THE EFFECTS OF UPRIGHT AND SUPINE BIRTH POSITIONS ON MATERNAL AND NEWBORN OUTCOMES IN SIMIYU REGION-TANZANIA, A QUASI-EXPERIMENTAL STUDY

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Department of Community Health Nursing

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By

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A Dissertation submitted in (partial) Fulfilment of the Requirements for the Degree of Master of Sciences in Midwifery and Women`s Health of Muhimbili University of Health and Allied Sciences

October, 2020

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled:" The effects of upright and supine birth positions on maternal and new-born outcome in Simiyu Region Tanzania. A quasi –experimental study In (partial) fulfilment of the requirements for the degree of Master of Science (Midwifery and Women's Health) of Muhimbili University of Health and Allied Sciences

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(Co-supervisor)

Date ……..

DECLARATION AND COPYRIGHT

I, **Advera V. Mtatina**, declare that this **dissertation** is my 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_____ Date_____

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Lastly but not least, special thanks goes to my husband, children and all family members for their genuine moral support and endurance during my study time.

DEDICATION

This work is dedicated to my beloved family, my supervisors, and friends; I could not have done this without you. Thank you for all of your support along the way.

ABSTRACT

Background: Long time ago, Tanzanian women have preferred to give birth in upright as it fitted their culture. The upright position is associated with minimal complications on maternal and new-born outcomes. Midwives and obstetrician prefer parturient to confirm in supine position, since it is easy for them to monitor and assist labour and delivery while the position is related to maternal and new-born complications including perineal trauma and low Apgar score.

Objective: This study compared the effects of upright and supine birthing positions on maternal and new-born outcomes at Bariadi and Maswa hospitals in Simiyu Region in Tanzania.

Methods: A quasi-experimental study design using a quantitative approach was used. This design used for comparison of two groups one for intervention and another for non-intervention group at Bariadi and Maswa district hospital in labour room.

Data were collected from 30th June to 23rd July 2020.A total of 150 parturient were included, 73 in interventional and 77 as non-interventional group. The main independent variable were birth positions (supine and upright) and the dependent variables were duration of labour, perineum status, maternal outcome and Apgar score of the new born. Data was recorded and analysed by using SPSS version 23. Results were compared using chi-square test by maintaining the P-value <0.05 as statistical significant differences.

Results: Majority of women (93%) who assumed upright position during labour and delivery had faster dilatation of the cervix compared to those assumed supine position with the p-value <0.001. Faster expulsion of the baby occurred in 96% (n=70) of women used upright position while in the group of women assumed supine were 44% (n= 34%) with P-value <0.001. Only 11 participants experience perineum tear when in upright position compared to 17% (n=13) of those in supine position with the P-value < 0.429. Further, only 6% of women in upright position had blood loss of >500mls compared to 14% of women assumed supine position with P-value <0.278. There was a slight significant differences of 0.056 was identified in new born Apgar score among parturient in upright and supine groups.

Conclusion: Parturient who assume upright birth positions had faster dilatation of the cervix, short duration of second stage of labour and few babies with Apgar score less than seven in the first minute of birth compared parturient assumed supine position. There is no statistical significant differences among parturient who assumed upright and supine birth positions in relation with perineum tear and maternal blood loss.

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ABBREVIATIONSAND ACRONYMS

APGAR	The scoring system of the baby about activity, pulse rate, grimace, appearance and Respiration
ANC	Antenatal Care
CCT	Controlled cord Traction
C/S	Caesarean Section
FHR	Fetal Heart Rate
LATRA	Land and Transport Regulatory Authority
MoH	Ministry of Health
MoHCDGEC	Ministry of Health, Community Development, Gender, Elderly and Children
MUHAS	Muhimbili University of Health and Allied Sciences
NICU	Neonatal Intensive Care Unit
PI	Principal Investigator
PID	Participant Identification
PIH	Pregnancy Induced Hypertension
PROM	Premature Rupture of Membranes
RA	Research Assistance
RCH	Reproductive and Child Health
SVD	Spontaneous Vertex Delivery
TAMA	Tanzania Midwives Association
TC	Town Council
WHO	World Health Organization

DEFINITION OF TERMS

1.	Maternal position:	Is the physical postures and positions women use in pregnancy and in labour for comfort or ease labour (Spinning babies, 2017)
2.	Perineal trauma:	Refers to any trauma to the perineum during birth and includes perineal tears, obstetric anal sphincter injuries and episiotomies(Lim *et al.*, 2017)
3.	Primiparous:	For this study, the primiparous is a woman who is giving birth for the first time (American, Heritage Dictionary 5th edit, 2006).
4.	Multiparous	For this study women who have given parity of two or more deliveries (AH.Mgaya, 2013).
5.	Episiotomy:	Incision made in the perineum (Mayo clinic, 2018).
6.	Severe perineal tear or trauma-	Third or fourth degree tear or trauma on the perineum (Mayo clinic,2019)
7.	Dyspareunia:	Painful sexual intercourse (Mayo clinic,2020)
8.	Labour:	The process of giving birth to a baby (Oxford student's dictionary,2012)
9.	Parturient:	For this study parturient mean a woman in labour(Collins Compact dictionary,2000)
10.	Upright birth position:	Giving birth while sitting on birthing stool or cushion, kneeling, hands- and -knees and

11.	Supine birth position	squatting (evidence Based Birth,2018) Is a position in which a woman lies on her back with her knees flexed and legs apart with her feet either supported or not(biomedcentre,2020)

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

The position a woman assumes during labour and delivery has an important outcome on maternal and new-born health. The perfect position for labour and delivery a woman should assume during labour and delivery is still not clear, but the standard endorsement is to encourage and support the parturient to deliver in the position she feels most comfortable in (Dabral *et al.*, 2018). Evidence shows that an upright position helps the uterus to contract more strongly and efficiently, the baby gets in a better position and thus can pass through the pelvis faster (Gizzo*et al.*, 2014a). Further, the upright position is associated with a shorter duration of labour, reducing labour pain, fewer instrumental deliveries, control blood loss, and fewer abnormal fetal heart rate (Walker *et al.*, 2018). Labour process that is between the normal range of time is important for the health of the mother and the baby during labour and even after labour and delivery, whereby delayed pushing especially in the second stage, is associated with infection, post-partum haemorrhage and new-born academia (Borders, 2019). When we consider the good health of a new-born at birth, the Apgar score is much emphasized, if it is below seven or above seven mean that, the baby has poor scoring (asphyxia) or good scoring (no asphyxia) respectively (Ersdal *et al.*, 2012).

World Health Organization (WHO) recommends a woman to deliver in a position that feels much comfortable when the risk is absent or very minimal (World Health Organization, 2018). Controversially, supine positions have been used for a long time in labour rooms worldwide in developed and developing countries. Moreover, it is well known that midwives and obstetricians influence the supine position because it is easy to monitor labour and assist delivery (Elvander *et al.*, 2015a; Mselle, Kohi, and Dol, 2019). Women give birth in the supine position are subjected to serious perineal trauma, prolonged labour, postpartum haemorrhage, and disappointed Apgar score of the new-born. A recent study in Tanzania suggested that supine birth position is very famous and very practiced but is the predilection of midwives and obstetricians, not parturient determination (Mselle and Eustace, 2020).

The supine birthing position is associated with a reduction of placental blood flow due to the compression of inferior vena cava by a gravid uterus which in turn may affect the oxygen and nutrients of the fetus, and hence the Apgar score of a new-born be affected (Meyvis *et al.*, 2012; Badejoko OO, Ibrahim HM, 2016; Diorgu *et al.*, 2016; Dabral *et al.*, 2017; Mohamed, Emam, and Al-zahrani, 2018). Nevertheless, the injuries of the perineum are common for most women who give birth by assuming supine and lithotomy birthing position including squatting (Moraloglu, Kansu-Celik, *et al.*, 2017). The classification of perineal trauma includes first, second, third, and fourth-degree and obstetric anal sphincter injuries while the third, fourth, and OASIs are the most serious injuries (Elvander *et al.*, 2015a; Diorgu *et al.*, 2016). These perineal injuries may results in long-lasting negative outcomes and contribute to minimizing the quality of the woman's life while impeding their experiences of motherhood (Elvander *et al.*, 2015a; Debra *et al.*, 2016).

A woman who suffered from severe pain due to perineal injuries may have a difficulty bonding with her new-born, trouble with finding comfortable positions to breastfeed, sometimes may experience urinary or bowel incontinence, fear of moving their bowels, suffer from dyspareunia including sepsis which could even lead to serious morbidity and death (Smith *et al.*, 2013; Lodge and Haith-Cooper, 2016; Zhang *et al.*, 2016). On the other hand, birthing positions influence the psychological outcome in a way that, a woman who can choose a most comfortable birthing position can increase her experience of being in control of the childbirth process (Kibuka and Thornton, 2017). By considering WHO recommendation of letting a woman choose the position she feels more comfortable to use during labour and delivery, studies such as comparing the effects of upright and supine positions on the maternal and new-born outcome will enable midwives and obstetrician to be sure when to encourage women to assume the birthing positions of their choice.

1.2 Statement of the problem

Despite evidence from different studies supporting the use of upright birthing positions in labour and delivery, recent literature shows that most of the women in high and low-income countries are still using a supine position (Debra *et al.*, 2016). Clinical observations show that

women who give birth in the supine position are more likely to suffer severe perineum swelling during the pushing process, which in turn results in perineal trauma (Smith *et al.*, 2013; Goh, Goh and Ellepola, 2018). The perineum trauma during delivery is likely to result in short and long term negative maternal experience and complications such as pain, puerperal sepsis, anal incontinence, sexual dysfunction, and reduction in quality of life (Smith *et al.*, 2013; Elvander *et al.*, 2015b).

