

**VACUUM ASSISTED VAGINAL DELIVERY: INCIDENCE,
MATERNAL AND NEONATAL COMPLICATIONS IN
MUHIMBILI NATIONAL HOSPITAL, DAR ES SALAAM,
TANZANIA.**

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**MMed (Obstetrics and Gynaecology) Dissertation
Muhimbili University of Health and Allied Sciences
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MATERNAL AND NEONATAL COMPLICATIONS IN
MUHIMBILI NATIONAL HOSPITAL, DAR ES SALAAM,
TANZANIA.**

By

Dr. Stephen S. Mihungo

**A dissertation submitted in (Partial) fulfillment of the requirements for the
Degree of Master of Medicine (Obstetrics and Gynaecology) of the
Muhimbili University of Health and Allied Sciences**

Muhimbili University of Health and Allied Sciences

October, 2016

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled “*Vacuum Assisted Vaginal Delivery: Incidence, Maternal and Neonatal complications in Muhimbili National Hospital, Dar es salaam, Tanzania*”, in (partial) fulfillment of requirements for the degree of Master of Medicine (Obstetrics and Gynaecology) of Muhimbili University of Health and Allied Sciences

Prof. Charles. D S .Kilewo

(Supervisor)

Date: _____

DECLARATION

AND

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I, **Stephen S. Mihungo**, declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature

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DEDICATION

This dissertation is dedicated to my family

ABSTRACT

Background: Vacuum assisted vaginal delivery is defined as vaginal delivery accomplished by vacuum extractor after creating a vacuum between the vacuum cup and the fetal scalp. It is commonly used to expedite birth for the benefit of mother and the baby. The frequency of vacuum assisted vaginal delivery differs from one country to another, and within the country, from one obstetric unit to another and the ideal rate is unknown. The results of this study inform, and also serve as a baseline for vacuum assisted vaginal delivery trend and maternal and neonatal complications in Muhimbili National Hospital (MNH).

Objective: This study was done to describe Incidence, Indications, Maternal and neonatal complications from vacuum assisted vaginal delivery at Muhimbili National Hospital Dar es salaam (DSM), Tanzania.

Methodology: A retrospective descriptive hospital based study, was conducted in Muhimbili National Hospital, DSM, Tanzania. Records of 211 women delivered by vacuum assisted vaginal delivery from January 2012 to December 2014 meeting inclusion criteria were included. Data was collected using a check list and analysed using SPSS data base program version 20. Data collection was done for a period of 3months from September to December 2015. Data was summarized and presented in tabular form, Bar chart, and Pie chart using frequencies and percentages.

Result: Total deliveries during the study period were 24922. Among all deliveries 231 were vacuum assisted vaginal deliveries giving an incidence of 0.93%; only 211(91.34%) were retrieved and their information was used in this study where by a case study was done. The ages of the Women raised between 17 to 45 respectively, the median age was 27.1. A higher proportional of women 97(45.9%) who had vacuum assisted vaginal delivery had perineal tears and most 72 (34.1%) of them had first degree tear and second degree tear 22(10.4%) and (24.6%) episiotomy was done before procedure. Other common presented maternal complications were postpartum haemorrhage (13.3%) followed by vaginal laceration (6.6%) and cervical tear (2.4%).

Among all vacuum assisted vaginal deliveries which occurred in 2012 to 2014, 29(13.7%) were done to fresh still births. So only 182(88.3%) were considered in counting neonatal complications due to vacuum assisted Vaginal delivery. Results showed that 43(23.6%) had lower Apgar score and 43(23.6%) were admitted to Neonatal intensive care unit (NICU) due to low score. Prolonged second stage of labour was the most common reported indication for vacuum assisted vaginal delivery with the rate of 84(39.81%) while the least common reported indication was foetal distress in the second stage of labour 34(16.1%).

Conclusion: Use of vacuum assisted vaginal delivery is low; the most presented maternal complications were postpartum haemorrhage, cervical tear, and perineal tear. Reported neonatal complications were low Apgar score and admission to NICU due to low score and maternal and neonatal complications were minimal.

Recommendations:

A health care provider should report on neonatal outcome following vacuum assisted vaginal delivery. The Procedure is safe and encouraged to cut down caesarean sections.

Further study on this topic especially on neonatal examination and follow up on NICU following vacuum assisted vaginal delivery.

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LIST OF ABBREVIATIONS

ACOG	American College of Obstetrician and Gynaecologist
HIV	Human Immuno Deficiency Virus
LCVE	Low Cavity Vacuum Extraction
NICU	Neonatal Intensive Care Unit
MNH	Muhimbili National Hospital
PPH	Postpartum Haemorrhage
RCOG	Royal College of Obstetricians and Gynaecologists
UK	United Kingdom
UN	United Nations
VAVD	Vacuum Assisted Vaginal Delivery

OPERATIONAL DEFINITIONS

Apgar score is a quick method of physical evaluation of the health status of the new born soon after birth by allocating a numerical value (0,1 or 2) based on five criteria named; Appearance, Pulse, Grimace, Activity and Respiration. The sum of the score in the apgar scale at one minute and five minutes after birth describes health status of the newborn. It has the maximum score of 10, the score below 7 is considered as a low score.(1)

Elective shortening of the second stage of labour is to shorten and reduce the effects of the second stage of labour on medical condition e.g. cardiac disease, hypertensive disease, and severe anaemia.(2)

INTRODUCTION

Vacuum assisted vaginal delivery is an operative vaginal delivery which is accomplished by creating a vacuum between the vacuum suction cup and the fetal scalp.(3) It is commonly used to expedite birth for the benefit of the mother and the baby. It is a procedure known to exist more than two centuries and it has been modified and refined until now. The incidence of vacuum assisted vaginal delivery differs from one country to another, and within the country, from one obstetric unit to another and the ideal rate is unknown.(4)

According to the Royal college of Obstetricians and Gynaecologist (RCOG) Consultants Conference(1998),the operative vaginal delivery rate is on average 10.5% (ranging from 4-20%).The resolution was to aim to lower the rate to an average of 8.5%(range 5-15%)(5).In the developed countries like the UK, it ranges from 10-15% and in the United States of America is 4.5%.In developing countries, Sub-Saharan Africa the rate is low ranging from 1% or less.(6) The appropriate use of vacuum extraction requires observance to guiding principles and prerequisites for the operation, good case selection and judgment, adequate skill and familiarity and mastery of the equipment.(5-7) This includes magnitude of its use in developed countries ranging from 4.5% to 5% and about 1% or less in Sub-Saharan Africa and conditions/criteria for its use.

