AUDIT FOR DIAGNOSIS OF INDICATIONS FOR CAESAREAN SECTION AMONG WOMEN OF LOW RISK GROUP AT A TERTIARY HOSPITAL IN TANZANIA.

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Department of Obstetrics and Gynaecology

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By

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A Dissertation Submitted in Partial Fulfillment of the Requirement for the Degree of Master of Medicine in Obstetrics and Gynaecology of the

Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by Muhimbili University of Health and Allied Sciences a dissertation titled "**Audit for diagnosis of indications for caesarean section among women of low risk group at a tertiary hospital in Tanzania.",** in fulfillment of the requirements for the degree of Master of Medicine in Obstetrics and Gynaecology of Muhimbili University of Health and Allied Sciences.

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PROF. ANDREA BARNABAS PEMBE

(Supervisor)

_____

Date

DECLARATION AND COPYRIGHT

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

Signature_____ Date_____

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DEDICATION

This work is dedicated to my beloved children Enock, Endesh, and Ezra for their tolerance and patience in my absence at home related to this dissertation.

ABSTRACT

Background: Caesarean section (CS) rate is dramatically increasing in both developed and developing countries across obstetric populations even those with minimal risk receive it. The group of multiparous women with singleton pregnancy in cephalic presentation at term in spontaneous labour, without history of previous CS has low risk for CS but yet high rate of CS has been reported. The aim of this study is to audit for diagnosis of common indications for CS against the criteria for standard diagnosis of indication for CS among women of low risk group.

Methodology: A descriptive cross-sectional study was conducted at Muhimbili National Hospital from 15th August to 31st December 2018. The common indication for CS among women of low risk group were fetal distress, obstructed labour, arrested labour and cephalopelvic disproportion. The criteria for standard diagnosis of these indications for CS were adapted from International, National guidelines and peer groups publications based on local expert consensus. The information was extracted from case notes and partographs against the checklist for indications for CS and adapted criteria for standard diagnosis of obstructed labour, fetal distress, arrested labour and cephalopelvic disproportion. The proportions for indications for CS and standard diagnosis were analysed through composite scoring using SPSS version 20.

Results: A total of 1670 emergency CS performed during the study period, 392 (23.5%) were among the women of low risk obstetric characteristics for CS. Fetal distress 101(25.8%), obstructed labour 92(23.5%), arrested labour 88(22.4%) and cephalopelvic disproportion 64(16.4%). Among the four indications for CS 55.1% meet the criteria for standard diagnosis for indications for CS.

Conclusion: More than half of CS performed during the study period had meet the criteria for the standard diagnosis of fetal distress, obstructed labour, arrested labour and CPD.

Recommendations: More studies to determine the factor hindering the adherence of the criteria for standard practice among health care providers during clinical practice.

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LIST OF ABBREVIATION

ACOG	American College of Obstetricians and Gynecologists
CPD	Cephalopelvic Disproportion
CS	Caesarean Section
FHR	Fetal Heart Rate
GA	Gestational Age
MNH	Muhimbili National Hospital
MoHSW	Ministry of Health, Social and Welfare
MUHAS	Muhimbili University of Health and Allied Sciences
PPH	Postpartum Haemorrhage
RTCOG	Royal Thai College of Obstetrics and Gynaecology
SMFM	Society of Maternal Fetal Medicine
WHO	World Health Organization

OPERATIONAL DEFINITION

Women of low risk group: Includes multiparous women who have singleton pregnancy in a cephalic presentation at term with spontaneous onset of labour, without a history of the previous uterine scar.

1.0 INTRODUCTION

1.1 BACKGROUND

Caesarean section (CS) rate is dramatically increasing globally, regionally and nationally independent of economic levels (1) that has risen concern among the health professionals (2). CS is a life –saving procedure, but can be associated with severe maternal morbidity and mortality especially in low resource settings when performed without appropriate obstetric indications (3). Studies have shown that the increasing rate of CS through 10% was associated with a decrease in maternal and perinatal mortality but a higher rate than 10% has not proven to improve maternal and fetal outcomes (4). Therefore, the WHO statement insisted that the rate of CS per se should not be of concern if the indications can be justified as saving the life of the mother and fetus (5).

Caesarean section is reported to have a direct association with intra or post-partum hemorrhage which increases the risk of blood transfusion, hysterectomy, longer hospital stay, puerperal sepsis and even death (6). Studies have reported the association of previous CS with life-threatening conditions like ruptured uterus, antepartum hemorrhage and placenta previa that increases the risk of maternal morbidity and mortality (7). The association between maternal mortality and CS rate is significant regardless of the indication for CS thus an important concern in obstetric care (8). Therefore, unnecessary CS is a burden on the individual, families and the health system to meet the demand of the procedure and management cost associated with the procedure or its complications (3).