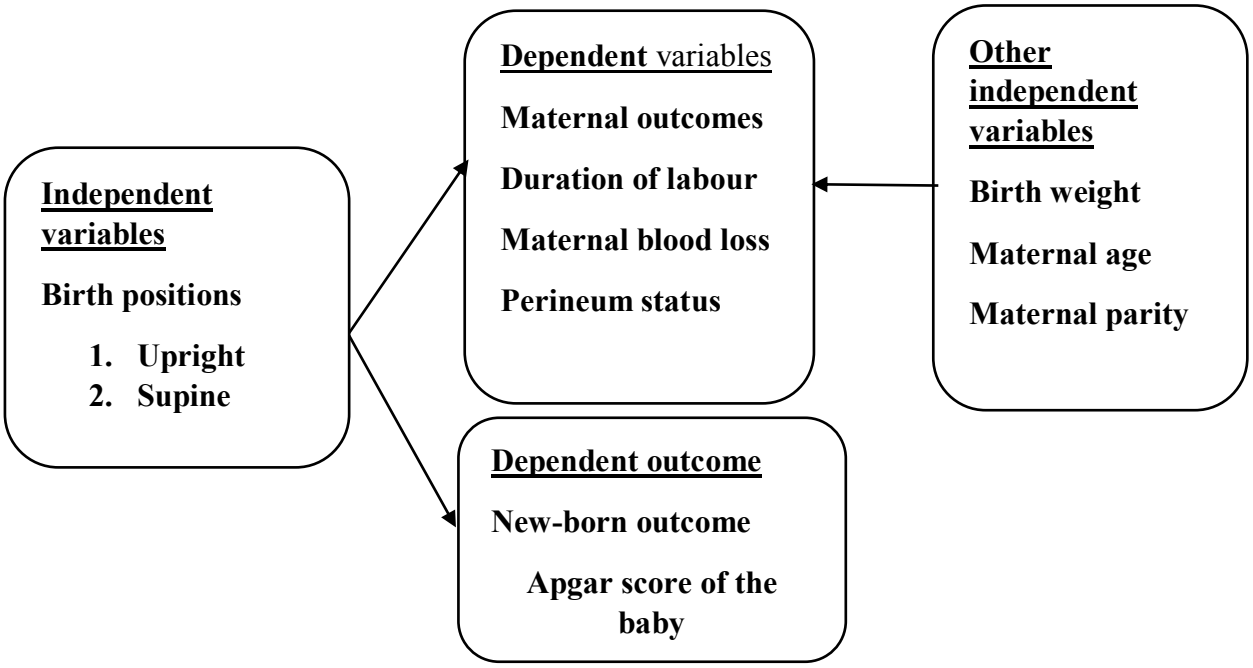
Worldwide perineal trauma ranges from more than 95%in Italy to 77% in Nordic countries (Gizzo *et al.*, 2014b; Edqvist *et al.*, 2016). In Sub-Saharan Africa, the magnitude of perineum trauma for women who give birth in a supine position ranges from 19 % to 60% (Akbarzadeh*et al.*, 2015; Suto *et al.*, 2015; Diorgu *et al.*, 2016). The upright position is known to have a favourable maternal and new-born outcome by facilitating the uterus to contract more strongly and efficiently, to allow the baby gets in a better position and pass through the pelvis faster while ensures flexibility in the pelvis and assists the extension of the outlet while improving an Apgar Score of a new-born compared to the supine position (Berta *et al.*, 2019a).

A study conducted in Tanzania reveals that midwives do not allow labouring women to choose the birthing position they prefer instead midwives commonly instruct them to bear in the supine position (Mselle and Eustace, 2020). Midwives prefer supine position as it enables them to continuously monitor the progress of labour and assist women effectively during delivery (Mselle and Eustace, 2020). In Tanzania and other East Africa countries, information about the outcomes of labour when an upright position is used is limited and many women continue using supine position that is known to have adverse effects to mothers and their new-born babies (Okonta, 2012). Women using supine position during labour and delivery are likely to have more painful uterine contractions, perineal muscle tear, maternal exhaustion and it reduces blood flow to the uterus and subjecting the fetus to hypoxia (Lawrence A, 2019). This study, therefore, compared the effects of upright and supine birth position on maternal and new-born outcomes among mothers with normal labour and cephalic presentation of the foetuses admitted at Bariadi Town Council and Maswa District Hospitals in Simiyu Region, Tanzania.

1.3 Conceptual Framework

The conceptual framework has been developed from reading various literature such as Henderson, 2013 and Lowdermilk, 2012. Using their ideas, I adopted specific concepts relevant to the outcomes under study. Therefore, this framework was used to write the specific objectives and the tool that was used to collect data.

Figure 1: Conceptual framework as designed by the researcher



This conceptual framework was developed by the researcher after organizing her ideas for the study. The arrows from the birthing positions (upright and supine) show how the chosen birthing position can result in various effects on maternal and new-born outcomes. These effects can be positive and encourage the routine use of such a birthing position if the expected outcomes were the results and also the effect can be negative and discourage the use of such a birth position.

On the other hand, the effects of the used birthing position may interfere with other factors that can bring out the same results and confuse the researcher on what the results are based on. These are indicated by arrows that are coming from other independent variables and directed to the outcomes. To avoid such confusion, the researcher detected those factors and compared them with those expected outcomes of the study to rule out if those outcomes were based on the birth position or are based on the other factors.

These are parity of the woman, the weight of the baby at birth, routine episiotomy including prenatal preparation as having explained in the literature review session.

Parity –grand multiparty is less likely to get perineal trauma during birth more than multiparty of gravida two or three. Also, grand porous are likely to have a short duration of labour compared to gravida two or three. However grand multiparty are likely to sustain post-partum haemorrhage more than gravida two or three.

Weight of the baby- a baby born with a heavyweight of more than 3.5kgs is likely to be associated with perineal trauma either spontaneously or by episiotomy. A large gravida uterus due to the big baby may delay to contract after delivery and cause postpartum haemorrhage. On the other hand, a big baby may be the reason of prolonged labour.

Maternal age-younger women with less than twenty years may have faster cervical dilatation compared with those of more than twenty years.

1.4 Rationale of the study

The results from this study provide information to the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) about the effects of different birth positions (supine, kneeling and hands-and –knees) on maternal and new-born outcomes and evidence for further expansion and application to other regions in Tanzania. In addition, the results from this study can be used by midwives and obstetricians with opportunities to learn, be informed and increase their competences in different birthing positions, thus give an opportunity to women in labour with low risk to choose the position they feel comfortable to use when giving birth as per WHO recommendation. Furthermore, the findings will facilitate

the preparation of policy guidelines and standards for intrapartum care together with providing platform for further researches.

1.5 Research Hypotheses

Null hypothesis (H_0)

- There is no difference in maternal and new-born outcomes when upright or supine birthing positions are used during labour and delivery.

Alternative hypothesis (HI)

- There is a difference in maternal and new-born outcomes when upright or supine birth positions are used during labour and delivery.

1.6 Research Objectives

1.6.1 Main Objective

To compare the effects of upright and supine birthing positions on maternal and new-born outcomes during labour and delivery at Bariadi and Maswa hospitals in the Simiyu Region in Tanzania.

1.6.2 Specific Objectives

1. To determine the effects of upright and supine birthing positions on maternal outcomes among women delivering at Bariadi and Maswa hospitals in Simiyu Region
2. To determine the effects of upright and supine birthing positions on new-born outcomes among women delivering at Bariadi and Maswa hospitals in Simiyu Region

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview of maternal birthing positions

The maternal birthing positions that women assume during labour and delivery have a substantial outcome on the course of labour, maternal comfortability, and physiology including facilitating the progress of labour and decrease pain (Lawrence A, 2019). Besides, there are different upright birth positions with no similar effects on maternal and new-born outcomes as evidenced by various studies. The study conducted in China reported that certain maternal positions during the second stage of labour have potential benefits in promoting optimal maternal and neonatal outcomes, but in Sub-Saharan Africa, the prevalence of perineal trauma related to the supine position during birth high from 95%in Sudan to 40.2% in Nigeria respectively (Njoku *et al.*, 2015; Mohamed, Emam and Al-zahrani, 2018; Vasileva, Strashilov and Yordanov, 2019). Moreover,Vasileva and colleagues in their study in Bulgaria reported no significant differences in baby's Apgar score at the first minute among women who gives birth in upright position versus those assumed supine positions (Vasileva, Strashilov and Yordanov, 2019).

2.2 The effects of upright position on maternal and new-born outcomes

Taking deliveries in the kneeling position is likely to be feasible on the standard delivery tables or beds available in the labour rooms. Moreover, amongst the various upright positions, kneeling has been described as the most comfortable and pain relief birth position in second stage of labour (Dabral *et al.*, 2017). A research conducted in Coimbatore with aim of assessing the effect of upright positions on maternal and new-born outcomes reported that, kneeling birth position does not seem to be associated with an increased intervention or negative effects on the well- being of mothers and babies (Santhi, Anuratha, 2015).

In the United States of America studies shows, the Women who use upright positions and are mobile during labour and delivery experience shorter duration of labour and receive less vaginal interventions than women in recumbent or supine positions (Ondeck, 2014). A

systemic review and meta-analysis study reported a short of duration of second stage of labour for mean of 6.16 minutes for women assumed kneeling position in 19 trials (Gupta *et al.*, 2017). The upright position (kneeling) is evinced from different studies to facilitate shorter time of labour specifically the second stage and perineum protection, thus there is a noteworthy reduction of 14.9 minutes in the usual time compared to supine, furthermore 91.6% of women given birth in kneeling position are not sustaining second degree of perineum tear compared to 89.5%of those who assumed supine position at the time of giving birth (Debra *et al.*, 2016; Lodge and Haith-Cooper, 2016; RCM, 2018; Huang *et al.*, 2019). Post-delivery haemorrhage is a threatening condition with significant attention for all women enters into labour, the kneeling position and hands and knees position have suggested having supportive protection of increased post-partum haemorrhage for parturient presumed upright positions at pushing stage (Zhang *et al.*, 2016; World Health Organization, 2018).

Regarding the study done in Canada on a new method of positioning at delivery compared with the supine position reported that kneeling position improves Apgar score of the fetus and increases the PH of the fatal blood on return reduces birth asphyxia of the baby (Maheux-Lacroix *et al.*, 2013). More studies have shown that upright positions such as kneeling position during labour and at delivery have been associated with, reduced risk of aortocaval compression, and improvement of acid-base of the new-born blood and reduction of birth asphyxia (Santhi, Anuratha, 2015). Another systematic review by Gupta and colleagues reported similar results of no significant difference of fetal heart rate abnormalities detected when women applied for hand and knees position during 1st and 2nd stages of labour (Gupta*et al.*, 2017).

