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Association between Duration of Second Stage of Labour and Perinatal Outcomes among Mothers admitted in Labour at Mbarara Regional Referral Hospital, Uganda

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Abstract

About four million babies die in the first 4 weeks of life annually. Most of the neonatal deaths occur in the first week mainly on the first day after delivery. The objective of our study was to determine the factors associated with poor perinatal outcomes among low risk mothers admitted in labour at Mbarara Regional Referral Hospital (MRRH). This was a retrospective cohort study of mothers on the postnatal ward of MRRH. The total number of respondents was 140. The duration of second stage was ≤30 minutes in 70.0% of the women. The number of women with poor feotal outcome was 27(19.3%). The poor outcomes included, birth asphyxia, fresh still birth and early neonatal death. The odds of having a good feotal delivery outcome was inversely proportional to time, with best results registered when delivery occurred within 30minutes OR, 4.9, 95% CI (1.8-13.1), weakening towards duration of ≥60 minutes with OR, 17.7, 95% CI (5.3-52.5). A second stage of labour lasting more than 60 minutes is associated with poor neonatal outcomes.

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For best perinatal outcomes we recommend if the second stage exceeds 60 minutes, labour should be re-assed and action should be taken to avoid further delay. To avoid poor neonatal outcomes, a second stage of labour lasting more than 60minutes requires continuous feotal monitoring.

Keywords: Perinatal; Risk; Early Labour.

1. Introduction

1.1 Background

The proportion of child deaths that occurs in the neonatal period (38% in 2000) is increasing, and the Millennium Development Goal for child survival cannot be met without substantial reductions in neonatal mortality. Every year an estimated 4 million babies die in the first 4 weeks of life (the neonatal period). A similar number are stillborn. Three-quarters of neonatal deaths happen in the first week (the highest risk of death is on the first day of life). Almost all (99%) neonatal deaths arise in low-income and middle-income countries, yet most epidemiological and other research focuses on the 1% of deaths in rich countries. The highest numbers of neonatal deaths are in south-central Asian countries and the highest rates are generally in sub-Saharan Africa. The countries in these regions (with some exceptions) have made little progress in reducing such deaths in the past 10–15 years. Globally, the main direct causes of neonatal death are estimated to be preterm birth (28%), severe infections (26%), and asphyxia (23%). Neonatal tetanus accounts for a smaller proportion of deaths (7%), but is easily preventable. Low birth weight is an important indirect cause of death. Maternal complications in labour carry a high risk of neonatal death, and poverty is strongly associated with an increased risk. Preventing deaths in newborn babies has not been a focus of child survival or safe motherhood programs. While we neglect these challenges, 450 newborn children die every hour, mainly from preventable causes, which is unconscionable in the 21st century [1]. A study was done to evaluate the prevalence, sex distribution and causes of neonatal mortality, as well as its risk factors, in an urban Pakistani population with access to obstetric and neonatal care. Birth outcomes were ascertained for 1280 (94%) of the 1369 women enrolled. The 28-day neonatal mortality rate was 47.3 per 1000 live births. Preterm birth, Caesarean section and intrapartum complications were associated with neonatal death. Some 45% of the deaths occurred within 48 hours and 73% within the first week. The primary obstetric causes of death were preterm labour (34%) and intrapartum asphyxia (21%). Final causes were classified as immaturity-related (26%), birth asphyxia or hypoxia (26%) and infection (23%). Neither delivery in a health facility nor by health professionals was associated with fewer neonatal deaths. The Caesarean section rate was 19%. Almost all (88%) neonates who died received treatment and 75% died in the hospital.

