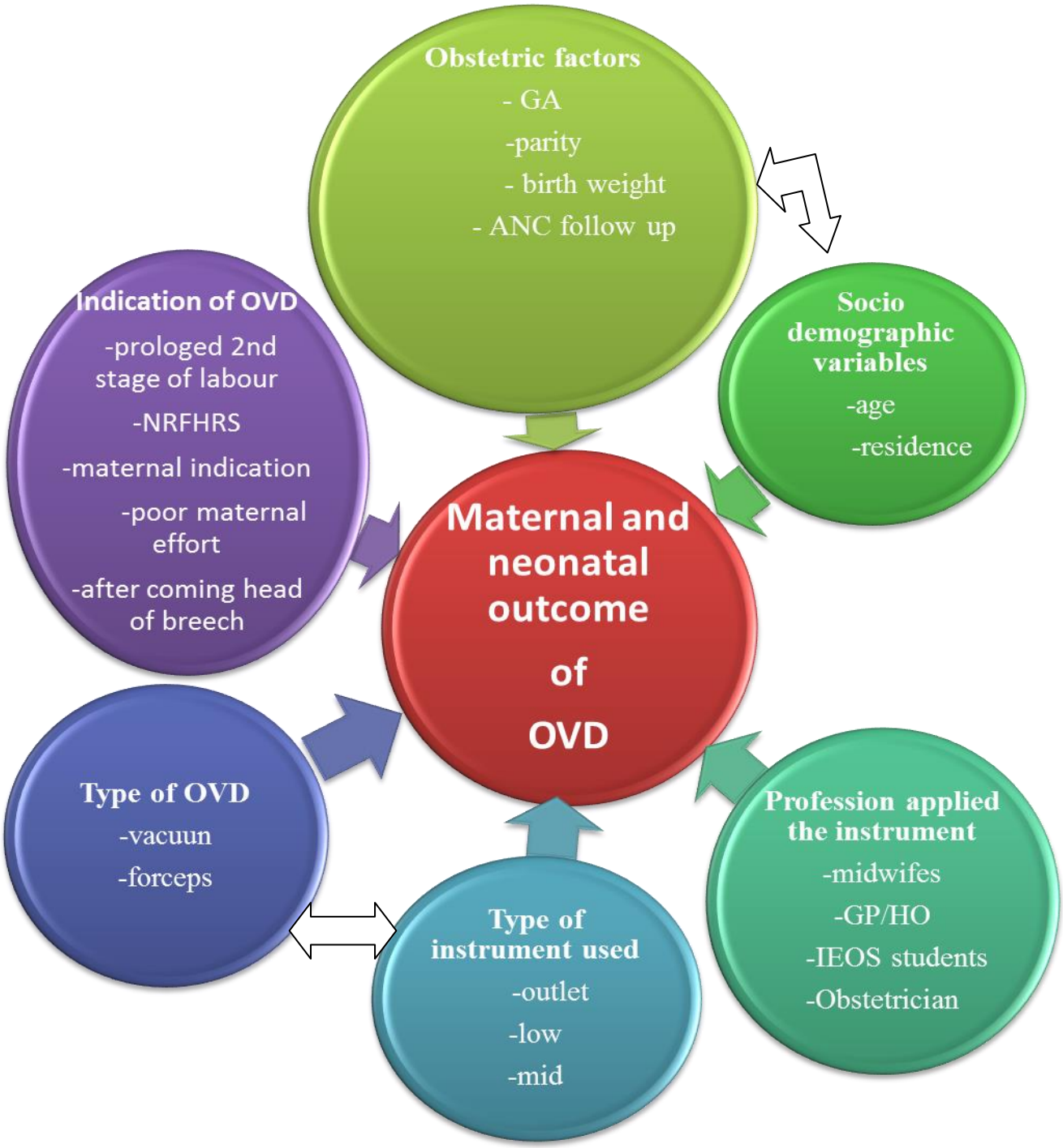


***Figure-1: conceptual frame work for operative vaginal delivery, its outcome and associated factors***

# CHAPTER THREE: OBJECTIVE

## 3.1. General Objective:

To determine prevalence, outcome and factor associated among mothers who gave birth by operative vaginal delivery in Tercha General Hospital during the study period January 1, 2014 to December 31, 2016.

## 3.2. Specific Objectives:

1. To determine the prevalence of Operative Vaginal Delivery in the study setting.
2. To verify outcome of operative vaginal deliveries among mothers who give birth and newborn delivered by operative delivery in study area
3. To identify factors associated with outcomes of operative vaginal delivery among mothers who gave birth and newborn delivered by operative delivery in study area.

# CHAPTER FOUR: METHODS AND MATERIALS

## 4.1 Study area

The Hospital is located south west of Addis Ababa 489km along the Jimma road and 282km far from Hawasa which is capital city of SNNPR. The zonal climate temperature ranges from15.1-27.5 c°, annual rain falls 120-1800ml and 500m -2820m above sea level. The service has been operative since 1995E.C. The service is owned by MOH. Dawro Zone has total population 573,077 & 4,436km2 area i.e. 129 inhabitants per square kilometer. The total number of population in the catchment area is 850,000. Out of this the number of women in the reproductive age group (15-45year) is 131,808 and the expected number of deliveries per year is 20,289.

There are 18 Health Centers, 175 health posts, 7 private clinics, and 6 rural drug venders from 5 woredas and Tarcha town using the Hospital as referral center. The nearest Hospitals are Jimma university specialized Hospital in Jimma, 145km away, and wolayta referral Hospital, 120km away, Hawasa referral hospital, 282km away. The Hospital has 112 beds. There are 48 beds in the Maternity ward, 3 Labor Beds and 2 Delivery Beds. There is 1 obstetrician/gynecologist, 1 surgeon, 5 GPs, 3 Health officer, 3 pharmacists, 5 druggists, 55 nurses, 4 laboratory technologists, 5 lab technicians, 10 midwiferies. There are 87 supportive staff members.

## 4.2 Study period

The data collection was conducted at Tercha General Hospital from May 1 to June 30, 2017.

## 4.3 Study Design

Institutional based retrospective cross sectional study design was conducted.

## 4.4 Populations

### *4.4.1 Source of population*

All mothers who deliver by OVD and their newborns in Tercha General Hospital from January 1, 2014- December 31, 2016.

