



EVALUATION OF PUBLIC PRIVATE PARTNERSHIP MODEL FOR NEWBORN CARE SERVICES AT TRUST HOSPITALS IN HIGH PRIORITY TALUKAS OF GUJARAT, INDIA

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ABSTRACT

Introduction: This study evaluated performance of Public Private Partnership (PPP) model adopted to improve infant mortality.

Methodology: For quantitative assessment, analysis of data from labor room records and Newborn Stabilization Unit (NBSU)/ Specialized Newborn Care Unit (SNCU) records, availability and training status of human resource and availability and functional status of equipment. For qualitative assessment, all specialist Doctors and Staff Nurses at all four Trust Hospitals were assessed for knowledge and skills.

Result: Most of the equipment critical for running NBSU/ SNCU were available and functional. Higher admission rate in SNCU were seen in two Hospitals where full time Pediatrician was available. There was high variation for the neonatal mortality, referral and Left Against Medical Advice (LAMA) among four hospitals, with no information regarding outcome among referrals and LAMA neonates. Most of the healthcare providers scored moderate to good in knowledge and skill assessment with wide inter-hospital variation.

Conclusion: Utilization and effectiveness of NBSU/ SNCU depends on availability of specialist doctors and para-medical staff, their training and skills and well equipped facility. The centers need to work in close coordination with local public health officers for following up neonates in the field.

Keywords: NBSU, SNCU, PPP, Performance evaluation, NICU

INTRODUCTION

Every year, four million newborn babies die in the first month of life - 99% in low and middle-income countries.¹ India carries the single largest share (25-30%) of neonatal deaths in the world.² Neonatal deaths constitute two-thirds of infant deaths in India; 45% of the deaths occur within the first two days of life.² It has been estimated that about 70% of neonatal deaths could be prevented if proven interventions are implemented effectively with high coverage.³ Facility-based newborn care has a significant potential for improving the survival of newborns in India.³

The detailed analysis of Sample Registration Survey (SRS) Statistical Report of 2013 shows that approximately 80% of under-five child mortality takes place within first year of birth, neonatal mortality in India contributes towards 57% of all deaths in childhood (up to age 5 years) and 70% of infant deaths (below one year of age), and about 79% of neonatal deaths took place within the first 7 days of birth (early neonates).⁴

Recognizing that events at the time of birth are critical to newborn survival, Newborn Care Corners (NBCC) are established at all delivery points and providers are trained in basic newborn care and resuscitation through Navjat Shishu

Shuraksha Karyakram (NSSK).⁵ Another smaller unit known as Newborn Stabilization Unit (NBSU) have been established at Community Health Centers (CHCs)/ First Referral Units (FRUs), whereas Specialized Newborn Care Units (SNCU) for the care of sick and premature low birth weight newborns are established at District Hospitals and Tertiary Care Hospitals.⁵

Infant Mortality Rate (IMR) of Gujarat as per SRS Statistical Report 2013 is 36 per 1000 live births.⁴ Still birth rate of Gujarat as per the same report is 4 per 1000 live births.⁴ 12th Five Year Plan has set a goal to reduce IMR up to 25 per 1000 live births by 2017.⁶ Though Gujarat has made significant progress in improving its health indicators, the progress in achieving the goals of reducing infant mortality and neonatal mortality has been limited, owing to limited outreach of specialist medical care in difficult rural and tribal areas.⁷ While until recently there has been little evidence of feasibility and effectiveness of level II newborn care in rural settings, recent experiences have shown that a rural district hospital can provide level II newborn care.⁸

In efforts to improve infant mortality and to provide with essential and emergency newborn care, Government of Gujarat entered into a unique Public Private Partnership (PPP) model with four different Trust Hospitals (*Anjali Hospital, Ranasan; Gram Seva Trust Hospital, Kharel; Shrimad Rajchandra Mission Hospital, Dharampur and Dhiraj Hospital, Piparia*) managed by Non-Government Organizations (NGOs) in high priority talukas on a resource sharing basis. The objective of this study was to evaluate the performance of this PPP model for providing immediate newborn care services.

METHODOLOGY

Study setting:

Under the PPP model, newborn care and resuscitation were provided through NBSU/ SNCU at four different Trust Hospitals in remote and identified high priority talukas. All four hospitals were included to evaluate the performance. (Figure 1)

Study design and study tools: This was a hospital based cross-sectional study using a mix of qualitative and quantitative assessment techniques. Quantitative assessment was based on the a) analysis of labor room records and NBSU/ SNCU records of all four hospitals, b) availability of human resource involved in NBSU/ SNCU and their trainings status and c) availability and functional status of equipment at NBSU/ SNCU of all four hospitals. Qualitative assessment was based on the

knowledge and skills assessment of Specialist Doctors and Staff Nurses involved in NBSU/ SNCU.