Indications for CS can be classified in terms of absolute or relative indications on other obstetric characteristics that may either be fetal or maternal as recommended in previous studies (9). Absolute indications for CS include obstructed labour, major antepartum hemorrhage, and malpresentation. Relative indications include failure of progress of labour/arrest labour, failure of induction of labour, previous uterine scar, fetal compromise, perineal injuries, minor, antepartum hemorrhage, breech presentation, cephalopelvic disproportion (CPD), maternal medical condition and psychological factors (10). Failure of vaginal operative delivery at the second stage of labour is another indication of CS (11). In the

developed world, increasingly CS is performed due to maternal request even without any obstetric indication (3)

According to Robson's ten group classification system, the risk for CS vary in each group depending on women's obstetric characteristics and their past obstetric history or model of delivery (9). Women are classified according to their obstetrics characteristics to ensure an appropriate explanation of indication for CS as described in Table 1 (12). In 2011 Robson's ten group classification system was adopted by WHO as a gold standard tool to monitor, assess and compare CS rate within the health facilities over time (13). The system uses five obstetrics characteristics which include, (1) parity, (2) onset of labour, (3) fetal presentation, (4) gestational age and (5) number of fetuses (5,14). Therefore, this classification assesses and help to guide health professional regarding the use of CS as a lifesaving procedure when indicated based on maternal and fetal conditions (14)

Women of low risk group for CS include the obstetric population who are multiparous women with a singleton pregnancy in a cephalic presentation at term in spontaneous labour, without a history of previous CS according to Robson classification system (12, 15). Despite their protective obstetric characteristics for CS, previous studies have shown high rates of CS among women of Robson group three. The increase rate of CS among these groups of women might have been contributed by questionable indications for CS (16).

Table 1: Robson's ten group classification.

1. Nulliparous, single cephalic, more or equal to 37 weeks, in spontaneous labour
2. Nulliparous, single cephalic, more or equal to 37 weeks, induced or CS before labour
3**. Multiparous (excluding previous CS), single cephalic, _37 weeks, in spontaneous labour**
4. Multiparous (excluding previous CS), single cephalic, _37 weeks, induced or CS before labour
5. Previous CS, single cephalic, more or equal to37 weeks
6. All nulliparous breeches
7. All multiparous breeches (including previous CS)
8. All multiple pregnancies (including previous CS)
9. All abnormal lies (including previous CS)
10. All single cephalic, less or equal 36 weeks (including previous CS)

Source. Best Practice and Research, Clinical Obstetrics and Gynaecology (12).

Other groups of multiparous women with multiple gestations, noncephalic presentation, induced labour and history of the previous scar are at high risk for CS as described in Robson's ten groups classification (17). Multiparous women with other pregnancy complications like antepartum hemorrhage including placenta previa have been planned for elective CS to avoid more life-threatening complications (18). Other indications for CS including bad obstetric history has been individualized based on obstetric indication and patient and physician consensus but they are at high risk of CS (19). These pregnancy complications that contribute risk for CS among obstetric populations were not clearly shown in Robson's ten group classification (12).

Because of disparity in healthcare resources, the notion of a universal standard of structure and process of care cannot be realistic. This is why in some settings standard criteria or guidelines may be developed or adapted depending on expertise and resources available and agreed based on local applicability and relevance (20). The standards adapted from peer's publications have been implemented and showed significant improvement standard of care in clinical practice (2). In Tanzania, the ministry of health has developed the job aid for the guidance of physician decision on diagnosis and management of emergency obstetric complications to reduce maternal and neonatal mortality (21). Nonetheless, at Muhimbili National Hospital (MNH) standard criteria have been established to improve monitoring the quality of obstetric care of women in labour and management of labour complications (22,23).

According to WHO, the recommended rate of CS in a community is between 5% and 15% (24). However, recently WHO has emphasized on improving the accessibility of CS to all women who have obstetric indications without strict reliance on the recommended rates (5). As performed in other settings regular assessment of the appropriateness of indications for CS is needed to improve quality of care (2,25).

1.2 LITERATURE REVIEW

Caesarean section rate has been reported to increase globally independent of the country's income level across ten groups of obstetric populations as described by Robson classification criteria for risk of CS (26). According to the new WHO statement, there is no ideal target rate recommended for CS deliveries but the medical explanation is emphasized. In comparing the rate of CS based on Robson ten groups classification, group three contribution to the overall rate of CS among the obstetric population is low (17). However, WHO reports that CS rates above 10% had not shown benefits with reference to the reduction of maternal and newborn morbidity and mortality (5). Furthermore, studies have shown that CS without medical indications is associated with higher cost and risk of procedure complications that may result in an increased risk of maternal and neonatal adverse outcomes (3).

In Western India, it was revealed that 11.6 percent of overall CS was contributed by women of low risk group (15). In Mahamodara teaching hospital, Galle Sri Lanka, Malik et al conducted the study to determine the strategies to reduce the rate of CS, the rate of CS among women of low risk group was found to be 26% (27). Furthermore, women of low risk group were found to contribute 15% of the overall CS rate at KwaZulu-Natal hospital, Durban, South Africa (28). Similarly, in Tanzania, the CS rate in this group was reported to be 33% that contributed to the overall CS rate by 12% (16).

A multi-country analysis of indications for CS in sub-Saharan Africa, reported the common indications for CS among general obstetric population were obstructed labor (31 %), malposition (18 %), prior CS scar (14 %), fetal distress (10 %), uterine rupture (9 %), and antepartum hemorrhage (8 %). In this analysis, no comment was made regarding the appropriateness of the indications or whether or not a certain portion of these CS were unindicated (29). Furthermore, in Rajasthan India and China, the most common indications for primary CS among the multiparas are fetal distress, CPD, and antepartum haemorrhage (30) while at Matilab Bangladesh was a study focused on indications for CS, fetal distress and obstructed labour were among the common indications (31). Additionally, the abnormality/diseases of genital tract like cervical cancer, masses, and pelvic fracture together

with medical conditions including aortic dissection, aneurysm have been shown to be appropriate reasons for CS delivery(32).