In an urban population with good access to professional care, the investigators found a high neonatal mortality rate, often due to preventable conditions. These results suggest that, to decrease neonatal mortality, improved health service quality is crucial [2]. A study was conducted to estimate maternal and perinatal outcomes among women with increasing duration of the second stage of labor. A population-based cohort study was conducted among women with low-risk, singleton, vertex, non anomalous deliveries at or after 37 weeks of gestation between 1988 and 2006. Individual maternal (hemorrhagic, infectious, and traumatic), perinatal (birth

depression, infectious, and traumatic), and composite outcomes were evaluated with increasing duration of the second stage. Logistic regression was used to estimate adjusted odds ratios and 95% confidence intervals for all outcomes and to account for confounding variables, including maternal age, prelabor rupture of membranes, augmentation of labor, antibiotics in labor, regional analgesia, gestational age, birth weight, and year of birth. Effect modification caused by method of delivery was considered. From a population of 193,823 women, 121,517 women met inclusion and exclusion criteria, of whom 63,404 (52%) were nulliparous. There was an increase in risk of maternal obstetric trauma, postpartum hemorrhage, puerperal febrile morbidity and composite maternal morbidity, and low 5-minute Apgar score, birth depression, admission to the neonatal intensive care unit, and composite perinatal morbidity among both nulliparous women and multiparous women, with increasing duration of the second stage of labor. Method of delivery only modified the effect of duration of second stage among nulliparous women. It was concluded that risks of both maternal and perinatal adverse outcomes rise with increased duration of the second stage, particularly for duration longer than 3 hours in nulliparous women and longer than 2 hours in multiparous women [3]. A prospective study was made in 153 patients with a second stage of labour lasting 1 to 120 min. Maternal venous, umbilical artery and vein blood were analyzed for acid-base variables and lactate levels. Blood was obtained immediately at delivery. Fetal heart rate monitoring data and blood test results were related to the duration of the second stage of labour and clinical outcome. In primiparae and multiparae there was a steady rise in umbilical artery lactate levels, with duration of second stage of labour, P>0·025 and P= 0·023, respectively. The median umbilical artery pH decreased significantly from 7·31 in patients with a second stage of labour that lasted ≤15 min to a pH of 7·25 in patients with a second stage of labour that lasted more than 30 min. Changes in Po2 and Pco2 were not statistically significant[4]

While obstetrical management has changed significantly over years, the optimal duration of the second stage of labor still remains to be defined. A study was done to evaluate the effect of the duration of labor on fetal distress and maternal perinatal morbidity. There were 1457 consecutive patients delivered of a singleton fetus in cephalic presentation beyond the 34th week of gestation at the I. Frauenklinik, Ludwig-Maximilians University, Munich between May 1999 and June 2000. The 257 patients (17.6%), who underwent cesarean section prior to or during labor, were excluded from the study. Of the 1200 vaginal deliveries, 1017 (84.8%) were normal spontaneous deliveries, while 183 (15.2%) were instrumentally assisted. Data were contemporaneously collected and analyzed for the presence of severe pelvic floor damage, maternal hemorrhage, maternal fever, delayed involution of the uterus, fetal acidosis and Apgar score, and the necessity for admitting the newborn to the intensive care unit (NICU). A second stage duration of >2 hours was considered to be prolonged. The mean duration of the second stage of labor was 70 min (range 2–387, SD 73 min). For 952 patients (79.3%), the second stage was less than 2 h. For 47 patients (3.9%), it exceeded 4 h. A prolonged duration of the second stage was not associated with low Apgar scores 5 and 10 min postpartum (P = 0.76 and P = 0.38, respectively), a higher incidence of umbilical artery pH levels of <7.20 (P = 0.60), nor with an increased rate of admission to the NICU (P = 0.24). A significant increase in the rate of maternal blood loss was noted after long second stages (1.84 g/dl median difference between the intrapartum and postpartum hemoglobin level) in comparison to patients with normal duration of second stage (0.79 g/dl), both by univariate (P < 0.0001) and multivariate (P < 0.001) analysis. The incidence of third degree anal sphincter tears was significantly correlated with a prolonged

duration of second stage in univariate analysis (7.7%, P = 0.001), but not in multivariate analysis after allowing for duration of the second stage, maternal age, birth weight, episiotomy, and mode of delivery (P = 0.26). There is no evidence that prolonged second stage of labor is a serious disadvantage to the fetus, if adequate monitoring is provided. Because the increase of maternal morbidity in patients with prolonged labor may be partially attributed to a higher rate of operative procedures in these patients, interventions should not be solely based on the elapsed time after full cervical dilatation [5].

