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Risk Factors For Caesarean Section Due to Cephalopelvic Disproportion at Sakubva Hospital in Mutare District Manicaland Zimbabwe

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Abstract

Cephalopelvic disproportion (CPD) was identied as the commonest indication of caesarean section (CS) . Failure to recognize cephalopelvic before or during labor is associated with fatal complications on the pregnant mother and the foetus . The average caesarean rate at Sakubva district hospital from 2018 to 2020 was 36.4% which is higher above compared to the Zimbabwean national C/S rate of 6 % and the WHO recommended CS rate of 10-15 % . The present increase in CS at Sakubva district is alarming and is a major concern, hence there is need to investigate the major risk factor which could have influenced its rising. Therefore, the current report aimed to assess the various risk factors associated with caesarean section with regard to CPD at Sakubva district hospital in 2021.An analytic cross-sectional study was used taking data from January to December 2021 to investigate risk factor associated with CS due to CPD at Sakubva district Hospital. Data were collected from the theatre and delivery register where records of 1950 cases of CS (348 cases of CS due to CPD and 1602 cases CS with no CPD) in 2021 were Censued purporsely. Chi square test was used to test associatinon betwenn CS due CPD and various risk factors using Graphc pad (Prism version 6) and P< 0.05 was considered as statistialy significant . The overall prevalence of CS due to CPD was 18% and major risk factors associated with CS due to CPD (P< 0.05) were maternal age ≤18 years (OR2.6, 95% CI 2.03 -3.5), primigravida (OR 1.6, 95% CI 1.2 -2.2), age of gestationa ≥40 weeks (OR 2.1, 95% CI 1.6 – 2.6) , being unreferred (OR 3, 95% CI 1.9 -4.6), living in rural setting (OR 2.9, 95% CI 2.2-3.7), ANC visit < 4 (OR 1.4, 95% CI:1.1- 1.8) maternal height ≤150 cm (OR 20.5, 95% CI :7.6-54.8). High prevalence of CS due to CPD was found in this study, significant risk factors associated were mainly maternal but not neonatal which could have adverse maternal and perinatal outcome therefore intervention such as proper antenatal screening of patient with risk factors and health education, training of health workers, use of partograph and timely CS is needed.

INTRODUCTION

Increase in the CS rate is widely observed a cross the globe and china alone reported a CS rate of 46% while the CS rate of 25% or above was documented in several Asian, European nations and other part of the world including USA and Latin America (Hafeez et al., 2014). Around 20 million CS deliveries took place every year worldwide(Soto-Vega et al., 2015) . The rate of deliveries by CS among womens have drastically increased in an ascending manner for both developed and developing countries and