### *4.4.2 Study population*

All mothers who gave birth by operative vaginal delivery and newborn delivered by OVD at Tercha General Hospital during study period fulfilling the inclusion criteria were the study population.

### *4.4.3 Eligibility Criteria*

***Inclusion criteria*:** All mothers who underwent OVD at Tercha General Hospital from January1, 2014 to December 31, 2016 was included in the study.

***Exclusion criteria*:** Women whose charts were incomplete was not included in the study.

## 4.5 Sample Size

All cards of mother who were gave birth by operative vaginal delivery from January 1, 2014 to December31, 2016 G.C was included in the study.

## 4.6 Study Variables

### *4.6.1 Dependent variables*

- Maternal outcome.
    - Vaginal laceration
    - Episiotomy extension
    - Peri urethral tear
    - Cervical tear
    - $1^{st}$ and $2^{nd}$ degree perineal tear
    - Post-partum hemorrhage
- Neonatal outcome
    - Early neonatal death
    - Cephalohematoma
    - Scalp laceration and bruise
    - Skull fracture
    - Facial nerve palsies
    - NICU admission

### *4.6.2 Independent variables*

- Social demographic
  - Age
  - Place of residence
- Maternal factor
  - Gravidity
  - Parity
  - Gestational age
  - ANC follow-up
  - Type of OVD
  - Indication of OVD
  - Type of instrument
  - Professional who applied instrument
- Fetal factor
  - Apgar score
  - Weight of new born

## 4.7 Data Collection Processes and procedures

A pre-prepared questionnaire was designed in English language to meet the requirement of the study based on different study variables after review of relevant literatures. All registered mothers who gave birth by OVD from total delivery was retrieved first from delivery log book during study period. Next, using card no. of patients, cards were collected from the card room. Finally, based on the inclusion and exclusion criteria of the study, cards were select and analyzed. Appropriate information was gathered and filled in to the pre-prepared data collection tool from patient chart by trained second year IEOS students who had been practiced at Tercha General Hospital.

### 4.8 Data processing and analysis

The collected data was reviewed, checked and coded before entering into SPSS for analysis. Complete data was analyzed using SPSS version 22.0 software. Then it was summarized and results of the study were presented by frequency tables, graphs and other summary statistic. Frequency distributions of both dependent and independent variables were worked out and binary logistic regression was carried out to identify individual variables associated with the outcome variable. Finally, multiple logistic regression analysis was carried out to control confounding variables effects. Variables with P value < 0.2 in the binary logistic regression analysis were selected and entered into the multiple logistic regression analysis. The strength of statistical association was measured by adjusted odds ratios and 95% confidence intervals. P value <0.05 was considered statistically significant.

### 4.9 Data quality assurance

To assure the quality of data, second year IEOS students was trained before the actual study period. Before data collection patients chart and delivery registration books were collected and cross checked. The questionnaires were checked to avoid printing errors before data collection started. The name of the data collectors was recorded so as to enhance the responsibility to any incomplete data. Data collectors were submitted the collected data to supervisor on daily basis and the supervisors were checked the completeness of the data. Code cleaning was done.

### 4.10 Ethical clearance

The study was carried out after having approval from Institutional Review Board (IRB) of college of Health Sciences, Jimma University. Necessary permission letter was obtained from the hospital. Confidentiality of study-reviewed card was assured.

### 4.11 Operational definitions

1. Operative vaginal delivery – used interchangeably with instrumental vaginal delivery, refers to a delivery in which the operator uses forceps or a vacuum device to assist the mother in transitioning the fetus to extra uterine life.
2. Parity - number of births (both life birth infants & stillbirth) after 28 weeks of Gestational age

3. Gestational age- is calculated from the LNMP that was documented on the card or ultrasound estimation if not from the duration of amenorrhea documented from mother's recall & is rounded to the nearest weeks. Amenorrhea of 9 months was taken as 40 weeks' gestation for all mothers.
4. Post term is defined as pregnancy continue to be 420/7 weeks and beyond.
5. Favorable maternal outcome – mother alive with no complication after OVD.
6. Unfavorable maternal outcome – mother alive with like birth canal injury, hemorrhage, including death after operative deliveries.
7. Favorable neonatal outcome –neonatal outcome without any complication after delivery
8. Early neonatal dies are defined as a live born infant who dies before 7 days of age.
9. Unfavorable neonatal outcome –neonatal outcome with complication like stillbirth or any birth injury to the neonate immediately after delivery, low Apgar score both at $1^{st}$ and $5^{th}$ minute and early neonatal death.
10. Apgar score - is a scoring system which provide a standardized assessment for infants after delivery and it includes 5 components: heart rate, respiratory effort, muscle tone, reflex irritability, and each of which is given a score of 0, 1, or 2, reported at one and five minutes after birth. The scores which is out of 10 interpreted as; Normal (7-10), intermediate (4-6) and Low (0-3).
11. Urban—mothers live at least Woreda town.
12. Rural –m other live out of Zonal and Woreda town.

## 4.12 plan for utilization and dissemination of result

Having obtained the approval from Jimma University College of Public Health and Medical Sciences, the findings of this research will be disseminated to:

- Jimma university institute of health.
- Integrated emergency surgery training program coordinating office
- Tercha General Hospital
- Dawro zone Health Bureau
- Peer reviewed Medical Journal

# CHAPTER: FIVE RESULT

## 5.1 Descriptive Statistics

During the 3 years' study period, a total of 2,647 mothers gave birth; Of the 184 mothers managed by operative vaginal delivery, 20 mothers were excluded because of incomplete charts and lost cards, 13 and 7 cards, respectively. Of which 164 charts of mothers who gave birth by operative vaginal deliveries are included in the study, and give prevalence of operative vaginal delivery 6.2% from total delivery.

