

SUPPLEMENTARY MATERIAL

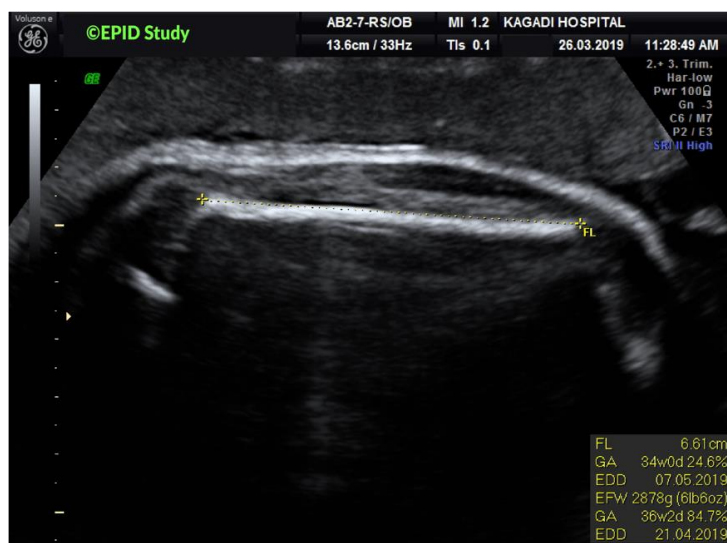
Figure S1 Fetal biometry images showing correct measurement of head circumference (a), abdominal circumference (b) and femur length (c).



a)



b)



c)

Figure S2 Color and pulsed-wave Doppler images showing correct measurement of umbilical artery (a), middle cerebral artery (b) and uterine artery (c).

