

Table 1

Origin of the 26 included articles

Region	Included articles (n)
Multi-continent	2 [64,65]
Africa	
Multi-country	2 [42,48]
Eastern	4 [43,45–47]
Western	1 [44]
Asia	
Multi-country*	1 [53]
Western Asia	3 [49,52,54]
Middle East	3 [50,51,55]
Latin America	
Multi-country	1 [66]
Brazil	8 [41,56,57,59–63]
Peru	1[58]

*Japan is part of the study

Table 2 Characteristics of included studies

Nº	First author	Setting	Ownership	Type of study	Participants	Outcome	Results
1	Shah and al. 2009. Caesarean delivery outcomes from the WHO global survey on maternal and perinatal health in Africa.	7 African countries (Kenya, Algeria, Angola, DR Congo, Niger, Nigeria, & Uganda)	Public-Private	Prospective random	83 439 births in 131 facilities	<p>*Maternal outcomes death and severe morbidity (admission to ICU, ...)</p> <p>*Perinatal outcomes: neonatal death before discharge, fresh stillbirths, delayed breast feeding</p> <p>*Severe neonatal morbidity: 5-minute Apgar score <4, referral to higher level, ICU for ≥7 days.</p>	<p>Overall CSD and maternal and perinatal outcomes A=β: -0.858; B= β: 2.361; C= β: 2.890; D= β: 4.227^a; E= β: 2.812; F= β: 1.850</p> <p>Elective CSD and maternal and perinatal outcomes A=β: 3.278; B=β: -0.894; C=β: 10.115; D=β: -1.845; E=β: - 6.775^a; F=β: - 6.945^a</p> <p>Emergency CSD and maternal and perinatal outcomes A=β: -1.172; B=β: 2.847; C=β: 0.159; D=β: 5.224^a; E=β: 5.119^a; F=β: 4.147^a</p> <p>^a P < 0.05 A=Maternal mortality; B=Maternal morbidity; C=Delayed breastfeeding; D=Severe neonatal morbidity; E=Fresh stillbirths; F=Neonatal death;</p>
2	Souza et al. 2010 Caesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: the 2004-2008.	24 countries (from Africa, America & Asia) *Japan is part of the study	Public-Private	Retrospective multisite random	*286,565 deliveries were analysed *CSD was 25.7% and 1.0% of CSD was CSD without medical indications	*Severe maternal outcomes	<p>Severe Maternal Outcomes Spontaneous=1 Versus A=AOR: 5.93, 95%CI=3.88-9.05; B=AOR: 14.29, 95%CI=10.91-18.72</p> <p>Severe Maternal Outcomes by continent *Asia Spontaneous=1 Versus A= AOR: 2.14, 95%CI=1.04 to 4.43; B=AOR: 12.86, 95%CI=8.83-18.73; C=AOR: 8.09, 95%CI=7.12-9.18; D=AOR: 11.61, 95%CI=10.56-12.76.</p> <p>*Africa Spontaneous=1 Versus A=AOR: 71.29, 95%CI=32.06-158.55; B=AOR: 40.67, 95%CI=24.56-67.33; C=AOR: 88.61, 95%CI=74.88-104.86; D=AOR: 54.26, 95%CI=47.81-61.59</p> <p>*Latin America Spontaneous=1 Versus A= AOR: 1.94, 95%CI=0.77-4.9; B=AOR: 4, 95%CI=2.05-7.82; C= AOR: 3.04, 95%CI=2.71-3.41; D=AOR: 1.91, 95%CI=1.71-2.13</p> <p>A=Antepartum CSD without indications; B=Intrapartum CSD without indications; C=Antepartum CSD with indications; D=Intrapartum CSD with indications</p>
3	Rwabizi 2016 Maternal near miss and mortality due to postpartum infection: a cross-sectional analysis from Rwanda	Rwanda	Public	Retrospective	117 patients with postpartum infections	*Primary outcome: composite of maternal mortality and “near miss” defined as more than one laparotomy with/without hysterectomy and prolonged hospitalization	<p>*CSD=95 (81 %) for 79 (83 %) of severe morbidity or mortality versus 50% (n=14) for abortion versus 62 % (n=8) versus vaginal delivery</p> <p>*No association with increased morbidity/mortality and the length of stay at the District Hospital prior to transfer</p>