2.3 The effect of supine position on maternal and new-born outcomes

The majority of women worldwide commonly give birth to a supine position as evidenced in a study conducted in Turkey, (Moraloglu, Kansu-celik, *et al.*, 2017). One meta-analysis and another study reported that, the supine position reduces the incidence of perineal injuries compared to upright positions due to the famous techniques of supporting the perineum to

control the speed of the coming heads of the fetus accompanied by pressure from the uterine contractions (Jakeman, 2016; Huang *et al.*, 2019). Likewise in Switzerland the study on prevention of perineal trauma in nulliparous reported the incidence of perineal tear or trauma to be high for women who use supine positions compared to those who assumed upright positions (van Limbeek *et al.*, 2016). In Tanzania a qualitative study conducted by Mselle and colleague reported that, midwives are more promoting supine birthing positions because they believe that the position is much safe compared to an alternative (upright) positions for the mother and the new-born, and supports easy management of labour and delivery assistance (Mselle and Eustace, 2020)

Based on the different studies in different regions globally, the evidence shows that women who assume supine or lithotomy position during labour are likely to experience perineal trauma, painful prolonged labour, fetal distress due to the weight of the gravid uterus over the inferior vena cava of the maternal (Priddis, Dahlen and Schmied, 2012; Elvander *et al.*, 2015b; Dabral *et al.*, 2018; Abedzadeh-Kalahroudi *et al.*, 2019). In a facility-based study done in Italy to assess the women's choice of positions during labour, results revealed that there is a high rate of abnormal fetal heart rate 13% for women assumed supine position compared to those used upright position 0.7% (Nieuwenhuijze *et al.*, 2012; Gizzo *et al.*, 2014a), reported that, the supine position during labour and delivery has a disadvantage of hypotension which could cause the poor blood supply to the baby and lead to fetal distress as a result of the low Apgar score while not in any of upright position.

2.4 Factors which may contribute to the labour outcomes

There some factors that may contribute to the outcomes of labour. These may include routine episiotomy, perineal trauma is common when a woman is giving birth per vaginally and the injury may happen spontaneously or intentionally (episiotomy) during childbirth (Smith *et al.*, 2013; Jakeman, 2016; Vasileva, Strashilov and Yordanov, 2019). Different scientific literature shows several predictors of perineal trauma such as maternal age, parity, induction of labour, gestational age, and birth weight, while in other studies some of these variables are not associated with perineal trauma (Abedzadeh-Kalahroudi *et al.*, 2019). The Apgar score of the

new-born within five minutes may be affected by many factors if some parameters in maternal are not normal as a retrospective registry study in Sweden reported, maternal height < 158 cm, BMI > 30 kg/m2, null parity, post-term birth (≥42 weeks of gestation), preterm birth (≤36 + 6 weeks of gestation), previous caesarean section, multiple pregnancies, preeclampsia, and cardiotocography (CTG)at admission are independent risk factors for low Apgar score <7 at first five minutes after birth (Svenvik, Brudin and Blomberg, 2015). Similarly, other studies have recommended that normal or abnormal Apgar score of a new-born at five minutes may be a result of gestation age if pregnancy below or above 37 weeks, together with the ethnicity of the woman were by white people seems to bear new-born with Apgar score more than seven compared to black people (Li *et al.*, 2013). Prolonged labour or short labour also is affected by various factors such as maternal obesity, being too skinny, hormone imbalance, size of the baby (head is large or small), multiple pregnancies especially when presents with malpresentation weak uterus contraction including psychological imbalances (Debra *et al.*, 2016; Zwelling, 2016).

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Study Design

This study was a quasi-experimental design applied quantitative approach and including an intervention and comparison group. The design has been chosen because it enabled the researcher to test the research hypothesis by using an alternative birth position (upright) in an intervention group and left the non-intervention group without alteration therefore the effects were determined at analysis phase.

3.2 Study Area

The study was conducted in Simiyu Region which is located in the North part of Tanzania and South East of Lake Victoria, lying between Latitude 201" and 400" South of Equator and between Longitude 3303" and 3501" East of Greenwich. The region covers an area of 23,807.7 square kilometres and administratively it consists of 5 Districts, 6 Councils, 16 divisions, 109 wards, and 471 villages. According to 2012 national census the total population of Simiyu region was 1,584,157. However, according to the Regional reproductive and child health report of 2019, the region had a population of 2,304,228 with a growth rate of 1.8 % per year. The Region is bordered by Manyara and Singida Regions in the East, Shinyanga region in the South, Mwanza region in the West, and Mara Region in the North. In the Eastern and Northern part of the region the famous Serengeti and Ngoro Ngoro National Parks is found. The Region has been selected because it is among newly established region in Tanzania and has higher rates of maternal Mortality**.** For example, while the National MMR is 556/100,000 live births in Simiyu region the MMR was estimated to be 40/100,000 and 50/100,000 in 2018 and 2019 respectively. The study was conducted at Bariadi and Maswa District Hospital The purposeful sampling technique was used to obtain two hospitals from two different districts among other districts in the same region**.**

Bariadi Town Council is one of the new councils in the Simiyu Region which originated from the former Bariadi District Council. According to 2012 National Population and household

Census report, Bariadi Town Council has a population of 155,620 whereby 81,772 are Female and 73,848 are Male. Bariadi hospital has an average of 9 deliveries per day which makes a total average of 270 deliveries per month of which around 50 are delivered through caesarean section. This hospital serves as a designated regional hospital and receives patients and clients from two nearby districts which are Itilima and Bariadi District Councils. The hospital has a labour ward with a bed capacity of 5 beds and a total of 13nurses and midwives.

Maswa is among of 5 districts in Simiyu Region, it is allocated 50 km from Bariadi Town Council. It has a population of about 379,717; male 185,198, and female 194,519 Maswa district has one district hospital, four health Centres, and 49 dispensaries. Maswa district hospital has an average of 8-9 deliveries per day which makes an average of 240 to 270 total deliveries per month. The bed capacity in the labour ward is 3 beds and there are 12 nurses and midwives. Maswa district has been chosen because it also has challenges in maternal health including maternal deaths in which for the year 2018 and 2019 there were 6 deaths per 100,000 and from January to November 2019 maternal death read 10 deaths per100, 000 respectively. In general, for the year 2019 Bariadi Town council and Maswa District have a total of 27 out of 50 per 100,000 equivalents to 54% of maternal deaths of live births in Simiyu Region while the National MMR is about 556/100,000. Besides, these facilities are surrounded by communities that are more social-cultural practicing and also both upright and supine birthing positions are locally practiced as evidenced by local midwives to be used in this community.

3.3 Study Setting

The study setting were Bariadi and Maswa district hospital in labour room

3.4 Study Population

The target population for this study were women in labour admitted in labour room at Bariadi and Maswa district hospitals during the data collection period. The minimum average of women delivering at Bariadi and Maswa hospitals per month is 270 and 270 respectively with minimum average of 9 deliveries per day at each hospital.

3.4.1 Inclusion Criteria

The study included mothers in normal labour with age between 15-49 years, gestation age of 37 weeks and above, with cephalic presentation, and those in the active phase of labour from 4-6cm cervical dilatation to ensure good progress of labour.

3.4.2 Exclusion Criteria

The study did not include pregnant women with high risk like, preterm delivery, fetal distress, PROM>12hours, severe PIH, severe anaemia, heart diseases, obesity (BMI≥ 30kg/$m^{2)}$, multiple pregnancies (twins or triple lets), malposition of the fetus, women with the previous scar due to caesarean section and those with previous perineum trauma in the previous pregnancy (ies) including those who had induction of labour or argumentation on the present labour and delivery.

3.5 Sample Size Estimation

The sample size was calculated by using comparative study sample size formula calculator (adapted from internet https://clincalc.com/stats/samplesize.aspx -Kothari, 2004). Total of 156 women who were admitted in labour rooms, 78 participants per each study setting who had active labour formed the sample size of this study. The prevalence of 95% and 80.4% of perineum trauma from a study done in Italy and Ghana (Gizzo *et al.*, 2014b; Goh, Goh and Ellepola, 2018) respectively were used. The prevalence were taken from the mentioned countries since there is prevalence in this area from East Africa and Tanzania included.

$$N_1 = \{z_1 \_ \alpha 2 \times \sqrt{p \times q \times (1+/k)} + z_1 \_ \beta \times \sqrt{p_1 \times q_1 + (p_2 \times q_2 \div k)}\}^2 \div (p_1 \_ p_2)$$

$$N_1 = \frac{\{1.96 \times \sqrt{0.877 \times 0.123 \times (1 + 1/1)} + 0.84 \times \sqrt{0.95 \times (0.05 + 0.196) \div 1}\}}{(0.146)^2}$$

N_1=78

$N_2 = K \times N_1$

N_2=78, Therefore, 78 + 78 = 156

1, p2 = proportion (incidence) of groups #1 and #2

P2-p1 = absolute difference between two proportions

N1 = sample size for group #1

N2 = sample size for group #2

α = probability of type I error (usually 0.05)

β = probability of type II error (usually 0.2)

z = critical Z value for a given α or β

K = ratio of sample size for group #2 to group #1

The sample size of participants from each facility was 78 for intervention group and 78 for non-intervention.

3.6 Sampling Technique

A purposeful technique was used to select the study settings (Bariadi and Maswa Districts) from Simiyu Region whilst convenience sampling technique was used to obtain the participants of the study. This is the process of using available participants into the study, due to the nature of the study (non-randomization study), little number of deliveries (average of 270 in each facility) per month, and a short period for data collection. Therefore, the researcher decided to recruit all available participants in labour room but by considering those with inclusion criteria.

3.7 Variables

3.7.1 Independent Variables

The main independent variables for this study were birthing position: supine (yes, no) and upright (kneeling and hands- and -knees (yes, no). Other independent variables baby's weight at birth, episiotomy, and parity.

3. 7.2 Dependent Variables

There were two dependent variables for this study including maternal and new-born outcomes. Maternal outcomes included length of labour, amount of blood loss, and perineum status. The new-born outcome was the Apgar scores within the first and fifth minutes after birth. All these outcomes were measured as follows.