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this was corresponding to an average prevalence rate of 33%; prevalence ranges was from 4% for Africa to 29% for Latin America and Caribbean nations . In Zimbabwe context the CS rate was 6% in 2016(Gutema and Shimye, 2014). As CS is increasing world-wide similtanously cephalopelvic disproportion(CPD) is recognised among the major indications of CS (Waniala et al., 2020). In Sub-Saharan Africa CPD is one of the commonest indication for caesarean section (Dumont et al., 2001). Failure to recognize CPD in labor may result in obstructed labor which is identified as one among the five most common cause of maternal death in developing countries(Khan et al., 2006, Nwogu-Ikojo et al., 2008). Complication of obstructed labour includes maternal deaths, rupture of uterus, postpartum haemorrhage, puerperal sepsis, recto-vaginal fistula (RVF), injury to the urinary bladder wall, Vesico-Vaginal fistula (VVF), as well as asphyxia at birth and stillbirth (MacKeith and Wur, 2013). CS contributed in incresease in neonatal and maternal mortality in Zimbabwe where in the country a higher rate of maternal and neonatal morbidities and mortality were reported with a neonatal mortality rate (NMR)^ of 24 deaths per 1,000 live births according to Inter-agency United nation Group for Child Mortality Report (UNICEF, WHO 2015). Accordingly UNFPA reported in Zimbabwe a Maternal mortality of 363 per 100,000 live births based on preliminary data of the year 2022 Housing and Population Census) and those figures are quiet alrming. Sakubva District Hospital (SDH), similar to other district hospitals in Zimbabwe provide Caesarean section as an essential obstetric service to pregnant women. According to preliminary data from (DHIS2) there was gradual increase in the prevalence of CS across Sackvuva district from 2018, 2020 up to 2021 . In 2018 year alone there was 1869 CS out of 4922 total delivery giving a prevalence of CS 37.5 % .Furthermore in year 2020 there was a total of 4834 delivery out of them 1710 case were CS given a prevalence of CS of 35%. To add to those DHIS statistics Sakubva district situation worsen in 2021 were the hospital reported a total of 5214 deliveries of which 3261 normal deliveries, 1953 CS giving a CS rate of 37.4 %.(DHIS2). The years 2018, 2020, 2021 high CS rate (37.5% ,35%,37,4%) found at SDH (DHIS2) reveled a sustained higher CS rate which is above the Zimbabwean national C/S rate of 6 % (Maswime and Buchmann, 2017)and the WHO recommended C/S rate of 10-15 % (Betrán et al., 2016). The major indicator leadind to CS at SDH was cephalopelvic disproportion (CPD) and studies have shown that CPD in labor may result in obstructed labor which is one of the five major cause of maternal death in developing countries (Khan, 2006 and Ngwogu et al., 2010). The present increase in CS in Sakubva district is alarming and is a major concern, hence there is need to investigate the major risk factor which could have influenced its rising Several studies have reported major indicators for CS such as CPD including in recent study conducted in ethiopia (Mariam et al 2022) which stipulated the leading indications for CS were: nonreassuring fetal heart rate (NRFHR), (CPD), previous CS mal-presentation and position(G/Mariam et al., 2021). Accodingly this current report aimed to evaluate the various risk factors associated with caesarean section with regard to CPD which is one of the leading indication for caesarean at Sakubva district hospital, determine the prevalence of CS due to CPD and to evaluate the sociodemographic ,obstetric and neonatal risk factors associated with C/S due to CPD in 2021.

METHODS

An analytic cross-sectional study was used where records of mothers who delivered by C/S due to CPD from January 2021 to December 2021 in a retrospective manner and data from Key informants. We investigated the prevalence and used analytical study design as well to evaluate risk factor associated with caesarean section due to CPD at Sakubva District Hospital at a single point of time. This study was carried out at Sakubva District Hospital, which is located in the old location of Sakubva in Mutare, Manicaland Zimbabwe. Sakubva district hospital is a maternity hospital that provides secondary level of health care and offers comprehensive obstetric services namely : antenatal care, normal deliveries, caesarean section and postnatal care. Free maternity care is provided at the Sakubva District Hospital starting from 2012 through approach named results-based financing (RBF). RBF cover the costs that the hospitals claimed from providing free maternity services. The hospital receives Referrals from 15 urban clinics in Mutare city and 42 clinics from Mutare rural which make it the busiest maternity unit in Manicaland. In 2021 the hospital registered a total of 5214 deliveries.

In 2021 a total of 5214 deliveries took place at Sackuba district , out of them 3261 were normal vaginal deliveries and 1953 were deliveries by CS .The target population of the study consisted of the records of mothers whose deliveries was by caesarean section and have satisfied the inclusion criteria from January 2021

to December 2021 ,this yield 1953 mothers and this was through census data procedures that allow to collect data from the whole population having the charateristics of interest for this study. With census the more large is the sample size the more greater is the precission with regards to unknown parametters. The current study being retrospective therefore health workers from antenatal clinic, maternity, postnatal ward and operating theatre were selected as key informants with respect to their area of speciality to further support our findings despite our study being retrospective relaying on secondary data.

All mothers whom mode of delivery was by caesarean sections at Sakubva, their medical report were included between 1 January 2021 and 31 December 2021.Criteria for diagnosis of CPD included pregnancy at term (37 or more completed weeks of gestation) live fetus in cephalic Vertex presentation in labour with disparity between the fetal head and maternal pelvis or when there is evidence of a prolonged first stage> 12 hours with presence of caput and moulding or above two hours in the stage two of labour in the absence of malpresentation or descent of the fetal head (Connolly et al., 2003), which ended in caesarean section delivery. For health workers as, key informant our inclusion criteria were all health workers from antenatal clinic, maternity, postnatal ward and operating Obstetrics theatre at Sakubva district hospital. Records of mothers who had C/S due other causes such as breech, malformation, malpresentation, multiple pregnancy and pelvic tumours were not included in our study because they did not fit the case definition of CPD. Women who had vaginal delivery and unclear medical record were not included. Health workers who were not from antenatal clinic, maternity, postnatal ward and operating Obstetrics theatre at Sakubva district hospital were not included.