Meanwhile, in Karachi Pakistan, common indications for primary CS among nulliparous and multiparous were labour arrest and fetal distress. The study highlighted that primary **CS** usually determines the future obstetric course of any woman and therefore should be avoided wherever possible (33). Furthermore, in Pondicherry, India, the common indications for primary CS among all multiparous were fetal distress, CPD, and malpresentation (34). Similarly, in the United States, the common indication for primary CS among multiparous women were labour arrest, fetal distress, and malpresentation (35).

In Kilimanjaro, Tanzania, a study conducted in St. Joseph hospital revealed that the common indications for CS among multiparous were obstructed labour, malpresentation and previous scar (18). Additionally, studies performed at MNH, Dar es Salaam, found that common indications for emergency CS among the general obstetric group include a previous uterine scar, obstructed labour, failure of progress of labour and fetal distress (16). Previous CS was revealed to be the most frequent indication for CS in each of the studies. Therefore, improving the decision for primary CS for the most common indications in a health facility level can be an effective method of preventing avoidable primary CS and reducing the risk of subsequent CS (2).

Adherence to the clinical practice guidelines in the diagnosis of indications for CS has been reported to be a useful tool for appropriate diagnosis for indications of CS (36). At Chiang Mai Hospital, Thailand it was observed that one-third of CS performed due to CPD were did not met the criteria for diagnosis (25). In order to reduce avoidable CS, different experts have jointly come up with agreed recommendations for the diagnosis of labour arrest as one of the most common indications of CS among women of low risk group (2). In assessing the clinical practice in the diagnosis of CPD, the study showed that physician noncompliance on clinical practice guidelines contributed to preventable CS in different facilities (20). Lumaan and colleagues conducted a prospective study at Aga Khan University, Karachi aimed at reducing the rate of primary CS evaluated the implementation of the universally accepted standards and

revealed the decrease of CS rate from 17% to 12% after intervention implementations were achieved (33). At MNH, Tanzania the criteria for diagnosis and management of obstructed labour and fetal distress were implemented and showed improved quality of care and better maternal and perinatal outcomes (22,23). According to the previous study that was conducted at MNH based on the criteria for the diagnosis of common indications for overall emergency CS revealed that substandard diagnosis had increased the rate of CS (37).

Reviews on adherence on criteria/guideline in management of obstetric emergencies is a quality improvement tool that systematically and critically assesses the process of obstetric care (38). Previous studies have shown improvement of compliance on guideline regarding audit after implementation of the criteria/guideline among the health care providers (36). The aim of this study is to determine the common indication for CS among women of low risk group and audit the diagnosis against the agreed criteria for standard diagnosis for incessant improvement of quality of care.

1.3 PROBLEM STATEMENT

Cesarean section is a lifesaving procedure, however, it can be associated with serious adverse maternal and neonatal outcome especially when performed without appropriate obstetric indications. The WHO statement has reported that CS rates above 10% do not offer maternal or neonatal health advantages (5). In Tanzania, the rate of CS is 6% suggesting an unmet need for CS. The rate shows regional variation with a significantly higher rate in Dar es Salaam, a rate of 17% (39). Additionally, at MNH in Dar es Salaam, the overall rate of CS has been reported to increase dramatically from 19 to 49% in a space of 10 years (2000 to 2011). Thus, suggestive of health inequity in terms of access to CS and the appropriate distribution of resources. At MNH, the rate of CS among women of low risk group have been reported to be 33% with uncertain indications (16). This apprehensions the need for evaluating the justification of these indications against the available evidence based criteria of standard clinical practice.

World health organization has evidently proven no added benefits to both mothers and their neonates for increased rate CS above 10% is done without justifiable medical indication (5).

Therefore, considering the long term and short term negative consequences of this procedure, the care provider's decision for CS needs to be objectively assessed in terms of safety and authenticity relying on scientific evidence in order to ensure CS is performed when medically indicated. At MNH the effort for development and implementation of criteria for the diagnosis of obstructed labour and fetal distress has resulted in improvement in both maternal and fetal outcomes. However, as shown from unpublished pilot study data from January to December 2017, CS rate among women of Robson group three has was still high by (31.7%). Lack of criteria for other common indications of CS including CPD and arrested labour may be a reason for higher CS rate observed among this group leading to an insufficient decrease in avoidable CS. Furthermore, the criteria for the diagnosis of indications for CS needs continuous revision assessment as a motivation for change in practice and conformity to improve quality of care in healthcare facilities especially in resources limited setting.

1.4 RATIONALE

This study is an eye-opener in the assessment of the clinical practice and establishment of local acceptable diagnostic criteria for the most common indications for CS and improved the quality of care in the management of complications of labour. The study determines whether an increase in the CS rate among women within the Robson group at MNH is rational. Care provider involvement through the criteria development for indications of CS showed the reputation of developing recommendations and guideline for standards provision of care to aid in decision making in the management of complications of labour. This study finding are helpful for the healthcare provider to in avoidance of preventable CS among women of low risk group population.

1.5 RESEARCH QUESTION

How rationality is the diagnosis of indications for **CS** among women of low risk group?

1.6 OBJECTIVE

1.6.1 Broad objective:

To determine common indications for CS and rationality of their diagnosis among women of low risk group.

1.6.2 Specific objectives:

1. To determine common indications for CS among women of low risk group.
2. To determine the proportion of women of low risk who meet the standard criteria for the diagnosis of indications for CS.

2.0 METHODOLOGY

2.1 STUDY DESIGN

A descriptive cross-sectional study was conducted from August 15th, 2018 to December 31st, 2018 in maternity unity at Muhimbili National Hospital in Dar-es-Salaam, Tanzania.

