

Impact of the Community-Based Newborn Care Package in Nepal: a quasi-experimental evaluation

Deepak Paudel*, Center for International Health, Ludwig Maximilians University, Munich, Germany; United States Agency for International Development, Nepal

Email: paudeld@gmail.com

Ishwar B. Shrestha, Department of Community Medicine and Family Health, Institute of Medicine, Tribhuvan University, Kathmandu, Nepal

Matthias Siebeck, Center for International Health, LMU Munich, Germany

Email: Matthias.Siebeck@med.uni-muenchen.de

Eva Rehfuess, Institute for Medical Information Processing, Biometry and Epidemiology, Pettenkofer School of Public Health and Center for International Health, LMU Munich, Germany

Email: rehfuess@ibe.med.uni-muenchen.de

Supplementary Information

Table S1 CB NCP Training Outputs District specific training start and end dates, DHS data collection dates, number of health workers trained and supporting agency								
District	Training start date (month/year)	Training end date (month/year)	DHS data collection (month/year)	Exposure period (months)	# CHWs trained	# FCHVs trained	# facility-based HWs trained	Supporting agency
Bardiya	5/2009	12/2009	2-3/2011	14	56	842	132	SAVE
Chitwan	4/2010	7/2010	2-3/2011	7	74	340	136	UNICEF
Dang	11/2009	4/2010	4-6/2011	12	62	840	179	UNICEF
Dhankuta	4/2010	7/2010	3-4/2011	8	60	315	91	GON
Doti	6/2009	7/2010	5-6/2011	10	84	653	127	CARE
Kavre	11/2009	7/2010	6/2011	11	128	923	244	UNICEF
Morang	4/2010	7/2010	2-3/2011	7	114	594	184	GON
Palpa	4/2010	7/2010	4/2011	9	93	585	130	GON
Parsa	5/2009	7/2010	2-3/2011	7	132	999	231	PLAN
Sunsari	5/2009	2/2010	2-3, 5-6/2011	12	99	981	161	PLAN
TOTAL	--	--		7-14	902	7072	1615	

DHS: Demographic and Health Survey; CHW: community health worker; FCHV: female community health volunteer; HW: health worker; SAVE: Save the Children; GON: Government of Nepal; UNICEF: United Nations Children Fund; CARE: CARE International; PLAN: Plan International

Table S2									
Difference-in-differences analysis for key practices to improved neonatal health (specific and aggregate outcomes in percent), for most recent births to women aged 15-49 years in the five years preceding the survey based on DHS data									
		Intervention area			Comparison area			Diff. of differences	p-value
		Before (n=533)	After (n=168)	Diff.	Before (n=347)	After (n=104)	Diff.		
Saved money	Yes	37.6	39.7	2.1	28.0	37.3	9.3	-7.2	0.419
	No	62.4	60.3		72.0	62.7			
Arranged transport	Yes	3.8	6.7	2.9	3.7	7.6	3.9	-1.1	0.835
	No	96.2	93.3		96.3	92.4			
Found blood donor	Yes	0.7	1.4	0.7	0.0	0.0	0.0	0.7	na
	No	99.3	98.6		100.0	100.0			
Identified health worker	Yes	1.2	0.7	-0.5	0.2	0.0	-0.2	-0.3	0.622
	No	98.8	99.3		99.8	100.0			
Bought safe delivery kit	Yes	1.2	0.7	-0.5	2.4	0.2	-2.2	1.6	0.167
	No	98.8	99.3		97.6	99.8			
At least one ¹ preparation	Yes	42.4	44.6	2.2	31.5	39.1	7.6	-5.4	0.575
	No	57.6	55.4		68.5	60.9			
Birth preparedness² (combined)	Better	6.2	8.4	2.2	4.8	6.0	1.2	1.0	0.810
	Poorer	93.8	91.6		95.2	94.0			
Antenatal care by skilled provider	Yes	62.6	69.6	7.0	53.4	64.5	11.1	-4.1	0.607
	No	37.4	30.4		46.6	35.5			
Antenatal care visits, four or more	Yes	52.4	64.5	12.1	40.8	55.7	15.0	-2.8	0.813
	No	47.6	35.5		59.2	44.3			
Iron tablets taken	Yes	78.5	87.2	8.7	76.7	80.0	3.4	5.3	0.305
	No	21.5	12.8		23.3	20.0			
TT2 taken	Yes	74.5	75.7	1.2	68.6	63.8	-4.8	6.0	0.371
	No	25.5	24.3		31.4	36.2			
Blood pressure measured ³	Yes	75.8	85.4	9.6	71.5	81.0	9.6	0.0	0.998
	No	24.2	14.6		28.5	19.0			
Urine sample taken ³	Yes	54.1	65.0	10.9	42.5	46.7	4.2	6.8	0.351
	No	45.9	35.0		57.5	53.3			
Blood sample taken ³	Yes	42.0	48.7	6.7	36.5	42.0	5.5	1.2	0.897
	No	58.0	51.3		63.5	58.0			
Told about pregnancy complications ³	Yes	64.5	77.9	13.4	56.9	54.1	-2.8	16.2	0.15
	No	35.5	22.1		43.1	45.9			
Told about where to go in complications	Yes	65.5	78.2	12.7	55.1	53.8	-1.4	14.0	0.164
	No	34.5	21.8		44.9	46.2			
Antenatal care quality – at least one ⁴	Yes	36.0	43.8	7.8	29.0	30.9	1.9	5.9	0.524
	No	64.0	56.2		71.0	69.1			
ANC care seeking⁵ (combined)	Better	33.7	49.7	16.0	26.4	33.2	6.8	9.2	0.383
	Poorer	66.3	50.3		73.6	66.8			
ANC quality⁶ (combined)	Better	47.4	59.9	12.5	34.8	37.8	3.0	9.5	0.290
	Poorer	52.6	40.1		65.2	62.2			

