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Epidemiology of postpartum haemorrhage: a systematic review

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Postpartum haemorrhage (PPH) is an important cause of maternal mortality. We conducted a systematic review of the prevalence of PPH with the objective of evaluating its magnitude both globally and in different regions and settings: global figures, as well as regional, country and provincial variations, are likely to exist but are currently unknown. We used prespecified criteria to select databases, recorded the database characteristics and assessed their methodological quality. After establishing PPH (≥500 mL blood loss) and severe PPH (SSPH) (≥1000 mL blood loss) as main outcomes, we found 120 datasets (involving a total of 3,815,034 women) that reported PPH and 70 datasets (505,379 women) that reported SPPH in the primary analysis. The prevalence of PPH and SPPH is approximately 6% and 1.86% of all deliveries, respectively, with a wide variation across regions of the world. The figures we obtained give a rough estimate of the prevalence of PPH and suggest the existence of some variations. For a reliable picture of PPH worldwide – its magnitude, distribution and consequences – a global survey tackling this condition is necessary.

Key words: blood; epidemiology; mortality; postpartum haemorrhage; puerperal disorders.

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INTRODUCTION

Bleeding after childbirth (postpartum haemorrhage, PPH) is an important cause of maternal mortality. It accounts for nearly one-quarter of all maternal deaths worldwide, with an estimated of 125,000 deaths per year.[1] As there are about 125 million births annually in the developing world[2], the risk of maternal death from PPH is approximately 1 in 1000 deliveries. In the United Kingdom, the risk of maternal death from PPH is about 1 in 100,000 births.[3]

PPH is defined as blood loss from the genital tract of 500 mL or more in the first 24 hours after the delivery of the baby. Severe postpartum haemorrhage (SPPH) is defined as blood loss from the genital tract of 1000 mL or more in the first 24 hours after the delivery of the baby. PPH is also associated with morbidity including blood transfusion, renal failure, coagulation deficiencies and long-term morbidity, such as anaemia. Hysterectomy and other surgical procedures to reduce blood flow to the uterus and their subsequent consequences in fertility have to be considered as consequences of PPH, although it is difficult to quantify their burden.

Common causes of PPH include failure of the uterus to contract adequately after birth (atonic PPH), which accounts for 90% of PPH in most countries; trauma to the genital tract (traumatic PPH), which accounts for about 7% of PPH; and bleeding due to retention of placental tissue and failure in the coagulation system, which accounts for the remaining 3%. Atonic PPH is the most prevalent of these conditions and the leading cause of maternal death, particularly in low- and middle-income countries.

Regional, country and provincial variations on the abovementioned global figures are likely to exist but are not currently known. There is therefore a need to establish the magnitude and the regional distribution of PPH around the world so as to adequately inform reproductive health policies and programmes. We conducted a systematic review of the prevalence of PPH with the objective of evaluating the magnitude of the problem globally and in different regions and settings.

METHODS

We used the World Health Organization (WHO) Systematic Review of Maternal Mortality and Morbidity Project Protocol[4,5] as a template. We used the same criteria for screening, identification and selection of studies and added an additional criterion (blood loss numerically quantified as more than 500 mL and more than 1000 mL, measured either objectively or subjectively) to all potentially eligible papers. The review covers the period 1997–2006.

Search strategy: screening and selection of studies

In addition to the global search strategy employed for the period between 1997 and 2002, Medline, CAB, Embase databases for the period 2003–2006 were scanned for all potentially eligible studies using the following search terms: 'postpartum haemorrhage', 'epidemiological data', 'hospital information system' and 'medical information system', with variations in the terms commonly used. No language restrictions were applied. Studies were assessed and checked independently by two reviewers. Disagreements were resolved after discussion. Both clinical trials and observational studies (cross-sectional, incidence/prevalence surveys and case-controls) were considered for inclusion. Case-control studies were included if the cases selected corresponded

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to all cases in a given population with known denominators. The intervention and control arms of controlled trials were treated separately. Data provided from different subgroups of women (e.g. nulliparous, multiparous, etc.) were stratified accordingly.

Studies reporting only data from before 1990, or reports including data from before 1980 were excluded. Articles were also excluded if dates for the data-collection period were not specified or if sample sizes were less than 200 women.

