Obstetrics Outcomes: A Comparison between Birthing Center and Conventional Labor Ward

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ABSTRACT

Introduction: Birthing Centers (BC) are increasingly accepted worldwide as an alternate low cost place of birth. The concept is especially relevant for developing countries with limited resources and constraints regarding availability of specialists and hospital beds. The various studies have concluded that when proper risk analyses are conducted and referral rules followed, there is no evidence of increased maternal or perinatal risk at BC compared to standard hospital deliveries.

Materials and Methods: This was a prospective, observational and comparative hospital based study done at Paropakar Maternity and Women's Hospital (PMWH),Kathmandu.The study was conducted on pregnant women without any known risk factors for complications who were admitted in BC and labor ward (LW) for delivery. Details on mode of delivery, genital tract status, Postpartum hemorrhage (PPH) and neonatal outcomes were collected. Descriptive data analysis was done using SPSS.

Results: Out of 5132 deliveries, 25.3% had no known risk factor and hence were eligible for study; no statistically significant difference was observed between BC & LW in relation to mode of delivery, perineal trauma, PPH and neonatal outcomes; however, practice of episiotomy was significantly less frequent in BC.

Conclusion: When proper risk analyses are conducted and referral rules followed, there is no evidence of adverse obstetrics outcome at BC as compared to standard hospital deliveries. Triaging of low risk pregnancy to a BC is a viable strategy, especially in a resource poor country. This lessens the burden in standard maternity unit so that specialists will be able to provide a quality care to high risk pregnancies.

Keywords: Birthing center, labor ward, obstetrics outcomes.

INTRODUCTION

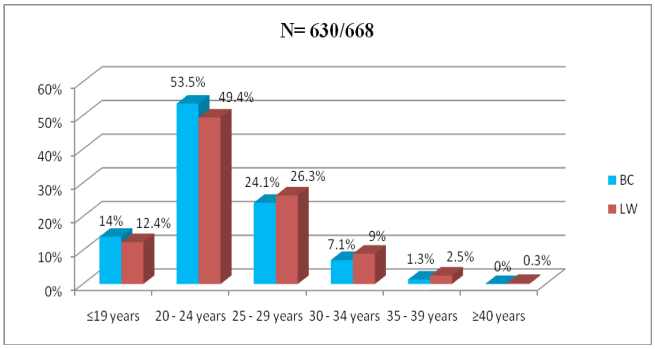
Birthing Centers (BC) are small maternity units which are run by midwives, hence are also known as midwife led maternity unit. They offer a comfortable low-tech environment where birth is treated as a "normal" process rather than a medical one by providing friendly individualized care in an atmosphere that is informal and unhurried. For women thought to be at low risk for obstetrical complications, labor and delivery at a BC can result in higher patient satisfaction, cost savings and equivalent or better outcomes than in-hospital birth.[1] Birthing centers are of two types; "Independent" and "along-side birthing center". Along-side birthing centers are located adjacent to the consultant led maternity unit where availability of obstetricians and pediatricians is prompt. BC accepts the women who are likely to have an uncomplicated straight-forward labor. Both the BC and the midwives who work in them have a non-interventionist philosophy. Maternal and fetal wellbeing as well as progress of labor is monitored using a modified WHO designed partograph. No study has reported poorer outcomes among women cared for in BC in the United States than among those cared for in hospitals.[2,3] Several studies have shown that if a woman gives birth in a BC, she is less likely to have obstetrics interventions, caesarian section, induction or augmentation and breast feeding problem. BC have been running since last 40 years in UK and USA. In Nepal, first BC was established as a hospital based BC adjacent to the consultant led maternity unit in Patan hospital in January 1995.[4,5] Maternal and Neonatal Service Center (MNSC) has been opened as an In-hospital BC in PMWH in December 2007. Pregnant woman at active phase of labor thought to be at low risk for obstetrical complications and who are likely to have an uncomplicated straight forward labor are considered eligible for admission to the BC, subject to her preferences & consent.[4]

