Caesarian Section Rates at Windhoek Referal Hospitals, Namibia by Robson Classification: A 3 Month Retrospective Cross-Sectional Study

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ABSTRACT

Introduction: There has been a global rise in caesarian sections that translates into a rise in maternal and foetal morbidity that is associated with caesarian section. A tool needs to be in place to monitor the caesarian sections and deal with this rise. The WHO recommended the use of the Robson Ten Group Classification this tool.

Methodology: Women who delivered via caesarian section between 01 May 2024 and 31 July 2024 were classified according to the Robson Ten Groups Classification. Those who's files were missing were not classified and hence excluded from the analysis. Indications in each group as well as the overall indications were noted and the caesarian section rate during the study period was also determined.

Results: The overall caesarean section rate during the study period was 36.6%. Group 5, 10 and 1 contributed 30.5% [242/794], 17.6% [140/794] and16.4% [130/794], respectively these were the highest groups contributing 64.6% of the total c-sections. The most common indication for c-section was a pathological cardiotocography (foetal distress)

Conclusions: Attempts should be made to avoid the first c/section as group 5 being high is shows that women receiving a c-section are at a higher risk for a subsequent one. Intrapartum foetal monitoring practices should be revised to prevent or reduce the rise in c-sections due to a pathological CTG.

Key words: Robson Ten group Classification, Caesarian sections, Pathological CTG,

INTRODUCTION

A caesarian section is the most common major surgery performed around the world (Jauniaux & Grobman, 2016) and involves the making a surgical incision into the mother's abdomen and uterus in order to deliver the baby. It can be done either electively or for emergency reasons. Although a C- section can be a lifesaving procedure for both the mother and baby it is not without its draw backs. These may include infections, anesthetic complications, hemorrhage, prolonged hospitalization, placental pathologies, uterine rupture and increased cost of hospital stay (Rukewe et al., 2022). Despite these complications, caesarian section rates have increased worldwide from 7% in 1990 to 21% presently (Angolile, C.M et al 2023), with Rukewe et al (2022) finding the rate in Windhoek, Namibia to be 18,3%.

This increase translates into a high health care costs and increased risks to both mother and baby (as Cited by WHO, 2015). Which in the Namibian context is a heavy burden on the government which provides healthcare

for 82% of the population (Christians, F 2020) and spends the highest proportion of its national budget on healthcare. With C- sections proven to be a high financial burden on health systems, there needs to be a monitoring tool in place that can help ameliorate the effects of an Increasing C-section rate. The WHO previously recommend an ideal rate of about 10-15% in an attempt to keep rates down, but they have since moved away from this.

Although the WHO no longer recommends an Ideal C- section rate at population level, it has found that mortality rates for both mother and children only decrease until a rate of 10% (WHO 2015). Further stating that the decision to perform a c-section should be case based and not in order to reach a specific target rate. The challenge was then finding the point where medically indicated c- sections are at their minimum while medically unnecessary operations are avoided.

At the heart of this challenge was that there was no internationally accepted classification system to produce standardized data which could be used to assess the primers of the uptrend across different populations.

Among the classification systems that are available, the Robson Classification proposed by Dr. Michael Robson in 2001, was found to be optimal for monitoring C-sections in a systematic review of caesarian section classifications done by Torloni MR et al (2011). Furthermore, the WHO (2015) has also recommended this classification as the global standard for monitoring of C sections. The Robson classification places woman into 10 groups based on pre-determined obstetric characteristics, thus reducing confounding factors. This would allow for the auditing of C- sections and focused intervention on groups with the highest C-section rates across different populations and even facilities within a country. Moreover, this standardized system would allow for comparison across different settings and adaptation of proven intervention strategies.

This research study aimed to classify women that underwent caesarian sections according to the Robson classification. The study would also determine the overall rate and furthermore establish the reasons for the group which contributes the most to this rate doing so.