A study was conducted to assess the influence of the duration of active second-stage labor on maternal and neonatal outcomes, secondary analysis of the Pushing Early or Pushing Late with Epidural trial that included 1862 nulliparous women with epidural analgesia who were in the second stage of labor. According to duration of active second-stage labor, estimates were made on the proportion of spontaneous vaginal deliveries (SVD) with a newborn infant without signs of asphyxia (5-minute Apgar score ≥7 and arterial pH >7.10). Analysis was done for maternal and neonatal outcomes according to the duration of expulsive efforts. Relative to the first hour of expulsive efforts, the chances of a SVD of a newborn infant without signs of asphyxia decreased significantly every hour (1- to 2-hour adjusted odds ratio, 0.4; 95% confidence interval [CI], 0.3–0.6; 2- to 3-hour adjusted odds ratio, 0.1; 95% CI, 0.09–0.2; >3-hour adjusted odds ratio, 0.03; 95% CI, 0.02–0.05). The risk of postpartum hemorrhage and intrapartum fever increased significantly after 2 hours of pushing. Faced with a decreasing probability of SVD and increased maternal risk of morbidity after 2 hours, a question is raised as to whether expulsive efforts should be continued after this time [1].

Another study was done whose purpose was to examine maternal and neonatal outcomes in relation to lengthening intervals of the second stage of labor. This was a retrospective cohort study of 15,759 nulliparous, term, cephalic, singleton births at the University of California, San Francisco, between 1976 and 2001. The second stage of labor was divided into 1-hour intervals. Maternal and neonatal outcomes were compared with the use of chi-squared and Student t tests and a probability value of ≤ 0.05 was used to indicate statistical significance. Potential confounders were controlled for with multivariate logistic regression. Increasing rates of cesarean delivery, operative vaginal delivery, and perineal trauma were associated with the second stage beyond the first hour. In multivariate analysis, the >4-hour interval group had higher rates of cesarean delivery (odds ratio, 5.65; P < .001), operative vaginal deliveries (odds ratio, 2.83; P < .001), 3rd- or 4th-degree perineal lacerations (odds ratio, 1.33; P.009), and chorioamnionitis (odds ratio, 1.79; P < .001). There were no differences in neonatal acid-base status associated with length of second stage. However, there were fewer neonates with a 5-minute Apgar score of <7 (odds ratio, 0.45; P.01). It was concluded that although the length of the second stage of labor is not associated with poor neonatal outcome, a prolonged second stage is associated with increased maternal morbidity and operative delivery rates [6].

Obstetric data from 4403 nulliparas were analyzed in order to determine whether the duration of the second stage of labor influences perinatal outcome or maternal puerperal morbidity. No significant increase in the frequency of perinatal mortality, neonatal mortality, or low 5-minute Apgar scores was noted with long second stages. An increase in the incidence of low 1-minute Apgar scores was observed only in those infants who were not monitored. An increase in puerperal hemorrhage after more than 3 hours of second stage labor was attributable to those patients delivered by midforceps operations. It appears that it is unwarranted to terminate

labor simply because an arbitrary period of time has elapsed in the second stage [7].

Another study was conducted to determine risk factors for a prolonged second stage of labor and evaluate the maternal and neonatal outcomes of such pregnancies. All 7818 patients who delivered at the University of Illinois at Chicago from 1996 to 1999 were reviewed. Excluding nonvertex and multiple gestations, 6791 reached the second stage. Group 1 (n = 6259) consisted of patients with a second stage of 120 minutes or less; group 2, greater than 120 minutes (n = 532 [7.8%]); group 2A, 121–240 minutes (n = 384 [5.7%]); and group 2B, greater than 240 minutes (n = 148 [2.2%]). Pregnancy outcomes for these groups were compared with respect to maternal and neonatal morbidity factors using $\chi 2$, Student t, and Wilcoxon rank-sum tests (significance, $P < .05$). Vaginal delivery rates were 98.7% (group 1), 84.0% (group 2), 90.2% (group 2A), and 65.5% (group 2B). Group 2 had higher rates of perineal trauma, episiotomy usage, chorioamnionitis, postpartum hemorrhage, and operative vaginal delivery than group 1 ($P < .001$, all comparisons). Group 2B had higher rates of episiotomy usage, operative vaginal deliveries, and perineal trauma than group 2A ($P < .001$, all comparisons). The neonatal morbidity rates were similar for the three groups. Diabetes, preeclampsia ($P < .023$), macrosomia, nulliparity, chorioamnionitis, oxytocin usage, and labor induction were each independently associated with an increased risk of a prolonged second stage (all but preeclampsia, $P < .001$). A prolonged second stage is associated with a high rate of vaginal delivery, but a high rate of maternal, though not neonatal, morbidity was observed. Certain antenatal and intrapartum conditions are associated with a prolonged second stage of labor [8].

