

Impact of Perinatal Death Auditing: Outcomes of An Interventional Study on Perinatal Death Auditing in Two Districts of Karnataka State, India

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ABSTRACT

Background: Perinatal death auditing is useful to identify preventable perinatal deaths and avoidable/preventable factors. **Objectives:** To know the impact of perinatal death audit like 1). Documentation of Care Provided 2) Changes in Infrastructure and Facilities 3). Number of perinatal deaths 4) Any other impact.

Methodology: Perinatal death auditing project implemented in two districts of Karnataka state. As a Part of Intervention, Expert Panel audited the perinatal deaths and provided feedback to the hospitals where these deaths occurred. The feedback included issues identified and suggestion for prevention. Trained Medical-Social Workers conducted evaluation surveys in post-interventional period at 6th monthly intervals. They collected the filled tools from the hospitals and handed over the written feedback of the expert panel to these hospitals. It was anticipated that the process of feedback would initiate some changes in infrastructure, facilities, documentation and number of perinatal deaths.

Results: Number of reported perinatal deaths decreased in Koppal District (from 325 to 301) as compared with Dakshina Kannada (from 223 to 221). Improvements in: 1]. Documentation of care provided 2] Assertion of preventability by the doctors 3] Infrastructure & facilities were observed in backward district of Koppal as compared to developed district of Dakshina Kannada.

Conclusion: Perinatal Death Auditing reduces the number of perinatal deaths apart from improving documentation, assertion of preventability by doctors, infrastructure & facilities.

Keywords: Perinatal Death Auditing, Impact, Interventional Study, Karnataka

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INTRODUCTION

With a focus on lowering preventable newborn deaths, Sustainable Development Goals (SDG) aims to reduce neonatal mortality to less than 12 per 1,000 live births.¹ To achieve this it is important to have knowledge of avoidable/preventable factors contributing to perinatal mortality. Unfortunately for at least half of the babies born across the world there is no registration of births or documentation of deaths.² So it is impossible to know the causative factors, avoidable/preventable factors contributing to perinatal mortality.² Perinatal death auditing helps to know avoidable/preventable factors, identify preventable deaths apart from providing inputs for planning interventions.^{3,4} So perinatal death auditing has been suggested as one of the solutions for identifying preventable perinatal deaths and improving standards of care.⁵ In fact perinatal death auditing is known to reduce perinatal mortality by at least 30% in low and middle income countries making this relevant for India.^{3,6}

There is no system of perinatal death auditing in India. But child death review which is done for reported deaths from government hospitals in a district does not include private hospitals.^{8,9} So perinatal deaths occurring in private hospitals do not get reported. This leads to underestimation of perinatal deaths.^{7,8} There is lack of information on whether this system actually identifies preventable perinatal and avoidable/preventable factors. This necessitated a community based perinatal death auditing project in two districts of Karnataka State, the initial reports of which showed that there are issues with documentation and reporting of perinatal deaths.⁹ As a part of community based perinatal death auditing project, tools developed to identify preventable perinatal deaths were found to be useful.¹⁰ An expert panel was constituted for each district which identified 49.9% of perinatal deaths as preventable apart from issues related to care, documentation, reporting & referral of perinatal deaths in two districts of Karnataka state.¹¹ This paper describes the overall impact of perinatal auditing other than issues identified by the expert panel.¹¹

METHODOLOGY

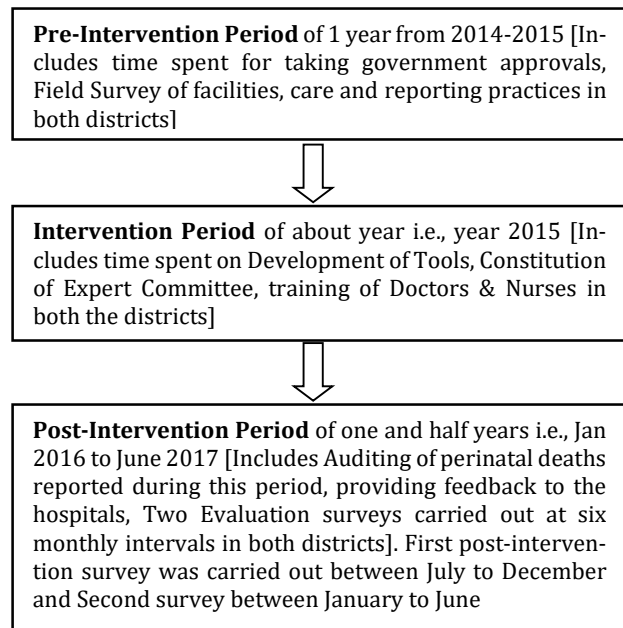
Study Setting: This community based interventional study was done in two districts i.e., Dakshina Kananda & Koppal of Karnataka State. As Dakshina Kananda is an economically, educationally better developed, with better health care infrastructure provides a good contrast with Koppal— which is poor on these parameters.^{12,13} So it is possible to assess the impact of the audit model in two different conditions