Problem statement

The proposed study would classify the woman undergoing C sections at the referral hospitals in Windhoek into the Robson 10 groups classification. Thereby determining which groups contribute the most to the caesarian section rate as well as the indications within these groups. This would assist in finding strategies to reduce the rates among these groups by finding focused intervention strategies or mimicking strategies already in place in other facilities with relatively similar resources. The overall Caesarian section rate will also be determined in this study.

Significance of the study

During the literature search, only 2 similar studies, by Rukewe A et al (2022) and Shikwambi H.I.T (2014), classifying caesarian sections according to the Robson system in Namibia were found. Carrying out this study would help add significance to these previous studies and see if the results can be replicated. The data collected in the study would give a more up to date Robson distribution at the Windhoek referral hospitals, which is The WHO endorsed tool for monitoring C-section rates. It can also provide an idea of which specific groups interventions should be targeted to in order to optimize C-section rates. The optimization of the c-section rates would then hopefully help reduce the high financial burden that c-sections are notorious for (WHO, 2015)

Main objective of the study

Determine and establish the rates of caesarian section by Robinson classification at Windhoek Central Hospital for three months period.

Specific objectives

a) Determine the overall caesarian section rate during the study period.

b) Classify women that have undergone C-sections according to the Ten group classification

c) Establish different groups obtained as well as determining the indications within each group.

d) Determine the highest factors contributing to groups and to caesarian section rate

METHODOLOGY

Research design and setting

The research design was quantitative, performed cross-sectionally and retrospectively and the obstetric data of women that have undergone caesarian sections from May 2024 to July 2024 was collected. The caesarean section rate during the study period was determined by the quotient of the number of caesarean deliveries and the total number of deliveries.

This study was conducted at the Windhoek referral hospitals namely Windhoek Central Hospital as well as Katutura Intermediate hospital. Specifically, under the Obstetrics and Gynecology department which functionally encompasses both hospitals.

Study population and sampling method

The study population comprised of pregnant women who have undergone caesarian sections at the Windhoek referral hospitals, whether electively or for emergency reasons. It was limited to state patients.

The sampling method used was purposive sampling and the characteristic that was chosen were those that had undergone a caesarean section during the defined study period. The number of participants was based on the number of files that were retrieved from the records room.

Data collection tools and method

The data was retrieved from the hospital archives as well as the statistics collected by the Obstetrics and Gynecology department. The collection tools that were used during the study are those that are outlined in the WHO Robson classification implementation manual (WHO 2017). These tools include the

- The Robson classification table (Appendix A)

- The Robson classification table with Sub divisions (Appendix B)

- Flow chart for the classification of women in the Robson classification (Appendix C)

- Description of Core variables (Appendix D)

- The Robson classification Report table (Appendix E)

All data was collected manually from the records available. However, two record locations exist, the nurse in charge of the maternity ward keeps statistics which include the total number of deliveries divided into the different modes of delivery. The other location is the records room where the Maternity patient files are kept. The obstetric characteristics as well as indications for caesarean delivery were found from the patient files and the absolute number of deliveries as well as the subset of caesarean deliveries and normal vaginal deliveries were obtained form the statistics kept by the Nurse in charge of the maternity wards. The data from the nurse in charge was deemed to be superior for determining the caesarean section rate during the study period as it is less impacted by lost files, poor storage etc. But less so for determining the Robson grouping as no obstetric data was recorded.

While collecting data, the WHO flow chart (Appendix B) was used to group the woman into each of the ten groups. The flow chart was used in conjunction with the provided descriptions of the variables (Appendix C)

as outlined in the implementation manual in order to have a more standardized grouping. If the gestation was not known or noted a weight of >2.5kg at birth was considered as a gestational age of >37 weeks, this method was also used in previous similar studies.

Based on a previous similar study by Rukewe et al (2021), which found that group 5 is the highest contributor. It was opted to subdivide group 5 into 5.1 (women with one previous c-section) and 5.2, (women with 2 or more previous C-sections). This is because current recommendation is that after one previous C-section, a TOLAC can still be attempted unless obstetric contraindications exist. Thus, subdividing this group will impact possible recommendations to be made. After the patients are correctly classified. Data was then be entered into the Robson classification report table (Appendix D). The Report table was only filled for the columns that were significant to the study as the other columns include data for women who had undergone normal vaginal delivery.