The vacuum extraction can be associated with complications if inappropriately used; such as neonate superficial scalp abrasion, sloughing of the scalp, cephalohaematoma, low Apgar score(<7) and the mother can get a cervical tear,vaginal laceration leading to blood loss.(9) The WHO and other UN agencies declared that vacuum assisted vaginal delivery is one of the six critical functions of basic emergency obstetric care. Indications for its use are; maternal exhaustion in the 2nd stage of labour, fetal distress in the second stage of labour, medical conditions (Severe anaemia, Cardiac disease) requiring shortening of the second stage of labour.(10) The benefits of vacuum assisted vaginal delivery are the reduction of caesarean section rate, reduction in the cost of delivery and brighter obstetric future hence the need for more studies in this area to provide health care providers with more information on implementation of this procedure to improve its utilization and

safety(5). Maternal and neonatal complications as well as indications and benefits are provided in the paragraph above paving the way for studies in the subject.

The following settings have to be fulfilled prior to use of a vacuum extractor to reduce maternal and neonatal complications: the presentation has to be vertex, foetal membrane must be ruptured, gestational age must not be <34 weeks, head must be engaged to exclude cephalopelvic disproportion with the exception of the second baby in case of twin with vertex presentation, there must be ≥ 8 cm cervical dilatation, the bladder must be emptied, the skills must be at hand and patient consent must be obtained.(11)

This Study has been proposed to show how frequent this life- saving intervention is used, its safety, maternal and neonatal complications as a result of vacuum assisted vaginal delivery and its indications. The information obtained has provided awareness to health care providers about complications to the mother and baby following vacuum assisted vaginal delivery. The study is about the frequency of use of vacuum extractor, its safety and indications to facilitate plans for its enhancement of emergency obstetric care for improved maternal and foetal outcomes.

LITERATURE REVIEW

Vacuum extraction improves the maternal and fetal outcome whenever appropriately indicated. Studies have shown that vacuum assisted vaginal delivery has a distinct advantage of reduced need for anesthesia compared to the other vaginal operative procedure, although it can be associated with maternal and fetal trauma, there is markedly fewer complications.(12,13)

In randomized clinical studies, vacuum assisted vaginal deliveries, when used with care, were associated with minimal rates of significant intracranial injuries. Rigid vacuum extractors are more efficient than flexible instruments but are associated with more fetal scalp trauma. (12) Vacuum extraction role / benefits: Improves maternal and foetal outcome, reduced need for anaesthesia, shorten 2nd stage of labour, for non reassuring foetal status, to avoid maternal bearing down e.g. cardiac disease/hypertensive disease. However, the decision to do vacuum assisted vaginal delivery is not at all times straight forward. Vacuum assisted vaginal delivery requires maternal effort, but still in such

situations like hypertensive disorders of pregnancy, it can achieve its aim of shortening the second stage of labour with minimal maternal efforts.(13)

The vacuum assisted vaginal delivery rate

Frequency of use of Vacuum assisted vaginal delivery ranges from 3.7% to 15% in developed countries, 1% or less in Sub Saharan Africa. (4) Muhimbili National hospital is low resulting in delay in 2nd stage of labour leading to birth asphyxia and perinatal death. (14)

Neonatal outcomes

Good Apgar score, less admission to NICU; Adverse neonatal outcomes: Scalp abrasion or laceration, cephalohaematoma and even intracranial haemorrhage especially on repeated application, need for close neonatal monitoring for at least 10 hours. Pediatricians ought to be notified whenever vacuum assisted vaginal delivery has been attempted and whether it was successful as serious morbidity can present a number of hours after birth. Hence, such neonates should be closely monitored. A large prospective, observational, cohort study which was done in the Netherlands showed that all vacuum-related injuries in term neonates were marked in 10 hours of birth. The authors concluded that neonates to be discharged 10 or more hours after vacuum assisted vaginal delivery if no complications are evident.(15)

Long-term sequelae: Intracranial hemorrhage and neuromuscular injury are rare. A nine-month follow-up study of children randomized at term to vacuum assisted vaginal delivery revealed no major differences in head circumference, weight, head circumference-to-weight ratio, testing of vision and hearing, also hospital readmission rates. Vacuum-assisted vaginal delivery in addition does not show to adversely impact long-term cognitive development. There was no difference in terms of fine- and gross-motor power, perceptual integration, and behavioral maturity between those children delivered by vacuum assisted vaginal delivery and spontaneous vaginal delivery.(14,18)

Maternal outcomes

Maternal benefits: Relief from exhaustion, distress and shortened 2nd stage of labour;
Complications: Cervical / vaginal trauma, excessive blood loss, prolonged hospital stay, perineal laceration, annular detachment of the cervix, cervical incompetence, and uterine prolapsed. Vacuum assisted vaginal delivery provides safe and effective obstetric care of a healthy mother and baby. Different studies have pointed out an average of significant improvement of maternal and neonatal well-being, and hence advocating on its adequate usage whenever indicated.(17,19)

Episiotomy is a term which refers to a surgical incision in the perineum intended to enlarge the vagina and aid in childbirth. While episiotomy has often accompanied vacuum assisted vaginal delivery, current evidence suggests that routine use of episiotomy with vacuum assisted vaginal delivery is related with an increased rather than decreased danger of perineal trauma and rectal injuries.