Several methods are available in sample size determinations including census data procedures which was used in study because it has seveal advantages: It allow to collect data from the whole population, where more large is the sample size and more greater is the precission with regards to unknown parametters. To determine our sample size and prevent sampling error we have used a census data procedure where participants are sampled through complete enumeration therefore this stipulated that our sample size is equivalent to our population size meeting the inclision criteria. Accordingly based on Sakubva District medical records in 2021 a total of 5214 deliveries took place at Sackuba district where out of them 3261 were normal vaginal deliveries and 1953 were deliveries by CS among which 1950 meet the inclusion criteria and were sample in this present study . In addition 3 women were excluded due to missing data or incompleted reccords. This yield a sample size of 1950 (CS with no CPD 1602 cases and CS with CPD 348 cases).

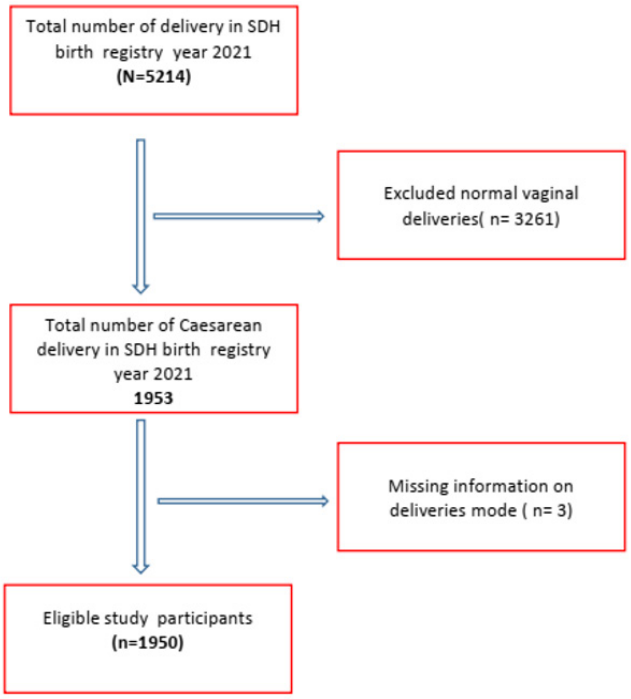

Figure 1. Eligibilty and Sampling Procedure

Purposive census sampling a non-probability sampling was used, precisely its subtype known as total population sampling through which the entire population having one or more shared characteristics was applied to select patient's records from January to December 2021 (figure 1 below) in addition health workers as key informants were sampled purposely and interviewed.

The dependent variable in our study was caesarian section due to CPD and independents variables were sociodemographic, obstetrical and neonatal characteristics which included: maternal age, parity, gestational age, ANC visit, place of residence, referral status, and numbers of ANC visit, maternal height, stature, birth weight, head circumference, Apgar score and neonatal gender.

Data collection tools that was used in this study used were the district health information system (DHIS2), delivery register, theatre register and the monthly hospital report as follow : The medical birth registry at Sakubva health district and medical records derived from the hospital registry database which compiles all information on maternal socio-demographic profiles, health status of the mother before and during pregnancy as well as on mode of delivery. Socio-demographic data that was guadered included age, ANC, Referal status, residential information , marital status. With regard to delivery Clinical data collected include parity status, gestational age, mode of delivery, use of induction, indications for IOL, methods used for induction maternal height and weight as well as neonatal characteristic such child Birth weight, Head circumference, APGAR score, Neonatal gender. Well-trained midwife nurses and health staff at maternity conduct interviews as key informant using a standardized questionnaire. in brief informations on foetal and -maternal cases documented following delivery were complied by trained maternity health staff that underwent two day's training on aspects focusing how to deal with data such as how to successfuly complete the data collection form. Questionnaires in English version was applied to conduct interview, as well direct observations were applied where we used observation checklist to compile the needed information All essential patient details information of interest to the study were captured on the check list as well as in the questionnaire The questionnaire focus on women's socio-demographic data, obstetrics factors, and maternal previous diseases history.