All these tools were adapted from Facility Based Newborn Care Operational Guidelines for planning and implementation, published by Ministry of Health and Family Welfare, Government of India, year 2011.⁹

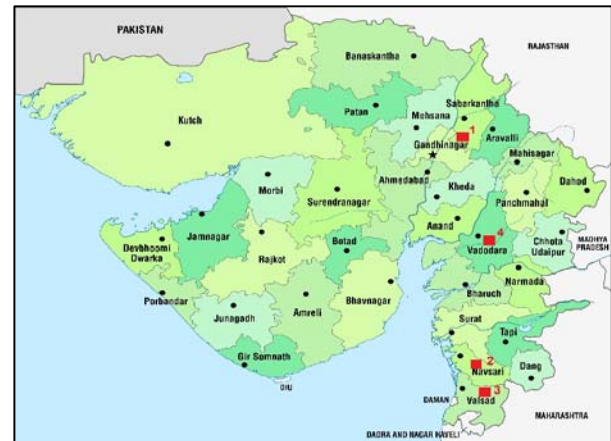


Figure 1: Location of four Trust Hospitals providing immediate newborn care under PPP model.

- 1) Anjali (Society for Rural Health and Development), Ranasan, (Taluka Talod, District Sabarkantha)
- 2) Gram Seva Trust, Kharel, (Taluka Gandevi, District Navsari)
- 3) Shrimad Rajchandra Mission Hospital, Dharampur (Taluka Dharampur, District Valsad)
- 4) Dhiraj Hospital, Piparia (Taluka Waghodia, District Vadoara)

Sample size: All four trust hospitals involved in PPP with Government of Gujarat were included in the study. From these four hospitals, 3 Pediatricians, 10 Medical Officers, 2 Resident doctors, 18 Staff Nurses and 2 ANMs were available at the time visit and interviewed for their knowledge and skills.

Data collection: Records and registers of NBSU/ SNCU were checked as well as physical observation was made along with the checklist for availability and functional status of equipment at all four hospitals. A pre-tested semi-structured questionnaire was used to assess the knowledge of healthcare providers involved in NBSU/ SNCU. Their skills were assessed using a standard checklist.

Assessment of knowledge and skills of health care providers: A total of 26 questions were framed to assess their knowledge for routine newborn care as per the Navjat Shishu Suraksha Karyakram (NSSK).¹⁰ A correct reply was scored

as 'two', partially correct response was scored as 'one' and an improper or no response was scored as 'zero'. A total of all the scores was made for each participant and converted into percentages.

Similarly seven vital skills pertaining to resuscitation, prevention of hypothermia and infections were assessed. Each correctly performed skill, was given a score of 'two', while a score of 'one' or 'zero' was awarded to partially correct or incorrect demonstration of skill, respectively. The final score of skills for each participant was presented as percentage of the maximum score.

Data processing and analysis: Quantitative data thus collected was entered into MS Excel 2013 and analyzed using Epi Info 3.5.1 software.¹¹ Continuous variables were expressed as Mean and Standard Deviation. Categorical variables were expressed as percentages. Some part of the interview questions were also converted into quantitative data by using scores, and analyzed using Mean and Standard Deviation. Appropriate statistical

test were applied when necessary. Qualitative data were analyzed through scored based assessment of knowledge and skills and expressed using percentages and proportions.

Ethical consideration: Administrative permission was taken from State Health Officials and from Managing Trustee of all four respective Trust Hospitals before proceeding for field work. Informed verbal consent was taken before proceeding with the interview of health care providers involved in NBCC and NBSU/ SNCU.

RESULTS

All four trust hospitals managed by NGO and providing immediate newborn care under PPP model were visited and included in the study. A total of thirty five health care providers involved in NBSU/ SNCU at all hospitals were interviewed for their knowledge and skills.

Table 1: Labor room records from all four Hospitals (April 2015 – February 2016)

Hospital name	Total deliveries	Live births	Still births	Birth weight (% of total live births)		Preterm births** (<37 weeks) (% of total live births)
				≥2500 g	<2500 g*	
Anjali	642	640	2	442 (68.7)	200 (31.3)	25 (3.9)
Gram Seva Trust	1499	1482	22	816 (55.0)	666 (45.0)	231 (15.6)
Srimad Rajchandra	952	937	15	559 (59.7)	378 (40.3)	197 (21.1)
Dhiraj	1206	1165	45	725 (62.2)	440 (37.8)	184 (15.8)