Study Units: Government & Private Hospitals of both the districts were assessed and graded in the pre-intervention period the details of which are published elsewhere.¹⁴

Audit Model: Flow chart 1 depicts the community-

based intervention study along with pre & post intervention evaluation. The overall audit model, and its working is described elsewhere.^{10,11}

Flow Chart 1: Sequence & time line of activities during the project



Tools were developed and manpower [i.e., Doctors & Nurses] in both the districts were trained to fill the tools the details of which are already published.¹⁰ The filled were useful to identify preventable perinatal deaths.¹⁰

Expert Panel was constituted for each district which audited and identified preventable perinatal deaths along with causes, avoidable/preventable factors, issues related to documentation, care provided, infrastructure, equipment's, and referral of cases.¹¹ Expert panel provided feed back to the hospitals where the perinatal deaths had occurred which included: issues identified and changes that would help prevent the perinatal death.

Impact Assessment: It was expected that the process of feedback would provide the necessary inputs for the hospitals to make the needed changes. During the post-interventional period two evaluation surveys were carried out in both the districts to assess the impact of audit. First Post-Intervention Survey was conducted in December 2016 to know the changes for the period July to December. Second Post-Intervention Survey was conducted in June 2017 for the period Jan to June. The survey included government and private hospitals in both the districts.

Parameters for Impact Assessment: These were changes in 1). Documentation of care delivered [like lab reports, diagnosis, treatment given, referral details, filling up of case sheets and death certificates] 2). Preventability Assertion [As decided by the expert panel based on clinical details and verbal autopsy reports] 3). The number of Perinatal Deaths.5).

Infrastructure and Facilities were assessed as explained elsewhere.¹⁴

Data Collection: Necessary clearances were taken from the government before beginning of the project. Trained MSWs carried out the two evaluation surveys at 6th monthly intervals using the tools developed for the purpose.¹⁰ They collected tools filled by doctors and nurses and gave it to the expert Committee which audited the deaths and provided feedback through specific tools which were given by the MSWs to the hospitals.^{10,11,15}

Data Analysis: The results are expressed as proportions in tables. Implications of the results are described and discussed.

RESULTS

Number of reported perinatal deaths decreased in Koppal District (from 325 to 301) as compared with Dakshina Kannada (from 223 to 221) (Table 1). The time taken to fill and submit the tools had increased (Table1).

Table 1: Impact on Number of Perinatal Deaths and Reporting Time during 1st [2016 July – December] and 2nd [2017 January – June] Post-Interventional Surveys

Reporting about Perinatal Death	July to Dec 16	Jan to Jun - 17
Number of Perinatal Deaths reported		
Dakshina Kannada District	225	221
Koppal District	325	301
Time Taken for Reporting Fetal Deaths* (in Hours)		
Public	51.2	47.9
Private	52.1	50
Time Taken for Reporting Neonatal Deaths* (in Hours)		
Public	18.4	18.4
Private	32.5	68.2

*Includes Antenatal and Intranatal Fetal Deaths

Table 2: Impact on Assertion of Preventability by the doctors during 1st [2016 July – December] and 2nd [2017 January – June] Post-Interventional Surveys

Preventability of Perinatal Death*	Dakshina Kannada District			Koppal District		
	July to Dec 16 n=223 (%)	Jan to Jun - 17 n=221 (%)	Change (%)	July to Dec 16 n=325 (%)	Jan to Jun - 17 n=301 (%)	Change (%)
Not Preventable	81 (36.3)	104 (47.06)	11	4 (1.2)	15 (5)	3
Possibly Preventable	91 (40.8)	76 (34.4)	6	11 (3.4)	27 (9)	6
Preventable	17 (7.6)	20 (9)	1	9 (2.8)	15 (5)	2
Unclassified	29 (13)	26 (11.8)	3	303 (93.2)	242 (80.4)	11

*Doctors who managed the cases of perinatal death were able to assert the perinatal deaths in to one of the categories using the tools the details of which are published elsewhere.¹⁰

Table 3: Impact on Documentation of Care Provided in Hospitals during 1st [2016 July – December] and 2nd [2017 January – June] Post-Interventional Surveys