Before launching a full-scale research study, a pilot study using convenience sampling was conducted to test the procedures, measures, and protocols that have been designed for data collection.The data collection form was constructed in English language. Two days of training session was conducted for data collectors and supervisors by the principal investigator on techniques for data collection and collectors were guided on each question in the data collection form. A pretest was carried out in 10% of the sample size to guaranty the validity of the tool and adjustment was made before the collection time . To decrease bias, interviews were carried out in an place for confidentiality and privacy.

Data about the patients from the hospital registers records who delivered at SDH through C/S was entered in the designed data collection sheet after collection by the researcher to ensure uniformity. Records of patients who had CS for CPD and CS for others causes in each month for the year 2021 was collected. For key informants an interview administered questionnaire was applied to compile data on risk factor associated to caesarean section due to CPD. Prior to data collection permission was sought to Mutare district medical office and AUREC (AUREC 2676/23).

In this present study we analysed data using GraphPad version 6. Quantitative data were showed in the form of frequency tables, pie chart and graphs, followed by comments. The dependent variable in our study was caesarian section due to CPD and independents variables were sociodemographic, obstetrical and neonatal characteristics which included: maternal age, parity, gestational age, ANC visit, place of residence, referral status, and numbers of ANC visit, maternal height, stature, birth weight, head circumference, Apgar score and neonatal gender.Association between covariates with regards to CS with CPD was performed by Pearson (x2) Chi-square with Yates' correction for categorical variables and their adjusted odd ratio ,and confidence interval set at 95 % were assessed,and level of significance was set at $P < 0.05$ to identify the predictors associated with cesarean section due to CPD. Pearson quare (x2 was also used to estimate Relative Risks (RRs) of CS due to CPD. Qualitative data from open-ended questionnaires were analysed manually using themes.

Permission was sought from the District Medical Officer of Mutare district. The letter was accompanied by a copy of the proposal so that ethical guidelines of the study are clearly outlined. Ethical approval to conduct study was also sought from Africa University Research Committee (AUREC). Informed consent to research was also be taken into consideration and it was used for the health workers who are coming in as key informants and participants. Participants

were informed that they are free to participate or withdraw from the research at any time without prejudice. Names and home addresses were omitted in order to ensure the anonymity of the patient's identity.

RESULTS AND DISCUSSIONS

Characteristics of the study population

About 1950 pregnant mothers under went C/S in 2021 at Sakubva district hospital , out of them 348 had C/S for CPD and 1602 for non CPD related CS indications. The pregnant mothers were generally young with a mean age of 24.3 ± 6 years with 63% age between 19 to 29 years. Their mean gestational age was 39 ± 2 weeks , they have attended at least 4 ± ANC visit. The majority resided in rural area (61%), most of them were referred (82%) and delivered babies a mean birth weight of 3311 ± 445g with good an Apgar score. Table 2 and table 1 summarize the baseline maternal and neonatal characteristics of the study population. For the key informants 25 health workers were recruited 6 male and 19 female , their mean age was 43 years and their average years of experience was 14 years . Participants included 3 doctors, 8 midwives from labor ward, 3 nurses from antennal clinic, 3 nurses from postnatal ward , 3 theatre nurses , 4 sister in charge, 1 matron.

Table 1. Maternal socio-demographic and obstetric characteristics (N= 1950)

Characteristic	Category	C/S for CPD n= 348	C/S no CPD n = 1602	Total C/S N= 1950
Maternal age (years)	Mean , SD	23 (6)	25 (7)	24 (7)
	≤ 18	101(30)	213(13)	314(16)
	19 – 29	189(53)	1046(65)	1235(63)
	< 30	58(17)	343(22)	401(21)
Parity	Nullipara	280(80)	1136(71)	1416 (73)
	Multipara	68(20)	466(29)	534 (27)
Gestational age (weeks)	Mean ,SD	39 (2)	38 (2)	39 (2)
	≥ 40	151(43)	434(28)	585(30)
	< 40	197(57)	1168(72)	1365(70)
Frequency of ANC visits	Mean , SD	42 (2)	4 (2)	4 (2)
	< 4 visits	216(62)	481(30)	697(36)
	≥4 visits	132(38)	1121(70)	1253(64)
Place of residence	Rural	235(68)	1148(72)	1383(71)
	Urban	113(32)	454(28)	567(29)
Referral status	Unreferred	10(3)	78(5)	88(5)
	Referred	338(98)	1524(95)	1862(95)
Maternal height (cm)	≤ 150	21 (6)	5(0.3)	26(1.3)
	> 150	329(94)	1595 (99.7)	1924(98.7)