*Figures in parenthesis indicate percentage of low birth weight babies

**Figures in parenthesis indicate percentage (Proportion of pre-term out of total live births)

N.B. Live births + Still births total is more than total deliveries, because twins are counted as single delivery

Table 2: NBSU/ SNCU records from all four Hospitals (April 2015 – February 2016)

Hospital name	Admissions in unit		Outcome (Out of total admissions)				Average length of stay (days)
	I*	O^	Discharge (%)	Refer (%)	LAMA# (%)	Died (%)	
Anjali	72	6	51 (65.4)	21 (26.9)	3 (3.8)	3 (3.8)	3.3
Gram Seva Trust**	220	30	189 (75.6)	13 (5.2)	3 (1.2)	21 (8.4)	5.5
Srimad Rajchandra	417	239	592 (90.2)	7 (1.1)	9 (1.4)	48 (7.3)	5.7
Dhiraj	234	169	343 (85.1)	6 (1.5)	33 (8.2)	21 (5.2)	9.0

* Inborn, ^Outborn, # Left Against Medical Advice

**Total outcomes is not matching total admissions, due to some error in data management at the center.

As shown in table 1, at all four Trust Hospitals, on an average 2 to 4 deliveries are conducted every day; lowest at Anjali Hospital and Srimad Rajchandra Hospital, while highest at Gram Seva Trust Hospital and Dhiraj Hospital. Most of the deliveries (more than 99%) resulted in live births, except at Dhiraj Hospital where stillborn rate was around 4%. The proportion of Low Birth Weight (LBW) babies at all four Trust Hospital was higher than the national average¹²; lowest at Anjali Hospital (31%) and highest at Gram Seva Trust Hospital (45%). The rate of pre-term births at Gram Seva

Trust Hospital, Srimad Rajchandra Hospital and Dhiraj Hospital was parallel to or in slight excess of the national average.¹³

Table 2 depicts that Srimad Rajchandra Hospital and Dhiraj Hospital had relatively higher workload of around 50 to 60 admissions per month. Despite having higher number of births and high proportion of LBW (45%) at Gram Seva Trust Hospital, there is proportionately much lower admission rate. Anjali Hospital, Ranasan had lowest number of admissions. Neonatal death rate (total neonatal deaths out of total admission in NBSU/

SNCU) and referral rate had higher variation among four Hospitals, with no information regarding outcome among referrals and LAMA neonates. Average duration of stay in NBSU/ SNCU

varied between different hospitals from around 3 days to 9 days, while the remuneration under this PPP model is based on number of admission, irrespective of length of stay.

Table 3: Staff involved in NBSU/ SNCU

Designation	Availability of staff dedicated to NBSU/SNCU			
	Anjali (NBSU)	Gram Seva Trust (SNCU)	Srimad Rajchandra (SNCU)	Dhiraj (SNCU)
Paediatrician	0	1*	2	1^
Medical Officer	2	5	3	0 (2 Resident Doctors)
Staff Nurse	2	3 + 3#	6	4
ANM	2	0	0	0

* Pediatrician at Gram Seva Trust, Kharel was on leave during our visit. (Visiting time of Pediatrician is Monday to Friday 9 am to 1 pm, and on call during emergency)

3 Staff nurse are posted in Labor room and 3 are dedicated to SNCU

^ One Assistant Professor of Pediatric Department is dedicated for SNCU

Two full time Pediatricians were available at Srimad Rajchandra Hospital. One Assistant Professor is posted for six months on rotation basis in SNCU at Dhiraj Hospital and two Resident doctors were also present round the clock in SNCU. No dedicated Pediatrician was available for NBSU at Anjali Hospital. So only basic neonatal care was given and most complicated cases were referred to other health facilities. Gram Seva Trust Hospital had limited availability of Pediatrician (during OPD hours) and he remained on call for any emergency cases. Medical Officers and Staff Nurse were present at all four Hospitals. However, availability of Pediatrician was directly related to the effective utilization of the NBSU/ SNCU centers. None of the staff (Pediatrician, Medical Officers and most of the Staff Nurse) were formally trained for facility based newborn care (FBNC).

Table 4: Availability and functional status of equipment at NBSU/ SNCU of all four Hospitals

Hospital name	Availability of equipment (%)	Functional status of equipment (%)
Anjali	100	100
Gram Seva Trust	100	100
Srimad Rajchandra	100	100
Dhiraj	100	92

All equipment required for NBCC, NBSU and SCNU were available at all four Hospitals. However, the number of radiant warmers were inadequate at Anjali hospital, Gram Seva Trust and Srimad Rajchandra hospital. All the available equipment were found to be in functional status, except one phototherapy unit at Dhiraj hospital.