Information documented in Case Sheets*	Dakshina Kannada District			Koppal District		
	July to Dec 16 n=223 (%)	Jan to Jun - 17 n=221 (%)	Change (%)	July to Dec 16 n=325 (%)	Jan to Jun - 17 n=301 (%)	Change (%)
Date & Time of Admission	132 (59.2)	201 (91)	31.8	113 (34.8)	208 (69.1)	34.3
Period of Pregnancy	198 (88.8)	199 (90)	1.2	171 (52.6)	276 (91.7)	39.1
Weight of Pregnant Mother	211 (94.6)	217 (98.2)	3.6	302 (92.9)	301 (100)	7.1
Hemoglobin	177 (79.4)	178 (80.5)	1.1	192 (59.1)	252 (83.7)	24.6
Blood Group	190 (85.2)	196 (88.7)	3.5	191 (58.8)	242 (80.4)	21.6
Date and Time of Delivery	156 (70)	216 (97.7)	27.7	131 (40.3)	233 (77.4)	37.1
Baby's Cry at Birth	82 (36.8)	95 (43)	6.2	39 (12)	111 (36.9)	24.9
Resuscitation Efforts	79 (35.4)	96 (43.4)	8	26 (8)	75 (24.9)	16.9
Wiped at Birth	77 (34.5)	97 (43.9)	9.4	21 (6.5)	60 (19.9)	13.4
Use of Baby Mask	30 (13.4)	55 (24.9)	11.5	26 (8)	70 (23.2)	17.2
Use of Incubator	52 (23.3)	59 (26.7)	3.4	18 (5.5)	45 (14.9)	9.4
Warmer Care	80 (35.9)	90 (40.7)	4.8	20 (6.1)	65 (21.6)	15.5
Oxygen Administration*	45 (20.2)	20 (9)	-11.2	20 (6.1)	48 (15.9)	9.8
Provisional Diagnosis	208 (93.3)	213 (96.4)	3.1	113 (34.8)	138 (45.8)	11
Referral Details	14 (6.3)	20 (9)	2.7	24 (7.4)	76 (25.2)	17.8
Transport Details	1 (0.4)	4 (1.8)	1.4	3 (0.9)	59 (19.6)	18.7
Death Notification	208 (93.3)	221 (100)	6.7	77 (23.7)	291 (96.7)	73
Signed Death Register	204 (91.3)	209 (94.6)	3.3	91 (28)	113 (37.5)	9.5

*Based on feedback of expert panel inappropriate oxygen administration practice had reduced in Dakshina Kannada district

Table 4: Impact on Facility and Infrastructure: Comparison of Pre [2015] and Post Intervention periods [2016-17]

CMAnc*		Dakshina Kannada District				Koppal District			
		Public		Private		Public		Private	
Level	Adequacy	Pre	Post	Pre	Post	Pre	Post	Pre	Post
I	Adequate	5	6	6	6	5	20	0	0
	Inadequate	4	3	10	10	31	16	0	0
II	Adequate	0	0	7	7	1	2	2	5
	Inadequate	0	0	15	15	2	1	16	13
III	Adequate	0	0	0	0	0	0	0	0
	Inadequate	0	0	2	2	0	0	0	0
IV	Adequate	0	0	5	5	0	0	0	0
	Inadequate	1	1	7	7	0	0	0	0
NICU	Adequate	1	1	0	0	0	0	0	0
	Inadequate	0	0	0	0	0	0	0	0
SNCU	Adequate	0	0	0	0	0	0	3	4
	Inadequate	0	0	0	0	0	0	4	3

*Criteria for different levels have been published earlier.¹⁴

Improvements in assertion of preventability by the treating doctors were seen in both the districts which are provided in Table 2. Improvements were better in Koppal District as compared with Dakshina Kannada. The Number of “Unclassified” deaths reduced (by 11% in Koppal as compared to 3% in Dakshina Kannada) and the “Preventable” and “Possibly Preventable” increased by 2% & 6% in Koppal District.

Improvements in documentation of care provided was seen in both the districts as evident in Table 3. Improvements were better in Koppal District where the situation was worse than Dakshina Kannada district at the beginning of the study.

