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Original Research Article

Effectiveness of safe child birth checklist on maternal and perinatal outcomes in tertiary level hospitals

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ABSTRACT

Background: The World Health Organization (WHO) estimates nearly 2,87,000 maternal deaths, 1 million intrapartum related stillbirths and another 3 million new born deaths during the neonatal period against more than 130 million births each year. Intrapartum perinatal mortality, the deaths that occur during the period around birth, is a major problem in developing countries Objective of this study is to study the effectiveness of safe child birth checklist on maternal and perinatal outcomes in tertiary level hospitals.

Methods: This study is a hospital based prospective interventional study conducted at MGMH, Petlaburzu hospital, Hyderabad, Telanagana, which is a tertiary care hospital comes under Osmania medical college. 635 deliveries were followe up without SCC and 620 deliveries were followed up with SCC.

Results: There was significant improvement in starting of partograph at the time of admission with SCC (20% vs 32.2%), more number of cases required to start antibiotics in with SCC group compared to without SCC. Just Before and during Birth (or C-Section) without SCC group significantly more need to start Antibiotic compared to with SCC group (15.7% vs 11.3%) and active management of third stage of labour was significantly more among with SCC group (94.5% vs 96.9%).

Conclusions: In final mortality and morbidity outcomes of delivery i.e. maternal and perinatal, the effectiveness of implementation of safe child birth check list has no significant effect though there were improved set of certain practices during the child birth process.

Keywords: Maternal and perinatal outcomes, Safe childbirth checklist, Tertiary level hospital, WHO

INTRODUCTION

The maternal and neonatal mortality have declined in the country over last decade ever since National Rural health mission started but still yet achieve Millennium development goals 4 and 5 The maternal mortality of the country has reduced from 212 (2007-09) to 167 (2011-13) of 100,000 live births, but it is still far from the MDG goal of 70 per 100000 live births.¹ Intrapartum perinatal mortality, the deaths that occur during the period around birth, is a major problem in developing countries and in

India accounting for I million still births and a similar number of neonatal deaths occur globally annually.²

The World Health Organization (WHO) estimates nearly 2,87,000 maternal deaths, 1 million intrapartum related stillbirths and another 3 million new born deaths during the neonatal period against more than 130 million births each year. The greatest burden of maternal and perinatal mortality is clustered around the time of birth, with the majority of deaths occur within the first 24 hours after childbirth.³ Starting in 2008, the World Health

Organization developed this checklist-based quality improvement programme to enhance frontline health-care workers' capacity to deliver high quality maternal and perinatal care.³ In an observational study under SCC program in Rajasthan, women delivering in SCC program intervention facilities received on an average approximately 12 more safe practices as compared to women receiving care in the control facilities.^{1,3}

The WHO Safe Childbirth Checklist is not a regulatory device or a component of official policy; it is intended as a bedside tool for health-care workers to improve the safety of their care and reduce unnecessary deaths and complications.⁴ It may not be possible for the observer to document every delivery process at all times, particularly if multiple deliveries are taking place at one time, so observations will relate to activities at four specific periods (pause points). Although intensive mentorship and guidance may indeed serve to improve adherence to the checklist, it is not feasible for such a program to be implemented at the national level. Instead, this process evaluation will aim to understand uptake of the SCC in the context of a basic level of mentorship that the government could feasibly provide at a national scale.⁴ Checklist based interventions aid management of complex or neglected tasks and have been shown to reduce harm in healthcare. implementation of a novel checklist-based childbirth safety program led to improved quality of care delivered by health workers attending to institutional deliveries. The rate of successful delivery of essential practices at each birth event increased from an average of 10 of 29 practices at baseline (95%CI 9.4, 10.1) to an average of 25 of 29 practices afterwards (95%CI 24.6, 25.3; p,0.001.⁵

After starting of JSSK, is a cash-based incentive program, Institutional deliveries were increased by 75%, but there is no parallel improvement in the MMR, NMR. Though JSSK is able to address delay in seeking care and delay in transport but yet to improve in third delay i.e. delay in providing adequate quality of institutional care.⁶ SCC mainly focuses on evidence-based protocol to follow during intrapartum period and first day of delivery, as most of the maternal (44%), neonatal (40%) deaths occur during this period.