Indications of each caesarian was recorded simultaneously with the grouping as to ascertain the indications in each group. Specific indications in group 5.2 (all multiparous women with two or more previous C-sections, cephalic presentation >37 weeks) were not recorded as the description of this group is an indication for caesarean section in itself. This was also done for groups 6, 7, 8 and 9 for the same reason.

Data analysis

The data was collected manually and entered into a Microsoft Excel spread sheet and quick analysis was done as the data set was not complex. Files that could not be retrieved were not included in the analysis of the data but were used for determining overall rates. The Specific Robson group was used as the independent variable in the analysis of both the absolute contribution of the group to the caesarean section rate as well as for the specific indications which were the dependent variables.

Limitations of the study

This study's main limitation arose from the fact that it was be limited to women who have undergone a caesarian section. The classification system is however not limited to woman who have undergone a caesarian section and all pregnant woman can be classified into a specific group. All women being classified helps determine which women are likely to go into a caesarian section based on previous classification data. The fact that this system is not implemented at the research setting and no previous classification data exists makes the inclusion of all women futile. Hence the researcher opting to not include all women.

Ethical consideration

The proposal will be submitted for approval to the Ministry of Health and Social Services as well as the university of Namibia School of medicine review board. This will then be presented to the hospital superintendent who will grant permission for the maternity records to be used in the study. No consent will be required from the women that have undergone the caesarian sections as the study will be retrospective in nature and no personal identifying data will be collected and data will be strictly limited to the obstetric characteristics.

RESULTS

During the study period there were a total of 2632 deliveries of which 964 were Caesarean deliveries and the rest vaginal deliveries. 24 private patients delivered via caesarean section during the study period and were not classified. Only 794 files of state patients who had undergone reaesarean delivery could be retrieved and were classified into each of the ten groups. 146 of the files that were not found were added to group 99 of the Robson classification which defines the group as "could not be classified. The special group 99 was not analyzed as part of the Robson ten groups as it is more a measure of the quality of record keeping and does not tell anything of the caesarean section rate. Only 794 patients were Analyzed

Robson Caesarian section rate

During the study period an overall cesarean section rate of 36.6% [964/2632] was found. This was done by using the absolute number of caesarean sections, inclusive of files that could not be retrieved as this provides more accurate picture of the rate. The 10 groups were calculated as according to how much each group's absolute to the 794 files retrieved was.