Length of labour: This was categorized as delayed or not delayed from the time of 4-6cm to full dilation of the cervix and from the time the parturient felt the first urge to push to the expulsion of the baby (First and second stage of labour) based on the standard.

Amount of blood loss: The amount of blood loss was measured based on the WHO definition of postpartum haemorrhage (PPH) that is blood loss of <500mls was considered as no PPH and ≥500mls the woman was considered to have PPH.

Perineum status: Perineum status was measured as intact or tears depending on the WHO classifications as 1st, 2nd, 3rd, and 4th degree tear.

New-born outcome: The new-born outcome was measured based on Apgar score assessment. It was measured in two categories: low Apgar score and normal Apgar score thus as <7 scores or ≥7scores respectively based on WHO standards.

3. 7.3 Validity and Reliability

The validity refers to how well a tool measures what it is supposed to measure (Polit and Beck, 2012). To ensure the construct validity, a tool was reviewed by three experts on the study content (one obstetrician and two midwives both from the clinical area). Also, it was pre-tested at Ngulyati health Centre using a small sample size of 15 participants 7 in an upright position and 8 in the supine position, data were collected and analyzed to assess the accuracy of an instrument. The same checklist was administered to all participants. The constructed checklist was prepared in the English version only because the researcher and research assistants could read and understand the language. Data entry was closely monitored and audits conducted regularly by the researcher

Reliability concerns the extent to which a measurement of a phenomenon provides stable and consist of results (Polit and Beck, 2012Taherdoost, 2018).

To ensure the reliability of this study pre-testing of a checklist using a small sample size of participants was done before the actual study. This helped to identify the duration of the study, errors in the checklist, and to ensure the instructions were clear and straight forward. The researcher ensured, the unchanged data on its value from the process of data collection,

analysis, and interpretation by keeping on checking and reviewing the information at all stages and use the same tool for data collection to all participants.

Further, the data collection tool was pre-tested to 15 women in labour that is 10% of the sample size. The pilot was conducted at Ngulyati Health Centre, one of the health facilities in Simiyu region providing maternity services. Piloting to the tool was necessary to ensure content validity and reliability of the intervention approach and process. There was no major revision to be considered after the piloting of the tool. Further, three experts (one obstetrician and two midwives) has opportunity to review the tool and minor corrections were done accordingly.

3.7.4 Training of research assistants

Before data collection, three research assistants were trained for data collection. These were trained nurse-midwives with a diploma. A 3-stage training process was conducted for midwives 1 and 2 for intervention study and one for non-intervention study. The initial stage involved a meeting to provide background, rationale, and an overview of the planned intervention including how to adjust the delivery bed for the comfortability of both the parturient and midwife. Within this session, how to assist the woman in the upright birthing position and how to assess the outcomes were discussed. The second stage involved providing two midwives for the frame work of the intervention with instruction to undertake self – directed familiarization with the content in the checklist, the sampling procedure, monitoring of the progress of labour by using a partogram, assisting a woman to maintain the birth position of choice and data quality as concerns. The third stage was a face-to-face session with the principal researcher to discuss the intervention outline and practice plans for clinical application. The total time for training and familiarization was 2–2.5 hrs.

3.8 Data Collection and Procedures

3.8.1 Data collection tool

A research structured checklist composed of demographic characteristics, history on the onset of labour, birthing positions (upright and supine), expected maternal outcome including the

amount of blood loss, perineum trauma or intact and duration of labour, and new-born outcome that is Apgar score was used to collect data.

3.8.2 The data collection materials used

- Kidney dish with measuring marks to measure the blood loss
- Pieces of gauze and any linen which were used for absorbing the blood loss were counted and blood was estimated in terms of volume (ml).
- Wall -watch to check the time from when the cervix is 4 cm dilated to full dilatation and from the time a parturient felt the first urge to push up to the end of the second stage (expulsion of the baby).
- The WHO Apgar score scale to determine the scoring rate of the new-born immediately and 5 minutes after delivery.
- A partogram chart for monitoring the progress of labour, maternal and fetus health status
- Tape measure for measuring the fundus for the approximation of the gestation weeks of the pregnancy comparing with the calculation of the last menstrual period.
- Laptop (computer) for data processing

3.8.3 Data Collection procedure at an intervention setting

For fulfilment the aim of the study, the following were done: Assessment, intervention, observation and recording. These phases were carried out from 30th June to 15th July 2020 covering sixteen days. The researcher introduced herself to medical in charge officer and matron's office with the permission letter from RAS office. The planned RA training was done 2 days before data collection began. The researcher and researcher assistant stayed at data collection setting at night and days hours.

a) **Assessment**

This phase embraced interviewing the parturient to collect the socio-demographic data that is the researchers greeted each women at the beginning of the interview, explained the aim, duration, and activities of the study and taken informed consent. The baseline data of labor

condition such as uterine contraction (duration, interval, frequency and intensity), cervical dilatation, and fetal head descent including fetal heart rate were assessed on admission by the researcher using tool (checklist and partograph). Birth positions were assessed according to the type of position a woman assumed when the baby was born. The initial assessment was done the same in both intervention and non-intervention group.

b) Intervention

During this phase, parturient received the same management of first stage of labor according to the existing protocol in the study setting. Each women in this group individually met in the latent phase, meanwhile, an explanation of the benefits of assuming upright position including walking, standing, sitting on the bed or chair with back supported and kneeling during first stage of labor were re-explained. Therefore at the beginning of active phase of labor, women were encouraged to assume one of upright positions such as walking and non-walking as sitting, standing and kneeling. The parturient were told to return to bed when medical or nursing interventions were needed. Each woman was encouraged to assume such positions alternatively based on her comfort, until the cervix is 10 cm dilated- when she feels the first urge to push or if membrane ruptured. At this stage the researcher noted the time at which the parturient reported the first urge to push which was a sign of the end of the first stage of labour and the beginning of the second stage of labour. The researcher assistant adjusted the delivery bed at the level to which was comfortable to assist labour and ask the parturient to kneel on the bed and supported herself by the bedsides rails and push on the urge of contraction. Then the researcher noted the time at which the expulsion of the baby happened. The procedure was the same for those who applied for a hands-and-knees position with the additional that, the head of the delivery bed was raised to certain level which allows the disproportional of the two parts of the bed (make upper and lower part). The parturient instructed to turn her head direct to the raised part of the bed and foot on the lower part of the bed, then kneels while separating her thighs and supported herself by her fists or palms and push on the urge of the contraction.

(c) Observation and documentation

The researcher assessed the effects of the upright positions during the first, second and third stage of labor in terms of hours and minutes respectively, through assessing the progress of cervical dilatation, the descent of head and expulsion of the baby. Besides, the mode of delivery, perineum status (if tear or intact including if episiotomy was used), maternal blood loss and neonatal condition using tool by observing and recording the following;

First stage

- The time and dilation of the cervix when the parturient enrolled in the study
- The progress of labour until the end of the first stage by using the partograph

Second stage

- The time at which the parturient felt the first urge to push up to when the expulsion of the baby.
- Monitoring the parturient to keep on using the birth position she had chosen
- Scoring the new-born according to WHO chart.

Third stage

- After delivery the placenta, assessing the perineum to detect status (intact or tear).
- Measure and estimate the amount of blood loose.

Fourth stage

- Weigh the baby's body, monitor the mother's condition, and take appropriate action including repairing the perineum for those who had tears.

3.8.4 Data Collection Procedure at a non –intervention setting

A total of 14 days were used to collect data at Maswa district hospital. The researcher introduced herself to hospital administrations and she used that day to orient a research assistant on how to collect data using the data collection tool and how to fill the part of demographic information. The researcher created awareness to parturient in labour room on the aim of the study, advantages, and likely risks so that they can provide written involuntary consent of participation. The parturient that did not give birth on the supine position was not included in the study even if she retained on the bed the all-time of labouring.

In this process the parturient woman was allowed to get out of bed for little stretching and attending toilet if they wish in few minutes (5-10minutes/hour).The part of the checklist which includes the type of birth position and outcome on maternal and new-born was filled by a researcher after the expulsion of the new-born and third stage of labour.

3.8.5 Educations and Discharge.

Postnatal care, new-born care, and family planning during the first 24hrs post-delivery another research assistant was keeping on monitoring health of the mother by taking the vital signs, instructing her on how to take care of the repaired perineum for those who sustained second degree torn and monitoring the health of the baby by ensuring the baby is breastfeeding well including the care of the cord stump as WHO guideline. The post-partum mothers who need family planning services were connected with family planning services providers during this period before discharge.

Also at the time of discharge, the research assistant instructed the woman to attend the postnatal clinic as per MoH recommendation and take care of the cord stump of the new-born.

3.9 Data Analysis and Management

Data was collected using a structured checklist then entered, cleaned and analysed with SPSS version 23 to determine the frequency and proportional between variables whilst chi-square test measures of the association were used for categorical variables to indicate statistically significant differences. All variables of p-values < 0.2 were re-analysed by logistic regression analysis and the adjusted odds ratio (aOR) at 95% confidence interval (CI) were calculated. The p-values < 0.05 indicated the statistical significant association in this study.

3.10 Ethical Considerations

Ethical clearance sought from the Senate Research and Publications Committee of Muhimbili University of Health and Allied Sciences (MUHAS) .The Permission to conduct the study obtained from the Simiyu Regional Administrative Secretary (RAS-SIMIYU) and health facility authorities. The participant's involvement was absolutely voluntary and non-coercive whilst the right to withdraw from the study any at time they feel uncomfortable were

explained to each participant before enrolled in the study. Informed consent was obtained from each participant and their names, addresses and other unique identifiers were not included in the checklist (questionnaire), in order to ensure anonymity.

3.11 Dissemination of Findings

Following the completion of the study copy will be submitted to Muhimbili University of Health and Allied Sciences, Muhimbili School of Nursing, Publication in a peer-review journal, and Regional Medical Officer and Medical Officer In-charge of Simiyu Region, Bariadi and Maswa District medical officers.