MATERIALS AND METHODS

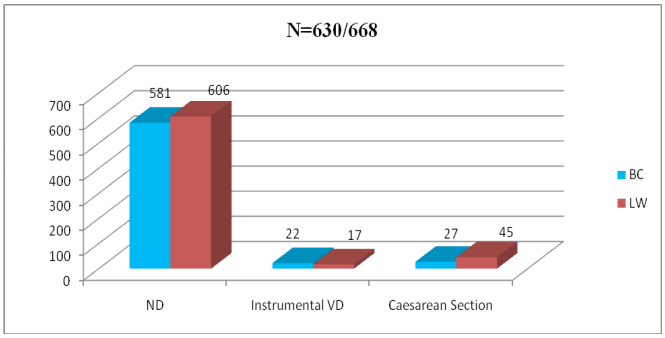
This was a prospective, observational and comparative hospital based study done at PMWH for a period of three months (17th august-15th November, 2008), using a universal and purposive sampling technique. The study was conducted on term pregnant women without any known risk factors for obstetrics complications and who were likely to have an uncomplicated straight forward labor. Out of 5132 deliveries conducted there during the study period, only 1298 cases (BC=630 & LW=668) met the inclusion criteria. Consequently, sample size covered 25.3% of the total deliveries. After taking permission from hospital authority, data withrelevant information on mode of delivery, status of the genital tract, amount of blood loss, APGAR score at 1 and 5 minutes, birth weight, NICU admission and neonatal death (NND) was collected and analyzed with the help of SPSS program. Chi-square test was applied to test the statistical significant difference. Significance was taken at 95% confidence level with P value <0.05.

RESULTS

Out of 5132 deliveries conducted during study period, 25.3% pregnancies were calculated to be at low risk for obstetrical complications and hence they were likely to have an uncomplicated straight forward labor.



The mean age of women in BC was 23.2 years, while in LW, it was 23.8 years. The range of age was 15 to 36 years and 16 to 40 years in BC and LW respectively.



There was no statistically significant difference between BC and LW in terms of incidence of instrumental vaginal delivery (3.5% and 2.5%, P = 0.31). The percentage of women with caesarean

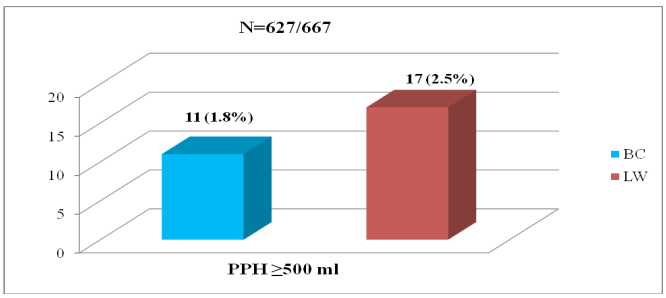
delivery was 4.3% for BC, whereas in LW,it was slightly higher at 6.7%.

Table 1: Genital tract status

Genital tract status	BC	LW	P value
Intact perineum	144 (23.9%)	149 (23.9%)	
Planned episiotomy	146 (24.2%)	231 (37.1%)	<0.001
1st degree perineal tear	256 (42.5%)	180 (28.9%)	
2nd degree perineal tear	55 (9.1%)	60 (9.6%)	
Cervical tear	2 (0.3%)	3 (0.5%)	
Total	603 (100%)	623 (100%)	

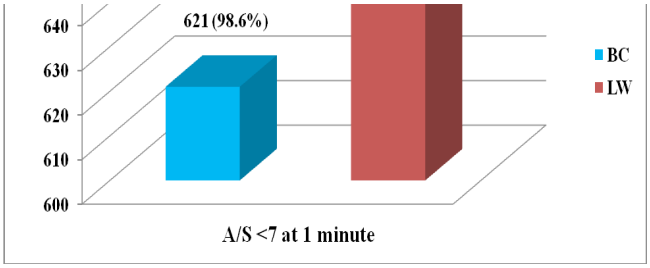
There was significantly less practice of episiotomy in BC (24.2% versus 37.1%, P = <0.001). Though episiotomy rate was lower, the incidence of perineal injury (1st and 2nd degree) was significantly higher in BC group (51.6% versus 38.5%, P = <0.001).