## 5.2 Socio-demographic characteristics

One hundred six mothers (64.6%) were from rural areas of the referral catchment area of the hospital, and about two-third, 145 (88.5%), were within the age category of 18-35 years. See table: 1

***Table1. Socio-demographic characteristics of mothers who underwent operative vaginal delivery at Tercha General Hospital from January1, 2014-December31, 2016(n=164).***

| **Socio-demographic Variable** | **Categories** | **Frequency** | **Percent** |
|---|---|---|---|
| Age | <18 | 9 | 5.5 |
| | 18-35 | 145 | 88.5 |
| | ≥36 | 10 | 6.1 |
| | **Total** | **164** | **100** |
| Residence | Urban | 58 | 35.4 |
| | Rural | 106 | 64.6 |
| | **Total** | **164** | **100** |

### 5.3 Obstetric history

About two-third 67.1% was waiting their first baby. More than half 68.9% born to a mother underwent instrumental delivery were term, (37-41weeks) and nearly three-fourth of the mothers 78.7% had ANC follow up. (Table: 2)

***Table: 2 Obstetric profile of mothers who underwent operative vaginal delivery at Tercha General Hospital from January 1 2014-December 31, 2016(n=164)***.

| **Variables** | **Categories** | **Frequency** | **Percent** |
|---|---|---|---|
| Parity | Prim Para | 110 | 67.1 |
| | Multi Para | 54 | 32.9 |
| | **Total** | **164** | **100** |
| Gestational age in weeks | 37-41 | 113 | 68.9 |
| | ≥42 | 51 | 31.1 |
| | **Total** | **164** | **100** |
| Status of ANC | Attended | 129 | 78.7 |
| | Not attended | 35 | 21.3 |
| | **Total** | **164** | **100** |
| Episiotomy done | Yes | 155 | 95.1 |
| | No | 9 | 4.9 |
| | **Total** | **164** | **100** |

*In the study period outlet vacuum instrumental delivery is common 87(77.7%) instrumental deliveries than outlet forceps 38(73.1%).*

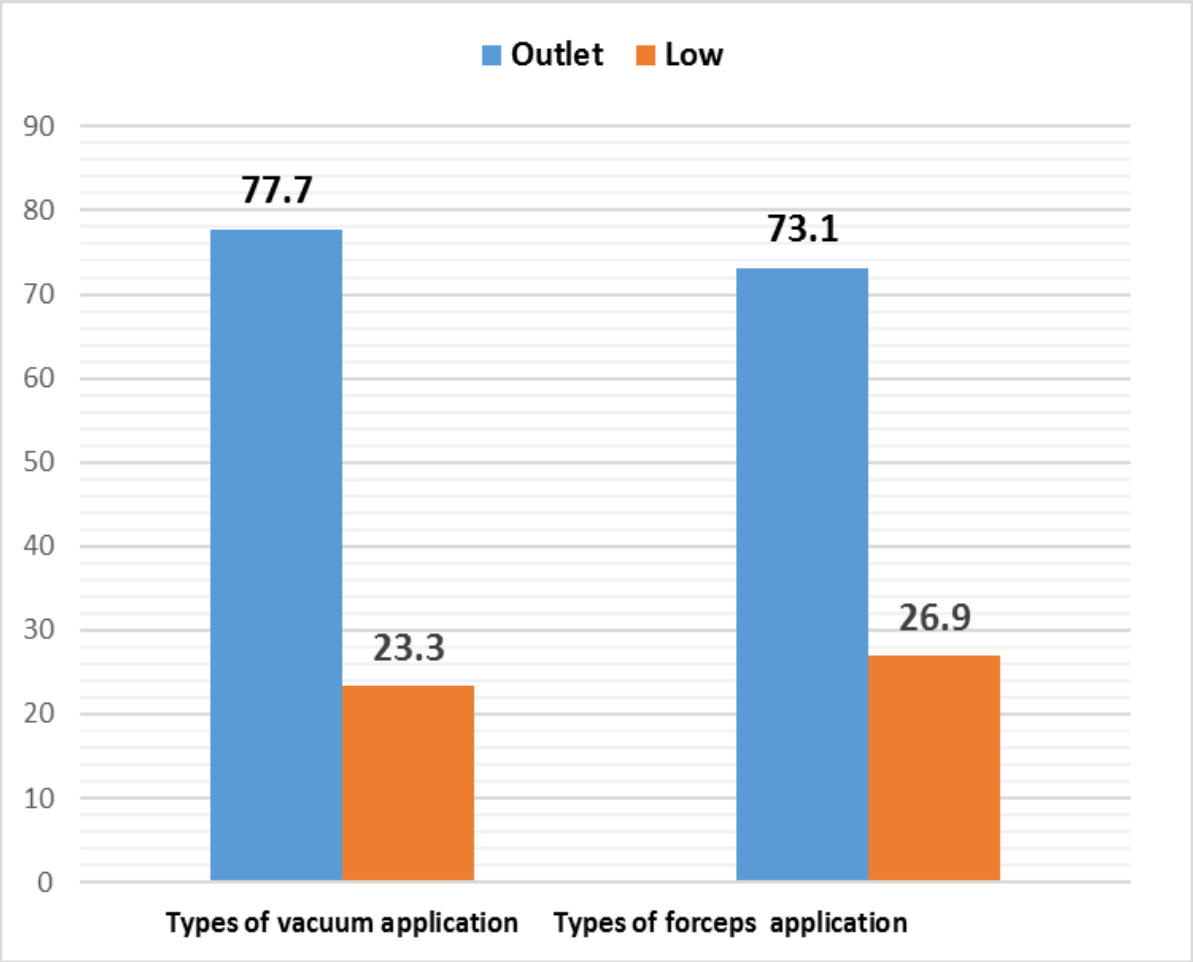


**Figure 2, Shows distribution of type of instrument application at Tercha General Hospital from January1, 2014-December31, 2016*(n=164)*.**

Two third of 103(62.8%), 40(24.4%) operative vaginal delivery was attended by IESO and midwifery respectively.