Episiotomy: Perineal trauma and rectal injuries, postpartum haemorrhage, perineal infection, demand for stronger analgesia. In total, this information suggests that routine episiotomy during vacuum assisted vaginal delivery should be discouraged. Episiotomy, however, should be given if there is an imminent perineal tear.(2,18,)

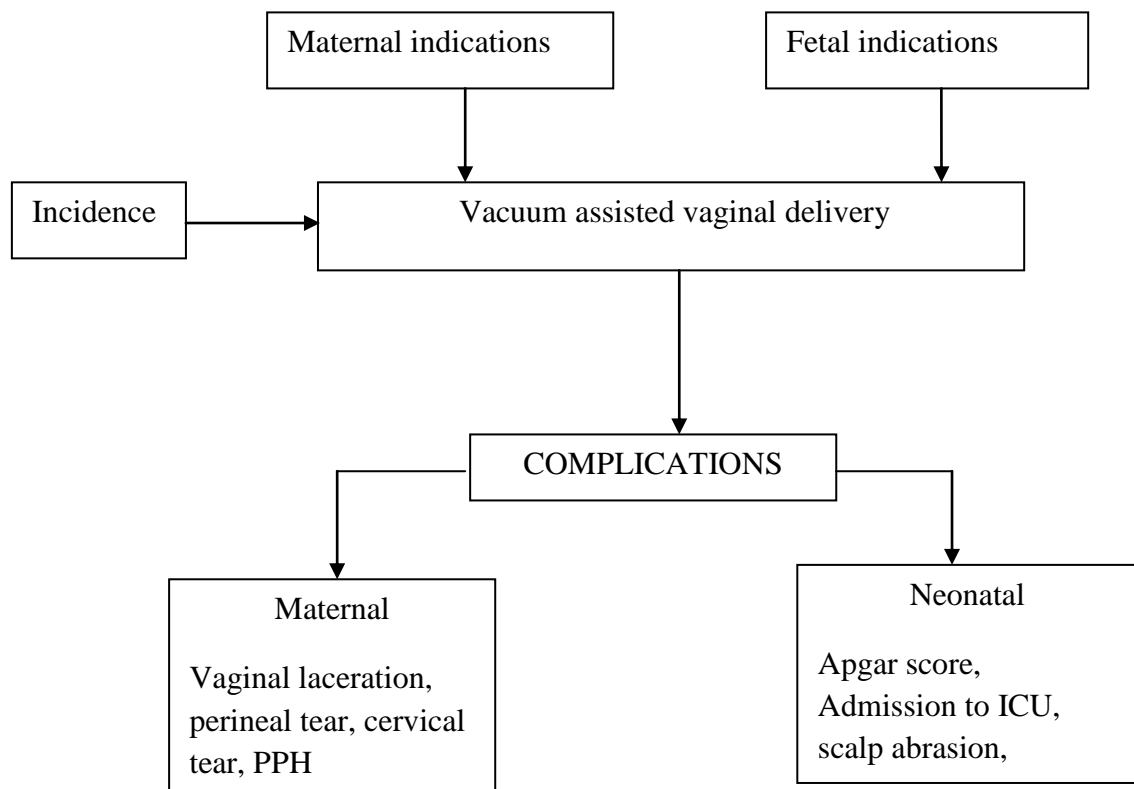
This study hence aimed to establish the maternal and neonatal complications following vacuum assisted vaginal delivery in MNH; Baseline for trends in its use, maternal and neonatal complications at MNH.

CONCEPTUAL FRAMEWORK

The figures which are presented on the following page demonstrate the conceptual model of the maternal and neonatal complications after the vacuum assisted vaginal delivery.

Vacuum assisted vaginal delivery is done aiming at accomplishing a successful vaginal delivery of the baby with good maternal and neonatal outcomes. There are maternal and fetal indications for vacuum assisted vaginal delivery, women who are indicated for Vacuum assisted vaginal delivery the aim is to shorten the 2nd stage of labour as per indication.

This study aimed at reviewing the complications for both the mother and neonate following Vacuum assisted vaginal delivery.



PROBLEM STATEMENT

The vacuum assisted vaginal delivery is an important lifesaving procedure for the improvement of the mother and neonatal status. Maternal morbidity may occur following vacuum assisted vaginal delivery. Documenting the maternal and neonatal complications as well as indications of this procedure will help to know where we are as there are limited studies in our setting and caesarean section rate is high accounting for 55.81%. This will facilitate the improvement of obstetric emergency care and cut down caesarean section rate by promoting the use of this procedure whenever indicated.(2,21)

RATIONALE OF THE STUDY

The vacuum assisted vaginal delivery is lifesaving for the mother and the baby and there has been a low rate of vacuum assisted vaginal delivery. This study provides data on maternal and neonatal complications as a measure to improve our services and also raise awareness about complications of mother and neonate following vacuum assisted vaginal delivery. The above information builds a foundation for the understanding of the current situation and what has to be done for the better future obstetric care.

RESEARCH QUESTION

What are the indications, maternal and neonatal complications after vacuum assisted vaginal delivery at MNH from 1st January 2012 to December 31st 2014?

Broad objective

To describe incidence, indications, maternal and neonatal complications in women delivered by vacuum assisted vaginal delivery in Muhimbili National Hospital.

Specific objectives

1. To determine the incidence of vacuum assisted vaginal delivery at MNH.
2. To determine immediate maternal and neonatal complications after vacuum assisted vaginal delivery.
3. To document indications for vacuum assisted vaginal delivery.

METHODOLOGY

Study design.

A retrospective descriptive study of all vacuum assisted vaginal delivery from 1st January 2012 to December 31st 2014 at MNH, the study used records of all women delivered by vacuum assisted vaginal delivery.

Study setting.

Muhimbili National Hospital is the largest tertiary level referral health facility and is used also as a University teaching Hospital for the Muhimbili University of Health and Allied Sciences in Dar es salaam, Tanzania. Deliveries are from Home and referral from City regional Hospitals or other health facilities in the City and nearby regions. Admitted women in the labour ward are attended by the admitting nurses who are responsible to record patient's particulars, vital signs and initiate a partograph. The team on call is available each and every day comprising of interns, resident, registrar and specialist doctors. The first three are present in the labour ward at any time and see all admitted women and perform physical examinations including timed vaginal examination.

Most vacuum assisted vaginal deliveries are performed by resident doctors. When a problem arises and expert opinion is required in the management of the patient then the specialist on call is called for intervention. On average there are thirty deliveries in a day, vacuum assisted vaginal delivery is performed on average 5 per month and there has been on and off functioning vacuum extractors. There is a special neonatal care unit which provides neonatal care to those babies who are sick as well as premature newborns. All deliveries taking place at MNH are recorded into the delivery books and then the information is transferred into the electronic data base. The information recorded includes sociodemographic characteristics, risk factors, and complications before, during and after labor and HIV sero status.