Figure 3: Postpartum Hemorrhage



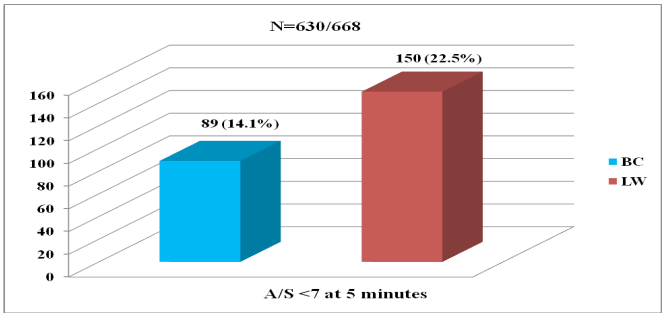
The mean blood loss for BC was 109.05ml ± 134.89 SD, whereas in LW, it was higher with the mean being 140.23ml ± 123.63 SD. The difference was statistically significant (P = <0.001). The largest amount of blood loss in BC was 1500ml, where as in LW, it was only 800ml. No significant difference was found in blood transfusion rate between BC and LW (1% & 1.3%, P=0.5).

Figure 4: APGAR Score <7 at 1 minute



The mean apgar score at 1 minute in BC was 6.15 ± 0.880 SD, whereas in LW, it was 6.14 ± 0.935 SD.

Figure 5: APGAR Score <7 at 5 minutes



Babies born in LW were at significantly increased risk to have an apgar score of <7 at 5 minutes. The mean A/S at 5 minutes in BC was 7.85 ± 0.717 SD, whereas in LW, it was 7.78 ± 0.824 SD. The difference however, was statistically not significant (P = 0.11). There was no statistically significant difference between BC and LW in terms of NICU admission (7.8% & 6.4%, P = 0.34). Perinatal mortality rate was 9.5 and 6.0 per 1000 total births in BC and LW respectively.

DISCUSSION

This study was undertaken to assess the clinical effectiveness of a newly introduced model of midwifery care by comparing specific outcomes from BC with LW of PMWH, Kathmandu. The BC named as MNSC has been running in this hospital, as an In-hospital BC since December 2007. It has been anticipated that this Nurse Midwives-led unit will help in reducing patient load in regular consultant-led unit so that doctors will be able to provide a quality care to high-risk patients. The cases identified as low-risk for obstetrics outcomes are managed in BC. Low-risk pregnant population is estimated to be 35% to 45%.

In this study, there were more young mothers (<20 years) in BC as compared to LW (14% and 12.4%). In overall, the burden of the young mother in this study is larger than that reported in most of other studies. This may be explained with the higher rate of early age marriage, illiteracy and unemployment among the female population of Nepal.