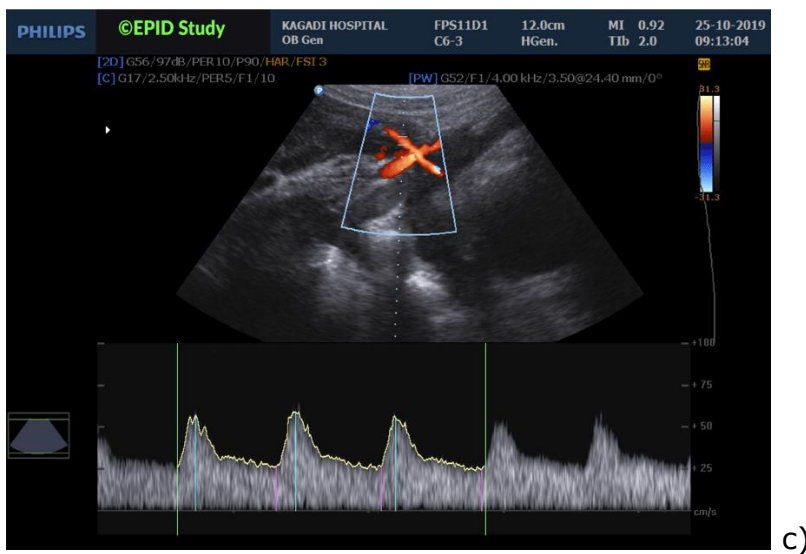
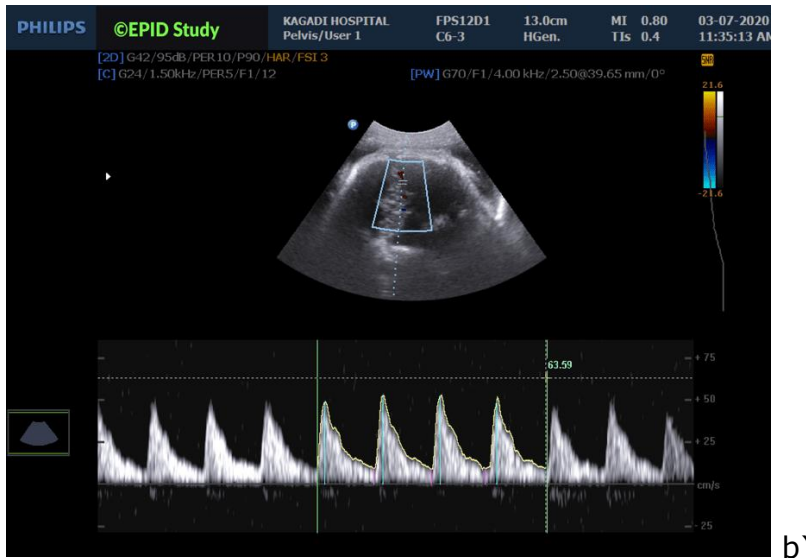
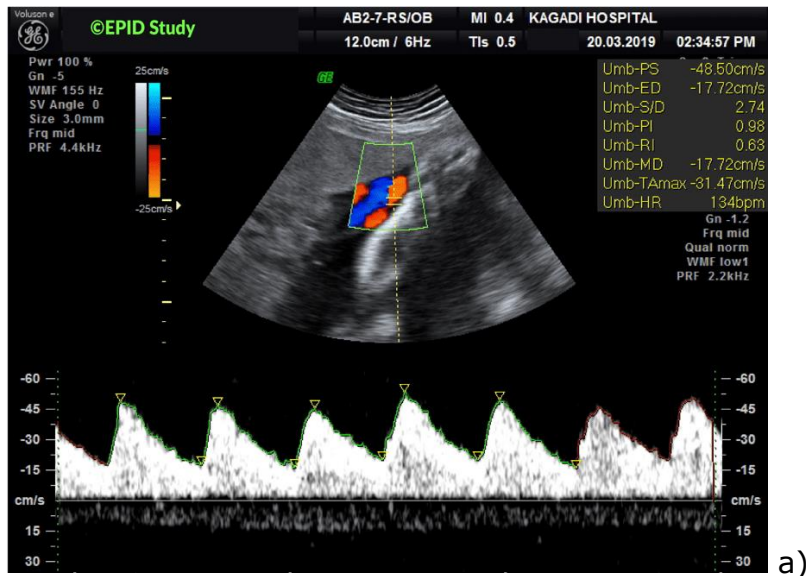
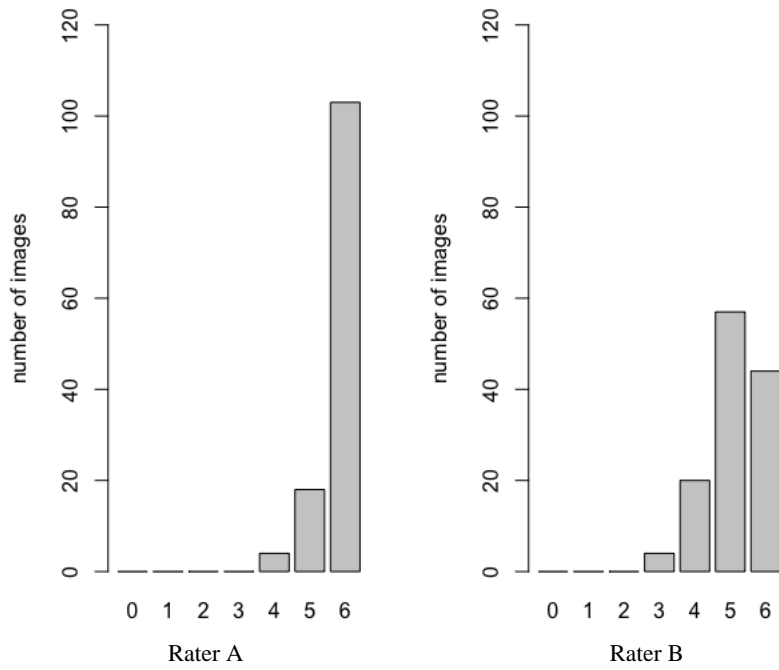
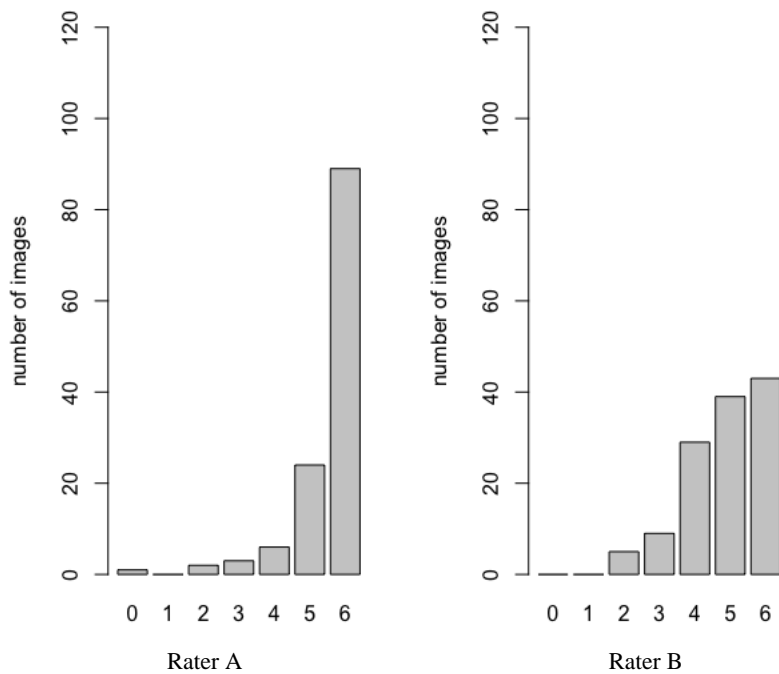