2.2 STUDY SETTING

Muhimbili National Hospital is the largest tertiary teaching hospital at the national level in Tanzania. The hospital is located at West Upanga in Ilala, Dar es Salaam. It operates an open door policy where all pregnant women who come for delivery are admitted and managed irrespective of their clinical state. According to the MNH birth registry, there are approximately 8,000 deliveries in 2017 with a daily rate of delivery were ten to thirty deliveries whereby CS rate was around 54% of the total delivery. The maternity block has three labour rooms which are located in the main labour ward at the maternity block which has a total of 23 delivery beds whereby 15 and 8 beds for public and private parturient respectively. The theater building has four operating rooms, a reception room, a recovery room, and other utility rooms and offices. Each operating room has one operating table and anesthetic equipment adequate to provide general or regional anesthesia.

All pregnant women are admitted through labour ward where they are investigated for imminent labour and screening for other diagnoses that will be managed in the ordinary wards. The labour ward is managed by five midwives and two attendants per shift. The nurses and support staff work 12 hours a day covering two shifts. The doctor's team on call for 24 hours shift, comprises of one specialist, two obstetric residents or one resident with one registrar and three intern doctors. Women admitted for labour management are received in labour ward whereby the nurse midwife assesses for triage before entering the labour room. A brief history, including personal particulars, next of kin, antenatal history, and past obstetric history is entered in the partogram.

The initial obstetric examination is performed in the labour room by the doctor on call which is usually performed by registrar or resident or specialist on call. The routine monitoring of labour is performed using the partogram by the nurse-midwife including four hourly findings

after the doctor reviewed the woman. Labour progress is observed and the necessary interventions are done depending on the trend of labour. Fetal heart rate monitoring during labour is every 30 minutes through intermittent fetal heart auscultation using Pinard Fetoscope or hand Fetal Doppler. Currently, there is a portable Ultrasound machine in the labour room which is shared in all rooms in the maternity block. The decision on mode of delivery is made by either by the registrar or resident or specialist on call or discussion agreement for any complicated cases.

Standard criteria for the diagnosis of indications for CS establishment

The criteria were adapted from reviewed peer's publications, national and international guidelines. The criteria for CPD were adapted from clinical practice guidelines of RTCOG and ACOG, as previously used in another study (25) and modified to fit the local context by using the national standards for diagnosis and management for emergency obstetric care (21). Furthermore, criteria for labour arrest were derived from the recommendation for diagnosis and management of labour arrest in both first and second stage of labour from ACOG and Society of Maternal and fetal medicine consensus (2,40). Additionally, two more criteria for fetal distress and obstructed labour were adapted from local studies conducted at MNH (23).

Criteria credibility

The opportunity for authentication of adapted criteria was performed by presenting the criteria to the health care providers in maternal mortality meetings. The meeting involves the hospital and university staff including Specialists (obstetricians and gynecologists), registrars, midwives, nurses, together with external visitors from nearby referral hospitals. The presentation provided the opportunity to assess the applicability of the criteria in clinical practice in the study setting based on the resources and expertise available. Comments were collected and reviewed for modification of the criteria to fit the clinical practice in the study setting. The second verification meeting was conducted to review and justify the criteria modification that involved the head of the department of obstetrics and gynecology, selected specialists, senior nurse midwives from labour ward and resident students. The modified criteria were presented again in the departmental meeting (MUHAS obstetrics and gynecology meeting for discussion and agreement. A pilot study was performed for two weeks to test the

applicability of the agreed criteria checklist for data collection and amendments were made accordingly, without changing the meaning of each criterion.

Adapted Criteria for diagnosis of common indication for CS

Table 2: Criteria for diagnosis of labour arrest from ACOG and SMFM recommendations (2).

	Labour arrest at the first stage of labour
1.	≥ 6cm cervical dilatation with ruptured membranes without progress despite 4 hours of adequate uterine contractions
2.	≥ 6cm cervical dilatation with ruptured membranes with inadequate uterine contraction despite 6 hours of oxytocin administration
	Labour arrest second stage of labour
3.	The prolonged second stage of labour for at least 1hour.
	Fulfillment for Standard diagnosis requires one of the three criteria.

Table 3: Criteria for diagnosis of CPD from ACOG and RTCOG clinical practice guideline(21,25).

1.	At least 3 cm of cervical dilatation and ≥ 80% of effacement
2.	Adequate uterine contraction (3 to 5 contraction in 10min lasting 40 to 60seconds) for at least two hours
3.	Abnormal labor partograph findings (i.e. protraction or arrest disorders)[a]
	Fulfillment for standard diagnosis is when all three criteria for diagnosis are met.

[a] - cervical dilatation < 1cm per hour, no engagement/decent

Table 4: Criteria for diagnosis of fetal distress from peer publication Mgaya et al (23).

	Major criteria
1.	Irregular fetal heartbeats (non-uniform fetal heart rate between the uterine contractions)
2.	Abnormal fetal heart rate (≥ 180 or ≤ 100 beats/min).
	Minor criteria

1.	Persistence of irregular heartbeats despite hydration and change of maternal position
2.	Fresh meconium-stained liquor
3.	Reduced fetal movement
	*Fulfillmen*t for standard diagnosis required one major and one minor criteria.

Table 5: Criteria for diagnosis of obstructed labour from peer publication and MoHSW guideline (17,18).