Though most of the studies favor BC as a less interventional place for delivery in comparison to LW in terms of mode of delivery, findings observed in this study do not support this. The incidence of instrumental vaginal delivery was observed to be higher in BC than in LW; however, the difference was statistically not significant (3.5% and 2.5%). Many internationally published studies reported that instrumental vaginal delivery is less frequently practiced in BC in comparison to LW. Though the rate of instrumental vaginal delivery was found to be lower in BC, Hundley VA et al[6], Patrica A et al[7], Waldenstrom U et al[8,9], Rana TG et al[10] and Ulla W et al[11] reported that there was no statistically significant difference in mode of delivery between BC and LW. The finding of this current study is in consistent with that of RCT performed by Anita J et al[12] where rate of instrumental vaginal delivery in BC, 23% was higher by 1.4% than in LW. It isagainst the philosophy of BC that instrumental delivery rate observed by Anita J et al[12] is almost 6 times higher than that observed in this current study and it is also higher than that observed in most of other studies. Above mentioned finding of this study does not match with that of many international articles because most of the researchers like Rooks JP et al[4&5], Ryan M et al[13] and Kenny et al[14] concluded that the rate of instrumental vaginal delivery was significantly lower in BC as compared to LW. However, the incidence of vacuum/forceps delivery observed in this study is lower than that reported by Stern C et al[15] as 4%, Lukasse M et al[16] as 4.9% and Penwell V et al[17]as 5%. Similarly, rate of instrumental vaginal delivery in BC was in between 4 % to 14% in studies conducted by Flint et al[18], MacVicar et al[19], Rowley et al[20], Turnbull et al[21] and Harvey et al[22] which is higher than that observed in this current study. The higher rate of vacuum/forceps delivery in BC than in LW observed in this study can be justified with the fact that there is a protocol to carry out intervention in prolonged second stage of labor in BC. Progress of labor is monitored by partograph and hence there was a timely detection of prolonged labor. Second commonest indication for vacuum application was fetal distress as documented by presence of meconium in amniotic fluid. Most of the Obstetricians are convinced that post dated pregnancy is usually associated with meconium stained amniotic fluid. In this study, there were more post dated pregnancies in BC.

The results of this study regarding incidence of caesarean section (CS)is in consistent with the philosophy of BC as it was lower in BC than in LW (4.3% vs 6.7%) though the difference was statistically not significant. Similar findings were reported by Hundley VA et al[6], Patrica A et al[7] and Anita J et al[12] and Ryan M et al[13]. The results of other researchers like MacVicar et al[21], Kenny et al[14], Rawley et al[20], Harvey et al[22] and Waldenstrom et al[23]was also encouraging as results of this current study to label BC as an maternity unit of less intervention. Though, CS rate was lower in BC than in LW, Waldenstrom et al[8,9], Ulla W et al[11]and Hodnett ED et al[24] concluded that continuous labor support by nurse-midwives in BC does not affect likelihood of CS. The difference in CS rate as observed in this current study, between two groups may be possible because there were more women aged over 30 years in LW. An association of maternal age over 30 years and an increase in CS rate was established by the study of Lancaster et al[25]. Obstetricians may be biased for safe landing of babies in elderly primiparas. Most common indication for CS as observed in this study was fetal distress evidenced by meconium stained amniotic fluid in both the groups. Similar was the scenario in most of the internationally published studies. Since there was no provision for continuous electronic fetal monitoring, measurement of fetal scalp PH and amnioinfusion, presence of meconium in amniotic fluid is still considered as a fetal jeopardy and there is a tendency to deliver a baby as quickly as possible either by CS or by instrumental delivery whichever is appropriate. In this study, the difference was statistically significant (P = <0.001) regarding practice of episiotomy. This finding is similar with most of other international studies. Hundley et al[6], Rana TG et al[10], Ulla W et al[11], Ryan M et al[13], David M et al[26] and Bodner-Adler B et al[27] concluded that there was a significantly lower rate of episiotomy

in BC. Similarly, conclusion of Kenny et al[14], Flint et al[18], MacVicar et al[19], Rawley et al[20], Turnbull et al[21] and Harvey et al[22] has established BC as a less episiotomy performing maternity unit. Ryan M et al[13] have concluded that where there is lower rate of episiotomy, there is higher rate of second degree perineal tear. This conclusion is in contrary to finding of this study because there was almost equal rate of second degree perineal tear in BC and LW. However, it may be acceptable that where there is lower rate of episiotomy, there is higher rate of perineal tear because incidence of overall perineal tear was significantly higher in BC compared to LW (51.6% vs 38.5%, P = <0.001) in this current study. Provision of skilled nurse and their patience to support the perineum well during delivery could be the likely factors for lower incidence of second degree perineal tear despite lower rate of episiotomy in BC. The low episiotomy rate in the BC probably resulted from the low intervention profile of BC. The episiotomy rate in this study was higher in both groups compared with other midwife-dominated models of care. It has been established that perineal laceration or tear heals well and rapidly than inflicted wound. So the trend in reducing episiotomy should be encouraged.