Table S2 (continue)									
Difference-in-differences analysis for key practices to improved neonatal health (specific and aggregate outcomes in percent), for most recent births to women aged 15-49 years in the five years preceding the survey based on DHS data									
Delivery at health institution	Yes	42.9	60.3	17.4	30.5	42.0	11.6	5.8	0.488
	No	57.1	39.7		69.5	58.0			
Delivery attended by SBA⁷	Yes	46.7	57.7	11.0	31.2	37.6	6.4	4.6	0.577
	No	53.3	42.3		68.8	62.4			
Bathed after 24 hours ⁸	Yes	58.1	74.9	16.9	46.7	57.6	10.9	6.0	0.492
	No	42.0	25.1		53.3	42.4			
Dried before placenta delivered ⁸	Yes	75.3	83.9	8.6	70.6	74.2	3.6	5.0	0.601
	No	24.7	16.1		29.4	25.8			
Wrapped in cloth ⁸	Yes	80.2	82.6	2.4	71.3	86.6	15.3	-12.9	0.072
	No	19.8	17.4		28.7	13.4			
Placed in belly or breast ⁸	Yes	49.6	66.3	16.7	41.6	57.4	15.7	1.0	0.888
	No	50.4	33.7		58.4	42.6			
Applied nothing or only CHX on the cord ⁸	Yes	71.2	87.5	16.3	65.9	72.9	7.1	9.2	0.277
	No	28.8	12.5		34.1	27.1			
Initiated breastfeeding within one hour ⁸	Yes	47.8	51.2	3.5	40.5	53.6	13.2	-9.7	0.228
	No	52.2	48.8		59.5	46.4			
Immediate newborn care⁹	Better	74.4	85.9	11.5	64.3	79.9	15.7	-4.2	0.605
	Poorer	25.6	14.1		35.8	20.1			
Postnatal care within 48 hours	Yes	33.7	44.6	10.9	26.8	17.4	-9.4	20.3	0.036
	No	66.3	55.4		73.2	82.6			

¹ At least one among: money, transport, blood donor, identified health worker, bought safe deliver kit

² Birth preparedness: is defined as "better practices" if at least any two preparations are arranged, and as "poorer practices" if less than two or no preparation among: money, transport, blood donor, identified health worker, bought safe deliver kit

³ These information were asked only for the women who received antenatal care, thus it was assumed that those who didn't receive care didn't receive these services as well

⁴ At lease one among blood pressure, urine sample, blood pressure, told about pregnancy complication and told about where to go in complication

⁵ ANC care seeking is defined as "better practices" if all of the following were fulfilled and "poorer practices" if any of these were not fulfilled: ANC four or more visits, iron tablets (>90 tablets) taken, at least two doses of tetanus toxoid taken

⁶ ANC quality is defined as "better practices" if at least four of following five items were fulfilled and "poorer practices" if less than four items were fulfilled: blood pressure, urine sample, blood sample, told about pregnancy complication and told about where to go in complication

⁷ SBA (Skilled Birth Attendant): includes doctor, nurse and midwife

⁸ These information was asked only for home births and it was assumed that these practices were followed in case of institutional deliveries.