CHAPTER FOUR

4.0 RESULTS

4.1: Socio-demographic characteristics of the participants

A total number of 155 parturient entered the study but 150 (97%) of participants finished the study and was taken as 100%of all respondents in data analysis. Two of them left the study for caesarean section due to fetal distress in the first stage and the other four due to knees pain and discomfort during the second stage. Participant's age, level of education, employment, marital status, gestation age, and parity were considered in the analysis and are shown in table1. The range between the lowest and largest maternal age was 17 and 42 years with a mean of 26.38 and the dominant maternal age group was 21-25 yrs. (34.0%). All gestational age was more than 37weeks with a mean of 39.8 and most of participants 81 (54%) were above para two and para 0 were not included in this study (stable 1).

Table 1: Showing the Socio-demographic characteristics of the participants (n=150)

Variable	Frequency	Percentage
Maternal Age		
15-20	29	19.3
21-25	51	34.0
26-30	33	22.1
≥31	37	24.6
Total	**150**	**100**
Education		
Illiterate	11	7.33
Primary	111	74
Secondary	25	16.67
Tertiary	3	2
Total	**150**	**100**
Employment status		
Formal	6	4
Informal	31	20.67

Unemployed	113	75.33
Total	**150**	**100**
Marital status		
Married	141	94
Unmarried	9	6
Total	**150**	**100**
Gestational Age		
≥37	150	100
Total	150	100
Parity		
PR.1	69	46
PR.+	81	54
Total	**150**	**100**

4.2 The effects of birth position (upright) on maternal and new born outcomes

The duration of labour in the first and second stage

The effect of the upright birth position was assessed based on the time when the mother entered the study with 4-6cm of cervical dilation up to when the mother feels the first urge to push as the sign of the end of the first stage. It was categorized as faster dilatation, normal dilatation, and delayed dilatation in terms of hours such <4hrs, 4-6hrs, and >6 respectively. The parturient in upright position 68 (93.15%) had faster dilation of the cervix, while 4 (5.48%) and 1 (1.37%) had normal and delayed cervical dilation respectively (Figure 2).The upright position also shows the effect of high proportion of faster expulsion of the baby by 70 (95.89%) shown faster expulsion of the cervix and 1 (1.37%) hand normal expulsion including 2 (2.74%) of delayed in expulsion. (Figure 2 & 3)

Figure 2: Showing the proportional of dilatation of the cervix in first stage of labour (n=150)

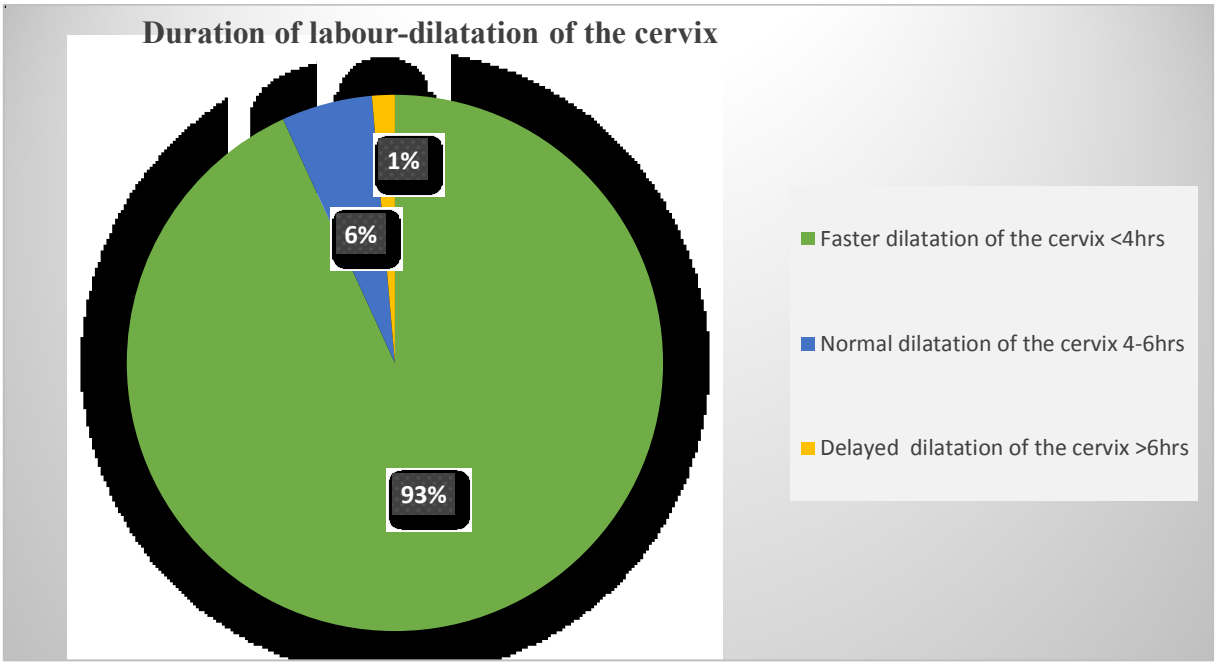
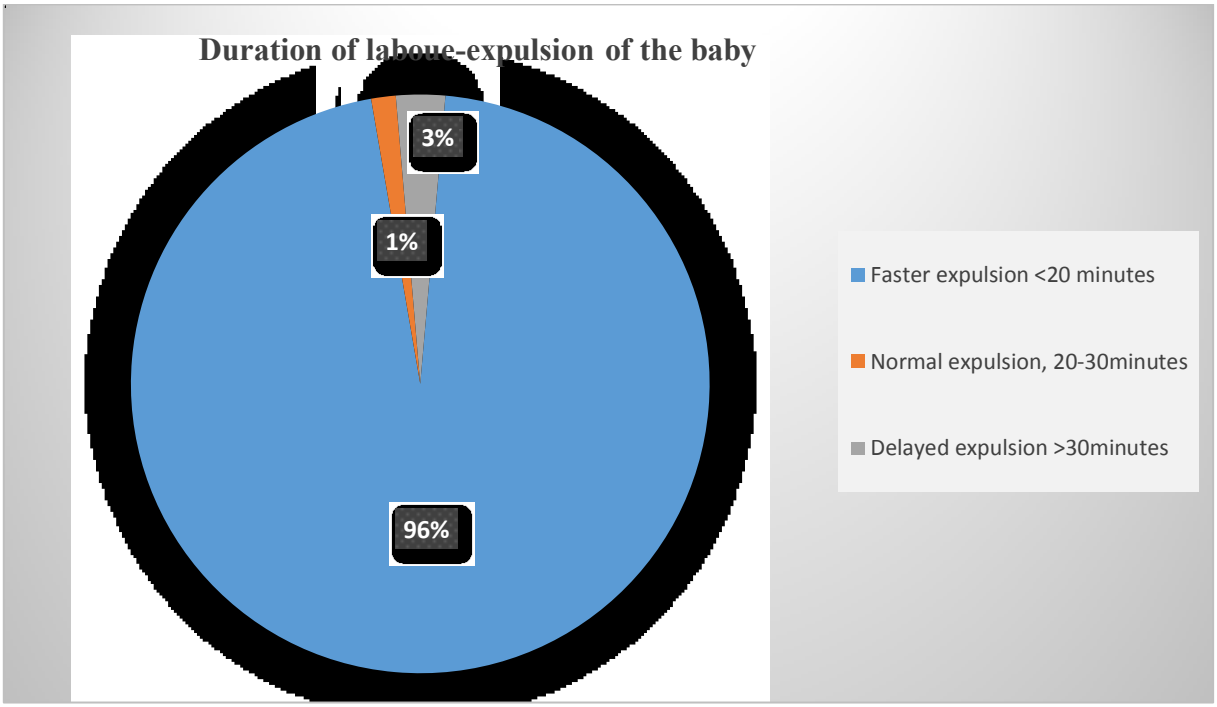


Figure 3: Showing the proportional of expulsion of the baby in second stage of labour



Perineum status, maternal blood loss and Apgar score of the baby

The data analysis showed that, out of 73 parturient in upright position 8 (10.96%) had perineum trauma episiotomy included and 65 (89.04%) had an intact perineum. The blood loss more than 500mls in this position were 4 (5.48%) and those who had normal blood loss less than 500mls were 69 (94.52%). The results shows that, the new-born in this position who scored less than 7 in the first minute of life was 1 (1.37%) whereby 72 (98.63%) scored more than 7 in the same time. After five minutes the new born score less than 7 was 1 (1.37%) as it is shown in table 2.

Table 2: Showing the effect of upright birth position on maternal and new born outcomes

THE EFFECT OF UPRIGHT BIRTH POSITION ON MATERNAL AND NEWBORN OUTCOMES		
VARIABLES	**FREQUENCY**	**PERCENTAGE**
Perineum status		
Tear	8	10.96%
Intact	65	89.04%
Total	73	100.00%
Maternal blood loss		
Less than 500mls	69	94.52%
More than 500mls	4	5.48%
Total	73	100.00%
Apgar score of the baby in one minute after birth		
Score less than 7	1	1.37%
Score 7 and above	72	98.63%
Total	73	100.00%
Apgar score of the baby after five minutes of birth		
Score less than 7	1	1.37%
Score7 and above	72	98.67%
Total	73	100.00%

4.3 The effect of birth position (supine) on maternal and new-born outcomes.

Duration of labour on dilation of the cervix, expulsion of the baby and Apgar score of the baby (n=150)

The table below (Table 3) shows the frequency distribution of the effects of supine birth position on maternal and new-born outcome. Among of 77 parturient who assumed supine position, only 19 (24.68%) had faster dilation of the cervix (<4hrs), 34 (44.16%) had faster expulsion of the baby (<20 minutes), 11 (14.29%) had more than 500mls blood loss, 13(16.88%) had perineal trauma 2^0 including episiotomy while 9 (11.69%) their babies had

Apgar score of less than 7 within the first minute and 2 (2.60%) had Apgar score of less than 7 after five minutes(table3).