Prevalence of C/S due to CPD at Sakubva District Hospital

A total of 1950 pregnant mothers delivered by caesarean section from January to December 2021, about 348 had caesarean section for CPD giving a prevalence of 18% for caesarean section due to CPD and 1602 (82%) had caesarean section for non CPD related causes. Figure 2 summarize the global prevalence of C/S due to CPD and C/S for CPD by month at Sakubva hospital in the year 2021.

The major risk factors for C/S due to CPD as mentioned by the 25 health workers by order of frequency were, maternal height ≤ 150 cm , primiparity ,birth weight ≥ 3500 g , maternal age ≤18 years , ANC < 4 visits . Table 5 summarize risk factors for C/S due to CPD as mentioned by health workers.

Risk factors associated with caesarean section for CPD

Maternal socio-demographic and obstetric factors associated with C/S for cephalopelvic disproportion were maternal age, parity, gestational age, place of residence, referral status ANC visit and maternal height (P<0.05). Neonatal factor

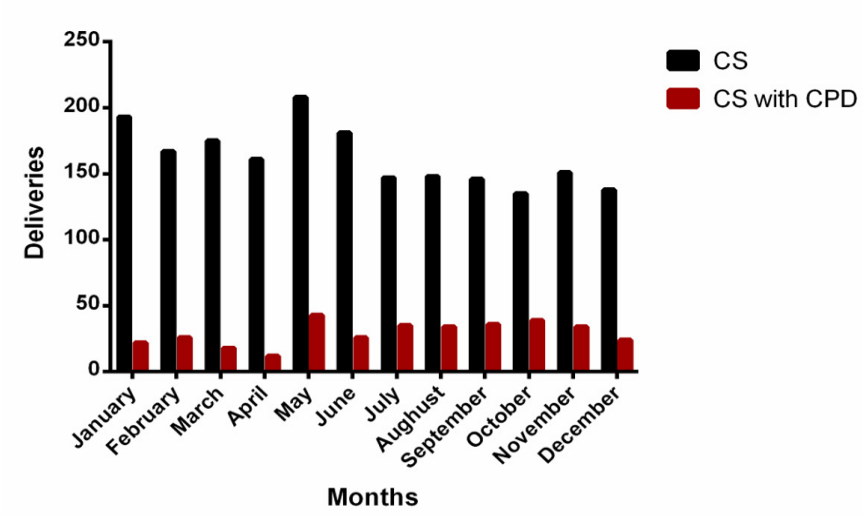

Figure 2. C/S for CPD by month at Sakubva hospital in 2021

Table 2. Neonatal characteristics (N=1950)

Variable		Category	C/S for CPD n= 348	C/S no CPD n = 1602	Total C/S
Birth weight (g)		Mean, SD	3185(490)	3438(400)	3311(445)
≥3500		118(34)	533(33)	651(33)	
< 3500		230(66)	1069(67)	1299(67)	
Head circumference(cm)		>34	124(36)	544(34)	668(34)
<34		224(64)	1058(66)	1282(66)	
APGAR score		< 3	7(2)	29(2)	36(2)
>4		341(98)	1573(98)	1914(98)	
Neonatal gender	Male		202(58)	926(58)	1128(58)
	Female		146(42)	67642)	825(42)