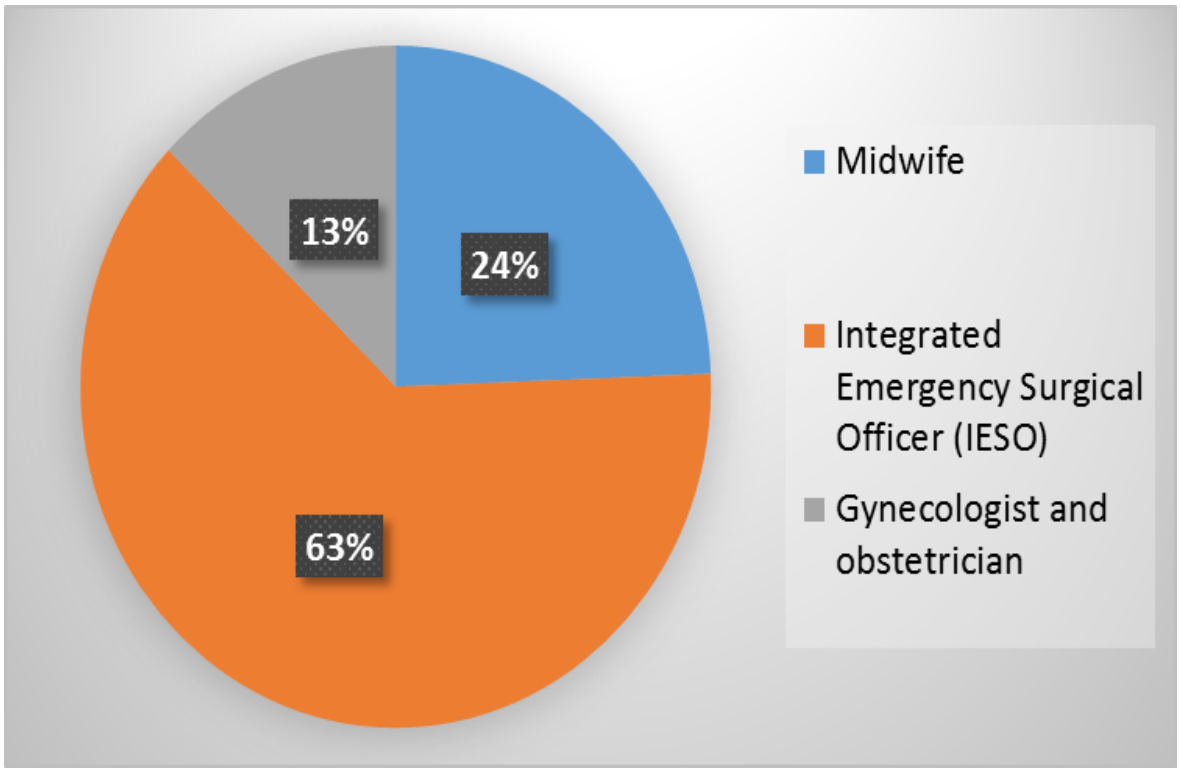


***Figure 3. Shows distribution of delivery attendant with types of professions during study period in Tercha General Hospital from January 1,2014 to December 31,2016(n=164).***

***Table-3: Indication of operative vaginal delivery in Tercha General Hospital from January 1, 2014– December 31, 2016 (n=164).***

| **Indication of OVD** | **Type of operative vaginal delivery** | | | | |
|---|---|---|---|---|---|
| | **Vacuum** | | **Forceps** | | Total |
| | Frequency | Percent | Frequency | Percent | No (%) |
| Non reassuring fetal heart rate | 18 | 16.1 | 30 | 57.7 | 48(29.3) |
| Prolonged 2nd stage of labor | 79 | 70.5 | 13 | 25 | 92(56.1) |
| Shortening of 2nd stage of labor for maternal indication | 4 | 3.6 | 3 | 5.8 | 7(4.2) |
| Poor maternal effort in the expulsive phase of second stage | 11 | 9.7 | 6 | 11.5 | 17(10.4) |
| **Total** | **112** | **100** | **52** | **100** | **164(100)** |

Among participants of this study who underwent operative vaginal delivery 112(68.3%), 52(31.7%) were vacuum and forceps delivery respectively.

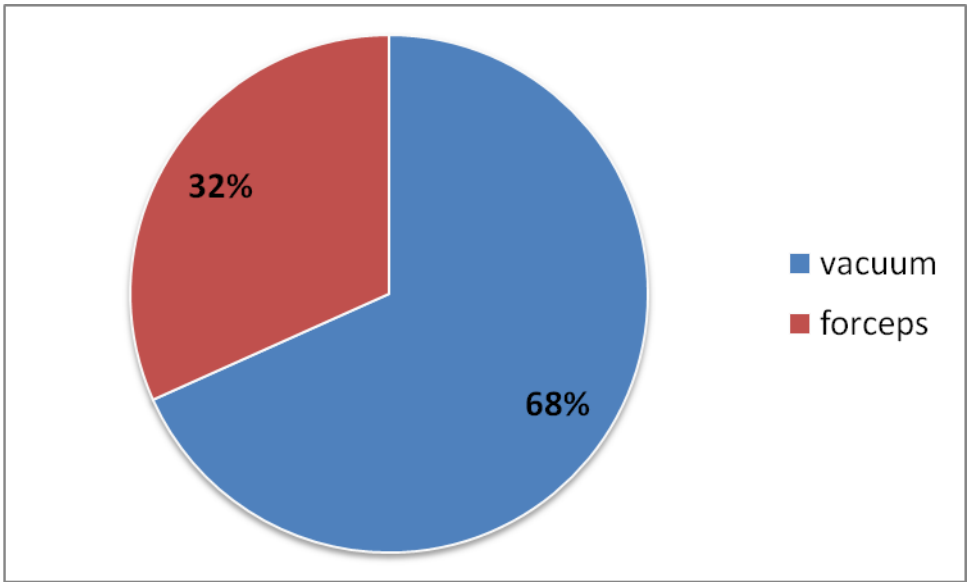


***Figure 4. Distribution of operative vaginal delivery at Tercha General Hospital, from January 1, 2014-December31, 2016(n=164).***

## 5.4 Maternal outcome

Of 164 study subjects 42(25.6%) had maternal unfavorable outcome. From which vaginal laceration was the highest complication which is high in forceps than vacuum, (19.2%) & (8%). Next was episiotomy extension also high in forceps (13.5%) & (1.8%) but peri urethral tear was common after vacuum delivery than forceps (1.8%) and (0.0%). (See table 4)