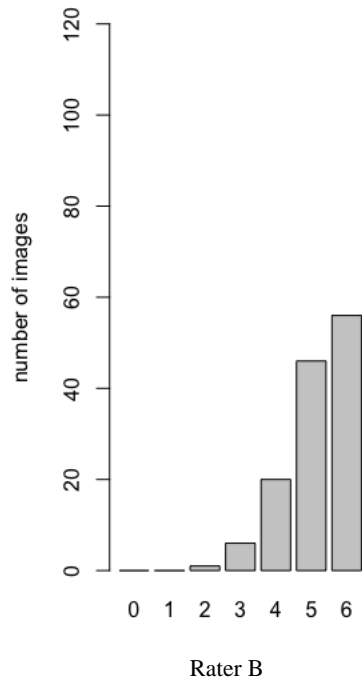
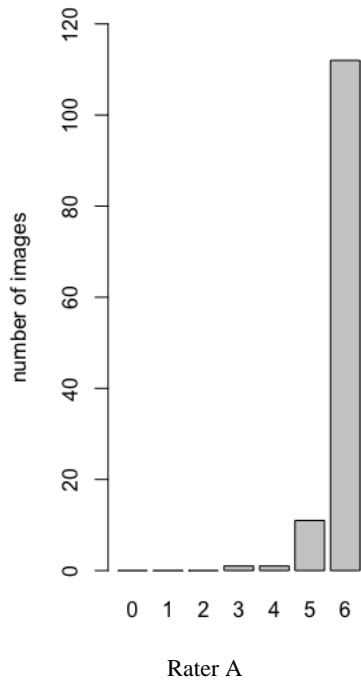
Figure S3 Distribution of the total quality scores for pulsed-wave Doppler images of the umbilical artery (a), middle cerebral artery (b), right uterine artery (c) and left uterine artery (d), according to Raters A and B.



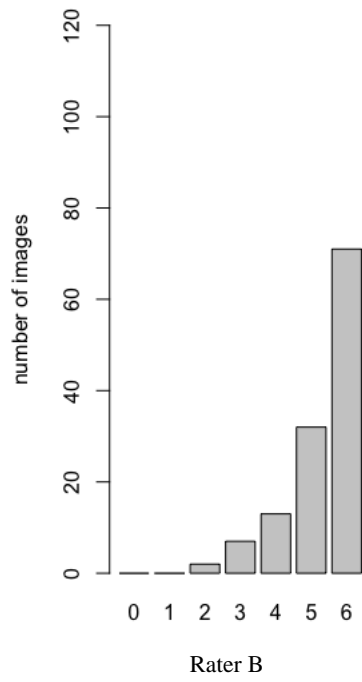
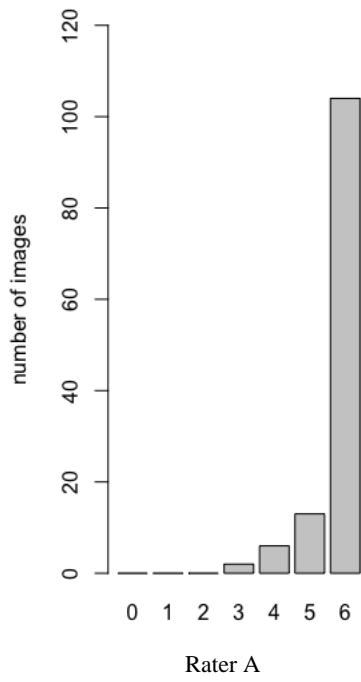
a) Umbilical artery