4	Fesseha, et al. 2011 A national review of cesarean delivery in Ethiopia.	Ethiopia	Public-Private	Retrospective cross-sectional	267 cesarean deliveries based on the last 3 performed in the 797 facilities surveyed	*Maternal & foetal outcome	For Emergency: (Live births, n=162); Early neonatal deaths (4,49%, n=12); Stillbirths (n=17); Live birth(s) and perinatal death (1,49%, n=4). Elective: (Live births, n= 50); Early neonatal deaths (0,03%, n=1); Stillbirths (n=2); Live birth(s) and perinatal death (0,03%, n=1).
5	Niyitegeka et al 2017. Longer travel time to district hospital worsens neonatal outcomes: a retrospective cross-sectional study of the effect of delays in receiving emergency cesarean section in Rwanda.	Rwanda	Public	Retrospective	441 neonates born via emergency cesarean section and their mothers	Neonatal outcomes, categorized as: -Unfavorable (APGAR <7 at 5 min or death) and -Favorable (alive and APGAR ≥7 at 5 min)	Neonatal outcomes were significantly worse among mothers with more than 90 min of travel time from the health center to the district hospital compared to mothers referred from health centers located on the same compound as the hospital (aOR = 5.12, p = 0.02).
6	Litorp et al 2013 Increasing caesarean section rates among low-risk groups: a panel study classifying deliveries according to Robson at a university hospital in Tanzania.	Muhimbili National Hospital, Dar es Salaam, Tanzania	Public	Panel study	137,094 deliveries	* CS rates trends *perinatal mortality *Neonatal distress *maternal mortality	- CS rate increase from 19% to 49% from 2000 to 2011 *Among the ten Robson groups: - Increase in perinatal mortality among: Multipara, no previous CS, single, cephalic, birth weight ≥ 2.5 kg, induced labour or elective CS; p=0.023) - Increase in perinatal mortality: Nullipara, single, cephalic, birth weight ≥ 2.5 kg, induced labour or elective CS; p< 0.001) *Non-statistically significant increase in neonatal distress (p=0.171) *The maternal mortality ratio increased from 463/100, 000 live births in 2000 to 2002 to 650/100, 000 live births in 2009 to 2011 (p = 0.031).
7*	Chu et al 2015. Cesarean section surgical site infections in sub-Saharan Africa: a multi-country study from Medecins Sans Frontieres.	Burundi, DRC, & Sierra Leone	Public (MSF)	Prospective	1,276 women underwent CS	*Postoperative surgical site infections (SSI) after CS	Incidence of SSI was 7.3 % (n = 93, range 1.7–10.4 %). The median length of hospital stay of women without SSI was 7 days (range 3–63 days) compared to 21 days (range 5–51 days) in those with SSI (p=0.001).
8	Dhakal et al 2018. Profile of Caesarean Section in Mid-Western Regional Hospital in Nepal.	Nepal	Public	Retrospective cross-sectional	All mothers (N=695) who had delivered their baby by CS	*Indications and complications of CS	Maternal complications due to caesarean section was low (n=26, 3.7%). <u>Among complications:</u> -Post-partum hemorrhage (30.5%) -Injury to the surrounding structure (19,2%). -Most of newborn babies had APGAR score six or more at one minute (94.5%) and five minutes (97.9%).
9	Kohler et 2018. Postpartum quality of life in Indian women after vaginal birth and cesarean section: a pilot study using the EQ-5D-5L descriptive system.	India	Public-Private	Prospective	224 women (n=46 for CS and n=178 for virginal delivery (VD) interviewed at 1, 7 and 21 days after the CSD	*Postpartum "QOL" and *Quality Adjusted Life Days (QALDs)	Vaginal birth group had a higher postpartum QOL (0–3 days: 0.28 vs. 0.57, 3–7 days: 0.59 vs. 0.812, 21-30 days: 0.85 vs 0.93, & 1–21 days : 13.1 vs 16.6; P < 0.001) and was more likely to report no or slight problems in 4 of 5 health dimensions (mobility, self-care, usual activities, pain or discomfort; P ≤ 0.04).