The percentage of women with PPH was 1.8% in BC and that in LW, it was 2.5%. Women delivered in BC were less prone to face PPH (P = 0.32). Waldenstroms et al[8&9] and Bodner-Adler et al[27] concluded that there was no significant difference in rate of PPH between these two groups. Furthermore, the incidence of PPH observed by Stern C et al[15] as 3.1% and Penwell V[17] as 17% is higher than the rate recorded in this current study.The results of this study favored BC as a safer place of delivery in terms of mean blood loss because women in BC had experienced less amount of blood loss (109.05ml ± 134.89 SD vs 140.23ml ± 123.63 SD, P = <0.001). This is supported by study of Hundley VA et al[6] where mean blood loss was lower in BC by 17ml as compared to LW (156ml and 163ml). However, Waldenstroms et al[8&9] do not agree with the finding of this current study as they observed the opposite results (416ml and 404ml). The incidence of PPH as well as mean blood loss observed in this current study for both groups is lower than that reported by most of other studies. The rate of PPH had reflected the rate of blood transfusion. There were 1% and 1.3% women in BC and LW respectively who needed blood transfusion. This rate is higher than that reported by Waldenstroms et al[8,9] (BC 0.7% and LW 0.6%). Low pre-delivery hemoglobin and easy availability of blood products could be the justifiable factors for this slightly higher rate of blood transfusion.

Apgar score at 1 & 5 minutes as a reflection of the immediate neonatal outcome remained better in BC group as compared to LW group in this current study. Apgar score at 5 minutes is a better reflection of subsequent neonatal outcome than at 1 minute and hence most studies have taken this parameter to compare neonatal outcomes in BC and LW. In this study, significantly lower number of baby was found in BC group compared to LW group in terms of Apgar score <7 at 5 minutes (14.1% and 22.5%, P=<0.001). Similar report has been published by Tracy SK et al[28]. However, Kenny et al[14] is not in favor of this finding as they had observed the rate of Apgar score <7 at 5 minute to be 7.2% and 0.47% for BC and LW group respectively. Though, there was no statistically significant difference between BC and LW group, Hundley VA et al[6], Patrica A et al[7], Ulla W et al[11] and Bonder-Adler et al[27] concluded that BC may be a safer place of birth for newborns in terms of 5-minute Apgar Scores of <7. Their statement supports results observed in this study. Similarly, conclusion "newborns of BC are less likely to have apgar scores <7 at 5-minutes" of Lukasse M et al[16], Rowley et al[20], Turnbull et al[21], Harvey et al[22] and Waldenstroms et al[23] and Campos SE et al[29] seems to favor finding of this current study.

There are lots of international studies whose results go in favor of BC in terms of NICU admission. The results of trials reported by Ulla W et al[11] as 4.6% and 6.2%, Kenny et al[14] as 7.6% and 15.4% and MacVicar et al[19] as 1.4% and 1.8% do not support finding of this study and hence labeled BC as a safer unit for babies of low risk pregnancies.

Perinatal mortality rate calculated in this study was 9.5 and 6.0 per 1000 births for BC and LW respectively. After analyzing seven trials from different countries, Ulla W et al[11] concluded that

no statistically significant difference was observed between BC and LW in terms of perinatal mortality. They had reported the rate as being 9 and 6 per 1000 births for BC and LW respectively which is similar to finding of this study. when indicators of neonatal outcome were analyzed and compared, no statistically significant difference was observed between midwifery care group and standard maternity services group except in 5-minutes apgar score of <7. The BC was a safer unit for babies of low risk pregnancies in terms of apgar score of <7 at 5 minutes.

CONCLUSION

When proper risk analyses are conducted and referral rules followed, there is no evidence of adverse maternal and fetal outcome at the birthing center compared to standard hospital deliveries. The results observed in this current study suggest that triaging of low risk patients to a birthing center is a viable strategy, especially in a resource-poor country. This lessens the burden on the standard maternity unit so that specialists will be able to provide a quality care to high risk pregnancies.

CONFLICT OF INTEREST: None

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