b) Middle cerebral artery

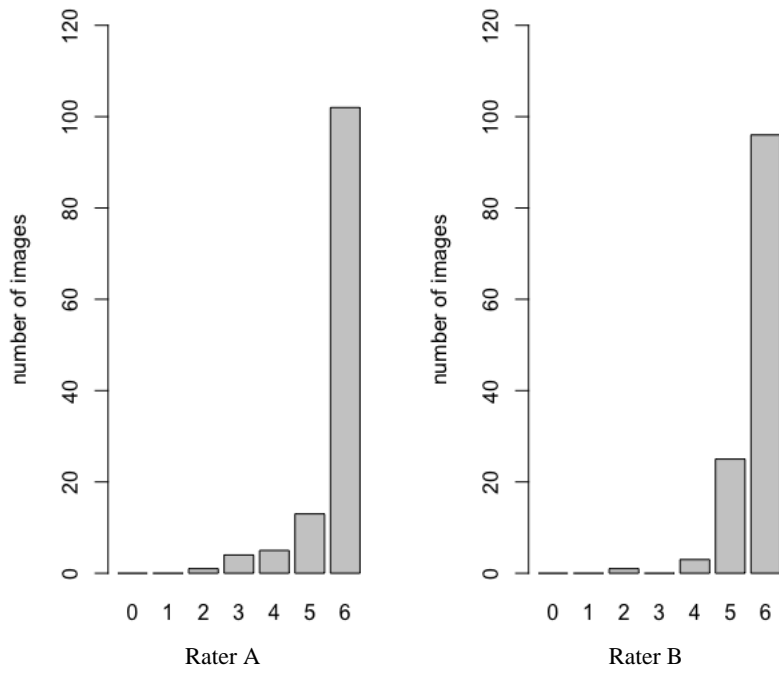


c) Right uterine artery

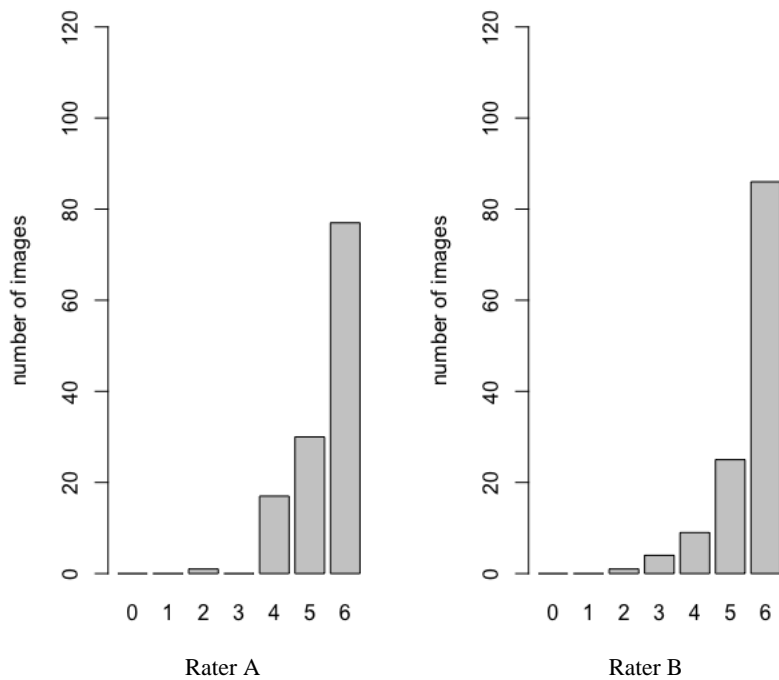


d) Left uterine artery

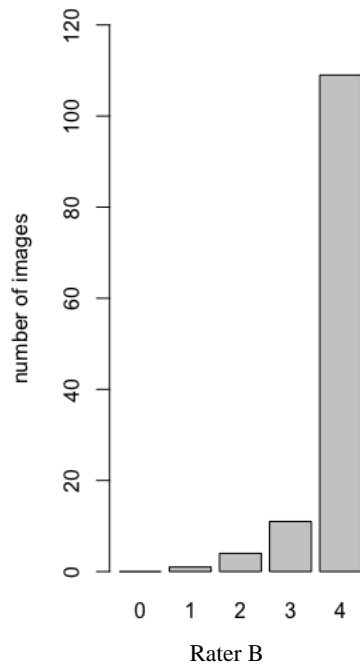
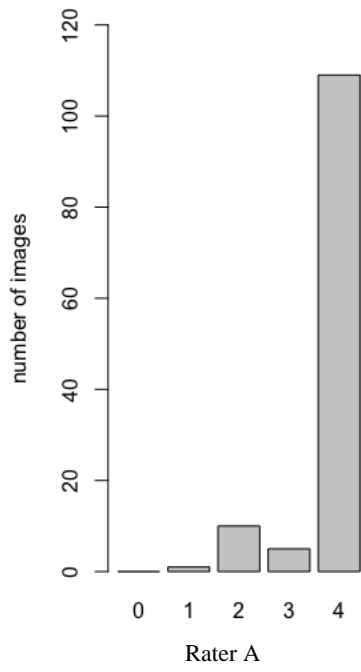
Figure S4 Distribution of the total quality scores for ultrasound images of head circumference (a), abdominal circumference (b) and femur length (c), according to Raters A and B.



a) Head circumference



b) Abdominal circumference



c) Femur length

Appendix S1 Image-scoring criteria for umbilical artery, middle cerebral artery and uterine artery pulsed-wave Doppler ultrasound measurements

a) Umbilical artery

#	Criterion	Description	Score
1.	Magnification	Area of interest fills 50% of screen, with zoom box and sample gate in center of vessel	
2.	Angle of insonation	Less than 30 ⁰	
3.	Sweep speed	Four to six waveforms with consistent and similar signals	
5.	Image clarity	Pulse rate frequency and color gain correction (avoid venous signal)	
5.	Anatomical site	Free loop	
6.	Velocity scale	75% of peak systolic velocity	

b) Middle cerebral artery

#	Criterion	Description	Score
1.	Magnification	Area of interest fills 50% of screen, with zoom box and sample gate in center of vessel	
2.	Angle of insonation	Near 0 ⁰ (angel correction if >20 ⁰)	
3.	Sweep speed	Four to six waveforms with consistent and similar signals	
5.	Image clarity	Pulse rate frequency and color gain correction (avoid venous signal)	
5.	Anatomical site	Before bifurcation above the iliac vessels	