	Major criteria
1.	Prolonged active labour of more than 8 hours despite regular adequate uterine contractions (3 to 5 contractions in 10min lasting 40 to 60seconds)
2.	Adequate uterine contractions.
	Minor criteria
1.	Prolonged cervical dilatation < 1cm per hour
2.	Prolonged descent of the fetal head at less than one-fifth per hour
3.	Prolongation of the second stage of labour for > 1 hour despite adequate uterine contraction.
4.	Presence of severe caput, which imply the inability to palpate molding or documented caput of ≥2+
5.	Presence of severe molding implying documented molding of 3+
	Fulfillment for standard diagnosis required at least one major and one minor criteria.

2.3 STUDY POPULATION

Multiparous women of less than five parties, with a singleton pregnancy in cephalic presentation without a history of previous uterine scar in labour who underwent emergency CS, were included in the study.

2.4 STUDY SAMPLE

A sample size of 384 emergency CS was calculated to estimate the proportion of standard/substandard decisions made in the diagnosis of indications for CS among women of low risk group. The proportion of 50% with a confidence interval of 95% was used in the calculation of the sample size. The formulae used was;

$$N = Z^2 P(1-P) / \square^2$$

Whereby;

N = sample size

Z = standard normal variate which is 1.96 when p <0.05

P = expected proportion in population

□ = absolute error

Sample size = 1.96^2 x 0.5(1 – 0.5)/ 0.05^2

= 384

Therefore; 384 was a number of women of low risk group estimated for this study. In a period of 138 days for data collection, 392 women were recruited where the common indications for CS in this group were determined**.**

2.5 SAMPLING

Convenience sampling technique was used by which all files for CS conducted in women of low risk group were assessed. Daily CS from register book at the obstetric theatre were sorted to identify the women who belong to a group of low risk for CS and the file number and admission ward were noted for tracing the files for the data collection process.

2.6 INCLUSION CRITERIA

1. Women of low risk group who delivered by CS during the study period were enrolled.

2.7 EXCLUSION CRITERIA

1. A severe medical condition whereby there was limited time for delivering a plan to improve maternal and neonatal outcomes.
2. Previous myomectomy and grand multiparous women
3. Obvious fetal anomalies including hydrocephalus.

2.8 DATA COLLECTION

The principal investigator recruited cases from the obstetric theatre procedure analysis book which defined each case based on age, parity, indication for CS and the ward admitted post operation. Information for data collection was obtained from the doctor's notes and from partograph as documented by the health care provider prior to the individual CS procedure as his/her options for the procedure. The files were daily traced in the respective ward where women have admitted post-CS. Data were collected using a structured checklist which consists of the variable for patient characteristics, indications for CS and criteria for the diagnosis of the four common indications. Each checklist for every case was coded for identifications during data entry and data analysis.

2.9 DATA MANAGEMENT AND ANALYSIS

Data were entered, coded and analyzed by using SPSS statistical software version 20. The principal investigator created the dataset template and data entry from each checklist was performed. Data were analyzed and strategized in frequency tables and bar charts. The proportion of social demographics, admission and billing characteristics for women low risk group were analyzed.

The proportion of each indication for CS among women of low risk group were analyzed to determine the common indications for CS. The standard for compliance for standard criteria for standard diagnosis of obstructed labour, fetal distress, arrested labour and CPD were analyzed through composite scoring formulation. The proportion for standard diagnosis was calculated by analyzing the percentage of CS that had met the standard criteria for the diagnosis of documented indications that define the justification for individual CS.

2.10 ETHICAL CONSIDERATIONS

Ethical clearance was sought from the Senate Research and Publication committee of MUHAS and the permission to conduct the study was obtained from the Teaching, Research and Consultancy Unit under Executive Director of MNH. Women have not consented during data collection; the waiver consent was obtained from the MNH Institution Review Board because the study aimed to assess the process of care provided by the health care provider during the

management of labour. Confidentiality was guaranteed and no patients' or doctors' name appeared during data collection. All responses form for the reviewed case notes were coded and the case identification was anonymized.

During the study period, a total of 2306 CS were performed. Out of it were 1670 (72.4%) whereby 392 (23.5%) were performed among women of low risk group. Among 392 women of low risk group 345(88.0%) were audited for diagnosis of obstructed labour, fetal distress, arrested labour and CPD, whereby 190(55.1%) meet the criteria for standard diagnosis.

Table 6: Demographic, admission and billing characteristics of women of low risk group (N=392)

Variable	Frequency(n)	Percentage(%)
Age		
<24	48	12.2
25-29	140	35.7
30-34	129	32.9
>35	75	19.1
Parity		
2	202	51.5
3	103	26.3
4	87	22.2
Admission status		
Referral from other hospital	244	62.2
Muhimbili National Hospital	148	37.8
Billing category		
Intramural Private Practice Management	150	38.3
Public cost sharing	242	61.7

Majority of these women were admitted as referral patient from other periphery hospitals billed in public cost-sharing category. The mean age was estimated to 30year as most of them lie between the age of 25-29 and 30-34 years and more than (50%) had one normal delivery followed by current CS delivery. The public cost-sharing billing category has dominated over the Intramural Private Practice Management category (Table 6).