Table 3: Showing the effect of birth position (supine) on maternal and new-born outcomes (n=77)

Supine birth position		
Variables	**Supine position**	
Duration of 1st stage	**Frequency**	**Percentage**
Faster Cervical dilatation	19	24.68
Normal Cervical dilatation	37	48.05
Delayed Cervical dilatation	21	27.27
Total	77	100
Duration 2nd stage		
Faster Expulsion	34	44.16
Norma Expulsion	19	24.68
Delayed Expulsion	24	31.16
Total	77	100
Blood loss		
Less than 500mls	66	85.71
More than 500mls	11	14.29
Total	77	100
Perineum status		
Intact	64	83.12
Tear	13	16.88
Total	77	100
Degree of tear		
1st and 2nd degree	13	16.88
Intact	64	98.04
Total	77	100
Apgar score at 1mn.		
Less than 7	9	11.69
More than 7	68	88.31
Total	77	100
Apgar score at 5mns		
Less than 7	2	2.6
More than 7	75	97.4
Total	77	100

Perineum trauma and maternal blood loss

Out of 77 parturient in supine birth position, 13 (16.88%) sustained perineum trauma on first and second degree including episiotomy.64 (81.12%) had perineum intact while the third and fourth degree of tear were not observed. Out of 77in this position 11 (14.29%) had blood loss more than 500mls after giving birth and 66 (85.71%) had normal maternal blood loss less than 500mls (table 3).

4.4 Compare the effects of birthing positions (upright and supine) on maternal and new-born outcomes with frequency proportional and chi-square test.

Duration of labour (first and second stage)

Table 4, shows the effects of birth positions on maternal and new-born outcomes, 68 (93.15%) who gave birth in upright birth position had faster dilation of cervix compared to 19 (24.68%) of supine birth positions with p-value <0.001, while out of 73 parturient in upright position 70 (95.89%) had faster expulsion of the baby in second stage of labour compared to 19 (24.68%) in supine birth position which was out of 77 parturient in this position. There results of expulsion of the baby shows a p-value of <0.001 and this is a significant associated differences and it is shown well in the table below.

Table 4: Shows duration of labour on dilatation of the cervix and expulsion of the baby

VARIABLES	FREQUENCY AND PERCENTAGE (OUTCOMES)			
Duration of labour	**Faster dilation**	**Normal dilation**	**Delayed dilation**	P-value
Upright position	68 (93.15%)	4 (5.48%)	1 (1.37%)	
Supine position	19 (24.68%)	37 (48.05%)	21 (27.27%)	**0.001**
Expulsion of the baby	**Faster expulsion**	**Normal expulsion**	**Delayed Expulsion**	
Upright position	70 (95.89%)	1 (1.33%)	2 (2.74%)	**0.001**
Supine position	34 (44.16%)	19(24.68%)	24 (31.17)	
Perineum Status	**Tear**	**Intact**		
Upright position	8 (10.96%)	65 (89.04%)		0.296
Supine position	13 (16.88%)	64 (81.12%)		
Degree of tear	**1st& 2nd degree**	**Intact**		
Upright position	8 (10.96%)	65 (89.04%)		0.211
Supine position	13(16.88%)	64 (81.12%)		
Maternal blood loss	**<500ml**	**>500ml**		
Upright position	69 (94.52%)	4 (5.48%)		**0.102**
Supine position	66 (85.71%)	11 (14.29%)		

Perineum trauma and maternal blood loss

Among 21(14.00%) parturient out of 150 had perineal trauma first and second degree, but 13 (16.88%) parturient were those who assumed supine birth position compared to 8 (10.96%) in upright birth position group with a p-value of 0.296 that is non-statistical significant differences. The degree of tear was the same as the frequency of tear and intact in both birth positions with only first and second degree and episiotomy included. Out of 15 (10.00%) of parturient who loss blood more than 500mls, 11(14.29%) were of supine position compared to

4 (5.48%) in upright birth position with p-value 0.102 and the differences is non-significant since the P-value is >0.05 this shown well in table 5 below.

Apgar score of the new-born in first and second minutes

Out of 10 (6.67%) of parturient whom their babies scored less than 7 in first minute, 9 (11.69 %) were of supine group compared to 1 (1.37%) in upright birth position with p-value of 0.018 and the results shows association of significant differences of upright and supine birth positions since the P-value is less than 0.05.However 2 (2.00%) of newborn were still had Apgar score of less than 7 after 5 minutes in supine compared to 1 (1.37%) of upright of upright birth position with P-value 0.591 non –significance differences as all information shown in the table 6 below.

Table 5: Shows the effect of Upright and supine birth position on neonatal outcome

VARIABLES	UPRIGHT	SUPINE	TOTAL	P-VALU
Apgar score of the baby in one minute				
Score less than 7	1 (1.37%)	9 (11.69 %)	10 (6.67%)	0.018
Score more than 7	72 (98.63%)	68 (88.31 %)	140 (93.33%)	
Total	73 (100.00%)	77 (100.00%)	150 (100.00%)	
Apgar score of the baby in one minute				
Score less than 7	1 (1.37%)	2 (2.60%)	3 (2.00%)	0.591
Score more than 7	72 (98.63%)	75 (97.40%)	147 (98.00%)	
Total	77 (100.00%)	77 (100.00%)	150 (100.00%)	

CHAPTER FIVE

5. 0 DISCUSSION

Upright birth positions are not commonly used during labour and delivery especially in public hospitals in Tanzania as the supine position. The midwives and obstetricians highlight the practice of supine birth position to all parturient in labour rooms. This universal practice does not concur with the world health organization guidelines for normal birth, which endorses the non-supine and allowing women in labour to assume the position they feel much comfortable. The upright birth positions are reported by different researchers to have minimal negative outcomes on maternal and new-born's health when used in labour and delivery (Mohamed, Emam and Al-zahrani, 2018; Berta *et al.*, 2019). Shifting from a supine to a non-supine position is a great challenge to women in labour, midwives and obstetrician in practice but is possible and practical**.**

5.1 Duration of labour

This study has found that there was a significant difference in faster dilation of the cervix among multiparous parturient who assumed upright birthing positions compared with multiparous parturient who assumed the supine position. These results are similar to the results of the study done in other countries (Gizzo *et al.*, 2014a; Dan, 2015; Dabral *et al.*, 2018; Mohamed, Emam and Al-zahrani, 2018; Berta *et al.*, 2019a; Lawrence A, 2019). The women who assumed the upright position during labour, were freely walking around or sitting on the chair without being laying horizontally on bed. There is a scientific association between the upright position and force of gravity which responds on uterine contraction whereby in each contraction the descent of the foetus is quickly following the birth canal. The faster expulsion of the baby it has an advantage for maternal and new-born as it reduces the risk of maternal and foetal distress and other related complications.

Women who assumed supine birthing position on the other hand, spent most of their time on bed, especially when cervical dilatation reached 5-6cm, because during this time the uterine

contractions are significantly strong and therefore the parturient were not motivated to move out of bed for walking or sitting. Therefore, using supine birth position is related to more delayed cervical dilation and expulsion of the baby. This might be due to the head of the baby not well fitting on the cervical orifice and therefore not responding well on the gravitation force when uterine contractions occur. Similar findings have reported by other researchers (Gupta, Hofmeyr and Smyth, 2012; Dabral *et al.*, 2018). However, the results are different from the Cochrane database systematic review which suggested that the differences in duration of labour for women who assumed upright and supine birth position is not clear (Gupta *et al.*, 2017). This miss-matching is likely to results from the methods used including study settings, ethnicity of participants and the sample size used in Cochrane study. As per the World Health Organization recommendations a woman in labour should be left to choose position that she feels comfortable during labour and delivery, however the upright positions could be applied in labour room considering minimal risks to maternal and new-born outcomes.

5.2 Maternal blood loss

The result of this study suggests that there is no statistical evidence supporting the association of maternal birth position with maternal blood loss more than 500mls since the p-value is 0.278. However, among 15 parturient who lost amount of blood more than 500mls, 13 (73.33%) were using supine birth position. This cannot be neglected results since in our local hospitals (countrywide) it is well known that (Mselle and Eustace, 2020) the majority of women apply for supine birth position and the post-partum haemorrhage is the among of the major cause of maternal weak health and mortality. World health organization (WHO) defined any blood loss more than 500mls post-delivery to be considered as nonstandard and taken into serious. In Africa and Tanzania included, exclusively in rural areas, the majority of women entered labouring and delivery without their haemoglobin statue well known and most of them have low haemoglobin level. It might be a health challenge if even have blood loss less than 500mls as a standard of PPH. A non-exposure of blood loss at a delivery time is a mandatory precaution.

Upright birth position which from this study has shown to promote less amount of blood loss compared to the supine position. Huang and colleague have reported similar results in their study on a review and comparison of common maternal positions during the second stage of labour (Huang *et al.*, 2019). Furthermore, another studier has reported there no difference in post-partum haemorrhage for women applied upright position compared to those applied supine.

In contrast, the systematic meta-analysis review reported that the use of upright position to mother without epidural analgesia may result into slight increase of PPH (The *et al.*, 2017; Huang *et al.*, 2019).

5.3 Perineum trauma

This study revealed that Parturient in the interventional group offered a low rate of perineal trauma including the degree of trauma (first and second degree) compared to the non-interventional group. The person's chi-square test revealed it is not statistically significant (p-value 0.429). Descriptive analysis of frequency distribution showed that women who give birth in the supine position were more likely to suffer from tear compared to those who assumed an upright position. This is the outcome of perineum swelling during the pushing process since the supine position permits more time for cervical dilation compared to upright thus, the coming baby's head compressing the birth canal floor and result in easily torn on the last pushing. The results of this study is in line with the study which was done in China (Zhang *et al.*, 2016; Goh, Goh and Ellepola, 2018; Rodrigues *et al.*, 2019). The negative effects of supine position on perineum trauma could be mitigated if the woman shifts to the hands-and-knees or the kneeling position since in these positions there is no direct prolonged compression. The upright position applied in this study shown low frequency of perineum trauma compared to supine, but this results differ from Cochrane review study which was focused on women without epidural anaesthesia, in their review reported that the upright position is possible related to the reduction of episiotomy but increases second-degree perineum tear.

It is also different from the study of Haslinger's study done in Switzerland on Position at birth as an important factor for the occurrence of anal sphincter tears, which suggested that kneeling birth position is associated with anal sphincter tear (Haslinger *et al.*, 2015; Gupta *et al.*, 2017). Another study by Shunji on birth posture and canal laceration reported that the incidence of severe perineal laceration in women gave birth in hands-and-knees posture were significantly higher than in women gave birth with supine posture. These differences can be due to the sample size of participants, time of data collection, and study design since Cochrane reviewed different studies from different settings with larger sample sizes the same applied to Haslinger and colleague and since there is different types of upright birth position, the results might depend on what type of position was used in such study. The RR of the effects of upright birth position on perineum status was not obtained since the sample size was not sufficient to give a statistical reasonable answer. This might be investigated by using a large sample size in future studies.

