

Every Newborn BIRTH multi-country validation study: informing measurement of coverage and quality of maternal and newborn care

Uterotonics for prevention of postpartum haemorrhage: EN-BIRTH multi-country validation study

Additional File 9: Individual-level validation of exit-survey report for uterotonic administration, EN-BIRTH Study (n=23,015)

	Bangladesh				Nepal		Tanzania				All sites Pooled	
	Azimpur Tertiary		Kustia District		Pokhara Regional		Temeke Regional		Muhimbili National		Random Effects	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
All modes of Birth												
Observer-assessed coverage %	98.9	(98.4,99.2)	99.8	(99.5,99.9)	99.9	(99.8,99.9)	99.3	(99.1,99.5)	98.4	(98,98.8)	99.4	(98.7,99.8)
Survey reported prevalence %	80.3	(78.8,81.7)	88.2	(86.8,89.5)	82.0	(81,82.8)	91.7	(90.9,92.4)	79.5	(78,81)	84.7	(79.1,89.5)
"Don't know" responses %	14.4		2.1		12.5		5.1		13.3		8.7	(4.5,14.1)

Current survey - Count "don't know" as "no"

> 10 counts in either column of 2x2 table	Yes	No		No		Yes	Yes					
Percent agreement (TN+TP/n) all observed %	79.8		88.1		83.0		92.0		79.2		84.7	(79.4,89.4)
Sensitivity % (95% CI)	80.3	(78.8,81.8)	+	+	+	+	91.8	(91,92.5)	79.7	(78.1,81.2)	84.9	(79.6,89.6)
Specificity % (95% CI)	28.0	(12.1,49.4)	+	+	+	+	33.3	(14.6,57)	41.7	(22.1,63.4)	32.5	(21.2,44.6)
Positive Predictive Value % (95% CI)	99.2	(98.8,99.5)	+	+	+	+	99.7	(99.6,99.9)	99.3	(98.9,99.6)		
Negative Predictive Value % (95% CI)	1.2	(0.5,2.6)	+	+	+	+	1.5	(0.6,3)	1.8	(0.9,3.3)		
AUC and "accuracy"	0.5	low	+	+	+	+	0.6	Moderate	0.6	Moderate		
Inflation Factor and "Bias"	0.8	low	+	+	+	+	0.9	low	0.8	low		

Consider only "yes" and "no" (exclude don't know)

> 10 counts in either column of 2x2 table	No	No		No		Yes	Yes					
Percent agreement (TN+TP/n) 2x2 table only %	93.1		90.1		93.8		96.4		91.3		93.1	(90.7,95.2)
Sensitivity (95% CI)	93.8	(92.8,94.8)	+	+	+	+	96.6	(96.1,97.1)	91.8	(90.6,92.9)	93.5	(91.1,95.5)
Specificity (95% CI)	18.2	(5.2,40.3)	+	+	+	+	17.6	(3.8,43.4)	26.3	(9.1,51.2)	17.3	(7.4,29.4)
Positive Predictive Value (95% CI)	99.2	(98.8,99.5)	+	+	+	+	99.7	(99.6,99.9)	99.3	(98.9,99.6)		
Negative Predictive Value (95% CI)	2.6	(0.7,6.6)	+	+	+	+	1.6	(0.3,4.7)	2.6	(0.8,5.9)		
AUC and "accuracy"	0.6	low	+	+	+	+	0.6	low	0.6	low		
Inflation Factor and "Bias"	0.9	low	+	+	+	+	1.0	low	0.9	low		

Vaginal births												
Observer-assessed coverage %	98.2	(96.9,98.9)	99.8	(99.3,99.9)	99.9	(99.8,100)	99.8	(99.7,99.9)	99.3	(98.7,99.6)	99.6	(99.1,99.9)
Survey reported prevalence %	80.8	(77.8,83.5)	85.6	(83.6,87.3)	91.1	(90.4,91.8)	94.1	(93.5,94.7)	92.3	(90.6,93.8)	89.3	(85.3,92.8)
"Don't know" responses %	6.8		1.0		4.3		2.9		2.7		3.2	(2.0,4.8)

Current survey - Count "don't know" as "no"

> 10 counts in either column of 2x2 table	Yes		No		No		No		No			
Percent agreement (TN+TP/n) all observed %	79.9		85.4		91.1		94.0		92.1		89.1	(85.0,92.6)
Sensitivity % (95% CI)	80.9	(77.9,83.7)	+	+	+	+	+	+	+	+	89.4	(85.4,92.8)
Specificity % (95% CI)	25.0	(5.5,57.2)	+	+	+	+	+	+	+	+	20.4	(6.4,37.9)
Positive Predictive Value % (95% CI)	98.5	(97.2,99.3)	+	+	+	+	+	+	+	+		
Negative Predictive Value % (95% CI)	2.1	(0.4,6)	+	+	+	+	+	+	+	+		
AUC and "accuracy"	0.5	low	+	+	+	+	+	+	+	+		
Inflation Factor and "Bias"	0.8	low	+	+	+	+	+	+	+	+		