10	Sharma and Dhakal 2018. Complications among Mothers and New Born Due to Delivery Process in Rupandehi District, Nepal.	Nepal	Public-Private	Cross sectional	550 deliveries	*Maternal and newborn complications	<p><u>Maternal complications:</u> -Vaginal delivery, n= 408 (yes=39%) -Low segment C-section, n=142 (yes= 53,5%)</p> <p><u>Newborn complications:</u> -Vaginal delivery, n= 408 (yes=28,4%) -Low segment C-section, n=142 (yes=52,1%)</p>
11	Lumbiganon et al 2010. Method of delivery and pregnancy outcomes in Asia: the WHO global survey on maternal and perinatal health.	Cambodia, China, India, Japan, Nepal, Philippines, Sri Lanka, Thailand, & Vietnam *Japan is part of the study	Public-Private	Cross sectional	109 101 deliveries with data available and 107 950 deliveries had data analysed	<p>*<u>Maternal outcomes:</u> death, admission to ICU, blood transfusion, hysterectomy, and mortality and morbidity index.</p> <p>*<u>Perinatal outcomes:</u> perinatal mortality, fetal deaths, neonatal mortality up to hospital discharge, stay in neonatal ICU for 7 days or longer, and perinatal mortality and morbidity index</p>	<p><u>Risk of maternal mortality & morbidity index</u> was increased for (Spontaneous, [n=1215] =1 versus) -A: n=146; aOR= 2.1, 95% CI= 1.7-2.6) -B: n=9; aOR=2.7, 95% CI= 1.4-5.5 -C: n=744; aOR=10.6, 95% CI= 9.3; -12.0 -D: n=40; aOR=14.2, 95% CI= 9.8;-20.7 -E: n=1947; aOR=14.5; 95% CI= 13.2;-16.0</p> <p>For breech presentation, c-section, either antepartum (0.2; 0.1; -0.3) or intrapartum (0.3; 0.2;-0.4), was associated with improved perinatal outcomes, but also with increased risk of stay in neonatal ICU (2.0; 1.1;-3.6; and 2.1; 1.2;-3.7, respectively)</p> <p><u>Risk of maternal mortality</u> (Spontaneous, [n=53] =1 versus) -A: n = 9; aOR=3.1, 95% CI=1.5-6.5 -B: n = 0; aOR=0 -C: n = 11; aOR= 1.1, 95% CI=0.5-2.3 -D: n = 1; aOR=4.8; 95% CI= 0.6-36,5 -E: n = 23; aOR=95% CI= 1.6, 0.9-2.8</p> <p>A=Operative vaginal delivery; B=Antepartum without indication; C=Antepartum with indication; D=Intrapartum without indication; E=Intrapartum with indication</p>
12	Gonzales et al 2013. Pregnancy outcomes associated with Cesarean deliveries in Peruvian public health facilities	Peru	Public	Retrospective	558,901 women delivered 563,668 infants weighing ≥ 500 g	<p>*Stillbirths *Preterm births *Small for gestational age *Preeclampsia, and *Maternal mortality</p>	<p><u>Maternal mortality:</u> Elective CS (versus VD) : OR=4.45, 95%CI=3.21-6.18 Emergency CS (versus VD) : OR=4.82, 95%CI= 3.44-6.75 Hospital level 1 (versus level2) : OR= 5.55, 95%CI=1.46-21.0 Hospital level 3 (versus level2) : OR=2.37, 95%CI=1.16-4.0</p>
13	Bauserman et al 2015 Risk factors for maternal death and trends in maternal mortality in low- and middle-income countries: A prospective longitudinal cohort analysis.	Multi-continent: Latin (Argentina & Guatemala), African (Kenya & Zambia)Asia (India & Pakistan)	Public-Private	Prospective longitudinal cohort analysis	277,736 deliveries 262,887 live births	*Maternal death	<p>*402 maternal deaths (out of 277,736 pregnancies) or MMR of 153/100,000 live births</p> <p>*Improvement in MMR within 4-year of the data period; 166/100,000 in 2010 down to 126/100,000 in 2013</p> <p>* Lower MMR in Latin America (91/100,000) than Asia (178/100,000) and 125/100,000 in Africa.</p> <p>*Maternal death versus alive at six weeks (Vaginal=1) -Caesarean section: RR=1.9, 95% CI=1.3-2.8 -Vaginal delivery assisted: RR=1.8, 95% CI=0.9-3.7</p>
14*	Borges et al 2010 Urinary incontinence after vaginal	Brazil	Public	Cross-sectional	332 women of ≥ 16 years of age	*Urinary incontinence	<p><u>Only VD (n=138) :</u> - Mixed urinary incontinence (11.6%): OR= 8.53 (1.25-364.12)</p>