A study was undertaken to determine whether a policy of delayed pushing for nulliparous women with continuous-infusion epidural analgesia reduces the risk of difficult delivery (cesarean delivery, operative delivery from a midpelvic position, low-pelvic procedures with rotation >45°). This was a multicenter, randomized, controlled trial, women in the delayed pushing group (n = 936) were advised to wait ≥2 hours after full dilatation before commencement of pushing. Women in the early pushing group (n = 926) were advised to commence pushing as soon as they had been randomly assigned. Difficult delivery was reduced with delayed pushing (relative risk, 0.79; 95% confidence interval, 0.66-0.95). The greatest effect was on midpelvic procedures (relative risk, 0.72; 95% confidence interval, 0.55-0.93). Although there was little evidence for an effect on low-pelvic procedures, spontaneous delivery was more frequent among women who practiced delayed pushing (relative risk, 1.09; 95% confidence interval, 1.00-1.18). Abnormal umbilical cord blood pH (<7.15 venous value or <7.10 arterial value) was more frequent in the delayed pushing group (relative risk, 2.45, 95% confidence interval, 1.35-4.43). However, scores for a summary indicator, the Neonatal Morbidity Index, were similarly distributed in the 2 groups. It was concluded that delayed pushing is an effective strategy to reduce difficult deliveries among nulliparous women [9].

Although there are two methods of caring for women with epidural anesthesia during second-stage labor (coached closed-glottis pushing immediately at 10-cm cervical dilation or delayed pushing until the woman feels the urge to push, passive fetal descent, and encouragement of open-glottis pushing when the woman has the urge to push), there are limited data concerning which method is most optimal for fetal well-being. A study was performed whose objective was to evaluate effects on fetal well-being, as measured by fetal oxygen saturation, of two different methods of second-stage labor nursing care for women with epidural anesthesia.

Forty-five nulliparous women who had progressed to the second stage were randomized to 1 of 2 groups (immediate or delayed pushing). Fetal oxygen saturation was continuously monitored and values at 10 cm, initiation of pushing and immediately prior to birth, as well as the amount of time that fetal oxygen saturation values were abnormal (≤30%) were compared between groups. Also evaluated were additional measures of fetal well-being such as fetal heart rate patterns, Apgar scores, and umbilical cord blood gases and maternal outcomes including length of labor, method of birth, and Perineal status. There was a significant difference between groups in fetal oxygen desaturation during the second stage (immediate: M = 12.5; delayed: M = 4.6) F (1, 43) = 12.24, p = .001, and in the number of ≥2-min epochs of fetal oxygen saturation <30% (immediate: M = 7.9; delayed: M = 2.7), F (1, 43) = 6.23, p = .02. There were more variable decelerations of the fetal heart rate in the immediate pushing group (immediate: M = 22.4; delayed: M = 15.6) F (1, 43) = 5.92, p = .02. There were no differences in length of labor, method of birth, Apgar scores, or umbilical cord blood gases. Women who pushed immediately had more Perineal lacerations (immediate: n = 13; delayed: n = 5) $\chi 2(1, N = 45) = 6.54$, p = .01. Delayed pushing results in less fetal oxygen desaturation and less ≥2-min epochs of fetal oxygen saturation <30% during second-stage labor than the immediate pushing method; thus, delayed pushing is more favorable for fetal well-being as measured by fetal oxygen saturation [10].