Outcomes

Two main outcomes were analysed: PPH, defined as blood loss $\geq$500 mL, and SPPH, defined as blood loss $\geq$1000 mL.

The prevalence of the outcome was evaluated in different subgroups defined by study design (observational – clinical trial), setting (country/province/region/city – medical facilities), management of labour (expectant management – active management – uterotonic before placenta delivery/no cord management or not specified – uterotonic after placenta delivery), type of delivery (vaginal – caesarean section), gestation (singleton – multiple) and parity (nulliparous – multiparous).

Quality assessment

To check internal validity, the methodological quality of all datasets was assessed using the following attributes:

- Method of assessment of blood loss (if measurement was objective, subjective or not defined) and definition of time of PPH (if the period of time when the blood loss was measured after delivery of the baby was specified or not): to ascertain the reliability of the outcome.
- Maternal characteristics (parity/gestation/type of delivery) and if there was a special population studied with reference to maternal health (e.g. diabetes): to ascertain the homogeneity of the populations studied.
- Sample size (if sample size was $>$1000 or not): to ensure a narrow confidence interval to estimate the incidence (with a significance level equal to 0.05, an expected incidence of 2% and precision of 0.9% for SPPH, and an expected incidence of 6% and precision of 1.5% for PPH).

Data extraction

Two reviewers independently extracted the data and completed an *ad hoc* form. Data were double entered into a database. In case of disagreement, the case was discussed and resolved by consensus.

Statistical procedures

For each study, we computed rates of PPH and/or SPPH and their 95% CI using SAS System rel. 9.1. The pooled prevalence for different subgroups was calculated by weighting the sample size of individual studies.

Heterogeneity between datasets was first checked by looking at the range of variation of PPH/SPPH rates. Forest plots, the Cochran Q test and the I^2 statistic were

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then used to explore the degree of heterogeneity. When I^2 was greater than 75%, the rates were considered very heterogeneous. The possible reasons for heterogeneity were investigated by assessing different subgroups of women defined by both characteristics of the study (setting, method for assessment of blood loss, study design, sample size, continent/region) and by maternal characteristics (type of delivery, parity, gestation, management of labour).

RESULTS

The WHO database includes 121 reports published between 1997 and 2002. Of these, 93 had an incorrect definition of PPH and four had not specified the period of study. Thus, we selected only 24 reports because these were the only ones numerically to quantify the blood loss (e.g. blood loss $\geq$500 mL for PPH, blood loss $\geq$1000 mL for SPPH). These 24 studies provided a total of 100 datasets (Figure 1).

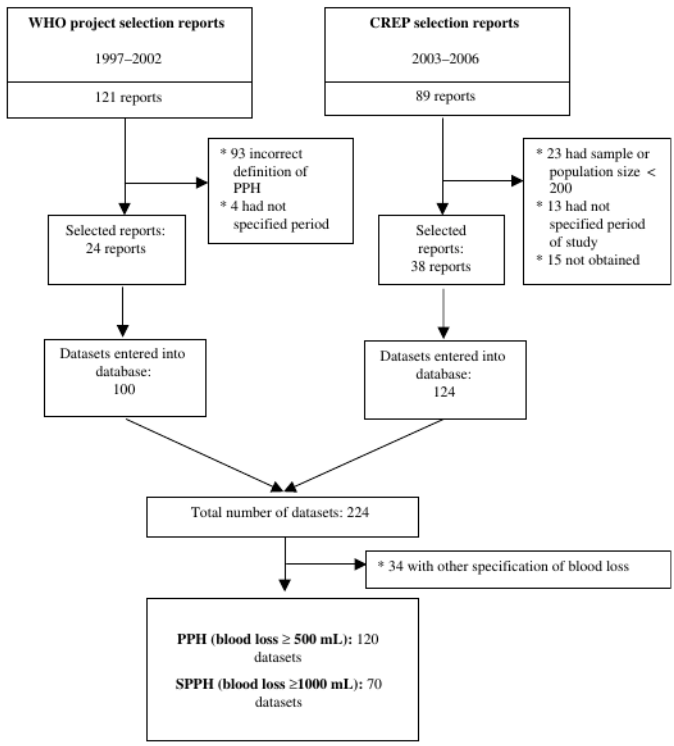

Figure 1. The process of selection from the WHO database.