Group 5 contributed the highest at 30.5% [242/794] with the sub-groups 5.1 and 5.2 contributing 16.9% [134/794] and 13.6% [108/794] respectively. Group 10 was second at 17.6% [140/794], group 1 at 16.4 [130/794] and group 3 the fourth highest contributor at 15.7% [125/794]. These 4 groups contributed 80.2% [637/794] to the caesarean sections. The rest of the groups namely group 2, 5.5% [44/794], group 4, 4.9% [39/793], group 7, 4.3% [34/794] group 8, 3.0% [24/793], group 6, 1.6% [13/794] and finally group 9 0.4% [3/794], contributed 19,8% to the total caesarean sections. (Figure 1: Robson groups distribution)
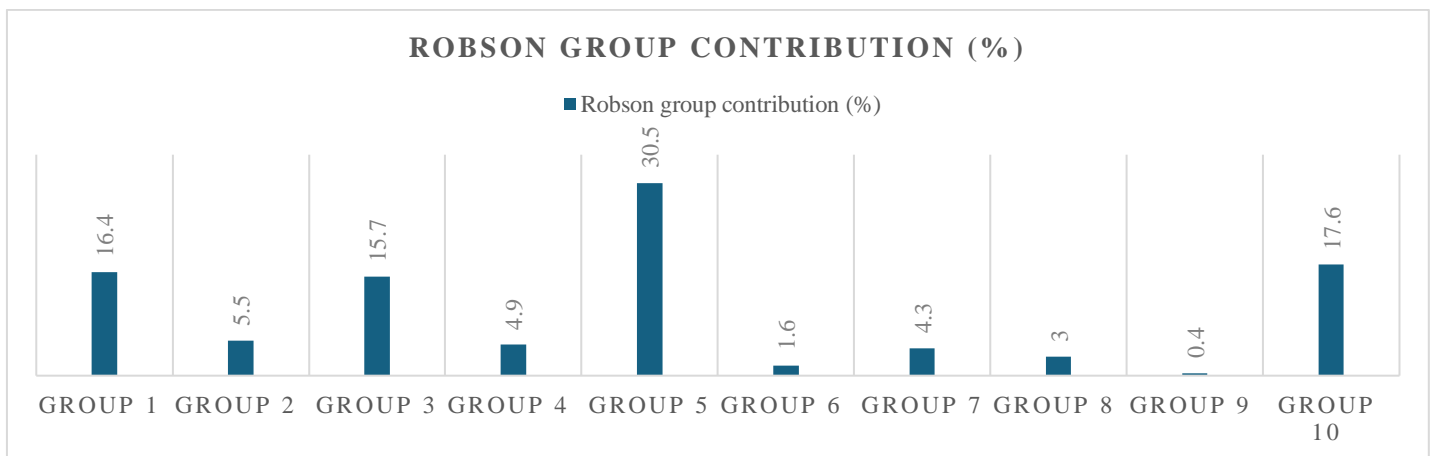

Figure 1: Robson groups distribution

Indications for caesarean section

The most common indication was a pathological cardiotocograph 37.4% [297/794] then two or more previous caesarian sections 13.6% [108/793], Elective caesarean section 7.68% [61/794], one previous caesarean section plus an obstetric indication 6.42% [51/794], and malpresentation 6.3% [50/794] followed in that order. These 5 mentioned made up 71.4% [594/794] of the total number of indications for caesarean sections. With the rest of the indications making up 28.6%. The indication labeled "maternal condition" refers to any condition that contraindicates the mother for a normal vaginal birth and those found in this study were previous myomectomy, cardiovascular diseases and active herpes infection. While the fetal condition similarly refers to conditions that contraindicates vaginal birth which here were hydrocephalus, multiple congenital anomalies as well as an intrauterine fetal death in no particular order of significance. Figure 2: Indications for caesarean section shows a visual representation of this data.
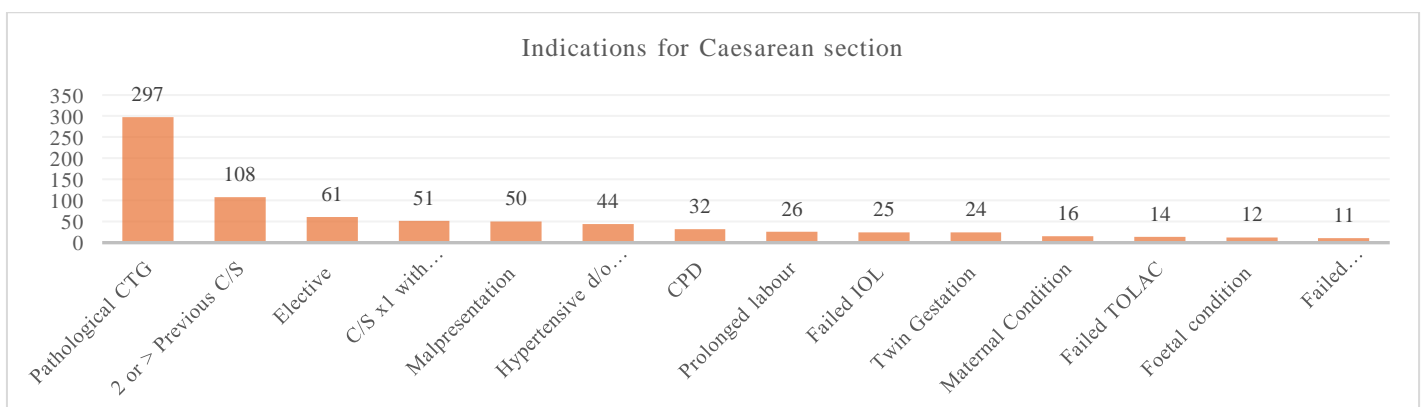