	delivery or cesarean section.						- Stress urinary incontinence (12.3%): OR= 9.07 (1.34-385.56) <u>Only CS (n=54) :</u> - Mixed urinary incontinence (11.1%): OR=7.3 (0.83-341.94) - Stress urinary incontinence (3.7%): OR=2.43 (0.12-146.16)
15	Cardoso et al. 2010 Postdischarge surveillance following cesarean section: the incidence of surgical site infection and associated factors	Brazil	Public	Prospective Cohort	204 men	*Surgical Site Infection (SSI)	- 44 (23.5%) women had developed a SSI. - In 42 (95.4%) women, the SSI appeared after the discharged from hospital - In 39 (93.9%) cases, the SSI was diagnosed during the first telephone contact (15 days)
16	Zaconeta et al. 2013. Depression with postpartum onset: A prospective cohort study in women undergoing elective cesarean section in Brasilia, Brazil.	Brazil	Private	Prospective cohort	113 women considered eligible (final sample, n= 107)	*Perinatal depression	12 women (11.2%) had postpartum depressive symptoms: 5 before, 6 before and after, and 6 only after childbirth.
17	Torres et al 2014. Caesarean section and neonatal outcomes in private hospitals in Brazil: comparative study of two different perinatal models of care.	Brazil	Public-Private	Cohort study	1,788 participants women *629: atypical hospitals *1,159: typical hospitals	*early skin-to-skin contact *breastfeeding in the first hour after birth *rooming-in care during all hospitalization *discharge in exclusive breastfeeding *adverse neonatal outcome (neonatal mortality or neonatal near miss)	*Early skin-to-skin contact (Yes): 37.7% (Atypical hospitals) VS 12.8% (typical hospitals), P= 0.000 *Breastfeeding in the first hour after birth (Yes): 65.8% (Atypical hospitals) VS 11.9% (typical hospitals), P= 0.000 *Rooming-in care during all hospitalization (Yes): 92.2% (Atypical hospitals) VS 34.7% (typical hospitals), P= 0.000 *Discharge in exclusive breastfeeding (Yes): 90.3% (Atypical hospitals) VS 56.5% (typical hospitals), P= 0.0000 *Adverse neonatal outcome (Yes) 3.2% (Atypical hospitals) VS 2.4% (typical hospitals), P= 0.250
18*	Domingues et al 2016. Factors associated with maternal near miss in childbirth and the postpartum period: findings from the birth in Brazil National Survey, 2011–2012.	Brazil	Public-Private	Cross sectional	*23,894 women interviewed	*Maternal near-miss cases in childbirth and the postpartum period	*Incidence of maternal near miss during hospitalization for childbirth care -Vaginal=1 VS Elective C-section: AOR=2.54, 95%CI=1.67–3.88 Intrapartum C-section: AOR=1.05, 95%CI=0.54–2.03 Forceps: AOR=9.37, 95%CI=4.01–21.91 p<0.001
19	Silva et al Risk factors for low birthweight in north-east Brazil: the role of caesarean section.	-Brazil	Public-Private	Cross sectional	- 2,542 live births - After exclusion (stillbirths, multiple births, missing data) =	*Low Birth Weight (LBW) *CS delivery	- LBW was associated with: low maternal height, maternal smoking, primiparity, previous LBW, public insurance, preterm birth and CS - CS rate was 33.7% - CSD was associated with increased risk of LBW: OR 1.58, 95% CI=1.09-2.26