- AMTSL has been shown to reduce the incidence of PPH (>1/3 of maternal deaths in India) by up to 66%.
- Use of MgSO₄ in severe pre-eclampsia has been shown to reduce progression to eclampsia by 58% and reduce deaths by up to 45%.
- Use of the partograph to monitor labour/identify complications early has been shown to reduce early neonatal deaths by 40%
- Antibiotics for preterm premature rupture reduces the incidence of infections by 32%
- Resuscitation of asphyxiated newborns by trained providers can save newborn lives by about 30%
- Immediate initiation of breastfeeding can reduce newborn mortality by 22%.⁷

Coordination and communication among facility staff as well as behaviours with an immediate, tangible benefit, shod the improvement and those with delayed benefits were less likely without a coach present. Coaching may be an important component in implementing the SCC at scale.⁸ In the study done by Nabihah Kara et al and Kumari S et al, the results showed that the intervention had no significant effect on maternal or perinatal mortality or maternal morbidity despite having positive effects on essential birth practices.^{9,10} The objective of the present study was to study the effectiveness of safe child birth checklist on maternal and perinatal outcomes in tertiary level hospitals.

METHODS

This study is a hospital based prospective interventional study conducted at MGMH, Petlaburzu hospital, Hyderabad, Telangana, which is a tertiary care hospital comes under Osmania medical college. A comparative Study was conducted for 15 days each with and without Safe childbirth checklist (SCC) follow up. Data collected prospectively during first half of April 2018 with follow up of SCC. All the pregnant women who entered admission and labour room were studied. Labour room Dmos, Duty Dmos, Resident post graduate students were enrolled as health care workers. They were all trained to implement the checklist as per protocol and record each event as mentioned in SCC.

Inclusion criteria

- All the pregnant women who entered admission and labour room were included in the study.

Exclusion criteria

- Elective caesarean sections and IUDs are excluded from the study.

Response from the healthcare workers side is great, they tried to follow SCC in all cases but failed to follow in 49 cases, the number of cases which were followed up as per SCC was 620.

Total no. of deliveries during study period was 770 after sensitisation of Health care workers at labour room and admission room, of which 497 were vaginal deliveries, 172 emergency caesarean sections, 80 elective caesarean sections and 21 IUD cases. We could follow SCC for remaining 620 cases against 669 eligible cases for routine administrative factors. Similarly, data from routine hospital protocol was collected retrospectively during the month of January in first half of 2018, on same check points but without following SCC. The total number of Deliveries during study period was 740, of which 450 were vaginal deliveries, 205 were emergency caesarean sections, 85 elective caesarean sections and 20 were IUD cases. Final number which was studied was 635 deliveries. SCC is a 29 items tool. Each item

addresses about the major global cause of maternal (pph, obstructed labour, sepsis, hypertensive disorders) and neonatal (prematurity, sepsis. Birth asphyxia) mortality. The checklist is designed to address the Quality of care at four clinical points in the birthing process

- At the time of admission,
- At the time of pushing, or before caesarean section,
- Soon after birth,
- Before discharge.

Statistical analysis

All data was captured using the attached Proforma. Data was transcribed into MS Excel. Statistical analysis was done using the software Statistical Package for Social Sciences (SPSS) 23.0 version. All categorical variables were expressed as frequency and percentages. Chi-square test was used to test the association between categorical variables. p value <0.05 is considered here the as statistically significant. ODDs ratio was used to measure the strength of association.