Figure 2: Indications for caesarean section

A pathological CTG was the most common indication for caesarean section for group 1 58.5%[76/130], group2 47.7%[21/44], group3 76% [95/125], group4 59% [23/39] and group10 45% [63/140]. While group 5.1 was an obstetric indication for C-section in the presence of a previous history of caesarean section. Groups 5.2, 6, 7, 8 and 9 were all each dominated by one indication which defines their group. For example, group 5.2 the only indication is x2 previous caesarean sections which is how the group is defined, similarly group 9 (all women with single pregnancy with a transverse or oblique lie) in which the indication was malpresentation.(Figure 3: Specific indications within each of the groups)
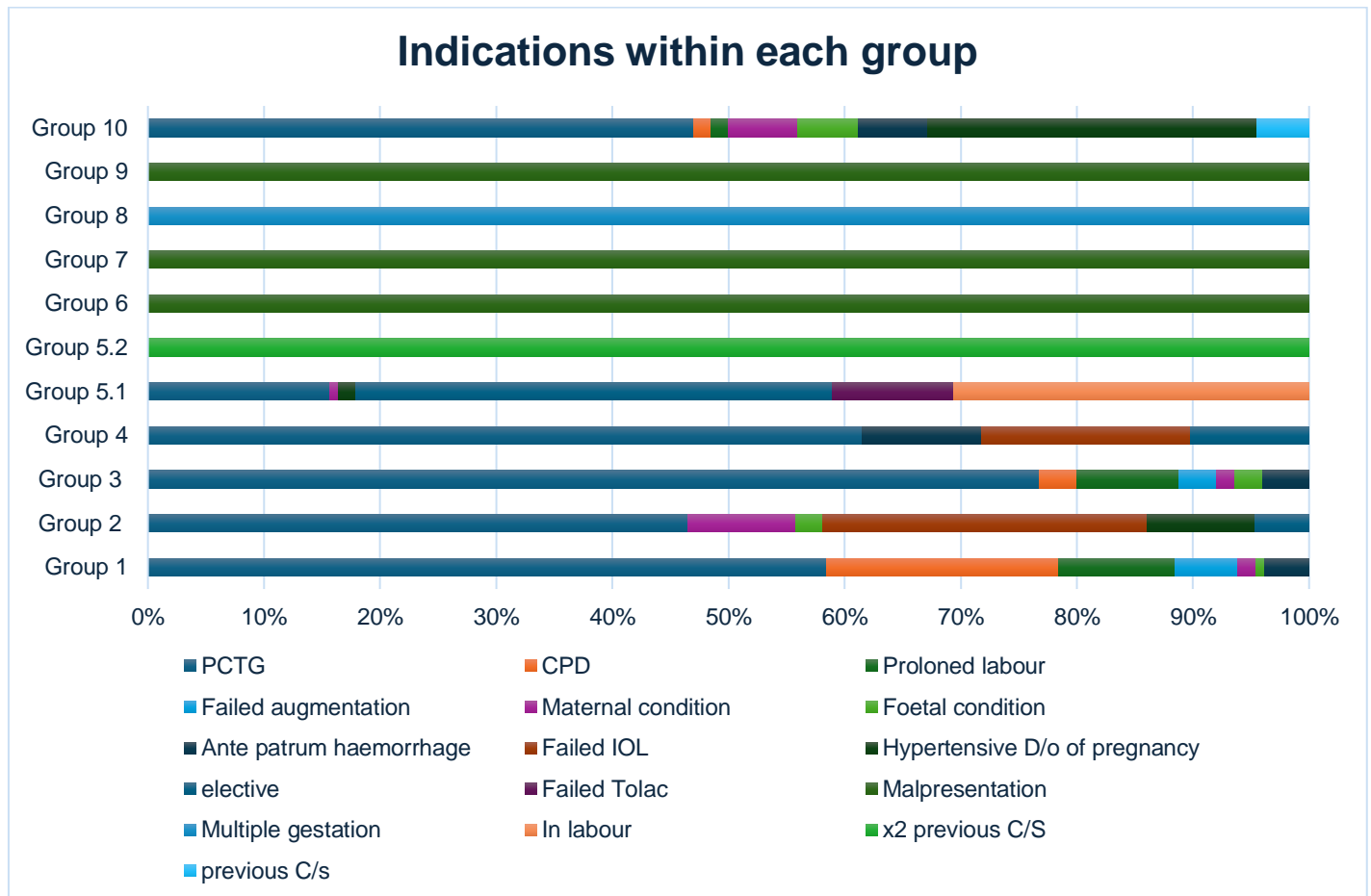