5.4 Apgar score of the new-born

From this study, the results show that out of supine birth position were associated to higher proportional of low Apgar score low than seven compared to those in upright birth position. Though the differences is non-statistical significance, among the shortcoming of supine position is the potential supine hypotension which could cause the poor blood supply to the uterus and lead to fetal distress and birth asphyxia. Most of the parturient in Tanzania hospital gives birth in supine position but at the same time, the leading cause of neonatal death in Tanzania is birth asphyxia (Survey, Survey and Findings, 2016). Moreover the results from this study revealed that the upright position had few new-borns Apgar score less than seven compared to the supine group, the results are not different from the one reported by another author thus there no significant differences in Apgar score of new-born among women applied upright and supine groups (Moraloglu, Kansu-celik, *et al.*, 2017; Huang *et al.*, 2019). However another study by H. Zhanggave recommended that the upright birth position is the suggested position for improving the new-born(neonatal) outcome thus supine birth position should be avoided due to its possible harmful effects(Zhang *et al.*, 2016).

5.6 Strength and limitation of the study

This study is significant to midwives practices in Tanzania because the upright position are not commonly applied in delivery settings.

At baseline, the midwives resists to apply the upright method as they thought it will be difficult and complicated. The researcher demonstrates the method first and the midwives were able to follow.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

6.1 Conclusion

Based on the findings of this study, it is concluded that, the results on the duration of labour in first and second stage including the Apgar score of the new-born within the first minute after birth has rejected its null hypothesis which stated, "There is no difference in maternal and new-born outcomes when upright or supine birthing positions are used during labour and delivery" since the P-value 0.001 is less than 0.05. Besides the result on the perineum status and maternal blood loss has accepted the null hypothesis (H_0). The upright birth position has shown the positive effect on duration of labour during first and second stage by promoting faster dilatation of the cervix, faster expulsion of the baby and high Apgar score of the newborn in the first minute. However our study suggests that, there was no differences in terms of sustaining perineal trauma and amount of blood loss, when women assume supine or upright positions during labour and delivery. This is where the alternative hypothesis is rejected and null hypothesis is accepted.

6.2 Recommendation

- While midwives should provide opportunity for women to assume position of their choice during labour and delivery, they should encourage them to assume upright birth position that facilitate shorter duration of the first and second stage of labour.
- Ministry of Health Community Development Gender Elderly and Children should build capacity of midwives to be able to conduct labour using alternative birthing positions including upright position. And for sustainability, midwifery curricular should realise competencies of alternative birthing positions and it is for supine position during labour and delivery.
- A large study with large sample size is recommended for generalization of the results

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APPENDECES

Appendix I: Checklist for data collection on maternal and fetal outcome.

Preliminary inclusion and exclusion criteria

Inclusion criteria		**Status**	
		YES	**NO**
1	GA ≥ 37 wks. (use ANC Card)	☐	☐
2	Dilatation of the cervix (after PV examination) 4-6cm	☐	☐
Exclusion criteria			
1	PIH (BP ≥ 140 /100 mmHg-physical examination and ANC. Card)	☐	☐
2	Preterm labour (use ANC card)	☐	☐
3	Fetal distress ,FHR ≤ 120 b/m or ≥ 160 b/m (use fetal scope)	☐	☐
4	PROM >12hours	☐	☐
5	Severe anaemia (check Hb on ANC.card, recent Hb of within one month)	☐	☐
6	Multiple pregnancy (evidenced by physical examination or USS or both)	☐	☐
7	Malposition of the fetus (evidenced by physical examination or USS or both)	☐	☐
8	Previous scar due to C/S (History taking and physical examination)	☐	☐
9	Previous perineum trauma (history taking)	☐	☐
10	Obesity BMI >30 (Calculate the BMI by using the data from ANC)	☐	☐
11	Induction of labour or augmentation of labour	☐	☐
12	Gravida one (history taking and ANC card)	☐	☐

Identification number…….

1) Social demographic information

a) Age ……..

b) Education level. i) Non ☐ ii) Prim ☐ iii) Secondary iv) Higher education ☐

c) Marital status i) Married ☐ ii) Unmarried ☐

d) Employment i) Formal Employme ☐ ii) Informal employment ☐

iii) Unemployed ☐

2) Obstetrical information

a) GA……b) Gravity i) Gravida 2 ☐ Gravida 3 ☐ iii) Gravida 4 ☐

iv) > Gravida 4 ☐

c) Parity i) para one ☐ ii) para two ☐ iii) para three iv) Para four ☐

v) > Par ☐

3) Labour status

i) Time at dilatation of the cervix 4-6cm……..

ii) Time at end of first stage of labour……

iii) Time at the parturient feels the urge to push……

iv) Time at the expulsion of the baby……..

4) Maternal Birth positions

i) Supine ☐ ii) Upright ☐ a) Kneeling posit ☐ b) Hands an ☐ Knees

5) Maternal birth outcome

i) Amount of blood loss; a) < 500mls ☐ b) >500mls ☐

ii) Perineum status ; a) Intact ☐ b) Tear ☐

c) Degree of tear, 10 ☐ 2^0 ☐ 3^0 ☐ 4^0 ☐

6) Birth Newborn outcome

i) Apgar Score at one minute <7 >7 ☐ ☐

ii) Apgar Score at five minutes <7 >7 ☐ ☐

7) Birth weight (kg) 2.5-3.0 ☐ 3.1-3.5 ☐ 3.6-4 ☐ >4 ☐

Appendix II. Informed consent form (English version)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES (MUHAS)

DIRECTORATE OF RESEARCH AND PUBLICATIONS

MUHAS INFORMED CONSERT

ID NO……..

Greetings!

I, Advera Vedasto Mtatina. I am a Postgraduate student pursuing MSc in Midwifery and Women's Health at Muhimbili University of Health and Allied Sciences (MUHAS), conducting a research entitled "**COMPARING THE EFFECTS OF UPRIGHTAND SUPINE BIRTH POSITIONS ON MATERNAL AND NEWBORN OUTCOMES IN SIMIYU REGION, TANZANIA"**

Purpose of the study

This study is aimed at identifying the outcome of birthing position on perineal trauma, duration of labour, the blood loss and the quality of Apgar score of the newborn.

Sponsor

Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) is going to sponsor **1.500400/=**.

What Participation Involves

If you agree to participate in this study you will be required to be enrolled in a birthing position such as either supine or upright position according to the study conducted at this hospital .The information that will obtained from you will be used for research purposes only.

Confidentiality

The information about you and what will happen during deliver will be treated with confidentiality and used only for research purposes. Your name will not be used for identification during data analysis and report process.

Benefits

There will be no direct benefits to you, however, participation in this research has the potential for improving care to mothers during labour and delivery at this hospital and country wise, also will improve midwifery practices (competences) through recommendations that will be made to the management of Health facilities and Ministry of Health.

Compensation:

There will be no compensation of any kind in your participation.

Risks

The researcher anticipates no harm to happen to you as you participate in this study.

Rights to Withdraw

Participating in this study is voluntary. You are free to choose whether to participate or not or to stop participating in this study at any time, even if you have already given your consent. Refusal to participate or withdraw from the study will not imply any effect to your treatment/services.

Whom to Contact

In case of any emerging concern you may contact the researcher through the following address: Advera V.Mtatina School of Nursing, MUHAS P. O. BOX 65004, and Dares Salaam Email address: mtatinaa@yahoo.com . Mobile no.0784502620

If you ever have questions about your rights as a participant, you may contact or call Director of Research and Publications Committee Prof. Aboud Said at MUHAS, P.O. Box 65001, Dar es Salaam. Tel: 2150302-6.

Agreement of participation

Do you agree to participate?

Participant agrees …… Participant does NOT agree ……..

I, _____ have read the contents in this form. My questions have been answered. I agree to participate in this study.

Signature of participant _____

Signature of the researcher _____Date_____

Appendix III. Fomu ya ridhaa

Idhini ya kushiriki katika utafiti kuhusu "**KULINGANISHA KATI YA KUJIFUNGUA UKIWA WIMA NA KUJIFUNGUA KWA KULALA CHALI NI KUPI KUNALETA MATOKEO MAZURI KWA MAMA NA MTOTO WAKATI WA UCHUNGU NA KUJIFUNGUA KATIKA WILAYA ZA BARIADI NA MASWA MKOANI SIMIYU**"

Mimi naitwa Advera V. Mtatina.Mwanafunzi wa shahada ya uzamili katika fani ya ukunga na afya ya akina mama katika chuo kikuu cha Afya na Sayansi shirikishi Muhimbili (MUHAS). Ninafanya utafiti wenye kichwa cha habari kilichotajwa hapo juu.

Lengo

Leng la utafitihuu ni kuchunguza mlalo upi wakati wa kujifungua unapunguza au unaongeza uwezekano wa kuchanika msamba, kutokwa na damunyingi baada ya kujifungua, kufupisha muda wa uchungu na kuimarisha au kufifisha hali ya mtoto mara baada ya kuzaliwa na baada ya dakika tano.

Udhamini

Utafiti huu unadhaminiwa na Wizara ya AfyaMaendeleoyaJamii, Jinsia Wazee na Watoto.

Ushirikikatikautafiti

Ushiriki wako katika utafiti huu ni wa hiari. Endapo utakubali kushiriki katika utafiti huu utatakiwa kutumia mlalo utakaotumika katika hospitali hii. Utafiti huu utafanyika kwa njia ya kukuangalia mlalo uliochagua pamoja na kuangalia kama umechanika msamba na kwa kiasi gani msamba umechanika, kiasi cha damu ulichovuja wakati unajifungua ,muda ulioutumia kwenye uchungu na kujifungua pamoja na uwezo wa mtoto kuanza kupumua na kulia baada ya kuzaliwa ndani ya dakika moja na dakika tano.