were not associated with C/S for CPD (P>0.05). Table 3 and table 4 summarize maternal and neonatal risk factors associated with C/S Table 3 shows that the odd of C/S for CPD was 2 times high among those with maternal age ≤18 years (OR 2.67, 95% CI 2.03-3.50) compared to those >18 years. The odd of C/S for CPD was 1 time high among primigravida (OR 1.69, 95% CI 1.27-2.25) compared to multigravida . Having gestational age ≥ 40 weeks increased the odd of C/S for CPD by 2 time (OR 2.06, 95% CI 1.62–2.72) compared to those with gestational age <40 weeks. The odd of C/S for CPD was 3 time higher among those who were unreferred (OR 3.031, 95% CI 1.995-4.605) compare to those who were referred. Staying in rural area (OR 2.923, 95% CI 2.287-3.736) increased the odd of C/S for CPD by 3 compare those who reside in urban area. Attending less than 4 ANC visit <4 increased the odd of C/S due to CPD by 3 (OR 3.81,95%CI:2.99- 4.95). The odd of C/S for CPD increased by 20 time in those with maternal ≤150 cm (OR 20.51, 95% CI :7.78-54.81) compare to those with maternal height above 150 cm. Table 4 and table 3 summarize maternal and neonatal risk factors associated with C/S for CPD.

Strategies to prevent CPD related complications

Strategies suggested by health workers to Prevent CPD related complications by order of frequency were, antenatal visit and health education, partograph use, CS and others as summarized in table 6.

CPD is the physical obstruction of labor, which take place when there is presence of an absolute or relative mechanical disparity between the fetal size and the birth canal (Liselele et al., 2000). This condition in some severe cases child delivery is unable to occur because the fetal head becomes impacted in the pelvis. If no intervention take place this can lead to uterine rupture,

fistulas, and as well as fetal and maternal death. (Richard, 2002). A total of 1950 pregnant mothers delivered by caesarean section from January to December 2021, 348 had caesarean section for CPD giving a prevalence of 18% for caesarean section due to CPD at Sakubva hospital in the year 2021.This prevalence is slightly above the prevalence of 15.5% that was reported by(Geidam et al., 2009) in Nigeria and nearly close to the prevalence of 19.8 % that was found by (Kamanda and Malama, 2021)in Zambia. The high prevalence of C/S in this study could be explain by the fact that the hospital serves as referral Centre for 39 clinic and maternity homes in Mutare district and thus may receive complicated case of women who are referred because they may need C/S delivery to relieve impending CPD. The researcher identified risk 7 risk factors associated with caesarean section for cephalopelvic disproportion (Table 4.2.3.1). Maternal age ≤ 18 years,

Table 3. Chi -square test on maternal risk factors associated with C/S for CPD (N=1950)

Variables	C/S for CPD	C/S for no CPD	Total C/S	Ajusted Odd Ratio	95% Confidence interval	P value two sided	Relative Risk
	n= 348	1602	1950				
Maternal Age< 18 Years							
Yes	101	213	314	2.6665	2.0300 -3.5027	0.0001*	2.13
No	247	1389	1636	0.375	0.2855 -0.4926		
Gestational Age							
≥ 40 weeks	151	434	585	2.0628	1.6244-26915	0.0001*	1.788
<40 weeks	197	1168	1365	2.063	1.624 -2.620		
Residency							
Rural	235	666	1201	2.923	2.287-3.736	0.0001*	2.42
Urban	113	936	749	0.7303	0.5712- 0.9338		
Referal Status							
Unreferred	26	315	341	3.031	1.995 -4.605	0.0001*	0.38
Referred	322	1287	1609	0.3299	0.2171 - 0.5012		
ANC Visit							
ANC visit < 4	216	1118	1337	1.415	1.109-1.797	0.005*	0.75
ANC visit >4	132	481	613	0.7084	0.5565 -0.9019		
Primipara							
Yes	280	1136	1416	1.6891	1.269 -2.249	0.0004*	1.55
No	68	466	534	0.592	0.4447-0.7882		
Height<150cm							
Yes	21	5	26	20.5119	7.677 - 54.81	0.0001*	4.75
No	327	1597	1924	0.04875	0.01825-0.1303		

Table 4. Chi square Test on Neonatal risk factor for CS due to CPD (N= 1950)

Variables	C/S for CPD	C/S for no CPD	Total C/S	Ajusted Odd Ratio	95% Confidence interval	P value two sided
	n= 348	1602	1950			
Birth weight ≥ 3500g	118	533	651	1.029	0.8053-1.3147	0.819
Birth weight < 3500g	230	1069	1299	0.9718	0.7606-1.242	0.819
Apgar score ≤3	7	29	36	1.113	0.4837 - 2.563	0.8004
Apgar score >3	341	1573	1914	0.8981	0.3901 - 2.068	0.8004
circumference> 34 cm	124	544	668	1.077	0.8447 - 1.372	0.5507
Circumference< 34 cm	224	1058	1282	0.9288	0.7288 -1.184	0.5507
Male	202	926	1128	1.164	0.7986 - 1.277	0.9523
Female	146	676	825	0.9901	0.7828 - 1.252	0.9523