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For the period 2003–2006, full texts of 166 reports were further assessed. The final number of reports analysed for this period was 38, with 124 datasets having PPH as the endpoint. Overall, 224 datasets were included in the final analysis: 120 of these reported PPH, 70 reported SPPH and 34 reported other measures of blood loss (Figure 1).

The overall quality of the reports was average to poor. The summary measure for the prespecified items assessing methodological quality was adequate in less than half (46.7%) of papers reporting PPH and in 58.6% of those reporting SPPH.

Taking into account the method of assessment of blood loss, quality was adequate in 37.5% of the articles reporting PPH and in 68.6% of those reporting SPPH. With regard to definition of duration of blood loss measurement, 69.2% of the reports for PPH and 52.9% for SPPH had adequate quality. In relation to population characteristics, the quality was adequate in 78.3% and 98.6% for PPH and SPPH, respectively. For the description of special populations, the quality was adequate in 91.7% of the reports for PPH and 97.1% for SPPH. The sample size was deemed adequate for 37.5% of the PPH reports and 37.1% of the SPPH articles (Figure 2).

Postpartum haemorrhage

The overall prevalence of PPH (blood loss ≥500 mL) was 6.09% [95% confidence interval (CI): 6.06 to 6.11] with 10.55% (10.55 to 10.37) when the outcome was measured objectively, 7.23% (7.18 to 7.27) when it was assessed subjectively and 5.40% (5.37 to 5.43) when it was not specified. When the outcome was stratified by setting, the prevalence was 6.02% (6.00 to 6.05) for country, province, region and city settings and 6.88% (6.76 to 7.00) when the outcome measure was assessed at the institutional (hospital) level. According to the study design, the prevalence of PPH was 5.97% (5.95 to 6.00) for observational studies and 13.94% (13.65 to 14.22) for randomized, controlled trials (RCTs).

When we stratified by sample size, the PPH prevalence was 11.93% (11.93 to 12.30) for studies with sample size of ≤1000 women and 6.04 (6.02 to 6.07) for those with sample size of >1000 women. PPH prevalence was 17.96% (16.97 to 18.95) for expectant management, 13.22% (12.87 to 13.57) for active management, 11.48% (10.68 to 12.28) for women receiving uterotonics before delivery of the placenta and 6.52% (5.63 to 7.40) for women receiving uterotonics after delivery of the placenta. PPH prevalence was 4.58% (4.49 to 4.68) and 13.14 (12.18 to 14.11) in urban and rural

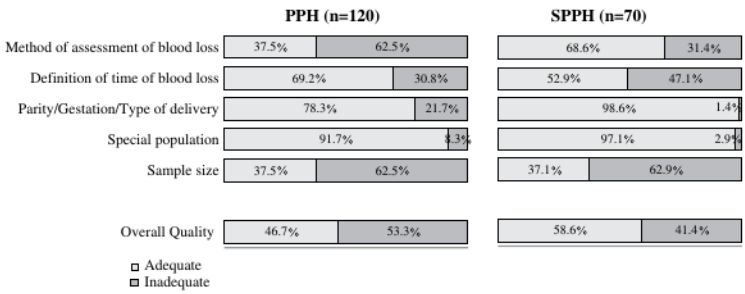

Figure 2. Methodological quality assessment of the datasets.

1. **The overall prevalence of PPH (blood loss 500 mL) was 6 .09 % [95 % confidence interval (CI): 6... Anchor Name: prevalence of births with sPPH almost double what is seen when subjectively assessed** *[Agency Switzerland m.waldis@fatzerimbach.ch]*

populations, respectively. In vaginal deliveries, PPH rates were 10.84% (10.64 to 11.03). Stratifying this subgroup by parity and by number of fetuses, PPH was 9.50% (9.13 to 9.86) and 7.45% (6.56 to 8.35) for nulliparous and multiparous women, respectively. For singleton pregnancies it was 8.13% (7.80 to 8.47) and for multiples 8.25% (6.50 to 9.99). The PPH rates for caesarean section were 8.67 (7.91 to 9.43). The PPH prevalence across regions reached its highest rates in Africa, with 10.45% (9.95 to 10.95); North America 6.37% (6.09 to 6.66), Europe 6.38% (6.35 to 6.40), Oceania 7.68% (7.36 to 8.01) and Latin America and the Caribbean 8.90% (8.03 to 9.76) had intermediate rates and Asia 2.55% (2.50 to 2.60) showed the lowest rates (Tables 1–3).