A study was done to determine longitudinally fetal and maternal blood lactate concentrations during the second stage of labour. It was a prospective, observational study of randomly selected labors. The study setting was labour ward, Sultanah Aminah General Hospital, Johore Bahru, Malaysia. The Main outcome measures were fetal scalp and maternal venous blood lactate, umbilical arterial and vein lactate and acid–base balance at delivery. Sixty-nine women and their infants were monitored in the second stage of labour. Mean maternal venous lactate by the end of the first stage was 2.6 ± 1.0 (±S.D.) mmol/L and increased to 3.6 ±1.4, 4.2 ±1.7, 4.8 ±1.6, 5.4 ±2.1 and 4.3±0.9 mmol/L, respectively, for every 15 minute of bearing down. Corresponding values for fetal scalp blood lactate were 2.4 ±1.1, 3.1 ±1.6, 3.2 ±1.8, 4.2 ±2.4, 4.9 ±2.8 and 5.8±1.9 mmol/L. The mean slope of maternal lactate increase was 0.070 mmol/L per minute (95% CI 0.050, 0.090) and for fetal lactate increase 0.032 mmol/L per minute (95% C.I.: 0.018, 0.045). The duration of active second stage was significantly associated with fetal lactate (P<0.001) and maternal lactate (P=0.03) at the time of crowning of the fetal head, and lactate in umbilical arterial and vein blood at delivery (P<0.001). Expulsion time ≥ 45 minutes, compared with shorter active second stage, and acidaemia at birth implied larger arterial-venous lactate differences (P<0.001). Fetal lactate at crowning was also significantly associated with the umbilical arterial-veonus lactate difference (P=0.03). Maternal and fetal lactate concentrations increase significantly with duration of the active second stage of labour, more rapidly in the mother. It is likely that fetal anaerobic metabolism is the main source for the fetal lactate increase [11]. Another controlled study showed that speeding birth increased umbilical artery and vein blood pH, most probably by reducing fetal asphyxia. The methods used to speed delivery were simple and were readily applied to a predominantly migrant population. The umbilical artery blood pH in the fast group was significantly higher than in six of seven studies in other centres [12].

A study was performed to evaluate the meconium staining of amniotic fluid (AF) in term of fetal distress, meconium aspiration syndrome, and perinatal morbidity and mortality. It was a prospective study at Princess Badeea Teaching Hospital from April to November 1999; women with a singleton cephalic pregnancy of

completed 37–42 weeks and with no pre-defined risk factor were recruited into the study. Study patients comprised 390 (10%) patients with meconium and 400 patients as controls but with clear amniotic fluid. Virtually meconium staining of the amniotic fluid was significantly associated with poor neonatal outcome in all outcomes measures assessed. Perinatal mortality increased from 2 per 1000 births with clear AF to 10 per 1000 with meconium (P<0.001). Other adverse outcomes also increased; e. g., severe fetal acidemia, Apgar score ≤3 at 1 min and 5 min, and meconium aspiration syndrome. Delivery by cesarean section also increased with meconium from 7–14% (P<0.001). We concluded that meconium in the amniotic fluids associated with an obstetric hazard and significantly increase risks of adverse neonatal outcomes. Women with thin meconium in the presence of normal fetal heart rate can be safely managed at the clinical level. Mod-thick meconium alone should alert the obstetrician to a high risk fetal condition. Continuous fetal heart rate monitoring during labour and reassurance of fetal well-being by acid-base assessment were most significant factors in the reduction of meconium aspiration syndrome [13]. The main objective of our study was to determine the factors associated with poor perinatal outcomes among low risk mothers admitted in early labour at Mbarara regional referral hospital in Southwestern Uganda. The hypothesis was that the duration of the second stage of labour had no effect on delivery outcomes among low risk women admitted in early labour at Mbarara Regional Referral Hospital.

2. Methods and materials

2.1 Study design

This was a retrospective cohort study of all low risk postpartum mothers on the postnatal ward who had presented to labour ward before onset of the second stage of labour.

2.2 Study site

The study was conducted on the postnatal ward at Mbarara Regional Referral Hospital. The hospital is located in Mbarara municipality which is 226 km (165 miles) south of Kampala, the capital city of Uganda. Mbarara Regional Referral Hospital is a 300 bed public hospital that serves as the referral hospital for ten districts in southwestern Uganda, with a population of about 4million people.

It is a teaching hospital for Mbarara University of Science and Technology, Faculty of Medicine and visiting students from other institutions. The hospital has obstetrics and gynecology department, with a maternity wing that conducts approximately 10,000 deliveries per year. The department is linked to four major operating theatres, a blood transfusion laboratory and is capable of providing comprehensive obstetric care.