Figure 3: Specific indications within each of the groups

DISCUSSION

The study showed the C-section rate to be 34.6% and that that the women in groups 5, 10, 1 and 3 contributed the highest to the total number of caesarean sections in that order and hence the rate. The most common indication was the presence of a pathological cardiotocograph (PCTG) followed by 2 or more previous c sections.

The C-section rate was much higher than what was previously found by Rukewe et al (2022), who stated it to be at 18.3%. This is quite concerning as the 2 studies were performed at the same setting over the same study period. Comparatively there were an absolute number of 556 in the study by Rukewe et al (2022) and 964 during this study. This is a dramatic increase in the number of c-sections performed over 3 months. The variation could be accounted for by the differences in the most common indication which in this study was a pathological CTG which is indicative of fetal distress while Rukewe et al (2022) study found mothers that have had two or more previous c-sections to be the most common cause. The cardiotocograph (CTG) is what is used to monitor a woman's contractions as well as the baby's heartbeat, either antepartum or intrapartum in order to assess for fetal hypoxia. Although the CTG is an indispensable tool that reduces perinatal morbidity and mortality, it has been associated with increased caesarean sections (Alfirevic Z. et al, 2017). This point is brough fourth here in order to demonstrate that the caesarean section rate may have increased due to the

number of available CTG's having increased at the research setting from the time of the study conducted by Rukewe et al (2022) study to the current one.

Groups 5, 10,1 and 3 were found to be the highest contributors to the caesarean section rates, similar to the already alluded article of Rukewe et al which also had the same order in which the groups contributed to the caesarean rates. This then comments to the generalizability of the results found in this study. The highest contributing groups matched that of a similar south African study by Makhanya V (2015) albeit the order of the South African study was different (Group 1, group 10, group 5 then group 3). This follows the trend of many studies where group 5 was the highest contributor, suggesting that the presence of a previous caesarean section puts the woman at a higher risk of a subsequent caesarean section.

In this study group 5 (multiparous women with single intrauterine pregnancy at term with a previous c-section) was subdivided into group 5.1 (one previous c-section) and group 5.2 (two or more previous c-sections) as the former group would still be eligible for a normal vaginal or assisted vaginal delivery after the first caesarian section. The highest indication in this group was the presence of another obstetric indication (PCTG, hypertensive disorder etc.) followed by Elective reasons (maternal request or refusal to trial labor). This group can be reduced with proper counselling of the benefits of a vaginal birth as opposed to a caesarean section, the risk of litigation in case of a poor outcome or a poor outcome just in general, the most dramatic being a uterine rupture may however deter the obstetrician from vigorously recommending this method (Angolile C.M et al, 2023). The shortfall of this study is that women that belonged to group 5.1 (previous c-section) and then went on to have a vaginal birth were not classified and could thus not be used as a comparative. Hence conclusions cannot be made about the uptake for attempts at a vaginal birth after caesarean section (VBAC) from both the obstetrician and the parturient.