Study population

The study used records of women delivered by vacuum assisted vaginal delivery.

Inclusion criteria.

Records of all women delivered by vacuum assisted vaginal delivery from 1st January 2012 to 31st December 2014.

Exclusion criteria

Vacuum assisted delivery done during caesarean section

Vacuum assisted vaginal delivery done on premature babies

Study duration

Data collection was for 3 months from September 2015 to December 2015

Study sample

Records of all 211 vacuum assisted vaginal deliveries done from 1st January 2012 to 31st December 2014 which fits the inclusion criteria were taken.

Sample size estimation

Records of All deliveries from the period of 1st January 2012 to 31st December 2014 were identified and among them the number of records of 211 vacuum assisted vaginal deliveries were counted and analyzed in terms of social demographic and obstetric characteristics, their indications, incidence, maternal and neonatal complications.

Sampling procedure

Purposeful sampling where by all the records of vacuum assisted vaginal deliveries done in a study period were taken.

Training of an assistant

A session of instruction to an assistant was conducted by the principal investigator. One assistant was selected a staff from medical records and instructed. He was instructed on the purpose of the study. An assistant helped to retrieve the files after being given file numbers.

Pretesting of the checklist

Pretesting was done at Muhimbili national hospital on twenty patient's files and changes were made like adjusting categories of marital status, educational level, maternal and neonatal complications.

Data collection

Sources of information were from delivery record books at labor ward and patient's files. A structured checklist was used to obtain the information. Data from 1st January 2012 to 31st December 2014 were collected. Cases were identified from the delivery books, low

cavity vacuum extraction (LCVE) done from 1st January 2012 to 31st December 2014. Identified files numbers were sent to an assistant from medical records, he retrieved the files from the shelves in the records room, and files were checked for detailed information and the questionnaire were filled. The correctness of the questionnaire was counterchecked and each one was assigned a number in order to avoid repetition of the filled data. They were then coded for easy analysis, coding entered into excels program. Cleaning of data to identify missing variables was done by using preliminary frequencies, and clean data was transferred to spss for analysis plan and type.

FLOW CHART OF DATA COLLECTION

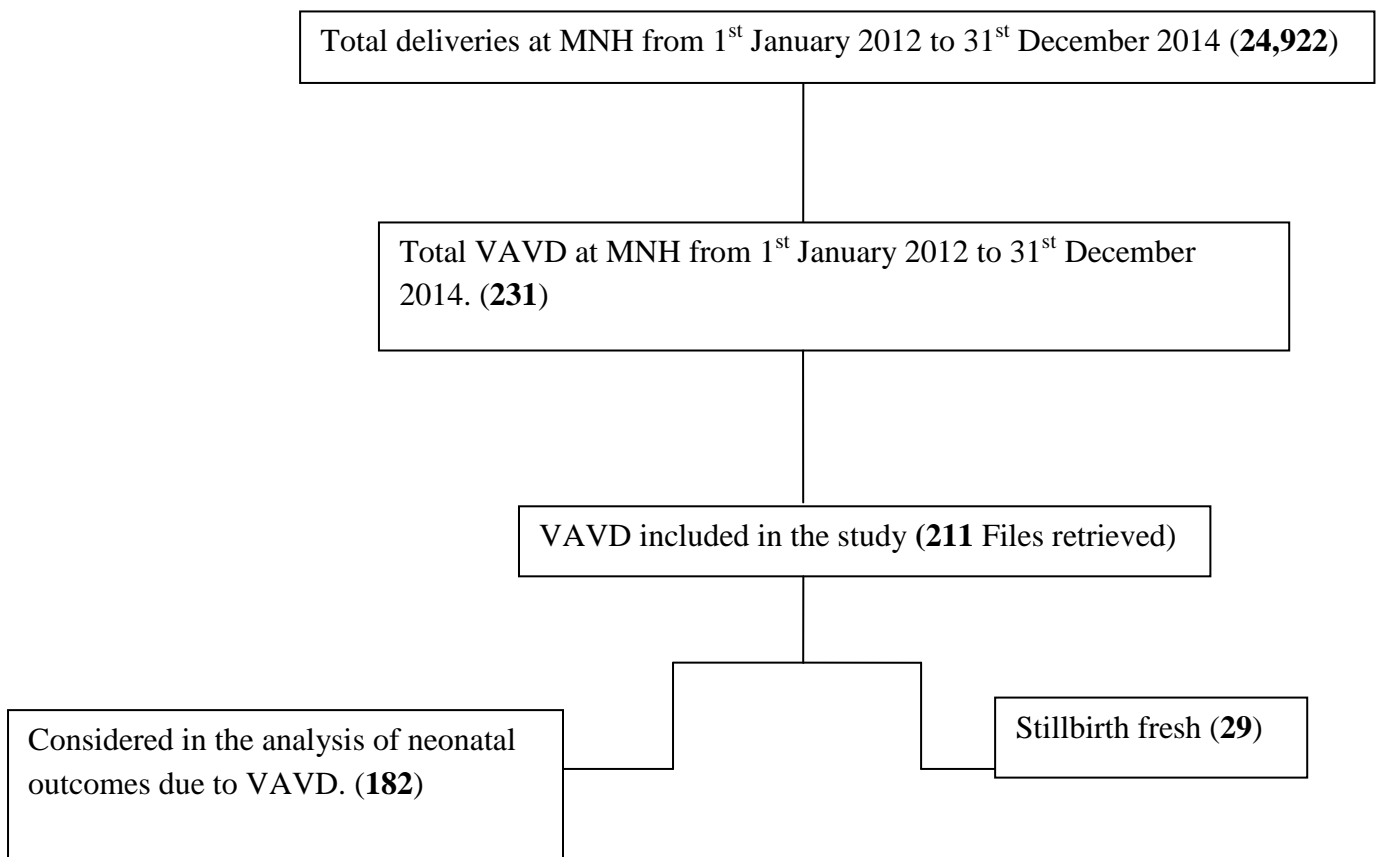


Figure 1: Flow chart of data collection

Variables**Independent variables**

Demographic characteristics; Age, marital status, educational level, occupation

Obstetric characteristics; Parity, gestation age

Outcome variables

Neonatal complications; Apgar score, admission to NICU, scalp abrasion or laceration, cephalohaematoma and intracranial haemorrhage.