***Table 4 .Outcome of mother, with operative vaginal delivery cases at Tercha General Hospital from January 1, 2014 to December 30, 2016(n=164).***

| **Maternal complication with** | **Types of instrument** | | | | |
|---|---|---|---|---|---|
| | **Vacuum** | | **Forceps** | | **Total No (%)** |
| | **Frequency** | **Percent** | **Frequency** | **Percent** | |
| No complication | 97 | 86.6 | 25 | 48.1 | 122(74.4) |
| Vaginal laceration | 9 | 8 | 10 | 19.2 | 19(11.6) |
| Cervical tear | 1 | 0.9 | 3 | 5.8 | 4(2.4) |
| Post-partum hemorrhage | 1 | 0.9 | 3 | 5.8 | 4(2.4) |
| $2^{nd}$ and $3^{rd}$ degree perennial tear | 1 | 0.9 | 2 | 3.8 | 3(1.8) |
| Episiotomy extension | 2 | 1.8 | 7 | 13.5 | 9(5.5) |
| Peri urethral tear | 2 | 1.8 | 0 | 0 | 2(1.2) |
| Need for transfusion | 0 | 00 | 2 | 3.8 | 2(1.2) |
| **Total** | **112** | **100** | **52** | **100** | **164(100)** |

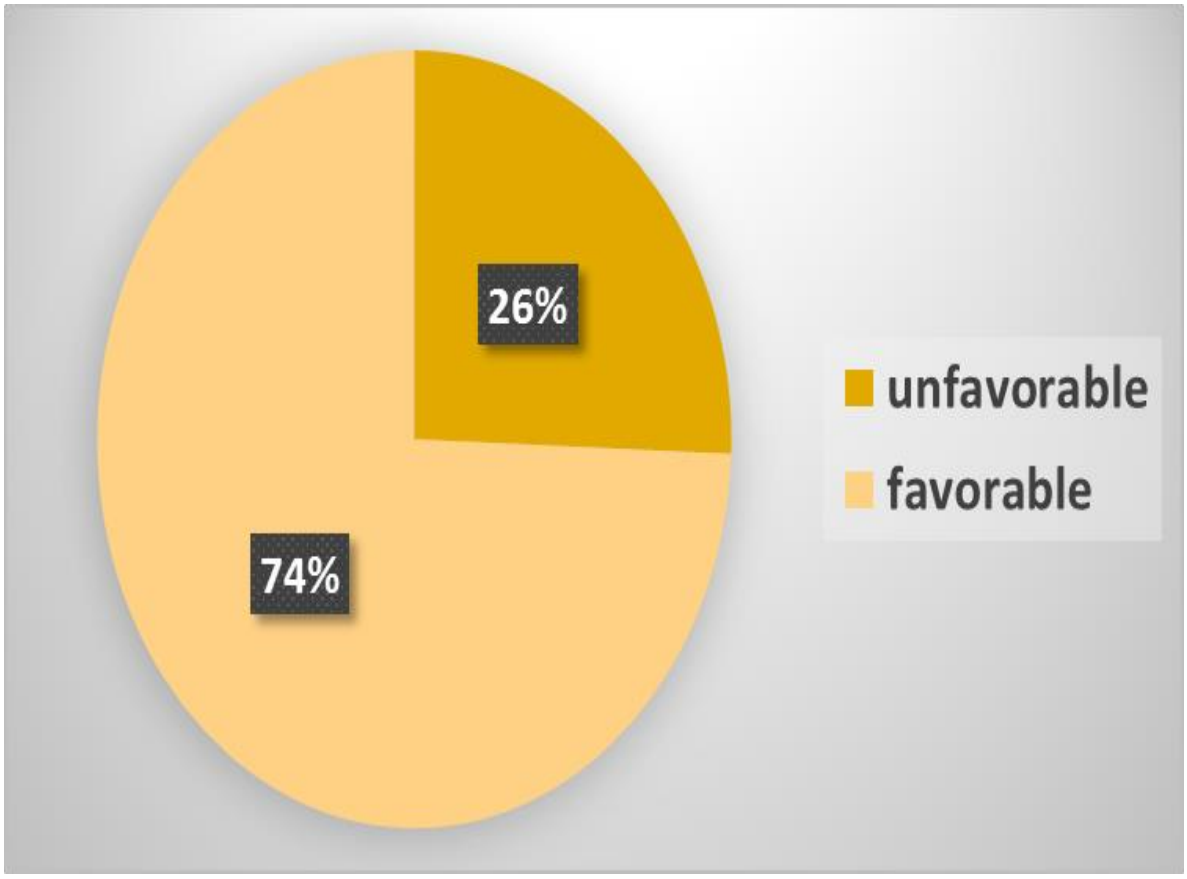


***Figure 5. Distribution of maternal outcome of operative vaginal deliveries at Tercha General Hospital, from January 1, 2014-December31, 2016(n=164).***

## 5.5 Fetal outcome

There were 37(22.6%) of the neonate was unfavorable outcome of which 26(15.8%), 11(5.9%) were vacuum and forceps delivery respectively. A large number, 149(90.9%), of the newborn had Apgar score ≥7 at the fifth minute. Most, 116(70.6%) of the newborn weight 2500-3999gram.Of all the study subject 2(1.2%) of the newborn were died. See Table 5

***Table5.Outcome of newborn among operative vaginal delivery cases at Tercha General Hospital from January 1, 2014 to December 30, 2016(n=164).***

| **Variables** | **Categories** | **Frequency** | **Percent** |
|---|---|---|---|
| Immediate outcome of neonate | Favorable | 127 | 77.4 |
| | Unfavorable | 37 | 22.6 |
| | **Total** | **164** | **100** |
| Early neonatal death | Yes | 2 | 1.1 |
| | No | 162 | 98.9 |
| | **Total** | **164** | **100** |
| Apgar score at the first minute | <7 | 36 | 22 |
| | ≥7 | 128 | 78 |
| | **Total** | **164** | **100** |
| Apgar score at the fifth minute | <7 | 15 | 9.1 |
| | ≥7 | 149 | 90.9 |
| | **Total** | **164** | **100** |
| Weight of the neonate in gram | 2500-3999 | 116 | 70.7 |
| | ≥4000 | 48 | 29.3 |
| | **Total** | **164** | **100** |
| NICU admission | Yes | 11 | 6.7 |
| | No | 153 | 93.3 |
| | **Total** | **164** | **100** |

***Table6.Short term neonatal complication among operative vaginal delivery cases at Tercha General Hospital from January 1, 2014 to December 30, 2016(n=164).***

| **Neonatal complication with** | **Types of instrument** | | | | |
|---|---|---|---|---|---|
| | **Vacuum** | | **Forceps** | | **Total No (%)** |
| | **Frequency** | **Percent** | **Frequency** | **Percent** | |
| No complication | 86 | 76.8 | 41 | 78.8 | 127(77.4) |
| Cephalohematoma | 18 | 16.1 | 0 | 0 | 18(10.9) |
| Scalp laceration and bruise | 0 | 0.0 | 7 | 15.2 | 7(4.3) |
| Birth asphyxia | 8 | 7.1 | 4 | 1.5 | 12(7.3) |
| **Total** | **112** | **100** | **52** | **100** | **164(100)** |

## 5.6 Maternal outcome and associated factor

On binary logistic regression analysis residence, fetal gestational age, ANC, type of operative vaginal delivery, types of forceps application and weight of newborn are the candidate variables for multi variable logistic regression.