Table 5. Risk factors for CPD as stated by health workers (N=25)

Risk Factors	Frequency	Percentage (%)
Maternal age	4	16
Primiparity	6	24
Gestational age ≥40	0	0
ANC visit < 4	3	12
Staying in rural area	0	0
Maternal height ≤ 150 cm	7	28
Birth weight ≥ 3500 g	5	20
Neonatal gender	0	0
Apgar score < 3	0	0
Head circumference > 34 cm	0	0

Table 6. Strategies to prevent CPD related complications stated by health workers (N=25)

Intervention	Frequency	Percentage %
Antenatal Visit/ Health Education	8	32
Waiting Mothers' Home	0	0
Ultrasound SCAN	1	4
Audit	0	0
Improve Refferal System (Transport)	2	8
Training of Staff	3	12
Partograph	6	24
CS	5	20

primigravida, gestational age ≥40 weeks, being unreferred, residing in rural area, ANC visit < 4 , maternal height ≤150 cm were significantly associated with C/S for CPD (P< 0.05).The odd of C/S for CPD was 2 time high (OR=2.6) among those ≤ 18 years compare to those >18 years (OR=0.375). Tsu et al (Tsu, 1992)reported young maternal age < 18 as an important risk factor. Similar findings were also reported by (Ikobho and Jeremiah, 2018)who found that Teenage pregnancies (age < 19 years) was risk factor for CPD. Teenage pregnancy are associated with CPD probably because issues of early marriage in Zimbabwe result in high prevalence of adolescent mothers, who go into pregnancy and labor with immature pelvises. Since adolescents are still growing, the implications of deficiency are restricted growth, contracted pelvis and CPD. The odd of C/S for CPD was 1 time higher among primigravida (OR=1.69) whilst being multigravida was protective against C/S for CPD (OR=0.62). Similar findings were reported by (Brabin et al., 2002) who mentioned nulliparity among the commonest risk factors of CPD. This was also confirmed by Kandemir et al (Kandemir et al., 2015) who found that primiparous women in labour have a higher occurrence of CPD than women with high parity. This association may be to the fact that a primigravida is a woman carrying her first pregnancy and pregnancy in a primigravida is often viewed with anxiety and negative attitude toward labor pain and therefore their obstetric performance is associated with many complications such as abnormal labor patterns which increased their risk of CPD and operative deliveries. These risks are further increased if there is poor utilization of antenatal care combined with adverse sociocultural practices. The odd of C/S due to CPD was high among those with gestational age ≥40 weeks (OR= 2.06) compare to those with gestational age < 40 (OR=0.48). Carl Cucco (Cucco et al., 1989) found that when pregnancy has exceeded 40 weeks gestation, the fetal weight also tends to increase and caesarean section for cephalopelvic disproportion was indicated in 60% of operations among women with postdate. Risks to both mother and infant increase as pregnancy progresses beyond 40 weeks of gestation.(Caughey and Musci, 2004).This association may be explained by the fact that Postdate pregnancy lead to big babies and this lead to CPD (Maharaj, 2010). As pregnancy exceed 40 weeks there is an increased risk of macrosomia (Singh et al., 2020). Referral status was a risk factor for C/S due to CPD (P=0.0001).The odd of C/S for CPD was high among unrefereed pregnant mothers (OR= 3.03) compared to those who were referred (OR= 0.32).Our findings were different from Musaba et al(Musaba et al., 2020) who noted that there was an increased risk of C/S for CPD among pregnant mother who were referred from a lower health facility(Musaba et al., 2020) . This variation can be justified by the events such as in the current study pregnant mothers that were unreferred likely did not have any opportunity to be evaluated for risk factors at any level of the health system whilst in the study by Musaba patients were first labouring at clinic level and later referred for abnormal labor pattern and then were at high risk of caesarean section due to CPD.The place of residence was another significant risk factor for C/S due to CPD (P= 0.012). the odd of C/S for CPD was 2 time higher among those who live in rural setting (OR=2.923) compare to those who stayed in urban area. Shaik (2015) (Shaikh et al., 2015) study revealed that staying in rural setting was a significant risk factors for CPD. This correlation may be to the scenario where by in rural setting , health facilities are located remotely , and accesses to information about institutional deliveries are hampered . This might lead in a delay for decision making when to look for medical help and delay in identification of risk factors. Additionally, mothers who are referred from clinics to the hospital will present late when already in labor due to lack of transportation. On the other hand, women residing in close vicinity to hospitals obtain easely life-saving obstetric information and access to obstetric services . The odd of C/S for CPD was high (OR= 3.81) among pregnant mother who had ANC visit < 4 visit and having ANC visit ≥ 4 was preventive against C/S for CPD (OR=0.26). Similar findings were reported by Bako (2018) (Bako et al., 2018) who found that none utilisation of ANC services to be associated with CPD. Women who have many ANC visit can benefit from early identification and prevention of CPD before they are in labour. Girma (2022)(Girma et al., 2022) documented in his study that the chance of experiencing CPD was 9.5 times higher in mothers who attended one ANC follow-up compared to those who had more than two ANC visits . But Musaba et al (Musaba et al., 2020) found that increased frequency of ANC attendance (< 4 Vs ≥ 4) was not protective of CPD. Association between ANC visit and C/S for CPD could be due to the situation that not ANC visit during pregnancy could reduce women knowledge about their pregnancy condition such as multiple pregnancies, big baby, fetal abnormalities and other potential risk parametters for CPD. More ANC