Maternal complications; cervical tear, vaginal laceration, postpartum haemorrhage, perineal tear.

Study tools

A structured Checklist was used to obtain information from the records like delivery books at labor ward, the patient's files, information about patient's age, gravidity, parity, estimated gestation age, information about labor from the partograph were extracted. Immediate neonatal outcomes like Apgar score at 5minutes, stillbirth, and the need of resuscitation, and admission to NICU also immediate maternal outcomes like amount of blood loss, blood transfusion, and perineal tear were extracted.

Data management and analysis

Each and every checklist was checked by the principal investigator for correctness and completeness of the information filled. The collected data were coded and entered into excel program, preliminary frequencies were done for data cleaning in order to identify missing variables.

Data was summarized using frequencies and percentages. Tables were used so that the statistical data can be put together as a basis for computation, SPSS data-base program version 20 was used for analysis. Data were presented by using tables, Bars and pie charts.

Ethical clearance and Ethical consideration

Ethical clearance was obtained from MUHAS ethical committee and permission to conduct the study was obtained from the executive Director of Muhimbili National Hospital and head of Department of obstetrics and gynaecology at MNH.

All information which was obtained from the patient's files and other records were confidential and was not shared by any means to someone else not involved in the study. Files were kept in the office where no one who was not involved in the study could have access to them.

The patient's names were not used and after extracting the required information from the medical record, books and files were returned back to the authority.

Results

In this retrospective cross-sectional study total number of all deliveries in the years 2012, 2013, and 2014 were 24922. Among all deliveries 231(0.93%) were vacuum assisted vaginal deliveries; 10782(43.26%) were spontaneous vertex delivery and 13909(55.81%) were caesarian section. Among 231 vacuum assisted vaginal deliveries only 211(91.34%) files were retrieved and their information was used in this study, Nurses conducted 16.11% of vacuum assisted vaginal deliveries, Registrars 3.32%, Residents 53.56% and Specialists 27.01%. Episiotomy was done in 24.6% before vacuum assisted vaginal delivery, and most (86.5%) were Primipara, Para 2 and above were few.

Table 1: Demographic and obstetric Characteristics of women who had vacuum assisted vaginal delivery N=211

Variable	Frequency(n)	Percentage (%)
Age group		
15-24 years	88	41.7
25-34years	104	49.3
35-44years	19	9.0
Education level		
Primary	158	74.9
Secondary	26	12.3
College	27	12.8
Marital status		
Single	18	8.5
Married	193	91.5
Occupation		
House Wife	149	70.6
Employed	27	12.8
Self Employed	34	16.1
Student	1	0.5
Parity		
1	138	65.4
2-4	35	16.6
≥5	38	18.0
Gestation age		
37-40	194	91.9
≥41	17	8.1

Ages of women were varied with minimum and maximum ages of 17 and 45 respectively. The median age was 27.10. Most 104(49.3%) of women were in age group 25 to 34 years and close to three quarters (74.9%) had attained primary education. Most of the women (91.5%) were married. The majority 149(70.6%) were identified as housewives. Many of them (65.4%) were Primipara and about a third: (34.6%) were Para 2 and above. Majority (91.9%) their gestation age ranges between 37 and 40 weeks. (Table 1)

The incidence of vacuum assisted vaginal delivery.

Case review of deliveries from January 2012 to December 2014 showed that a total of 231 were vacuum assisted vaginal delivery which makes an incidence of 0.93% for the three consecutive years, ranging between 0.87% and 1.03%.

(Figure 1 below illustrate)