***Table 7: Binary logistic analyses for selected variables and factors affecting maternal outcome at Tercha General Hospital, January 1, 2014 to December 31, 2016(n=164).***

| | | Maternal out come | | P – Value | COR |
|---|---|---|---|---|---|
| | | Unfavorable N (%) | Favorable N (%) | | |
| Residence of mother | Rural | 36(34) | 70(66) | .002* | 4.457(1.748,11.362) |
| | Urban | 6(10.3) | 52(89.7) | 1 | 1 |
| Parity | Prim para | 31(28.2) | 79(71.8) | .283 | .652(.298,1.425) |
| | Multi para | 11(20.4) | 43(79.6) | 1 | 1 |
| GA in weeks | 37-41 | 15(13.3) | 98(86.7) | 1 | 1 |
| | ≥42 | 27(52.9) | 24(47.1) | .000* | 7.350(3.393,15.923) |
| ANC follow up | Yes | 23(17.8) | 106(82.2) | 1 | 1 |
| | NO | 19(54.3) | 16(45.7) | .000* | 5.473(2.451,12.222) |
| Type of OVD | Vacuum | 23(20.5) | 89(79.5) | 1 | 1 |
| | Forceps | 19(36.5) | 33(63.5) | .031* | 2.228(1.077,4.610) |
| Types of forceps application | Outlet forceps | 12(32.4) | 25(67.6) | 1 | 1 |
| | Low forceps | 6(42.9) | 8(57.1) | .081 | 2.781(.880,8.788) |
| Weight of newborn in gram | 2500-3999 | 19(16.4) | 97(83.6) | 1 | 1 |
| | ≥4000 | 23(47.9) | 25(52.1) | .000* | 4.697(2.219,9.943) |

**=shows statistical significant at **p<0.05***

However, on multiple logistic regression maternal residence, fetal gestational age, ANC follows up and birth weight were the independent factors associated with maternal outcome adjusted for the other dependent factors. In which mothers who came from rural area 4.4 times more(AOR,4.4;95%CI: 1.52-12.7) likely to have unfavorable maternal outcome than those who came from urban.

Those who had no ANC follow up 4.14 times more(AOR; 4.14;95%CI: 1.74-9.8) likely to have unfavorable maternal outcome than those who had ANC follow up, fetus who were gestational age ≥42wks slightly 2.76 times more(AOR;2.45;95%CI:2.45-20.6) likely to have unfavorable maternal outcome than those who had gestational age 37-41wks and newborn who had birth weight >4000gram 1.94 times more likely to have unfavorable outcome as compared to newborn who had birth weight 2500-3999gram with 95%CI of 0.73-5.21. (Table 7)

***Table 8: Multiple logistic analyses for selected variables and factors affecting maternal outcome at Tercha General Hospital, January 1, 2014 to December 31, 2016(n=164).***

| | | Maternal out come | | P – Value | COR | P - Value | AOR |
|---|---|---|---|---|---|---|---|
| | | Unfavorable N (%) | Favorable N (%) | | | | |
| Residence of mother | Rural | 36(34) | 70(66) | 0.002 | 4.57(1.74,11.36) | .006***** | 4.39(1.52,12.7) |
| | Urban | 6(10.3) | 52(89.7) | 1 | 1 | 1 | 1 |
| GA in weeks | 37-41 | 15(13.3) | 98(86.7) | 1 | 1 | 1 | 1 |
| | ≥42 | 27(52.9) | 24(47.1) | .000 | 7.35(3.39,15.92) | .000* | 2.76(2.45,20.6) |
| ANC follow up | Yes | 23(17.8) | 106(82.2) | 1 | 1 | 1 | 1 |
| | NO | 19(54.3) | 16(45.7) | .000 | 5.473(2.451,12.222) | .005* | 4.14(1.74,9.8) |
| Type of OVD | vacuum | 23(20.5) | 89(79.5) | 1 | 1 | 1 | 1 |
| | Forceps | 19(36.5) | 33(63.5) | .031 | 2.228(1.077,4.610) | .000* | 1.77(.273,7.961) |
| Types of forceps application | Outlet forceps | 12(32.4) | 25(67.6) | 1 | 1 | 1 | 1 |
| | Low forceps | 6(42.9) | 8(57.1) | .081 | 2.78(.880,8.788) | 1.00 | 1.4(1.2,10.97) |
| Weight of new born in gram | 2500-3999 | 19(16.4) | 97(83.6) | 1 | 1 | 1 | 1 |
| | ≥4000 | 23(47.9) | 25(52.1) | .000 | 4.697(2.219,9.943) | .006* | 1.94(.73,5.21) |

**=shows statistical significant at* ***p<0.05***

## 5.7 Fetal outcome and associated factor

According to multi logistic analysis, neonate who born from mother who had no ANC follow up nearly 1.1 times more likely to have bad neonatal outcome after operative vaginal delivery as compared to who had ANC follow up with 95%CI of 0.008,0.499. Newborn who had birth weight >4000gram 38.5 times more likely to have unfavorable outcome as compared to newborn who had normal birth weight (2500-3999gram) with 95%CI of 4.1,362.3. Newborn who had Apgar score at 5th minute below normal (<7), 1.4 times more likely to have unfavorable outcome than newborn who had normal Apgar score at 5th minute with 95%CI of 0.05,36.96.