Changes in Health Care Infrastructure and facilities were evident as the same checklists and assessment system (of the health care facilities as done at the beginning of the project) were reused in the post-intervention evaluation surveys.¹⁴ The number of facilities categorized as “Adequate” had increased from 35 in the beginning to 56 (Table 4). The Number of deficient health care facilities at Level I & II in Koppal District had reduced as compared to Dakshina Kannada District. Some equipment’s in labour room (like suction apparatus, weighing machine, pulse oximeter, foetal monitoring unit) were functional as compared to the pre-interventional period. Some requirements (Like episiotomy tray, baby tray, sterile drapes, partograph, bins) were met as compared with pre-intervention period.

DISCUSSION

As India does not have a perinatal death auditing system, the impact of perinatal death auditing has been compared with other countries. The reported number of perinatal deaths reduced over the post-intervention period of 1 year (Table 1). The reduction was better in backward district of Koppal (from 325 to 301) as compared with developed district of Dakshina Kannada (from 223 to 221). Auditing reduced the number of perinatal deaths in low- and middle-income countries by 30%.³ Scope of perinatal death auditing to

identify avoidable/preventable factors in higher in low- and middle-income countries. The magnitude of avoidable / preventable factors identified by auditing in such low-income countries like Tanzania [51% to 65%], Sudan [58% to 82%] and Zimbabwe [76%] establishes that the scope for preventable perinatal deaths is high.¹⁶⁻¹⁸ Such an impressive impact has not been observed in High Income Countries.¹⁹⁻²² In resource poor settings, there is more scope for improvement in care practices as compared to developed regions. So, the changes are more obvious in backward district of Koppal as compared with Dakshina Kannada district.

Improvements in documentation of care provided was more obvious in Koppal District as compared with Dakshina Kannada (Table 3). Changes were observed in infrastructure and facilities (Table 4) which were prominent at Level I & II in Koppal District as the “Adequate Hospitals” had increased as compared with Dakshina Kannada. Auditing is known to improve the documentation and completeness of information.⁴ Auditing involves feedback to the care provider which consists of issues identified and suggestions for improvement. Feedback given after auditing is known to produce improvements in documentation and care provided in low-income countries as compared with developed countries.^{6,23} Improvements in documentation and care provided could also be indirectly inferred by more time taken to fill the tools during the post-intervention period (Table 1). At the beginning of the project, approvals were taken from the government and directives were issued to both the district administrations. So, the improvements were better in the government facilities at Level I & II as compared with private hospitals (Table 3 & 4). This also highlights the need to involve the private hospitals in ways and means beyond just involvement in the audit process so that effective changes could be seen in private hospitals.

During the post-intervention period, the assertion of preventability of perinatal deaths improved among the doctors (Table 2). The number of “Unclassified

Deaths” was lot higher in Koppal District (303 v/s 26) as compared to Dakshina Kannada in the beginning of post-intervention period (Table 2). This indicates the lack of clarity among doctors of Koppal District about avoidable/preventable factors and preventable perinatal deaths. It was anticipated that the process of feedback would result in doctors gaining knowledge of avoidable/preventable factors and help in identifying “Preventable/Not Preventable” perinatal deaths. Doctors were able to identify if a perinatal death was “Preventable/Not Preventable” as the project progressed. There are no comparable studies which explored the assertiveness of preventability among doctors who managed the cases. The findings of our project stand to reason and prove our anticipation.

There are some limitations. The changes / improvements due to the project were modest for the number of perinatal deaths, some aspects of documentation, facilities and equipment’s. In low- and middle-income countries where perinatal death auditing is a continuous process, the reductions in perinatal deaths are impressive.^{3,23} Post-Intervention period in this project was only 1 year. Auditing should be a continuous on-going activity to produce impressive improvements. Auditing results in mild to modest improvements in care and documentation in high income countries only if it is a continuous on-going process.^{21,22,24} Just one year of post-intervention period could be a reason for mild to no changes in a developed district of Dakshina Kannada district. It also highlights the need to have a perinatal death auditing as a continuous process.

CONCLUSION

Perinatal death auditing improves documentation of care provided, infrastructure, equipment’s, facilities and reduce the number of deaths. The improvements are better in less developed district as compared to developed district.

RECOMMENDATIONS

Auditing needs to be sustained and become a continuous on-going activity.

CONTRIBUTIONS OF AUTHORS

HK, SB, PK, NK, SR- are the Investigators for a 3-year community-based project funded by Indian Council of Medical Research [Later changed to Department of Health Research]. This research paper describes the overall impact of the intervention in two districts over a period of 3 and half years.**HK, PK, SB, NK, SR** Took part in drafting the protocol. **HK, SB, PK** – Organising the data collection & supervising field work. **SB, PK, NK, SR-** Cross-checking of the filled forms.**HK-** Statistical analysis.**HK, SB, PK** - Writing the paper.

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