					2,434 live births (singleton only).		
20	Murta et al 2006. Could elective cesarean sections influence the birth weight of full-term infants?	Brazil	Public-Private	Retrospective	Women who underwent vaginal and CSD in Private (N=1,354; CSD=81%) and Public (N=1,332; CSD=28%) hospitals.	Birth weight (< 2500 g)	*Low birth weight (< 2500 g) Vaginal delivery =1 versus Cesarean section at University hospital, OR= 1.4, 95% CI (0.82 to 2.4) Cesarean section at Private hospitals, OR= 2.33, 95% CI (1.19 to 4.55)
21	Kilsztajn, Samuel, et al. 2007. Caesarean sections and maternal mortality in Sao Paulo.	Brazil	Public-Private	Retrospective	Reviewed of : -10,630 births in both public & private sectors (2003) - 1,153,034 deliveries & 314 maternal deaths in the public sector (2001–2003)	*CS rates and maternal mortality	Delivery in the public sector from 2001 to 2003 Over 781053 53 hospitalized, 112 died (p= 14.3/100.000) from VD Over 371981 hospitalized, 202 died (p= 54.3/100.000) from CSD The odd ratio for maternal mortality associated with CSD in the public sector was 3.3 (95% CI: 2.6–4.3)
22	Villar, J. et al. Caesarean delivery rates and pregnancy outcomes: the 2005 WHO global survey on maternal and perinatal health in Latin America.	8 in Latin America countries (Argentina, Brazil, Cuba, Ecuador, Mexico, Nicaragua, Paraguay, Peru)	Public-Private	Retrospective multisite with random selection	97 095 of 106 546 parturients	*maternal outcomes *Périal outcomes	*Elective CSD outcome: -Maternal: A= Coef: 0.277, SE=0.1148, p=0.02; B= Coef: 496, p=0.02; C= Coef: (-)0.016, SE=0.0696, p=0.2 -Perinatal: D= Coef: 0.163, p=0.01; E= Coef: 0.010, SE=0.0705, p=0.9 (adjusted for proportion of primiparous women, previous caesarean delivery, and breech or other non-cephalic fetal presentation) *Intrapartum CSD outcomes -Maternal: A= Coef: 0.355, p=0.0001; B= Coef: 207, SE=0.1788, p=0.5; C= Coef: (-)0.016, SE=0.0696, p=0.8 -Perinatal: D= Coef: 0.063, p=0.0001; E= Coef: 0.072, SE=0.0520, p=0.2 (Adjusted for proportion of previous CSD, gestational hypertension or pre-eclampsia, or eclampsia, induced labour, and epidural during labour) A=Severe maternal morbidity and mortality index; B=Postnatal treatment with antibiotics; C=Perineal laceration or postpartum fistula; D=Fetal death; E=Neonatal death
23	Kavosi2015. A Comparison of Mothers' Quality of Life after Normal Vaginal, Cesarean, and Water Birth Deliveries.	Iran	Public	Cross sectional	59 women for VD, 39 women for water birth and 39 C-section	*Postpartum QOL	*Total mental health score (SF-36) (Mean ±SD) -Normal vaginal delivery: 60.17±18.76 -Water birth: 61.41±11.16 -Caesarean section: 56.05±11.97 p= 0.247
24	Zarshenas 2019. Determinants of in-hospital	Iran	Public-Private	Prospective cohort	700 Mothers who were 18 years or	*Three in-hospital feeding practices: incidence of	*Delayed initiation of breastfeeding -Vaginal delivery=1 versus

	feeding practices in Shiraz, Iran: Results of a prospective cohort study.				older, with a healthy, full term (≥ 37 weeks) baby weighing 2500 g or more	delayed initiation of breastfeeding *The introduction of traditional prelacteal foods, and *The use of formula in hospital	-Elective cesarean aOR=34.49, 95%CI=19.94-59.66 -Emergency cesarean aOR=63.85, 95%CI=34.09-119.60 *Traditional prelacteal foods -Vaginal delivery=1 versus -Elective cesarean : aOR=0.49, 95%CI=0.32-0.75 -Emergency cesarean : aOR=0.59, 95%CI=0.39-0.90 *Formula use in hospital -Vaginal delivery=1 versus -Elective caesarean: aOR=5.43, 95%CI=3.22-9.16 -Emergency cesarean: aOR=4.59, 95%CI=2.71-7.77
c25	Kandasamy et al. 2009 Cesarean delivery surveillance system at a maternity hospital in Kabul	Afghanistan	Public	Retrospective	392 cesarean deliveries	*maternal death *Périatal death	*8,93% of perinatal death (n=392 CSD) *2 maternal deaths from emergency CSD
26	Cissé 1998. Césarienne au Sénégal: couverture des besoins et qualité des services.	Sénégal	Public	Prospective (one-month post-CSD follow-up)	2436 cesarean deliveries	*CSD quality (perinatal maternal morbimortality)	*Maternal mortality & morbidity: 3.3% vs 13.8% (with indication), 2.6% vs 3.8% (discretion), 3.7% vs 14.6% (essential) $p < 10^{-8}$ *neonatal mortality & morbidity: 14.5% vs 8.7 (with indication), 2.8% vs 3.2% (discretion), 12.4% vs 5.6% (essential) $p < 5.10^{-8}$

* Not the initial selection