***Table 9: Multiple logistic analyses for selected variables and Factor associated with unfavorable neonatal outcome of OVD at Tercha General Hospital, Jan1, 2014 to Dec 31,2016(n=164).***

| | | Neonatal out come | | P – Value | COR | P – Value | AOR |
|---|---|---|---|---|---|---|---|
| | | Unfavorable N (%) | Favorable N (%) | | | | |
| Residence of mother | Rural | 26(24.5) | 80(75.5) | .182 | 1.77(.766,4.087) | .429 | 2.080(.338,12.799) |
| | Urban | 9(15.5) | 49(84.5) | 1 | 1 | 1 | 1 |
| Parity | Primi para | 29(26.4) | 81(73.6) | .030 | .35(.135,.902) | .246 | .268(.029,2.483) |
| | Multi para | 6(11.1) | 48(88.9) | 1 | 1 | 1 | 1 |
| GA in weeks | 37-41 | 18(15.9) | 95(84.1) | 1 | 1 | 1 | 1 |
| | ≥42 | 17(33.3) | 34(66.7) | .014 | 2.64(1.222,5.699) | .337 | 2.408(.401,14.480) |
| ANC follow up | Yes | 22(17.1) | 107(82.9) | 1 | 1 | 1 | 1 |
| | NO | 13(37.1) | 22(62.9) | .012 | 2.87(1.259,6.558) | .009* | 1.064(.008,.499) |
| Type of OVD | Vacuum | 27(24.1) | 85(75.9) | .208 | .57(.240,1.365) | 1.000 | 1 |
| | Forceps | 8(15.4) | 44(84.6) | 1 | 1 | 1 | 1 |
| Types of vacuum application | Outlet vacuum | 19(21.8) | 68(78.2) | 1 | 1 | 1 | 1 |
| | Low vacuum | 9(34.6) | 17(65.4) | .038 | 3.33(1.069,10.356) | .922 | 1 |
| Weight of newborn in gram | 2500-3999 | 10(8.6) | 106(91.4) | 1 | 1 | 1 | 1 |
| | ≥4000 | 25(52.1) | 23(47.9) | .000 | 11.52(4.871,27.251) | .013* | 38.5(4.1,362.3) |
| Apgar score at first minute | ≥7 | 6(4.7) | 122(95.3) | 1 | 1 | 1 | 1 |
| | <7 | 29(80.6) | 7(19.4) | .000 | 84.24(26.324,269.568) | .000* | 2.19(0.27,17.31) |
| Apgar score at 5th minute | ≥7 | 21(14.1) | 128(85.9) | 1 | 1 | 1 | 1 |
| | <7 | 14(93.3) | 1(6.7) | .000 | 85.33(10.655,683.440) | .017* | 1.4(0.05,36.96) |

**=shows statistical significant at* ***p<0.05***

# CHAPTER SIX: DISCUSSION

One of the areas of obstetrics that has dramatically changed in the past several years is operative vaginal delivery. Both forceps and vacuum extractors are acceptable and safe instruments for operative vaginal delivery, operator experience is the determining factor in which instrument should be used in a specific clinical situation. This study tried to identify prevalence, maternal & immediate neonatal outcomes and factors associated with unfavorable outcomes of operative vaginal delivery among mothers who gave birth at Tercha General Hospital, southern Ethiopia.

In this study the prevalence of operative vaginal delivery was 6.2 % from the total deliveries, and the rate of vacuum and forceps delivery was 112(4.2%) and 52(2%) respectively which was comparable with the study conducted in New York (6.2%)(31) but it was higher than the study conducted in Nigeria (3.6%)(40),and lower than study conducted in Addis Ababa(11.2%)(42),Mali (12.5%)(41).However increasing frequency of use of vacuum delivery as revealed in this study conforms to a similar trend observed in other centers. (32). This trend may be attributable to its relative safety, lower risk of maternal trauma, and the procedure is also easy to learn and technical simplicity to apply. And observed difference rate of operative vaginal delivery was due to the choice of either vacuum or forceps for instrumental vaginal delivery will depend on the judgment of the operator and the individual clinical circumstances.

This study also revealed that 110 (67.1%) mothers managed by operative vaginal delivery were expecting their first baby. Most authors have reported primi gravida with untested pelvis has high rate of OVD. This is supported by previous studies done in Nigeria (78.6%), USA (74%) and in Arba Minch (57.4%). (40), (33), (44).

Operative vaginal delivery is used to shorten the second stage of labor. It may be indicated for prolonged second stage of labor, maternal exhaustion or fetal conditions including non-reassuring fetal status to prevent hypoxic brain damage or fetal death (7, 8). Prolonged second stage of labor was the most common indication in our study and accounted for 70.5%in the vacuum and 25% in the forceps group which was similar to other studies at Winthrop-University and Arba Minch (33) (44).and Fetal distress was the most common

indication of forceps instrumental deliveries, (57.7%), that were similarly described by others (44).

The complication profile found in this study concurs with those found by most authors with higher risk of maternal complications associated with forceps deliveries and higher risk of fetal complication associated vacuum deliveries. Including our present study revealed that in which mothers who underwent forceps assisted vaginal delivery slightly 2 times (AOR;1.77;95% CI:.273,7.961) likely to have unfavorable maternal outcome than those who underwent vacuum assisted vaginal delivery which is consistence from the study done at Suhl General Hospital, Shire, North-West Tigray, Ethiopia (45) and other similar study (40,42). This Forceps delivery has been found having higher maternal complications that accounts for 16.5% of maternal complications and 12.2% of perennial tear. Of the perennial tears 6.1% of vaginal laceration, 4.3% of episiotomy extension, and 1.8% of cervical tear was associated with forceps delivery. In line with other studies.