Consider only "yes" and "no" (exclude don't know)

> 10 counts in either column of 2x2 table	Yes		No		No		No		No			
Percent agreement (TN+TP/n) 2x2 table only %	85.7		86.3		95.1		96.8		94.7		92.4	(88.3,95.7)
Sensitivity (95% CI)	86.8	(84,89.2)	+	+	+	+	+	+	+	+	92.7	(88.7,95.9)
Specificity (95% CI)	18.2	(2.3,51.8)	+	+	+	+	+	+	+	+	15.7	(3.1,33.1)
Positive Predictive Value (95% CI)	98.5	(97.2,99.3)	+	+	+	+	+	+	+	+		
Negative Predictive Value (95% CI)	2.2	(0.3,7.6)	+	+	+	+	+	+	+	+		
AUC and "accuracy"	0.5	low	+	+	+	+	+	+	+	+		
Inflation Factor and "Bias"	0.9	low	+	+	+	+	+	+	+	+		

Caesarean Births												
Observer-assessed coverage %	99.4	(98.9,99.6)	100.0	-	99.8	(99.2,100)	98.3	(96.6,99.1)	99.1	(98.6,99.5)	99.5	(98.9,99.9)
Survey reported prevalence %	80.1	(78.3,81.7)	92.0	(90.1,93.5)	29.6	(26.8,32.5)	50.2	(44.7,55.6)	70.8	(68.5,73)	66.3	(44.0,85.3)
"Don't know" responses %	17.1		3.7		59.3		42.4		20.5		26.0	(10.1,46.1)

Current survey - Count "don't know" as "no"

> 10 counts in either column of 2x2 table	Yes		No		No		No		No			
Percent agreement (TN+TP/n) all observed %	79.7		92.0		31.0		52.0		70.5		66.7	(45.3,85.0)
Sensitivity % (95% CI)	80.1	(78.3,81.8)	+	+	+	+	+	+	+	+	66.6	(45.1,85.0)
Specificity % (95% CI)	30.8	(9.1,61.4)	+	+	+	+	+	+	+	+	62.8	(16.1,99.1)

Positive Predictive Value % (95% CI)	99.5	(99,99.8)	+	+	+	+	+	+	+	+	
Negative Predictive Value % (95% CI)	1.0	(0.3,2.4)	+	+	+	+	+	+	+	+	
AUC and "accuracy"	0.6	low	+	+	+	+	+	+	+	+	
Inflation Factor and "Bias"	0.8	low	+	+	+	+	+	+	+	+	

Consider only "yes" and "no" (exclude don't know)

> 10 counts in either column of 2x2 table	Yes		No		No		No		No		
Percent agreement (TN+TP/n) 2x2 table only %	96.1		95.5		74.2		88.1		88.6		89.7 (82.5,95.2)
Sensitivity (95% CI)	96.6	(95.7,97.4)	+	+	+	+	+	+	+	+	90.0 (82.5,95.5)
Specificity (95% CI)	18.2	(2.3,51.8)	+	+	+	+	+	+	+	+	32.5 (0.2,78.4)
Positive Predictive Value (95% CI)	99.5	(99,99.8)	+	+	+	+	+	+	+	+	
Negative Predictive Value (95% CI)	3.3	(0.4,11.5)	+	+	+	+	+	+	+	+	
AUC and "accuracy"	0.6	low	+	+	+	+	+	+	+	+	
Inflation Factor and "Bias"	1.0	low	+	+	+	+	+	+	+	+	

Don't Know Responses

>20% : Poor
15.1-20 % : Moderate
10.1-15 % : Good
5.1-10 % : Very Good
0-5 % : Excellent

N= 23,015 women observer-assessed to give birth

CI=confidence interval

HMIS= health management information system

AUC= Area under the curve

+=result suppressed due to 10 or fewer count per column of two-by-two table for some results.

As reported in an associated paper [1]

Reference

1. Day L, Rahman QS, Rahman A, Salim N, KC A, Ruysen H, Tahsina T, Masanja H, Basnet O, Gore-langton G *et al*: **Assessment of the validity of the measurement of newborn and maternal health-care coverage in hospitals (EN-BIRTH): a mixed-methods observational study** *Lancet Global* (2020) DOI: 10.1016/S2214-109X(20)30504-0.