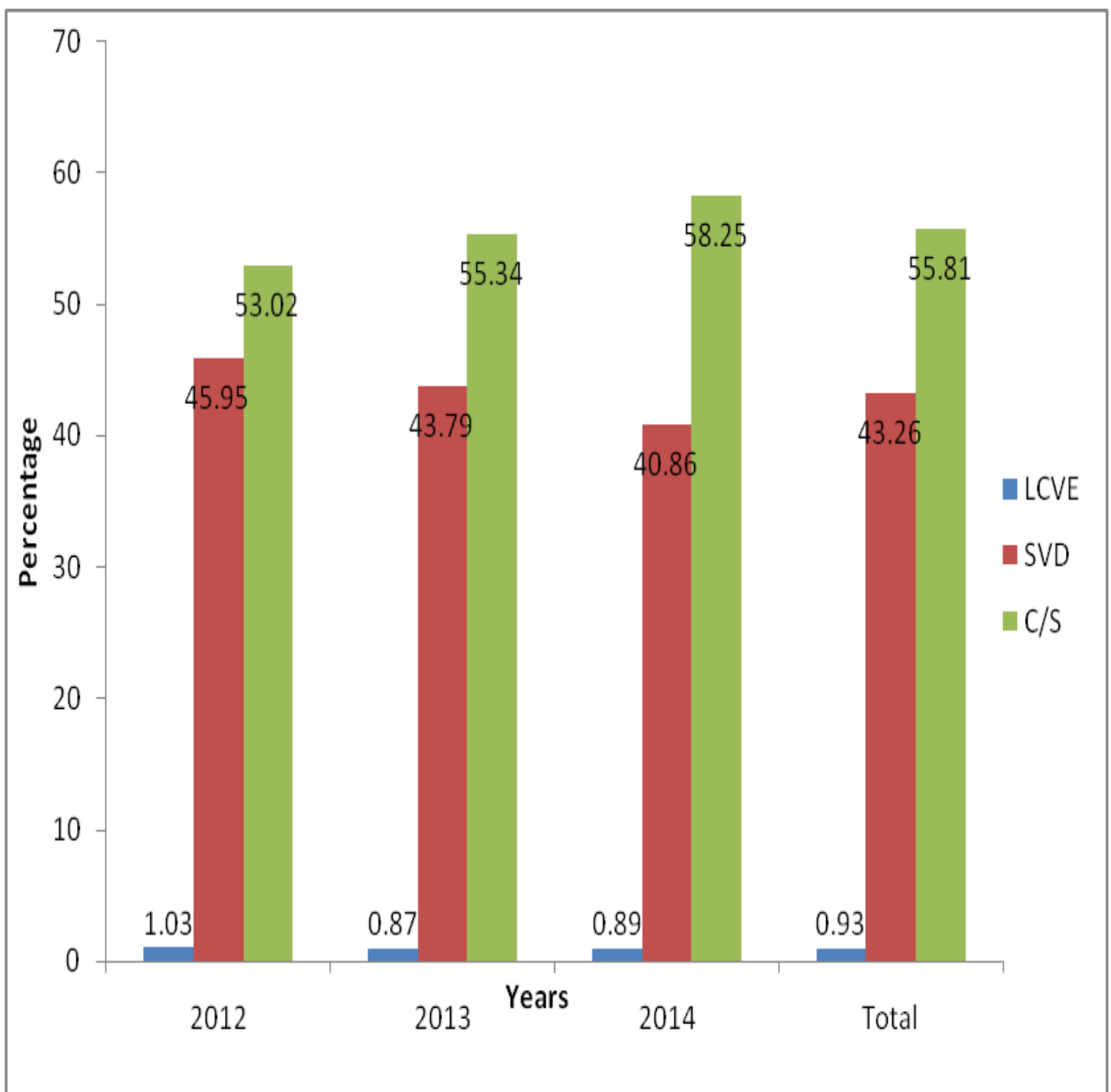


Figure 2: Mode of delivery 2012-2014

Table 2: Indications of Vacuum assisted Vaginal Delivery

Variable	Frequency(n)	Percentage (%)
INDICATIONS		
Prolonged second stage of labour	84	39.8
Elective shortening of second stage of labour	47	22.3
Maternal exhaustion	46	21.8
Foetal distress in second stage of labour	34	16.1
Total	211	100

Prolonged second stage of labour was the most common reported indication for vacuum assisted delivery with the rate of 84(39.8%) while the least common reported indication was foetal distress in the second stage of labour 34(16.1%). (Table 2)

Immediate maternal and neonatal complications after vacuum assisted vaginal delivery.

Table 3: Maternal complications N=144

Variable	Frequency(n)	Percentage (%)
Perineal tear		
1_Degree tear	72	50
2_Degree tear	22	15.3
3_Degree tear	2	1.4
4_Degree tear	1	0.7
Vaginal laceration	14	9.7
Cervical tear	5	3.5
Postpartum haemorrhage	28	19.4

Maternal complications.

In this study four **variables** are presented as maternal complications; perineal tears, vaginal lacerations, cervical tears and postpartum haemorrhage. A higher proportion of women 97(67.4%) who had vacuum assisted vaginal delivery had perineal tears and most 72 (50%)

of them were first degree tears and second degree tears 22(15.3%). Very few were reported to have had third (1.4%) and fourth (0.7%) degree tears.

Other common maternal complications recorded were postpartum haemorrhage (13.3%) followed by vaginal laceration (6.6%) and cervical tear (2.4%). Table 3

Table 4: Neonatal complications N=182

Variable	Frequency(n)	Percentage (%)
Apgar score at 5minutes		
Low score (<7)	43	23.6
Normal score (7-10)	139	76.4
Admission to NICU		
No	139	76.4
Yes	43	23.6

Among all vacuum assisted vaginal deliveries which occurred in 2012 to 2014, 29(13.7%) were done to fresh still birth. So only 182(88.3%) were considered in analysis of neonatal complications due to vacuum assisted vaginal delivery. Results showed that 43(23.6%) had lower Apgar score and were admitted 43(23.6%) to NICU. This study reports no baby delivered by vacuum who ended with scalp abrasion and cephalohaematoma. (Table 4)

Table 5: Association between Maternal complications and Parity

Maternal complications	Primipara N=139(%)	Para 2 N=33(%)	Para 3+ N=39 (%)	P- Value
Perineal tear				
No tear	67(48.2)	21(63.6)	25(64.1)	0.000
Tear	72(51.8)	12(36.4)	14(35.9)	
Vaginal laceration				
No	136(97.8)	27(81.8)	34(87.2)	0.000
Yes	3(2.2)	6(18.2)	5(12.8)	
Cervical tear				
No	134(96.4)	33(100.0)	39(100.0)	0.1
Yes	5(3.6)	0(0.0)	0(0.0)	
Postpartum haemorrhage				
No	123(88.5)	25(75.8)	35(89.7)	0.324
Yes	16(11.5)	8(24.2)	4(10.3)	

Assessment of the association of maternal complications (postpartum haemorrhage, cervical tear, vaginal laceration, perineal tear) and parity was done.

Among women reported to have perineal tears most of them were Primipara as compared to Multipara with p-value < 0.001. However higher (18.2%) proportion of Para 2 and Para 3 & above (12.8%) had vaginal laceration than Primipara (2.2) with p-value 0.001.

However there were no significant association between parity of the mother and occurrence of cervical tears and postpartum haemorrhage, although Primipara showed to have more cervical tear (3.6%) than Multipara while Para 2 had more postpartum haemorrhage (24.2%) than Primipara (11.5%) and Para 3+ (10.3%), though the difference were not statistically significant. (Table 5)

Table 6: Association of episiotomy and parity

	Primipara n= 139 (%)	Para 2 n= 33 (%)	Para 3+ n= 39 (%)	P-value
Episiotomy				
No	94(67.6)	28(84.8)	37(94.9)	
YES	45(32.4)	5(15.2)	2(5.1)	0.000

Only 24.6% of the LCVE had episiotomies done prior to the procedure and most (86.5%) were Primipara, Para 2 and above were few.