RESULTS

There were 740 deliveries and 770 deliveries observed without safe child birth checklist (SCC) and with safe child birth checklist respectively. Among 740 deliveries without SCC 450(60.85) were vaginal, 205(27.7%) were EMCS, 85 (11.5%) were ELCS, 20(2.7%) were intra partum IUD, 1 maternal death and 32(5.03%) perinatal deaths. SO 635 deliveries were taken for the study. Among 770 deliveries without SCC 497(64.5%) were vaginal, 172(22.3%) were EMCS, 80 (10.4%) were

ELCS, 21(2.7%) were intra partum IUD, 1 maternal death and 28(4.51%) perinatal deaths. SO 620 deliveries were taken for the study (Table 1).

Table 1: Distribution of deliveries according to mode and outcome.

Details of deliveries	No. of deliveries without SCC	No. of deliveries with SCC
Total number of deliveries	740	770
Vaginal	450 (60.8)	497 (64.5)
Emergency caesarean section	205 (27.7)	172(22.3)
Elective caesarean sections	85 (11.5)	80(10.4)
Intra partum IUD	20 (2.7)	21(2.7)
Final numbers taken for study	635 (n=635)	620 (n=620)
Maternal mortality	1	1
Perinatal mortality	32 (5.03%)	28 (4.51%)

It is observed from the Table 2 that there was significant improvement in starting of partograph at the time of admission with SCC (32.2%) compared to without SCC (20%), more number of cases required to start Antibiotics in SCC group (16.9% versus 12.6%) and this difference was significant, more mothers need to start Magnesium sulphate and antihypertensive treatment in SCC group (5.64% versus 5.04%), most of the mothers need to start corticosteroid in SCC group (8.06% versus 7.55%) and HIV positive mothers were also more common in without SCC group (2.36% versus 2.25%).

Table 2: Distribution according SCC checklist at the time of admission.

Check point	Before/without SCC (n=635)	With SCC (n=620)	P value Odds ratio
Does mother need referral?	Not applicable as it is a tertiary care hospital		
Partograph started?	127 (20)	200(32.2)	<0.001 0.52 (0.41-0.68)
Does mother need to start Antibiotics	80 (12.6)	105 (16.9)	0.03 0.70 (0.52-0.97)
Does mother need to start Magnesium sulphate and antihypertensive treatment?	32 (5.03)	35 (5.64)	0.633 0.89 (0.54-1.45)
Does mother need to start Corticosteroid	48 (7.55)	50 (8.06)	0.738 0.93 (0.62-1.41)
HIV status: Positive	15 (2.36)	14 (2.25)	0.902 1.04 (0.50-2.18)
Follow Universal Precautions*	yes	yes	-
Confirm supplies are available to clean hands and wear gloves for each vaginal exam.	Always ensured as it is a tertiary care hospital		
Encourage birth companion to be present at birth.	Not applicable in Indian scenario		
Confirm that mother or companion will call for help during labour if needed.	Only in high risk cases		

*At times full delivery kits for HIV positive cases not available and not measured here.

From the Table 3 it was observed that Just Before and during Birth (or C-Section) without SCC group significantly more need to start Antibiotic compared to with SCC group (15.7% vs 11.3%) and active

management of third stage of labour was significantly more among with SCC group (96.9% vs 94.5%), More mothers need to start Magnesium sulfate and antihypertensive treatment in SCC group (1.61% vs 1.26%) this was not significant.

Table 3: Distribution according SCC checklist just before and during birth (or C-section).

Check point	Before/without SCC (n=635)	With SCC (n=620)	P value Odds ratio
Does mother need to start Antibiotic	100 (15.7)	70 (11.3)	0.021 1.46 (1.05-2.03)
Does mother need to start Magnesium sulfate and antihypertensive treatment?	8 (1.26)	10 (1.61)	0.598 0.77 (0.30-1.98)
Confirm essential supplies are at bedside and prepare for delivery:	Always ensured as it is a tertiary care hospital		
Skilled assistant identified and ready to help at birth if needed	Not applicable as the institute is tertiary care hospital		
Active management of third stage of labour: Inj. Oxytocin 10units IM given within one minute of birth of baby	600 (94.5)	601 (96.9)	0.032 0.54 (0.30-0.95)
Breastfeeding initiated in first half an hour of birth of the baby	Not documented though all cases are encouraged to breastfeed new borns as early as possible		

Table 4: Distribution according SCC checklist soon after birth (within 1 hour).