On the other side of the spectrum group 9 0.3% and group 6 were the lowest contributors. For group 9 specifically it is so low because an oblique and transverse lie are unstable positions as the baby will more often than not revert to cephalic or breech presentation. In the case of group 6 (nulliparous women with a single intrauterine pregnancy in breech presentation) the group may be low because most breech babies turn to the cephalic position by 36-37 weeks (Noli S.A et al, 2019).

The study showed the most common indication to be a pathological CTG with this making up 37.4% [297/794] off all indications followed by 2 or more previous c-sections at 13.6% [108/793]. This is a shift as a previous c-section is often the most common indication for caesarean as was seen in the study by Rukewe et al (2022) as well as in a systemic review on prevelance indications and complications of caesarian sections in health facilities across Nigeria by Itohan Osayande et al (2023).

As previously mentioned to, the use of a Cardiotocograph increases the rate of c-sections partly due to its subjective nature of interpretation. As such, different international guidelines exist for the use of the CTG in order to circumvent this increase. The American College of Obstetricians and gynecologists suggest that ,even in low risk women, the CTG may be used. While other organizations such as the World health organization (WHO), The international federation of obstetricians and gynecologists (FIGO) as well as the National institute for Health and care excellence (NICE) all discourage the use of a CTG in low risk women and rather advocate for intermittent auscultation of the fetal heart rate. The intermittent auscultation usage was found to be an ameliorating factor in reduction of emergency c-sections without compromising neonatal and maternal out comes (Al Wattar B.H et al 2013). Low risk women are those in which no abnormality which would put them at risk of maternofetal compromise exists (Danilack, V. A., Nunes, A. P., & Phipps, M. G. 2015).These women are usually found in group 3 (multiparous women at term with no previous c/s) of the Robson ten group classification.

The use of intermittent auscultation for low risk women is however not practiced at the Windhoek referral hospital. At the research setting it is routine that every woman receives a CTG regardless of risk status, this happens despite the lack of evidence demonstrating this as beneficial. This can be the cause of the rise in c-sections as well as the increase in a pathological CTG being the indication for c-section. This is especially true in Group 3, which is a group that is at a lower risk for C-section (WHO,2017) and intermittent auscultation

would be recommended in the absence of other risk factors. In group 3 however, a pathological CTG makes up 76% of the indications for c-sections.

The weakness here is however that the risk status of the women that received the indication of the CTGs were not assessed in this study, so it cannot be definitively stated that the women in group 3 were low risk. The findings in this study can hopefully help point toward the need for looking into other methods of intra-partum fetal monitoring or refining the use of the CTG.

The researcher admits to weaknesses in the study pertaining to the collection of other maternal characteristics which would have better helped in charactering the women and explaining some of the occurrences. The retrospective nature of the study and anticipated poor record keeping at the research setting however made it difficult to include these data sets.

CONCLUSIONS

In this study the Robson Ten group classification was used to distribute woman according their obstetric characteristics. Group 5 was found to be the highest contributor which can be said to show that avoiding the first caesarean section as safely as possible is key in reducing the caesarean section rate. The caesarean section was also high at 34.6% and this can be attributed to the rise in the use of CTGs for intrapartum monitoring as an abnormal finding on CTG was the highest overall indication and also the leading indication in most of the Robson groups.

Other methods should be utilized when possible such as assisted vaginal delivery for prolonged labor due to various causes such as poor maternal effort or inadequate contractions unless contraindicated or external cephalic version for breech presentation in presence of experienced personnel. The use of a computerized cardiotocograph can also be used for fetal monitoring as it is more objective and interpretation of the fetal well being will not be as according to the skill of the interpreter.

Further research is required to asses specific maternal characteristics of women in different groups that would show why they are more likely to be classified as such. The neonatal outcomes of the use of the CTG on low risk mothers to determine if it is needed should also be considered.

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