The facility has a number of specialists who offer specialized services. This facility was thus suited to carry out this research. The data was collected between July and September 2015.

2.3 Study population

All postpartum mothers on the postnatal ward.

2.4 Inclusion criteria

Low risk postpartum mothers on the postnatal ward who had presented to the labour ward before second stage of labour and had delivered regard less of the outcome or mode of delivery.

2.5 Exclusion criteria

Women who presented in second stage of labour, who had any medical complication such as preeclampsia, urinary tract infection, diabetes mellitus and babies with congenital malformations or prematurity were excluded, intrauterine feotal Death (IUFD).

2.6 Outcome variables

The Primary outcome was any perinatal complication, such as intrauterine feotal death (IUFD), birth asphyxia and early neonatal death (ENND).

At the end all the complications of pregnancy were grouped together at the analytical stage and defined as either absence or presence of pregnancy complication.

2.7 Independent variables

Data was collected on, socio-demographic factors, obstetric factors, medical factors and gestation age as independent variables.

2.8 Sample size estimation

A sample size of 140 was used.

2.9 Sampling method

Consecutive sampling was used to recruit eligible participants. Consented mothers were interviewed using a pretested standard questionnaire in the language they best understand.

The principal investigator collected the data assisted by two trained research assistants at the level of a midwife. The questionnaire captured information including patient's socio-demographic characteristics, obstetric, medical factors and last normal menstrual period which was used to calculate of weeks of gestation at the time of delivery.

2.10 Statistical data analysis

The data was entered in an EXCEL spreadsheet and analyzed using SPSS statistical software, version 20 (SPSS, Chicago, IL, USA). Cross tabulations were conducted to obtain descriptive statistics which were presented as frequencies, percentages. Pearson Chi-square statistical test was used to determine association between

categorical variables.

Bivariate analysis was used to test the association between the independent and outcome variables. Variables with p-value <0.05 at bivariate analysis were considered to be statistically significant and Odds ratios at corresponding 95% Confidence Intervals were used to test for the strength of association.

2.11 Ethical considerations

Approval was sought from the department of Obstetrics and Gynecology Mbarara University of science and technology, Mbarara Regional Referral Hospital, Faculty of Medicine Research Committee and Mbarara University Institutional Research Board (IRB).

The participants' consent was sought and obtained for participation into the study using a consent form which was translated into Runyankole (the indigenous language).

Enrolment was voluntary and participants could withdraw at any time without any consequences to the patient. The study ensured confidentiality and no names were used at any stage during the data collection process.

3. Results

The total number of respondents was 140. The age range was 15 to 48yaers.

Table 1: Population characteristics

Characteristics	Frequency (%)
Age	
15-19	34 (24.3)
20-30	76 (54.3)
31+	27 (19.3)
Missing	3 (2.1)
Distance from hospital	
0-5km	49 (35.0)
>5km	91 (65.0)
Type of residence	
Rural	85 (60.7)

Urban	55 (40.3)
Education	
None	16 (11.4)
Primary	66 (47.1)
Secondary	37 (26.4)
High school	6 (4.3)
Tertiary	10 (7.1)
Missing	5 (3.6)
Marital status	
Single	7 (5.0)
Married	132 (94.3)
Missing	1 (0.7)
Occupation	
None	4 (2.9)
Business	20 (14.3)
Professional	11 (7.9)
Causal	11 (7.9)
House wife	88 (62.8)
Student	5 (3.6)
Missing	1 (0.7)
HIV status	
Negative	98 (70.0)
Positive	20 (14.3)
Missing	22 (15.5)

Table 2: Obstetrics Characteristics

Variable	Frequency (%)
Parity	
Prime para	58 (41.4)
Multiparous	60 (42.9)
GMP	22 (15.7)
Gestational age (weeks)	
28-36	7 (6.3)
37-42	91 (82.0)
>42	13 (11.7)
Missing	29 (20.7)
Parity	
Prime para	58 (41.4)
Multiparous	60 (42.9)
GMP	22 (15.7)
Duration of first stage(hrs)	
0-6	28 (20.0)
7-12	57 (40.7)
13-18	23 (16.4)
19-24	6 (4.3)
>24	9 (6.4)
Missing	17 (12.1)
Duration of second stage(minutes)	
≤ 30	98 (70.0)