Furthermore, in this study maternal complication has shown to be significantly higher in those who come from rural area and lack of antenatal care, which clearly speaks up inefficiency of the integrated primary health care service implemented starting from the community level. In other words, the finding of many women traveling a long distance to reach to a center after life threatening complications developed, prevention in terms of antepartum and intrapartum high risk identification as well as timely intervention at the easily accessible areas is not yet materialized, that were similarly described by others (42), (45). Additionally, in this study maternal complication has shown to be significantly higher in those macrosomic infant compared with appropriate for gestational age (AGA) control birth weight (2500-3999gram) infant with 95%CI of 4.1,362.3. Which is similar to other studies. (37)

Complication rates and neonatal morbidity differ substantially among published report (24). Concerning type of OVD, despite the fact that some authors compare the risk of vacuum & forceps, vacuum is generally considered as a safe alternative to forceps or with comparable outcomes concerning the neonatal complication (34). Including our present study revealed Vacuum deliveries can cause significant neonate morbidity in the vacuum group had higher incidence of unfavorable outcome than forceps (15.8% Vs 6.7%), with the commonest (10.9%), being cephalohematoma. Significantly higher rates of cephalohematomas have been reported in other studies after vacuum application (31 and 33). Other study show depressed 5-

min Apgar scores were observed more frequently in infants delivered by an operative vaginal delivery procedure. Including our present study revealed that in which neonates who had Apgar score at $5^{th}$ minute below normal range 1.4 times more (AOR; 95%CI of 0.05,36.96) likely un favorable neonatal outcome as compared to newborn who had normal (<7) Apgar score at $5^{th}$ minute. This compares to the findings of various studies and may not be truly attributable to the procedure as the asphyxia may be the outcome of the events of labor that indicated the intervention than from the operative vaginal procedure itself (35, 40). The hypothesis advanced by Towner et al, supports this view. Pediatricians should be notified whenever an operative vaginal delivery has been attempted and whether it was successful because serious morbidity can present several hours after birth.

### 6.1 Limitation of the study

As the source of the data for this study was obtained from patient chart some important variables such as number of pulls, sequential use of instruments and time interval from decision to delivery that may help to determine the outcome of mothers and neonates not be found on the card.

# CHAPTER SEVEN: CONCLUSION AND RECUMENDATION

## 7.1 Conclusion

Operative vaginal delivery rates in this center are comparable to other centers as are the possible complications. In our study we found that most of the study subjects were come from areas far more from Tercha General Hospital. Vacuum assisted delivery has least maternal complication than forceps application. Even though larger studies are needed to establish the likely association and significant, we conclude that birth weight and forceps application were significant, associated with feto-maternal complications. A trial of labor and careful use of forceps or vacuum extraction are acceptable for most fetuses suspected to be macrosomic, because there is no precise method for determining which mothers have macrosomic infants prior to delivery.

## 7.2 Recommendation

**The following recommendations are given based on the findings:**

1. Comprehensive emergency obstetric and newborn care service should be given to near health facility for those come far from Tercha general hospital. This should be facilitated by regional health bureau and Dawro Zone health office.
2. Special attention should be given to laboring mothers with non ANC attendants and those mother who come from rural area to minimize the possible complications by health care providers in Tercha General Hospital.
3. The federal ministry of health in collaboration with SNNPR Health bureau should encourage the primary health care provider to carry out extensive community based mobilization on standard ANC utilization.
4. Health professionals should give special attention on the indications, pre requisite and applications of OVD.
5. Care in the postnatal period is important to minimize the risk of adverse outcomes in the short and long term.
6. Finally, long term prospective study is recommended to identify the independent predictors of operative vaginal delivery outcomes.

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## ANNEX 2: DATA COLLECTION INSTRUMENT

### Check list

Jimma University, college of public health, faculty of medical science, coordinating office of integrated emergency obstetrics and surgery, Check list format on prevalence of OVD, maternal complication and prenatal outcome at Tercha General Hospital, Dawro Zone, SNNPR, Ethiopia. A retrospective cross sectional three years' study, from January 1, 2014 to December 31, 2016 G.C, in Tercha General Hospital.

**Part I: Socio-demographic Information**

1. Age_____

2. Residence_____

a) From urban -------  b) from ruler------

**Part II: Obstetric history**

1) Parity in number_____

2) Does she have ANC follow up?  A) Yes  B) No

3) Gestational age in weeks_____

4) Type of operative vaginal Delivery

A. vacuum  B. Forceps

5) Indication for application

A. NRFHR  D. Poor maternal effort

B. Prolonged 2nd stage labor  E. after coming head of breech

C. Too Shorten 2nd stage labor for maternal medical indication

6) Type of instrument applied

A. Out let  B. low  C. Mid  D. Other _____

7) Procedure done by (mention profession) ------

**Part III: maternal complication**

1. Is there any maternal complication encountered after OVD?

A. yes  B. No

2. If yes, what maternal complication encountered after delivery?

A. Need for transfusion/resuscitation

B. Vaginal laceration

C. per urethral tear

D .3rd& 4th degree perineal tear

E. Cervical tear

F. Episiotomy extension

G. Vaginal hematoma

H. Ruptured lower uterine segment

I. 1st & 2rd degree tear

J. PPH

3. Is there episiotomy done during instrumental delivery?

A. yes B. No

**Part IV: neonatal outcome**

1. What was neonatal outcome?

A) Alive B) Dead

2. If the neonate was alive, was there any injury encountered due to the procedure?

A) Yes B) No

3. If yes, mention_____

A. Fetal scalp laceration and bussing

B. Skull fracture

C. Cephalic hematoma

D. Facial nerve palsies

F. fetal asphyxia

G. Other (specify) _____

4. If the neonate was alive what was the first minute Apgar score?

A) APGAR score ≥7 B) APGAR score <7

5. If the neonate was alive what was the fifth minute Apgar score?

A) APGAR score ≥7 B) APGAR score <7

5 What was the weight of the neonate? Mention in gram_

7. Is there any neonatal admission to NICU after instrumental delivery?

A) YES B) No

Name of data collector……sign…… Date……

Name of Supervisor……Sign……...Date…-------

# DECLARATION

I, the undersigned, declared that the thesis is my original work, and hasn't been presented for a degree in any other university and that all sources of material used for this thesis have been duly acknowledged.

**Declared by, candidate**

Name: Jalel Hordofa

Signature: _____

Date: _____

This thesis has been declared for final submission with my internal examiner and advisers

**Approval as university**,

Name of internal examiner----------

Signature----------

Date----------

**Confirmed by, advisers**

1. Name of first advisor: Dr. Demisew Amenu: (MD, consultant and Associate professor of Obstetrics and Gynecology)

Date……. Signature…….

2. Name of second advisor: Mr. Damake Kifle (MSC).

Date ……... Signature…….