Severe postpartum haemorrhage

The overall prevalence of SPPH (blood loss ≥1000 mL) was 1.86% (95% CI 1.82 to 1.90) with 3.04% (2.90 to 3.17) when the outcome was measured objectively and 1.68% (1.64 to 1.72) when it was assessed subjectively. The prevalence was 1.67% (1.64 to 1.71) for country, province, region, city settings and 2.95% (2.83 to 3.07) for institutional level. SPPH was 1.69% (1.65 to 1.73) for observational studies and 3.18% (3.04 to 3.33) for RCTs. SPPH prevalence was 3.75% (3.49 to 4.00) in studies in which the sample size was ≤1000 women and 1.78% (1.74 to 1.82) for those studies with >1000 women. When we stratified by management of the third stage of labour, SPPH prevalence was 3.84% (3.31 to 4.37) for expectant management, 2.99% (2.80 to 3.18) for active management, 2.47% (2.06 to 2.88) for women receiving uterotonics before delivery of the placenta and 2.08% (1.39 to 2.77) for women receiving uterotonics after delivery of the placenta. The prevalence of SPPH was 3.64% (3.15 to 4.14) and 3.16 (2.58 to 3.74) for urban and for rural populations, respectively. In vaginal

Table 1. Postpartum haemorrhage prevalence (blood loss ≥500 mL).

Group/subgroup	% (CI 95%)	No. articles	No. datasets	No. women	% Min	% Max	I^2
Overall	6.09 (6.06–6.11)	55	120	3 815 034	0.00	60.40	99.93
By method of assessment of blood loss							
Objectively assessed	10.55 (10.33–10.37)	19	45	74 963	0.00	51.36	99.22
Subjectively assessed	7.23 (7.18–7.27)	22	52	1 226 611	0.00	60.40	99.90
Unspecified	5.40 (5.37–5.43)	14	23	2 513 460	0.43	22.16	99.98
By place studied							
National/province/ region/city	6.02 (6.00–6.05)	14	35	3 620 663	0.43	60.40	99.97
Medical facilities	6.88 (6.76–7.00)	40	83	185 597	0.00	51.36	99.72
By study design							
Observational study	5.97 (5.95–6.00)	31	61	3 758 077	0.00	60.40	99.96
Clinical trial	13.94 (13.65–14.22)	24	59	56 957	0.00	51.36	99.16
By population studied							
Urban	4.58 (4.49–4.68)	7	12	202 164	0.00	20.76	99.05
Rural	13.14 (12.18–14.11)	4	8	4 709	0.67	51.36	99.76
Mixed	11.91 (11.82–12.01)	6	18	484 586	0.84	60.40	99.70
Unspecified	5.27 (5.25–5.30)	39	82	3 123 575	0.00	40.41	99.92

1. **The overall prevalence of SPPH (blood loss 1000 mL) was 1 .86 % (95 % CI 1 .82 to 1 .90) with 3 ...**
Anchor Name: p1004 *[Agency Switzerland m.waldis@fatzerimbach.ch]*

Table 2. Postpartum haemorrhage prevalence (blood loss ≥500 mL).