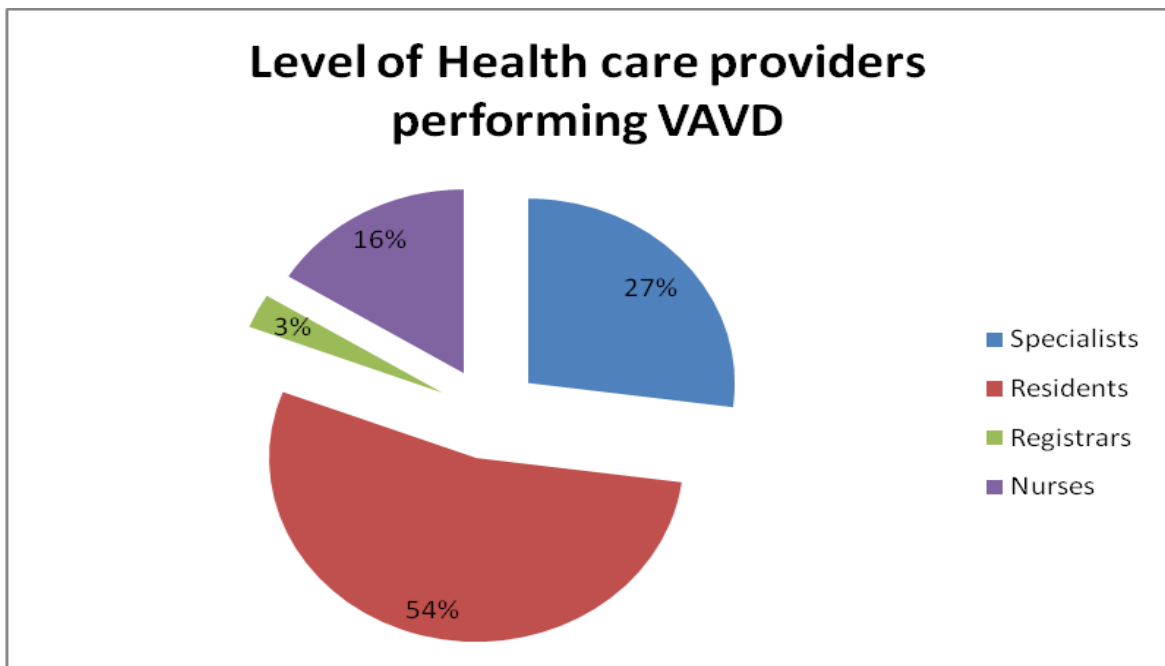


Figure 3: Level of Health care providers performing Vacuum assisted vaginal delivery.

Most (54%) of the vacuum assisted vaginal delivery were conducted by Residents, Specialists (27%) who performed vacuum assisted vaginal delivery were a half the number of Residents, about 16% of Nurses performed Vacuum assisted vaginal delivery and very few were done by Registrars. (Figure 2)

DISCUSSION

Vacuum assisted Vaginal delivery has recently been increased in use due to its relative fewer maternal and neonatal complications.(2,18) In this study most of the vacuum assisted vaginal deliveries were reported in primiparous women. The incidence rate of vacuum assisted delivery was 0.93%.The reported incidence rate was similar to the rate of 0.9% which was reported in a retrospective study to assess the vacuum delivery in the Aminu Kano Teaching Hospital in Nigeria.(11) However, the study was done by Aliyu and Kadas (2009) to assess instrumental vaginal delivery in Nigeria reported slightly lower incidence rate of 0.54%. Another study which reported lower incidence rate was the study done in India which reported 0.73%. (6) The incidence in this study compared well with findings in other studies.

Maternal complications due to vacuum assisted vaginal delivery have been reported at lower rate widely. The findings of this study regarding maternal complications following vacuum assisted vaginal delivery showed that 19.4% encountered postpartum hemorrhage, other complications such as perineal tears commonly 1st and 2nd degree tears, vaginal lacerations and cervical tears were reported at much lower rate. In Nigeria it was similarly reported that postpartum heamorrhage (14%) was common maternal complication after vacuum extraction and (20%) experienced episiotomy before the procedure, however the study did not report any tear due to vacuum extraction.(19)

Also another study in Nigeria reported postpartum haemorrhage as the most common adverse maternal outcome due to vacuum assisted vaginal delivery.(11).A study was done in Pakistan also reported episiotomy as a common procedure done before vacuum assisted vaginal delivery (20). Similarly study done in Canada to assess maternal outcome after vacuum assisted vaginal delivery reported postpartum hemorrhage to be common outcome, however it has reported other adverse outcomes like 3rd and 4th degree tears at higher rate than this study, also vulvovaginal hematomas, re-admissions for postpartum hemorrhage and complicated lacerations requiring obstetrician repair were reported (16).

In New York a comparative study to assess maternal and fetal outcomes between vacuum assisted delivery and forceps delivery results revealed that vaginal lacerations and perineal tears were commonly reported as maternal complications following vacuum assisted

vaginal delivery (21). Prolonged labour, perineal tear, cervical tear and vaginal laceration explain the postpartum haemorrhage; it is anticipated in operative vaginal deliveries and especially in vacuum assisted vaginal delivery, therefore this call for active management of the third stage of labour and any genital laceration should be repaired soon after delivery to prevent significant blood loss.(22) The frequency of genital injuries and postpartum haemorrhage in this study was the same as the studies in other regions except for fewer rates of 3rd and 4th degree vulvovaginal tears.

Indications of vacuum assisted vaginal delivery reported in this study were almost similar to what has been reported in the study on analysis of vacuum assisted vaginal deliveries at tertiary care teaching hospital whereby maternal exhaustion following prolonged labour was highly reported followed by failure to progress in the second stage of labour, and medical conditions such as pre-eclampsia, placental abruption, and acquired or congenital heart disease (6). The discussion on indications for vacuum assisted vaginal delivery point to second stage complications and other medical conditions.

In this study forty percent of vacuum assisted vaginal deliveries were performed due to prolonged second stage of labour. Study done in Belgium similarly reported prolonged second stage of labour at a higher rate (58%) among other indications of vacuum assisted vaginal delivery such as 2nd stage of labour complications which include prolonged 2nd stage and foetal distress(47%)(23).