Table 7: Indications for emergency CS among women within low risk group (N=392)

Indication	Frequency (n)	Percentage (%)
Fetal distress	101	25.8
Obstructed labour	92	23.5
Arrested labour	88	22.4
Cephalopelvic disproportion	64	16.3
Abruption placenta	14	3.6
Placenta previa	12	3.1
Bad obstetric history in labour	10	2.6
Cord prolapse	7	1.8
Cervical cancer	3	0.8
Vaginal cyst	1	0.3

The common indications for CS among women of low risk were fetal distress 101(25.8%), obstructed labour 92(23.5%), arrested labour 88(22.4%) and CPD 64(16.4%). Fetal distress had a significant contribution to the CS rate among women of low risk. The other indications contribute to unavoidable CS to improve maternal and fetal outcomes. These less common indications have contributed to about 12% of the total CS performed among women of low risk group (Table 7).

Table 8: Proportion of cases attributes for criteria on the diagnosis of indications for CS among women of low risk group (N = 345)

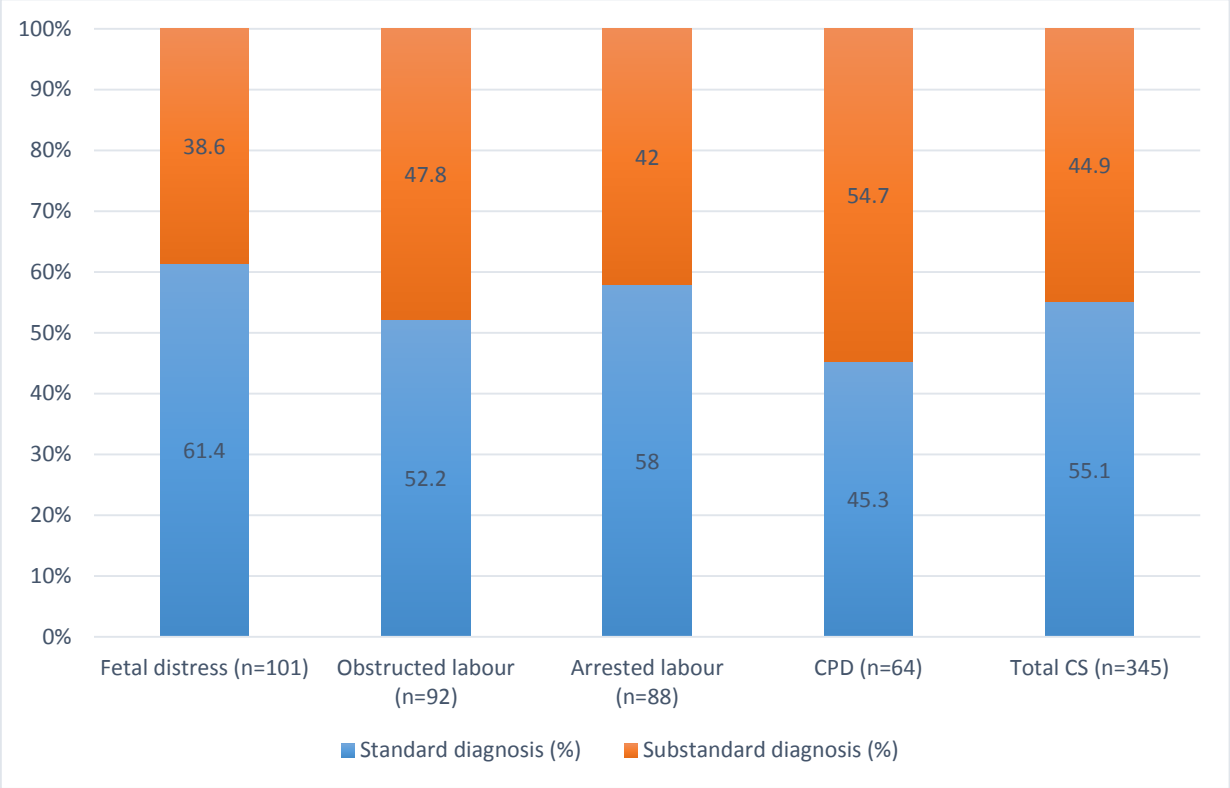
CRITERIA	ATTRIBUTES n(%)
Fetal distress (n=101)	
Major criteria	
Irregular fetal heartbeats (non-uniform fetal heart rate between the uterine contractions)[1]	53(52.5)
Abnormal fetal heart rate (≥180 or ≤100 beats/min)[1]	30(29.7)
Minor criteria	
Persistence of irregular heartbeats despite hydration and change of maternal position[2]	46(45.5)
Fresh meconium-stained liquor[2]	37(36.6)
Reduced fetal movement[2]	17(16.8)
Obstructed labour (n=92)	
Major criteria	
The prolonged active stage of labour of more than 8 hours' despite regular adequate uterine contractions[1] Adequate uterine contractions,[1]	9(9.8) 49(53.3)
Minor criteria	
Protracted cervical dilatation of < 1cm per hour[2]	25(27.2)
Protracted decent of the fetal head of less than one fifth per hour[2]	7(7.6)
The prolonged second stage of labour for more than 2 hours despite adequate uterine contractions[2]	11(12.0)
Presences of severe caput that imply the inability of palpate moulding or documented caput 2+ or more[2]	57(62.0)
Presence of severe molding that implies documented moulding 3+[2]	67(72.8)
Arrested labour (n=88)	
≥ 6cm cervical dilatation with ruptured membranes without progress despite 4 hours of adequate uterine contractions	16(18.2)
≥ 6cm cervical dilatation with ruptured membranes with inadequate uterine contraction despite 6 hours of oxytocin administration	24(27.3)
The prolonged second stage of labour for at least for 1hour.	11(12.5)
Cephalopelvic disproportion (n=64)	
At least 3cm of cervical dilatation and ≥ 80% of effacement	38(59.4)
Adequate uterine contraction for at least two hours.	32(50.0)
Abnormal labor partograph findings	31(48.4)

3-5 contractions in ten minutes lasting for 40 to 60 seconds.