⁹ Immediate newborn care has been defined as "better" if at least three of the following were fulfilled and "poorer" if less than three were fulfilled among: delayed bathing, dried, wrapped, placed in belly or breast, applied nothing or only Chlorhexidine and initiated breastfeeding within one hour of birth

Box 1 CBNCP programme components

- i. **Program planning and orientation:** This includes orientation of stakeholders on training overview, changes in roles and responsibilities of providers and supervisors, reporting and service delivery, required support from different stakeholders at local, district and national level. A detailed program implementation and monitoring plan per district prepared after the orientation
- ii. **Training/human resource:** Five different training packages were prepared: Master Training of Trainers and Training of Trainers (7+2 days), Service Providers from Health Facilities (5 days), Outreach Service Providers (7 days), Female Community Health Volunteers (5 days) and Program managers (2 days)

Training content and service provision requirement covered following components:



behavior change communication for birth preparedness and newborn care



promotion of **institutional** or clean home delivery



postnatal care to promote essential newborn care



community-based diagnosis and management of possible **infection**



care of **low birth weight** newborns



prevention and management of **hypothermia**



recognition, initial stimulation and resuscitation for **asphyxia**

- iii. **Supervision, monitoring and evaluation:** Utilizing existing and regular supervision and monitoring approach topped up with additional pilot phase intensive supervision from center, region, district and health facility level. Use of IMCI tools and additional CB NCP pilot tools (six forms CB NCP 1-6). Monthly review meeting with FCHVs at HF level, trimester review meeting at *llaka* level with HF providers, semi-annual review meeting at district level with all HFs. Additional regional and national review meetings.
- iv. **Logistics and supply chain management:** Ensuring regular availability of key drugs and commodities (e.g. gentamycin injection, insulin syringe, De Lee suction tube, clean delivery kit, bag-and-mask, acute respiratory infection (ARI) timer, cotrimoxazole pediatric tablets) at district, health facility and volunteer level
- v. **Communication:** Community and social mobilization, behavioral change communication, mass media, advocacy.
- vi. **Pay for performance:** Performance based (based on number of cases treated by a group of volunteers) incentives for volunteers to compensate for their effort during very specific and demanding period (primarily counselling on birth preparedness, being present on the day of delivery, follow up visits on day 3, 7 and 28 days)

Source and further details:

Pradhan YV, Upreti SR, KC NP, et al. Fitting Community Based Newborn Care Package into the health systems of Nepal. J Nepal Health Res Counc 2011;9(2):119-28.

Table S3												
Health providers' knowledge and skills												
Percentage of health providers with correct knowledge of essential newborn care and dose of cotrimoxazole paediatric tablets to treat newborn babies with infections and ability to demonstrate hand washing and birth asphyxia steps as outlined in CBNCP training package based on NHIS data												
District	Know all 5 essential newborn care messages ¹			Know correct dose of cotrimoxazole paediatric tablet ²			Demonstrate correct hand washing			Demonstrate management of birth asphyxia (using doll)		
	HW	CHW	FCHV	HWs	CHWs	FCHVs	HW	CHW	FCHV	HWs	CHWs	FCHVs
Bardiya	76	56	80	98	95	97	81	65	67	47	43	39
Chitwan	43	46	49	58	78	69	71	51	58	76	61	39
Dang	95	80	90	93	90	97	86	81	69	48	30	52
Dhankuta	87	57	37	89	96	86	67	42	58	61	39	47
Doti	na	na	na	82	95	84	76	57	38	43	24	9
Kavre	62	56	18	91	92	82	86	66	52	48	30	20
Morang	86	82	84	91	94	97	97	85	63	88	66	--
Palpa	70	59	61	90	87	59	73	70	55	42	23	19
Parsa	51	51	38	86	88	53	90	96	92	22	17	1
Sunsari	59	67	55	98	95	97	--	--	50	--	--	18
Mean (unweighted)	70	62	57	88	91	82	81	68	60	53	37	27

¹Five ENC messages: immediate drying; maintain skin-to-skin contact; apply nothing on cord; immediate breastfeeding; delayed bathing

²Correct dose of cotrimoxazole paediatric tablet: half a tablet twice daily for five days for newborns aged 0-28 days
CHW: community health worker; FCHV: female community health volunteer; HW: health worker.

Data source: Assessment of the community-based newborn care package (August 2012)