Check point	Before/without SCC (n=635)	With SCC (n=620)	P value Odds ratio
Is mother bleeding abnormally?	25 (3.94)	20 (3.22)	0.498 1.23 (0.67-2.23)
Does mother need to start: Antibiotics?	Yes, to all cases, hence not measured		
Does mother need to start Magnesium sulphate and antihypertensive treatment?	2 (0.31)	3 (0.48)	0.634 0.65 (0.11-3.90)
Does baby need: Referral? **	145 (22.8)	140 (22.6)	0.915 1.01 (0.78-1.32)
Antibiotics?	100 (15.7)	98 (15.8)	0.977 60.99 (0.74-1.34)
Special care and monitoring? ***	25 (3.94)	20 (3.22)	0.498 1.23 (0.67-2.23)
Syrup Nevarapine for newborns born to HIV positive mothers	15 (2.36)	14 (2.25)	0.902 1.04 (0.50-2.18)

** to NICU of same Institute, babies who did not need referral or special was 465 and 460 respectively

*** to Institute of Paediatrics, Niloufer Hospital, Hyderabad

From Table 4 it was observed that soon after birth (within 1 hour) more number of mothers bleed abnormally in without SCC group (3.94% versus 3.22%), all cases in both groups required to start antibiotics. More number of mothers need to start magnesium sulphate and antihypertensive treatment in SCC group (0.48% versus 0.31%), more number of new born babies need referral in without SCC group (22.8% versus 22.6%), more number of new born babies require special care and monitoring in without SCC group (3.94% versus 3.22%) and more new born babies with HIV positive mothers were given syrup Nevarapine in without SCC group (2.36% versus 2.25%).

All this finding were not significant as there is minor difference.

From Table 5 it was observed that before discharge in both with SCC and without SCC group mother's bleeding was controlled, more new born babies need to start antibiotics in without SCC group (16.06% versus 15.80%), more new born babies were feed well in with SCC group (73.8% versus 71.1%). All these observations were not significant. The p-value for maternal morbidity is 0.97. The result is not significant at $p > 0.05$. Maternal mortality was 1 each group with and without following SCC hence no change in outcomes with implementation

of SCC and without SCC. Perinatal mortality: The p-value is 0.984103. The result is not significant at $p > 0.05$. Perinatal morbidity: The p-value is 0.884426. The result is not significant at $p > 0.05$. Maternal morbidity was

measured in terms of number of mothers needed antibiotic cover at the time of discharge, 2. Whether bleeding was controlled, or further procedure was required like hysterectomy or balloon tamponade.

Table 5: Distribution according SCC checklist before discharge.

Check point	Before/without SCC (n=635)	With SCC (n=620)	P value Odds ratio
Is mother’s bleeding controlled No–further was procedure needed	2 (0.31)	2 (0.32)	0.980 0.97 (0.13-6.95)
Does baby need to start antibiotics?	102 (16.06)	98 (15.80)	0.901 1.01 (0.75-1.37)
Is baby feeding well?	451 (71.1)	458 (73.8)	0.259 0.86 (0.676-1.11)
Discuss and offer family planning options to mother	Offered by default to all		

In group I without SCC, one required hysterectomy and one needed balloon tamponade. In the group-II which followed SCC, two mothers needed balloon tamponade. There is no significant improvement in maternal morbidity. Maternal mortality was 1 each group with and without following SCC hence no change in outcomes with implementation of SCC and without SCC. Similar results observed in other studies improving adherence to safe child birth checklist increases practice of essential child birth practices but it requires long to show impact on maternal and perinatal outcomes.^{8,9}

Perinatal outcomes were measured in terms of mortality and morbidity i.e. need for referral to NICU, need for antibiotic, special care and monitoring (referral to Niloufer Institute of Child Health) and mortality without and with following of SCC respectively. This means outcomes of morbidity and mortality in neonates is insignificant with and without following SCC. This is perhaps because of tertiary care is provided to both mother and children at the Institute.