Usiri

Utafiti huu utafanyika kwa usiri. Lolote litakalotokea au utakalo sema wakati wa kushiriki kwako kwenye Utafiti itakuwa ni siri na matokeo yako hayataonyeshwa mahali popote ispokuwa kwa lengo la utafititu.Jina lako au kitu chochote cha kukutambulisha hakitaonekana kwenye ripoti.

FAIDA

Kushiriki kwako katika Utafiti huu hautafaidika binafsi, japokuwa kushiriki kwako kwenye Utafiti huu ni muhimu sana kwani matokeo yake yatasaidia kuboresha huduma za uzazi ikiwa ni pamoja na kuwawezesha akina mama kujifungua kwa kutumiami mlalo wanayoipenda.
Pia yatasaidia kujua ni milalo ipi inapunguza madhara wakatiwa mama kujifungua ili iweze kutumika katika hospitali zetu na pia wizara ya afya itatumia taarifa hizo katika kuboresha huduma hii.

MADHARA

Hatutegemei ya kwamba utapata madhara yoyote kwa kushiriki kwako katika Utafiti huu.

FIDIA

Hakutakuwa na fidia yoyote katika Utafiti huu

HAKI YA KUJITOA AU VINGINEVYO

Ushiriki katika Utafiti huu ni wahiari. Uko huru kuchagua kushiriki au kutoshiriki au kuacha kushiriki wakati wowote, hata kama ulikuwa umeisha kubali. Kukataa au kusitisha kushiriki kwenye Utafiti huu hakutakuwa. Hata hivyo tunge penda ushiriki katika Utafiti huu kwa sababu ushiriki wako ni muhimu sana kwetu.

MAWASILIANO

Kama utakuwa na maswali katikaUtafiti huu unaweza kuwasiliana na mtafiti mkuu, AdveraV.Mtatina, kutoka Chuo Kikuu cha Afya na Sayansi Shirikishi. S.L.P 65004, Dar es Salaam. Barua pepe:mtatinaa@yahoo.com Simu namba: 0784502620.Au unaweza kuwasiliana na mkurugenzi wa Utafiti na uchapishaji MUHAS, Professor Aboud Said. S.L.P 65001. Dar es Salaam. Tel: 2150302-6

UKUBALI WA KUSHIRIKI

Je unakubalikushiriki?

Nimekubali …… Sijakubali ……..

Mimi …

Nimesoma na nimeelewa idhini hii .Maswali yangu yote yamejibiwa. Ninakubali kushiriki katika utafiti huu.

Sahihi ya mshiriki……..

Sahihi ya mtafiti _____

Tarehe_____

Appendix IV: Introduction letter

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR OF POSTGRADUATE STUDIES

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Ref. No. HD/MUH/T.642//2018

19th June, 2020

Regional Administrative Secretary,
P.O. Box 4,
SIMIYU.

Re: INTRODUCTION LETTER

The bearer of this letter is Advera, Mtatina Vedasto, a student at Muhimbili University of Health and Allied Sciences (MUHAS) pursuing MSc. Midwifery and Woman Health.

As part of her studies she intends to do a study titled: "**COMPARING THE EFFECTS OF THE UPRIGHT AND SUPINE POSITIONS ON MATERNAL AND NEWBORN OUTCOMES IN SIMIYU REGION, TANZANIA".**

The research has been approved by the Chairman of University Senate.

Kindly provide her the necessary assistance to facilitate the conduct of her research.

We thank you for your cooperation.

Ms. Sharifa Kamby
For: DIRECTOR, POSTGRADUATE STUDIES

cc: Dean, School of Nursing, **MUHAS**
cc: Advera, Mtatina Vedasto

Appendix V: Ethical letter

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR OF POSTGRADUATE STUDIES

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Ref. No. HD/MUH/T.375/2018/02 **18th June 2020**
IRB#: MUHAS-REC-06-2020-304

Advera, Mtatina Vedasto,
MSc. Midwifery and Women Health,
School of Nursing,
MUHAS.

RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED "DETERMINE THE EFFECT OF UPRIGHT POSITION ON MATERNAL AND NEWBORN OUTCOME COMPARED WITH SUPINE POSITION IN SIMIYU REGION, TANZANIA."

Reference is made to the above heading.

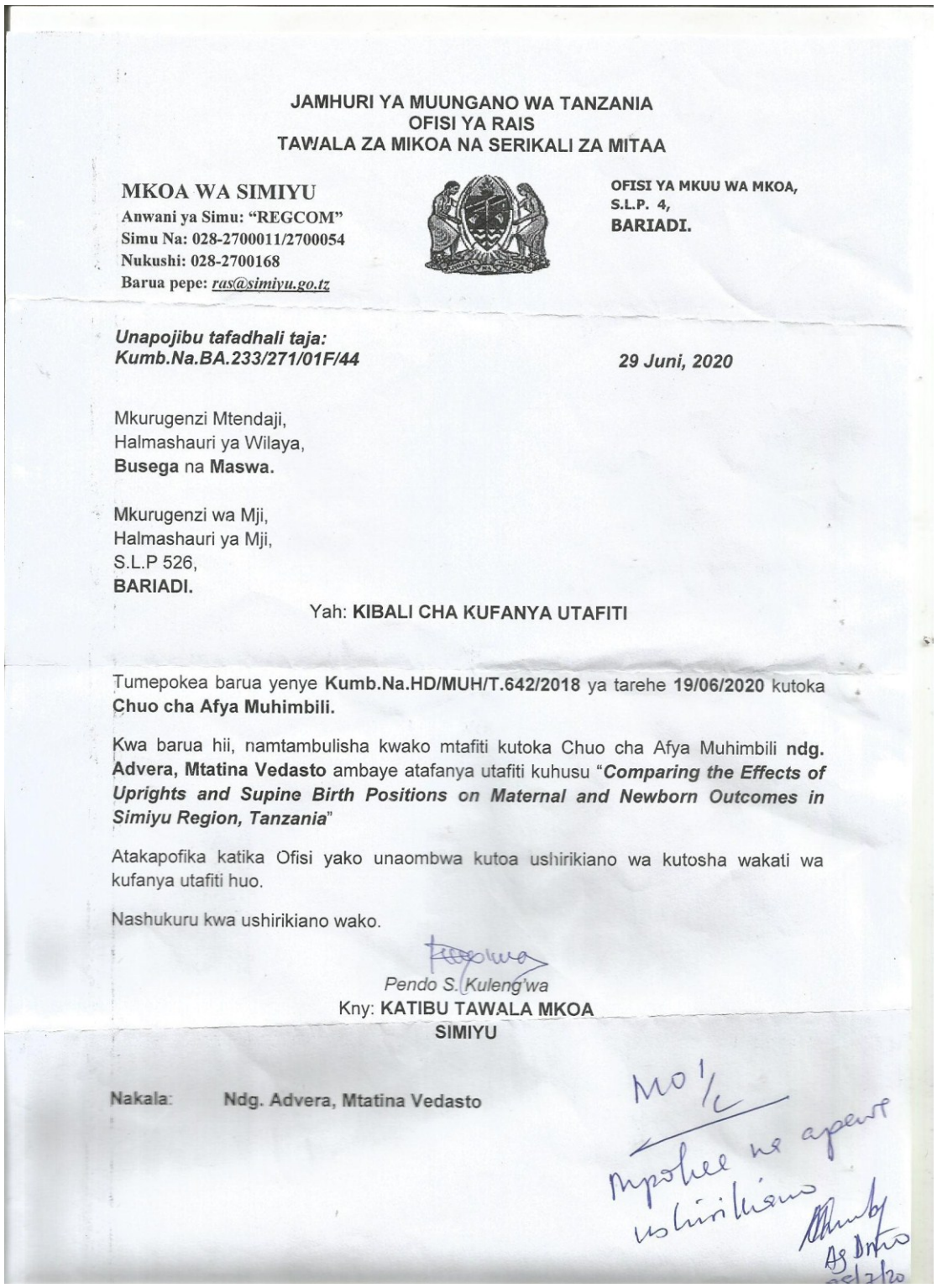
I am pleased to inform you that, the Chairman has, on behalf of the Senate, approved ethical clearance for the above-mentioned study. Hence you may proceed with the planned study.

The ethical clearance is valid for one year only, from **18th June, 2020 to 17th June, 2021.** In case you do not complete data analysis and dissertation report writing by **17th June, 2021,** you will have to apply for renewal of ethical clearance prior to the expiry date.

Dr. Emmanuel Balandya
ACTING: DIRECTOR OF POSTGRADUATE STUDIES

cc: Director of Research and Publications
cc: Dean, School of Nursing, **MUHAS**

Appendix VI: Permission letter



JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA

MKOA WA SIMIYU
Anwani ya Simu: "REGCOM"
Simu Na: 028-2700011/2700054
Nukushi: 028-2700168
Barua pepe: ras@simiyu.go.tz

OFISI YA MKUU WA MKOA,
S.L.P. 4,
BARIADI.

Unapojibu tafadhali taja:
Kumb.Na.BA.233/271/01F/44

29 Juni, 2020

Mkurugenzi Mtendaji,
Halmashauri ya Wilaya,
Busega na **Maswa.**

Mkurugenzi wa Mji,
Halmashauri ya Mji,
S.L.P 526,
BARIADI.

Yah: **KIBALI CHA KUFANYA UTAFITI**

Tumepokea barua yenye **Kumb.Na.HD/MUH/T.642/2018** ya tarehe **19/06/2020** kutoka **Chuo cha Afya Muhimbili.**

Kwa barua hii, namtambulisha kwako mtafiti kutoka Chuo cha Afya Muhimbili **ndg. Advera, Mtatina Vedasto** ambaye atafanya utafiti kuhusu "***Comparing the Effects of Uprights and Supine Birth Positions on Maternal and Newborn Outcomes in Simiyu Region, Tanzania***"

Atakapofika katika Ofisi yako unaombwa kutoa ushirikiano wa kutosha wakati wa kufanya utafiti huo.

Nashukuru kwa ushirikiano wako.

Pendo S. Kuleng'wa
Kny: **KATIBU TAWALA MKOA**
SIMIYU

Nakala: **Ndg. Advera, Mtatina Vedasto**

MO 1/c
Mpokee na apewe ushirikiano
Ag Dkto