6.	Velocity scale	75% of peak systolic velocity	

c) Uterine artery

#	Criterion	Description	Score
1.	Magnification	Area of interest fills 50% of screen, with zoom box and sample gate in center of vessel	
2.	Angle of insonation	Less than 30°	
3.	Sweep speed	Four to six waveforms with consistent and similar signals	
5.	Image clarity	Pulse rate frequency and color gain correction (avoid venous signal)	
5.	Anatomical site	Before bifurcation above the iliac vessels	
6.	Velocity scale	75% of peak systolic velocity	

Appendix S2 Image-scoring criteria for head circumference, abdominal circumference and femoral length ultrasound measurements

a) Head circumference

#	Criterion	Description	Score
1.	Symmetry	Symmetrical plane	
2.	Thalami	Visible	
3.	Cavum septum pellucidum	Visible	
5.	Cerebellum	Not visible	
5.	Magnification	Head occupying at least 30% of image	
6.	Calipers/ellipse	Placed correctly	

b) Abdominal circumference

#	Criterion	Description	Score
1.	Symmetry	Symmetrical plane	
2.	Stomach bubble	Stomach bubble visible	
3.	Portal sinus	Portal sinus visible	
5.	Kidneys	Kidneys not visible	
5.	Magnification	Abdomen occupying at least 30% of image	
6.	Calipers/ellipse	Placed correctly	

c) Femoral length

#	Criterion	Description	Score
1.	Bone ends	Clearly visible	
2.	Angle	Femur <45° angle to the horizontal	
3.	Magnification	Femur occupying at least 30% of image	
5.	Caliper	Placed correctly	

Table S1 Proportion of fetal biometric ultrasound images meeting each constituent criterion of the quality score, overall and according to rater.