DISCUSSION

The present study is a hospital based interventional study conducted in tertiary care hospital. Two groups (with and without safe childbirth checklist) were observed for maternal and perinatal outcomes. Among 740 deliveries without SCC 450 were vaginal, 205 were EMCS, 85 were ELCS, 20 were intra partum IUD, 1 maternal death and 32 (5.03%) perinatal deaths. Among 770 deliveries without SCC 497 were vaginal, 172 were EMCS, 80 were ELCS, 21 were intra partum. This is similar to study done by Jonathan M. Spector et al. Finally 635 and 620 deliveries were taken for study in without SCC and with SCC group respectively.⁵ At the time of admission there was significant improvement in starting of partograph at the time of admission with SCC (32.2%) compared to without SCC (20%), This is similar to study done by

Jonathan M. Spector et al that essential child birth practices were significantly improved with using SCC (3.8% to 42.6%, $p < 0.001$) and study done by Megan Marx Delaney et al. More number of cases required to start Antibiotics in SCC group and this difference was significant, more mothers need to start Magnesium sulphate and antihypertensive treatment in SCC group, most of the mothers need to start corticosteroid in SCC group and HIV positive mothers were also more common in without SCC group.

Just before and during Birth (or C-Section) without SCC group significantly more need to start Antibiotic compared to with SCC group and active management of third stage of labour was significantly more among with SCC group. This is similar to study done by Jonathan M. Spector et al that essential child birth practices were significantly improved with using SCC.⁵ More mothers need to start Magnesium sulfate and antihypertensive treatment in SCC group.

Soon after birth (within 1 hour) more number of mothers bleed abnormally in without SCC group. More number of mothers need to start magnesium sulphate and antihypertensive treatment in SCC group, more number of new born babies need referral in without SCC group, more number of new born babies require special care and monitoring in without SCC group and more new born babies with HIV positive mothers were given syrup Nevarapine in without SCC group. All above findings were similar in studies done by Jonathan M. Spector et al and Megan Marx Delaney et al.^{5,8} Before discharge more new born babies need to start antibiotics in without SCC group, more new born babies were feed well in with SCC group. All above findings were similar in studies done by Jonathan M. Spector et al and Megan Marx Delaney et al.^{5,8} There is no significant improvement in maternal morbidity. Maternal deaths were 1 each group with and without following SCC hence no change in outcomes

with implementation of SCC and without SCC. Similar results observed in other studies improving adherence to safe child birth checklist increases practice of essential child birth practices, but it requires long term follow up to show impact on maternal and perinatal outcomes.^{5,8,9} From this study it is observed that a simple checklist alone is difficult to make lasting behavior change.¹¹ In this study the WHO Safe Childbirth Checklist was the central component of an implementation program based on a well-described change model carried out by hospital administration and clinical leaders.¹² The program involves engaging and empowering the local team; providing education on best practices and existing deficiencies; discussing potential barriers and introducing the checklist through focused training; and establishing a mechanism for ongoing monitoring and evaluation.¹³ This is a comprehensive behavior change strategy facilitated by a checklist program. We found that this approach was associated with rapid uptake by the local team and low implementation costs.

CONCLUSION

In final mortality and morbidity outcomes of delivery i.e maternal and perinatal, the effectiveness of implementation of safe child birth check list has no significant effect though there were improved set of certain practices during the child birth process. However, on the other hand health care workers felt following SCC was laborious as case load is consistently high in the institute. There was also not much difference in the satisfaction expression of services among SCC followed cases when compared with cases without following SCC. The implementation of Safe child birth is very useful at peripheral centers where interventional less expertise is available.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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