31-60	17 (12.1)
61-90	9 (6.4)
91-120	3 (2.1)
121-180	4 (2.9)
Missing	6 (4.3)
Augmentation	
Done	1 (0.7)
Not done	131 (93.3)
Missing	8 (5.7)
Feotal presentation	
Vertex	125 (89.3)
Breech	8 (5.7)
Transverse	2 (1.4)
Compound	3 (2.1)
Face	1 (0.7)
Arm	1 (0.7)
Mode of delivery	
SVD	56 (40.0)
Assisted breech	2 (1.4)
Vacuum	9 (6.4)
C/S	72 (51.4)
Laparotomy	1 (0.7)

Table 3: Time spent in second stage of labour

Variable (Time in Minutes)	Freq (%)
≤10	82(58.6)
>10	52(37.1)
Missing	6(4.3)
≤20	93(66.4)
>20	41(29.3)
Missing	6(4.3)
≤30	98(70.0)
>30	25.7%)
Missing	6(4.3)
≤60	116(82.9)
>60	18(12.9)
Missing	6(4.3)
≤90	123(876.9)
>90	11(7.9)
Missing	6(4.3)
≤120	129(92.1)
>120	6(4.3)
Missing	5(3.6)
≤150	130(92.9)
>150	5(3.6)
Missing	5(3.6)
≤180	131(93.6)
>180	4(2.9)
Missing	5(3.6)

Table 4: Delivery outcomes

Feotal weight (Kg)	
<2.5	15(10.9)
2.5-3.5	96(68.6)
>3.5	28(20.0)
Missing	1(0.7)
Feotal outcome	
Normal	113(80.7)
Asphyxia	21(15.0)
FSB	5(3.6)
ENND	1(0.7)
General feotal outcome	
Good	113(80.7)
Poor	27(19.3)

The feotal outcomes were as follows, good outcome 80.7% and poor feotal outcome 19.3%.

Of those with poor outcome 15.0% had birth asphyxia, 3.6% delivered FSB and 0.7% had early neonatal death (ENND).

Table5: Association between social demographics and feotal outcomes

Variable	Feotal outcome		Odd's ratio (95%CI)	P –Value
	Good	Poor		
Client's Age				
<20	24	8	0.61(0.24-1.6)	0.309
20+	88	11		

Occupation			0.42(0.05-3.40)	0.400
Unemployed	104	25		
Employed	10	1		
Distance from hospital			1.80(0.67-4.85)	0.239
1-5km				
5km+	40	6		
	74	20		
Type of residence			0.78(0.32-1.91)	0.589
Rural				
Urban	68	17		
	46	9		
Education			0.63(0.25-1.58)	0.324
≤Primary	64	18		
≥Secondary	45	8		
Marital status			0.56(0.10-3.04)	
Single	5	2		0.492
Married/cohabiting	108	24		
HIV serostatus			1.11(0.33-3.72)	
Negative				0.864
Positive	80	18		
	16	4		

Table6: Association between obstetric factors and feotal outcomes

Variable	Feotal outcome		Odd's ratio (95%CI)	P –Value
	Good	Poor		
Gestation age				
28-36	4	0	1.19(1.10-1.29)	0.386
37+	90	17		
Parity			0.79(0.34-1.9)	0.588
Prime	46	12		
Multiparaous	68	14		
Feotal weight				
<2.5	11	2	1.23(0.26-5.92)	0.798
2.5+	103	23		
Augmentation				
Done	1	0	1.24(1.14-1.34)	0.628
Not done	106	25		
Mode of delivery				
VD			1.04(0.44-2.50)	0.924
CS	45	10		
	69	16		
Duration 1st stage			0.70(0.26-1.90)	0.484
≤18hours				
≥ 18hours	21	7		
	77	18		
Duration 2nd stage			17.66(5.28-52.51)	<0.001
≤60	106	10		
>60	7	11		