[b] Cervical dilatation < 1cm/hour.

In the diagnosis of indications for emergency CS among the women of low risk group, the commonly used attributes for fetal distress were irregular fetal heart beats 52% and 45% for major and minor criteria respectively. The reduced fetal movement attributes were 16.8% that show to be low compared with other criteria because this group of women had active labour whereby the woman mostly experience contractions rather than fetal movement. For diagnosis of obstructed labour adequate uterine contraction has contributed the diagnosis of 53.3% as a major criterion with severe caput 62.0% and moulding72.8%as minor criteria. The cases attribute for each standard criterion for diagnosis CPD were nearly equally despite the condensed rate of standard diagnosis because the diagnosis is fulfilled by the presence of all three criteria. The criteria for diagnosis arrested labour where independent of each other for standard diagnosis, therefore, the summation of their attributes 58% made up the total proportion for its standard diagnosis (Table 8).

Figure 1: Proportions of indications for CS that meet the standard criteria for diagnosis among women of low risk group (N=345)



Standard diagnosis for fetal distress and arrested labour were 61.4% and 58% respectively which show that clinician had adhered the criteria for standard diagnosis better. The standard diagnosis for CPD was 45.3% had significantly contributed unsatisfactory proportion for overall standard diagnosis for CS among women of low risk population. (Figure 1).

4.0 DISCUSSION

During the study period common indications for emergency CS among women of low risk group were fetal distress, obstructed labour, arrested labour and CPD. Fetal distress was the most common indication of CS in this obstetric group, although obstructed labour had a significant contribution to the number of CS which were performed. These findings were similar to that obtained in a study conducted in Pondicherry, India which aimed to determine the indications for primary CS among all multiparas' women who had previous normal deliveries (34). The similarity of these findings could be due to comparable study setting as it was conducted in a tertiary hospital like MNH despite difference context and obstetric characteristic were not selected according to Robson's classification system.

The proportion for standard diagnosis for fetal distress was lower compared to that obtained from the previous study conducted in the same setting among the overall obstetric population. The may have been contributed by the diverse in population obstetrics characteristic and intervention that was made during in previous prior the audit and re-audit of CS (23). The intervention included involving physician and midwives during the development of the criteria for standard diagnosis of fetal distress and distribute the posters in the labour ward. The availability and accessibility of the criteria for fetal distress in the study site, clinical training to improve competency in diagnosis may have contributed to accuracy in the diagnosis of fetal distress. This finding may explain that in this setting this group of women contributes to the insignificant rate of standard CS performed among the general obstetric population.

The standard diagnosis for obstructed labour was half by half among women of low risk group who underwent CS due to obstructed labour. According to the study findings obtained by Mgaya at el on the assessment of standard diagnosis and management of obstructed labour among the obstetric population at MNH the standard diagnosis showed improvement in the re-audit phase (22). These showed that the emphasizing application of criteria among health care providers should be an ongoing process as standard of practice may be dropping as the interval of retraining increases. During our observation, the diagnosis of obstructed labour was contributed significantly by the three criteria which are the presence of caput, molding and

adequate uterine contraction. These findings may differ from previous studies because some of the criteria adapted were modified for standard diagnosis of CPD and arrested labour. The mechanism of labour and delivery process was seen as a challenge in prediction and accuracy in the diagnosis of obstructed labour in the previous study whereby prolonged first stage of labour which was interpreted as either arrested labour or CPD(22). Studies have shown the reputation of evidence based criteria in standard diagnosis of each indication for CS may add knowledge and skills of diagnosis of complications during management of women in labour (2).

Standard diagnosis for CPD was observed in less than half of the cases which were different from the previous study conducted to assess the adherence for standard criteria for standard diagnosis of CPD (25). Furthermore, these findings were different from another previous study that was conducted to assess the compliance of the same criteria for standard diagnosis of CPD that revealed excellence result (36). The different of these studies findings may have been contributed by lack criteria for standard diagnosis of CPD in the study site as CPD was overlapping with obstructed labour. The case attributes for each criterion for standard diagnosis of CPD were about half of the cases which showed that reduction of standard diagnosis might have been contributed by incomplete documentation as standard diagnosis required all three criteria.

Among CS performed due to Arrested labour more than half meet the criteria for standard diagnosis. According to the previous study conducted among the overall obstetric population at MNH, it was observed that standard diagnosis for arrested labour was low as the majority of women delivered per vaginal while in the waiting list for CS (37). Prior to the new agreed standard criteria for the diagnosis of arrested labour the prolonged active stage of labour was interpreted as an arrested labour that was one of the criteria for obstructed labour. This shows that an arrested labour diagnosis should be made while the require time for monitoring contraction and cervical dilatation with augmentation if indicate has been observed as the maternal and fetal conditions allowed. Maternal distress may necessitate the CS decision for a

woman who was in labour despite the excellent progress of labour process and interpreted as substandard if not documented.

4.1 CONCLUSION

The common indication for CS includes fetal distress, obstructed labour, arrested labour and cephalopelvic disproportional. More than half of CS performed during the study period had meet the criteria for standard diagnosis of obstructed labour, fetal distress, arrested labour and CPD.