Main neonatal complications in this study were low score (23.6%) and admissions to NICU (23.6%). A study done in Nigeria reported lower proportion of low score (5.8%). Difference cut off for low score may explain differences in the frequency of low score. (19). Similarly another study done in the United Kingdom reported admission to NICU as one among adverse outcomes of vacuum assisted vaginal delivery (18). While other complications not documented in this study but documented in other studies included subdural haematoma, cephalohaematoma and fracture of the clavicle perhaps due to poor neonatal assessment.(9,22)

Also another study in India reported that in 52 of vacuum assisted vaginal delivery 19.23% neonates ended in being admitted to Neonatal ICU others were neonatal injury and birth asphyxia.(6) Birth injuries related to vacuum assisted delivery such as subdural

haematoma and cephalohaematoma were not documented in the case file hence were not reported in this study nevertheless several other studies reported those complications.

Promoting the use of vacuum assisted vaginal delivery whenever indicated in our setting, will help to cut down caesarean section rate which has been on the rise and increasing the chance of neonatal survival and maternal wellbeing.

Association between maternal complications and parity was done whereby; higher (18.2%) proportion of Para 2 and Para 3 & above (12.8%) had vaginal laceration than Primipara (2.2) with p-value 0.001 but this could be an artifact as we expected Primipara to be more prone to laceration than Multipara and bearing in mind that it was retrospective study whereby a review was done as per records findings. The relative higher proportion of perineal tears in Primipara than Multipara was equally shown by other studies. In Pakistan a study done to assess frequency and severity of perineal tears in hospital result showed that perineal tears were higher in Primipara than in Multipara ($p \leq 0.006$).⁽²⁴⁾

Also another study in Netherland showed that Primiparity was significantly associated with an increased risk for perineal injury during vacuum extraction.⁽²⁵⁾ This study has also showed higher proportion of vacuum extraction being done in Primipara women than in Multipara. This was similarly showed by Wanyonyi et al (26) whereby 81.5% of women who had vacuum extraction were Primipara and the remaining percent were Multipara, though the difference was not statistically significant. The frequency of episiotomy was also higher in Primipara than in Multipara. As it has been supported by Brohi et al (24) that episiotomy is the common procedure done during labour to facilitate the safe delivery, prevent foetal injury and also decrease the chance of perineal tear. Since primiparous women have features which necessitate operative delivery such as tight perineum, untried lower genital tracts for delivery, excessive anxiety, and inexperience in labour.⁽²⁷⁾

Postpartum haemorrhage was higher among Para 2: 24.2% and Para 3+: 10.3% than in Primipara: 11.5% after vacuum assisted vaginal delivery though the differences were not statistically significant. Study done in the united state which reviewed on prevention of postpartum haemorrhage it was reported that vacuum assisted vaginal delivery was important predictor of postpartum haemorrhage and also Primiparity was also associated with postpartum haemorrhage. It was also found that vacuum delivery was significant

predictor of postpartum haemorrhage with adjusted odds ratio of 1.6; (95% CI 1.3-1.9) and most of postpartum haemorrhage was reported among Primipara.(22)

In this study Residents (53.56%) conducted much more vacuum assisted vaginal deliveries than the other level of health care providers (specialists (27.01%), registrars (3.32%), and Nurses (16.11%).These findings might reflect the maternal and neonatal complications which have been observed in this study, this is simply because Residents are on training and therefore may lack confidence, may have a deficient skill and lack of the experience in performing vacuum assisted vaginal delivery.

Study done in Northern Nigeria at the Aminu Kano Teaching Hospital which was a retrospective study, a 5 year review of vacuum assisted vaginal delivery revealed almost similar findings that 47.4% of vacuum assisted vaginal delivery were done by senior registrars(Residents)(11).

STUDY STRENGTH.

Most (91.34%) of the files of vacuum assisted vaginal delivery were collected for this study. Although documentation was not adequate but supplementation of the information was done by looking to other sources like delivery books, and report books at the labour ward.

Limitation of the study.

There was a failure to get some data due to poor documentation, like in the fetal complications only reported complications were Low Apgar score and admission to NICU, other more information were not reported like scalp abrasion, cephalohaematoma. Although some of the information was supplemented by looking to other sources like delivery books, admission books and report books at the labour ward.

Some of the files could not be found,

Information of neonates from the neonatal ward could not be obtained.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The incidence rate of vacuum assisted vaginal delivery was low (0.93%) and most presented maternal complications were postpartum haemorrhage, cervical tear, vaginal laceration and perineal tear. Reported neonatal complications were low score and admission to NICU. Vacuum assisted vaginal delivery was done under the following indications prolonged second stage of labour, maternal exhaustion, fetal distress in the second stage of labour, elective shortening of second stage of labour. This study reports fewer maternal and neonatal complications following vacuum assisted vaginal delivery.

Recommendations

It is very important to do neonatal examination and follow up in the NICU as well as documenting on the findings following vacuum assisted vaginal delivery.

The Procedure is safe and encouraged to cut down caesarean sections.

Further study on this topic especially on area of neonatal examination and follow up in NICU.

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APPENDICES

CHECKLIST

FOR VACUUM ASSISTED VAGINAL DELIVERY: INCIDENCE, MATERNAL AND NEONATAL COMPLICATIONS IN MUHIMBILI NATIONAL HOSPITAL, DAR ES SALAAM, TANZANIA

1. Hospital Reg.no.....
2. Address.....
3. Age.....
4. Educational Level
 - a) Unattended b) Primary c) Secondary d) College
5. Occupation
 - a) Housewife b) Self-employed c) Employed
6. Marital status
 - a) Married b) Unmarried
7. Gravidity.....
8. Parity.....
9. Gestation age
10. Mode of delivery:-
 - Vacuum delivery.....
11. Labour status:-
 - Length of labour (in hours)
 - 1st stage 2nd
12. Indications for vacuum assisted vaginal delivery.....
13. Birth weight.....
14. Maternal outcomes
 - i).Vaginal laceration.....
 - ii) Perineal tear
 - a) No tear b) 1st degree c) 2nd degree d) 3rd degree e) 4th degree f)
 - Episiotomy
 - ii) Cervical tear
 - iii) Postpartum haemorrhage.....

15. Fetal outcomes

- i) Apgar score at 5 minutes
- ii) Admission to ICU.....
- iii) Scalp abrasion
- iv) Cephalohaematoma.....