Parameter	Rater A	Rater B	Both Raters
HC			
Symmetrical plane	121 (96.8)	123 (98.4)	120 (96.0)
Thalami visible	115 (92.0)	123 (98.4)	115 (92.0)
Cavum septum pellucidum visible	107 (85.6)	112 (89.6)	100 (80.0)
Cerebellum not visible	120 (96.0)	123 (98.4)	119 (95.2)
Head occupy >30% total image size	124 (99.2)	125 (100)	124 (99.2)
Correct caliper placement	124 (99.2)	109 (87.2)	108 (86.4)
AC			
Symmetrical plane	120 (96.0)	120 (96.0)	115 (92.0)
Stomach bubble	103 (82.4)	109 (87.2)	99 (79.2)
Portal sinus	97 (77.6)	110 (88.0)	90 (72.0)
Kidneys not visible	118 (94.4)	111 (88.8)	107 (85.6)
Abdomen occupy >30% total image size	125 (100)	125 (100)	125 (100)
Correct caliper placement	119 (95.2)	116 (92.8)	112 (89.6)
FL			
Both ends clearly visible	115 (92.0)	118 (94.4)	111 (88.8)
Femur <45° angle to the horizontal	124 (99.2)	125 (100)	124 (99.2)
Femur occupy >30% total image size	121 (96.8)	114 (91.2)	110 (88.0)
Correct caliper placement	112 (89.6)	121 (96.8)	112 (89.6)

*N= 125; data reported as n (%); HC: head circumference; AC: abdominal circumference; FL: femur length.

Table S2 Proportion of pulsed-wave Doppler ultrasound images meeting each constituent criterion of the quality score, overall and according to rater.

Parameter	Rater A	Rater B	Both Raters
UA			
Magnification	122 (97.6)	120 (96.0)	118 (94.4)
Angle of insonation	125 (100)	117 (93.6)	117 (93.6)
Sweep speed	121 (96.8)	118 (94.4)	115 (92.0)
Image clarity	117 (93.6)	64 (51.2)	61 (48.8)
Anatomical site	123 (98.4)	125 (100)	123 (98.4)
Velocity scale	116 (92.8)	97 (77.6)	92 (73.6)
MCA			
Magnification	115 (92.0)	122 (97.6)	112 (89.6)
Angle of insonation	123 (98.4)	95 (76.0)	93 (74.4)
Sweep speed	118 (94.4)	122 (97.6)	116 (92.8)
Image clarity	108 (86.4)	113 (90.4)	101 (80.8)
Anatomical site	115 (92.0)	96 (76.8)	87 (70.0)
Velocity scale	112 (89.6)	58 (46.4)	56 (44.8)
RUtA			
Magnification	124 (99.2)	110 (88.0)	110 (88.0)
Angle of insonation	125 (100)	101 (80.8)	101 (80.8)
Sweep speed	125 (100)	124 (99.2)	124 (99.2)
Image clarity	121 (96.8)	98 (78.4)	95 (76.0)
Anatomical site	119 (95.2)	106 (84.8)	100 (80.0)
Velocity scale	120 (96.0)	103 (82.4)	99 (79.2)
LUtA			
Magnification	122 (97.6)	102 (81.6)	99 (79.2)
Angle of insonation	123 (98.4)	107 (85.6)	105 (84.0)
Sweep speed	125 (100)	125 (100)	125 (100)
Image clarity	113 (90.4)	108 (86.4)	101 (80.8)
Anatomical site	116 (92.8)	115 (92.0)	107 (85.6)
Velocity scale	120 (96.0)	106 (84.8)	102 (81.6)

*N= 125; data reported as n (%); UA: umbilical artery; MCA: middle cerebral artery; RUtA: right uterine artery; LUtA: left uterine artery