4.2 RECOMMENDATIONS

We recommend the development of criteria for standard practice and monitoring of their utilization during clinical practice among health care providers. Further study is of great important to determine factors hinder adherence of criteria for standard diagnosis of indications for CS during clinical practice**.**

4.3 LIMITATION

During data analysis undocumented information were analysed by composite scoring as substandard that might have made the standard diagnosis CS be low as expected in tertiary level facility.

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APPENDICES

Appendix i: Checklist

1. Patient particulars
    a. Registration number
    b. Age
    c. Date of admission
    d. Date of operation
    e. Parity
    f. Number of living children
2. Payment status
    a. Cash
    b. Insurance
    c. Cost sharing
3. What is the patient admission status?
    a. Referral from other hospital
    b. From antenatal clinic at MNH
4. What is the documented indication for CS?
    a. Obstructed labour
    b. Fetal distress
    c. Labour arrest/ poor progress of labour
    d. Cephalopelvic disproportion/ big baby
    e. Cord prolapse
    f. APH
    g. BOH
    h. other specific…….

5. Tick yes/no column of criteria checklist in reference to the clinical bases used to make above indication for CS.

NO.	CRITERIA	YES	NO
	Criteria for Labour arrest		
	a. First stage of labour		
1.	≥ 6cm cervical dilatation with ruptured membranes without progress despite of 4 hours of adequate uterine contractions		
2.	≥ 6cm cervical dilatation with ruptured membranes with inadequate uterine contraction despite of 6 hours of oxytocin administration		
	b. Second stage of labour		
3.	Prolonged second stage of labour for at least for 1hour.		
	Criteria for CPD		
1.	At least 3cm of cervical dilatation and ≥ 80% of effacement		
2.	Adequate uterine contraction for at least two hours (3 to 5 contractions in 10min lasting 40 to 60sec.)		
3.	Abnormal labor patograph findings (i.e. protraction and arrest disorders)/ cervical dilatation < 1cm/hour/no decent		
	Criteria for fetal distress		
	a. Major criteria		
1.	Irregular fetal heartbeats (non-uniform fetal heart rate between the uterine contractions)		
2.	Abnormal fetal heart rate (≥180 or ≤100 beats/min).		
	b. Minor criteria		
1.	Persistence of irregular heartbeats despite hydration and change of maternal position		
2.	Fresh meconium-stained liquor		
3.	Reduced fetal movement		
	Criteria for diagnosis of obstructed labour		
	a. Major		

1.	Prolonged active labour of more than 8 hours despite of regular adequate uterine contractions		
2.	Adequate uterine contractions		
	b. Minor		
1.	Protracted cervical dilatation < 1cm per hour		
2.	Protracted descent of the fetal head at less than one -fifth per hour		
3.	Prolongation of second stage of labour for > 2 hours despite of adequate uterine contractions.		
4.	Presence of severe caput, which imply inability to palpate moulding, or documented caput of ≥2+.		
5.	Presence of severe moulding implying documented moulding of 3+		

6. Who made decision for CS
    a. Registrar
    b. Resident
    c. Specialist
7. What were the maternal CS delivery outcomes within 24hours of post CS?
    a. Alive normal
    b. ICU admission
    c. PPH
    d. Maternal death
8. Birth weight
    a. < 4000 grams
    b. > 4000 grams
9. What are the fetal outcomes of CS from delivery to 24hous post CS?
    a. Still birth
    b. Low scow at 5^{th} minutes
    c. Score above 7 at 5^{th} minutes
    d. Neonatal asphyxia
    e. Early Neonatal death

Appendix Ii: Ethical Clearance

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

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Ref. No. DA.287/298/01A/

27th July, 2018

Dr. Murete S. Lukumay
MMed. Obstetrics and Gynaecology
MUHAS

RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED: "REVIEW OF INDICATIONS FOR CAESAREAN SECTION AMONG LOW RISK GROUP DELVIERED AT MUHIMBILI NATIONAL HOSPITAL"

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 27th July, 2018 to 26th July, 2019. In case you do not complete data analysis and dissertation report writing by 26th July, 2019, 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 Medicine

Appendix iii: Permission to Collect Data

MUHIMBILI NATIONAL HOSPITAL

Cables: "MUHIMBILI"
Telephones: +255-22-2151367-9
FAX: +255-22-2150534
Web: www.mnh.or.tz

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P.O. Box 65000
DAR ES SALAAM
Tanzania

In reply please quote: MNH/TRC/Permission /2018/384 07th August, 2018

Head,
Records Department,
Muhimbili National Hospital

RE: PERMISSION TO COLLECT DATA AT MNH

Name of Student	Dr. Murete S. Lukumay
Title	"REVIEW OF INDICATIONS FOR CAESAREAN SECTION AMONG LOW RISK GROUP DELIVERED AT MUHIMBILI NATIONAL HOSPITAL".
Institution	Muhimbili University of Health and Allied Sciences .
Supervisors	Prof. Andrea B. Pembe .
Period	7/8/2018 to 30/2/2019 (6 months)

Permission has been granted to **Dr. Murete S. Lukumay** to collect data for the above study.

Please ensure that the researcher abide to the ethical principle and other conditions.

Sincerely,

13/8/18

Dr. Joan Rugemalila
Ag. Head of Teaching, Research and Consultancy
Coordination Unit

HEAD, TEACHING RESEARCH & CONSULTANCY UNIT
MUHIMBILI NATIONAL HOSPITAL
P. O. BOX 65000

c.c. DICT
c.c. **Dr. Murete S. Lukumay**