visit enhance the chance to be screened early for risk factors before onset of labor. On the contrary women without antenatal care are exposed to home childbirth and have poor awareness of birth preparedness, complication and danger signs of pregnancy which consequently potentiate the risk of CPD. The odd of caesarean section for CPD was significantly higher among pregnant mothers who were ≤150 cm (OR=20.5).Having maternal height > 150 cm was protective against C/S for CPD. Liselele et al (Liselele et al., 2000) found that maternal height < 150 cm was associated with CPD .Similar findings were also reported by Toh-Adam et al (Toh-Adam et al., 2012) who found that Short stature < 145 cm was significantly correlated with a higher rate of CPD. This association can have as main explanation the fact that short stature is commonly associated with a contracted pelvis which is a major component in the occurrence of CPD .Nevertheless even if maternal height can predict the risk of CPD , it is also a reflection the women nutritional status from her child hood, in which genetic factors can also play a major role. Therefore, the obstetric significance of a particular height needs to be related to the patient's own genetic background and based on ethnic groups. No neonatal risk factor in the current study was associated with C/S for CPD. Despite the evidence that variables such as birth weight which are important attributes of CPD, as documented by other authors. Brabin (2002)(Brabin et al., 2002) found that birth weight ≥ 3400 was associated with high risk of cephalopelvic disproportion. Ikobho (2018(Ikobho and Jeremiah, 2018)) found that women who delivered babies with birth weight ≥ 4000 grams had significantly more at risk of developing cephalopelvic disproportion. The possible reason for the difference between these findings might be due to a difference in the study designs of the current and previous studies.

Majors' strategies to prevent CPD related complications included: antenatal visit and health education, partograph use, C-section. Philpot (1982) (Philpott, 1982) suggested that CPD can be prevented through adequate prenatal care and monitoring of labor using partogram, so that abnormal cervical dilation can be detected early. Therefore by Promoting the antenatal care service utilization, proving good referral system, and availability of comprehensive obstetric care which included caesarean section are key ways out to prevent complications associated to cephalopelvic disproportion (Ayenew, 2021).

CONCLUSION

This study demonstrated a high prevalence of cephalopelvic disproportion (18%) and identified risk factors associated with caesarean section due to CPD at Sakubva district hospital in the year 2021.The main risk factors identified were risk factors associated with C/S for CPD were maternal age ≤ 18, primigravida , gestational age ≥ 40 weeks, being unreferred, residing in rural area, ANC visit < 4, maternal height ≤150 cm . The high prevalence of CPD and identified risk factors must be taken seriously in order to reduce the adverse maternal and neonatal outcomes.To generalised finding this study need to be extended to national level in Zimbabwe.

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