Table 5: Knowledge and Skills assessment of healthcare providers involved in newborn care

Percentage Score obtained by healthcare providers in Knowledge and Skills assessment	Designation			
	Pediatrician	Medical Officer	Staff Nurse	ANM
Knowledge score (Routine newborn care)				
Anjali	-NA-	50.0	46.1	34.6
Gram Seva Trust	-NA-	53.8	61.5	-NA-
Srimad Rajchandra	84.6	57.6	65.3	-NA-
Dhiraj	80.7	73.1 (Residents)	73.1	-NA-
Skills score (Resuscitation and emergency care)				
Anjali	-NA-	56.2	56.2	25.0
Gram Seva Trust	-NA-	62.5	68.7	-NA-
Srimad Rajchandra	87.5	62.5	68.7	-NA-
Dhiraj	87.5	75.0 (Residents)	75.0	-NA-

As per NSSK, minimum 85% individual scoring is essential to be termed as 'trained' and skilled enough to perform emergency newborn resuscitation.¹⁰

Table 5 shows that there is no uniformity in the level of score obtained by newborn care providers and a wide variation was seen across all four hospitals. Only the Pediatricians at Srimad Rajchandra hospital and Dhiraj hospital scored more than 80 percent in both knowledge and skills assessment.

Lowest score was seen among the health care providers at Anjali hospital. Medical Officer and Staff Nurses at Gram Seva Trust hospital (where full time Pediatrician is not available), scored between 53%-68% in knowledge and skills assessment.

DISCUSSION

Low workload at Anjali Hospital may be due to absence of full time Obstetrician. However, low workload at Srimad Rajchandra Hospital despite availability of full time Obstetrician needs further attention. The higher proportion of LBW babies at all hospitals may be due to the fact that all this PPP newborn care centers were located in tribal and difficult rural areas where poverty and under-nutrition may be higher. Prematurity and LBW are important deciding factor for which emergency newborn resuscitation may be required. Hence more newborn admissions in NBSU/ SNCU may be expected at three Hospitals except at Anjali hospital, where only around 4% newborns were born pre-term.

The better utilization of neonatal services at Srimad Rajchandra hospital and at Dhiraj hospital may be due to availability of two full time Pediatrician at former and round the clock availability of Pediatrician faculties (and Residents) due to attached Medical College at the latter. Lower admission rate at Gram Seva Trust hospital may be due to the absence of full time Pediatrician that is critical to run SNCU round the clock. Anjali hospital had lowest workload which may be due to lower number of births and very limited (2 days a week during OPD hours) availability of Pediatrician. Remuneration to all four hospitals under PPP model for NBSU/ SNCU may be based on per day basis, so that neonates are discharged only when they are fully recovered from acute illness.

Most of the equipment that are critical for running NBSU/ SNCU were available and functional at all four Trust Hospitals. However, looking at the workload Srimad Rajchandra Hospital and Dhiraj Hospital, there is scope for further expansion.

A study conducted by Lodkiya KK et al,¹⁴ showed that 60% of the Pediatrician, 40% of the staff nurse, 25% of the Residents and 16% of Medical Officer and ANM had scored more than 85%. In our study, only the Pediatricians at Srimad Rajchandra and Dhiraj hospital scored more than 85% in skills assessment. This may also reflect the fact that none of the healthcare provider had taken formal training on FBNC.

CONCLUSION

Overall, the NBSUs and SNBUs are essential to reduce neonatal mortality that is responsible for majority of infant mortalities. However, utilization and effectiveness of such centers depends of availability of expert specialist doctors and para-medical staff, their training and skills and well equipped facility. It was observed during the eval-

uation that wherever full time pediatricians were available, the utilization and effectiveness were much higher, compared to the part time specialist availability.

For SNCUs, the availability of pediatricians should be mandatory, preferably trained in neonatology, while for NBSUs, well trained Medical Officers and para medical staffs can manage it under supervision of part time pediatrician. So, Government should encourage at all hospitals attached to the teaching institutes (Govt. and Private) to start SNCUs and make senior faculty trained in Neonatology in-charge for such centers. If required, the pediatricians may be send for fellowship programs in neonatology at other apex institutes. Private hospitals with availability of full time pediatricians maybe encourage to join NBSU or SNCU PPP model based on their capacity to increase outreach of facility and services and rates of remunerations shall be update based on market experience.

Health & Family Welfare Dept., Government of Gujarat must ensure that standardized formal training on essential and emergency newborn care is given to all such centers for disseminating proper information and uniform protocol based service delivery for the newborns.

This PPP NBSU/SNCU shall work in close coordination with local public health officers for increasing utilization and for following up neonates in the field after discharge from the hospital to add synergy for reducing infant mortality.

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