Table 7: Association between times spent in second stage and feotal outcome

Variable(Time in minutes)	General feotal outcome		Odds Ratio	P-value
	Good	Poor		
≤10	76	6	5.14(1.84-14.31)	0.001
>10	37	15		
≤20	85	8	4.93(1.85-13.13)	0.001
>20	28	13		
≤30	89	9	4.94(1.87-13.11)	0.001
>30	24	12		
≤60	106	10	17.66(5.28-52.51)	<0.001
>60	7	11		
≤90	108	15	8.64(2.35-31.83)	<0.001
>90	5	6		
≤120	110	19	5.79(1.09-30.84)	0.022
>120	3	3		
≤150	111	19	8.76(1.37-55.97)	0.007
>150	2	3		
≤180	112	19	17.68(1.77-179.0)	0.001
>180	1	3		

The strength of association between duration of second stage and perinatal outcome was inversely proportional to Time. Results: The total number of respondents was 140. The duration of second stage was ≤30 minutes in 70.0% of the women. The number of women with poor feotal outcome was 27(19.3%). The poor outcomes included, birth asphyxia, fresh still birth and early neonatal death. The strength of association between duration of second stage and good perinatal outcome was inversely proportional to time, with best results registered when delivery occurred within 30minutes OR, 4.9, 95% CI (1.8-13.1), weakening towards duration of ≥60 minutes with OR, 17.7, 95% CI (5.3-52.5).

4. Discussion

The time spent in first stage ranged from 3 to 42 hours. The mode time (14.3%) was 9 hours. The duration of

second stage was ≤30 minutes in 70.0% of the women. The proportion of poor feotal outcome was 19.3%. Of those with poor outcome 15.0% had birth asphyxia, 3.6% delivered FSB and 0.7% had ENND. Globally; the main direct causes of neonatal death are estimated to be preterm birth (28%), severe infections (26%), and asphyxia (23%). Maternal complications in labour carry a high risk of neonatal death, and poverty is strongly associated with an increased risk[1].

Duration of second stage was the only factor statistically associated with poor feotal outcome. The strength of association between duration of second stage and good perinatal outcome was inversely proportional to time with best results registered with delivery ≤30minutes. This agrees with studies by Nordstrom et al 2001, and Wood et al 1973 where the reported that the duration of active second stage was significantly associated with fetal lactate ($P<0.001$) and maternal lactate ($P=0.03$) at the time of crowning of the fetal head, and lactate in umbilical arterial and vein blood at delivery ($P<0.001$). Expulsion time ≥ 45 minutes, compared with shorter active second stage, and acidaemia at birth implied larger arterial-venous lactate differences ($P<0.001$). Fetal lactate at crowning was also significantly associated with the umbilical arterial-veonus lactate difference ($P=0.03$). Maternal and fetal lactate concentrations increase significantly with duration of the active second stage of labour, more rapidly in the mother. It is likely that fetal anaerobic metabolism is the main source for the fetal lactate increase [11]. Wood et al in another controlled study showed that speeding birth increased umbilical artery and vein blood pH, most probably by reducing fetal asphyxia. The methods used to speed delivery were simple and were readily applied to a predominantly migrant population. The umbilical artery blood pH in the fast group was significantly higher than in six of seven studies in other centres[12].

5. Conclusion

At Mbarara Regional Referral Hospital the time women spend in first stage of labour ranged from 3 to 42 hours, with most women (14.3%) taking 9 hours. Most women (70.0%) at Mbarara Regional Referral Hospital take ≤30 minutes in second stage. The proportion of poor feotal outcome in women admitted in early labour is 19.3%, and those with good outcome are 80.7%. Of those with poor outcome 15.0% have birth asphyxia, 3.6% delivered FSB and 0.7% ended with ENND. Duration of second stage is the only factor statistically associated with poor feotal outcome. The odds of having a good feotal delivery outcome was inversely proportional to time, with best results registered when delivery occurred within 30minutes OR, 4.9, 95% CI (1.8-13.1), weakening towards duration of ≥60 minutes with OR, 17.7, 95% CI (5.3-52.5). **Recommendations**: For best perinatal outcomes we recommend if the second stage exceeds 60 minutes, labour should be re-assed and action should be taken to avoid further delay. To avoid poor neonatal outcomes, a second stage of labour lasting more than 60minutes requires continuous feotal monitoring.

Competing interests

Authors did not have any conflict of interest

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