Group/subgroup		% (CI 95%)	No. articles	No. datasets	No. women	% Min	% Max	I^2
By type of delivery								
Vaginal		10.84 (10.64–11.03)	35	74	99 037	0.00	51.36	99.22
Parity	Nulliparous	9.50 (9.13–9.86)	4	5	24 225	5.08	23.10	99.51
	Multiparous	7.45 (6.56–8.35)	2	4	3 286	4.26	12.02	94.03
	Unspecified	11.45 (11.21–11.68)	29	65	71 526	0.00	51.36	99.28
Gestation	Singleton	8.13 (7.80–8.47)	10	24	25 854	0.00	35.93	98.65
	Multiple	8.25 (6.50–9.99)	1	4	958	7.50	8.75	0.00
	Unspecified	11.83 (11.60–12.07)	24	46	72 225	0.00	51.36	99.37
Management of labour	Expectant management	17.96 (16.97–18.95)	7	8	5 763	3.84	51.36	99.59
	Active management	13.22 (12.87–13.57)	17	35	35 507	0.00	19.46	99.28
	Uterotonic before placenta delivery: NO or NOT specified cord management	11.48 (10.68–12.28)	8	13	6 063	4.26	45.45	97.37
	Uterotonic after placenta delivery	6.52 (5.63–7.40)	4	5	2 991	0.83	10.96	98.50
	Unspecified	8.44 (8.19–8.69)	10	13	48 713	1.12	27.63	99.42
Caesarean section		8.67 (7.91–9.43)	3	5	5 260	3.88	20.76	97.90
Unspecified		5.96 (5.94–5.98)	20	41	3 710 737	0.43	60.40	99.97
By sample size								
≤1000		11.93 (11.58–12.30)	34	75	31 620	0.00	60.40	98.89
>1000		6.04 (6.02–6.07)	29	45	3 783 414	0.43	38.20	99.97

deliveries, SPPH was 2.94% (2.82 to 3.07). Stratifying this subgroup by parity and by number of fetuses, PPH rates were 4.18% (3.52 to 4.85) and 0.45% (0.23 to 0.69) for nulliparous and multiparous women, respectively and 3.01% (2.54 to 3.48) for singleton pregnancies. The SPPH rate for caesarean section was 6.38 (5.45 to 7.31). The prevalence of SPPH across regions was 2.21 (2.01 to 2.41) in Africa, 1.78% (1.62 to 1.95) in Asia, 1.75% (1.71 to 1.79) in Europe, 5.33% (4.49 to 6.18) in Latin America and the Caribbean, and 4.33% (3.66 to 5.01) in Oceania (Tables 4–6).

There is a high degree of heterogeneity of PPH rates across studies. Heterogeneity remains even in subgroups with similar characteristics. As an example, in the 24 datasets describing PPH rates for women with singleton pregnancies and vaginal delivery, PPH rates range from 0 to 35.93%. This high variability is reflected both in Q statistics and in the I^2 statistic, which is equal to 98.65.

DISCUSSION

From our datasets, the prevalence of PPH is approximately 6% of all deliveries. However, those studies that measured blood loss objectively, as opposed to subjectively,

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Table 3. Postpartum haemorrhage prevalence (blood loss ≥500 mL).

Group/subgroup	% (CI 95%)	No. articles	No. datasets	No. women	% Min	% Max	I^2
By continent/region							
Africa	10.45 (9.95–10.95)	9	15	14 443	0.00	51.36	99.40
Eastern Africa	14.23 (11.16–17.29)	1	2	499	13.28	15.22	0.00
Middle Africa	18.67 (17.12–20.23)	2	3	2 410	8.23	40.41	99.48
Western Africa	8.57 (8.06–9.08)	6	10	11 534	0.00	51.35	99.36
Asia	2.55 (2.50–2.60)	16	34	391 141	0.43	27.63	99.81
Eastern Asia	3.96 (3.87–4.05)	3	5	186 749	3.92	12.12	91.42
South-Central Asia	4.35 (3.92–4.78)	4	9	8 659	0.67	12.00	97.51
South-Eastern Asia	4.88 (4.19–5.56)	2	3	3 835	2.67	27.63	97.76
Western Asia	1.05 (1.00–1.09)	7	17	191 898	0.43	15.01	99.25
Europe	6.38 (6.35–6.40)	16	30	3 295 864	0.53	60.40	99.93
Northern Europe	6.37 (6.34–6.40)	12	23	3 286 467	0.53	60.40	99.95
Western Europe	9.38 (8.79–9.97)	4	7	9 393	1.12	27.95	99.77
Latin America and the Caribbean	8.90 (8.03–9.76)	2	6	4 158	0.00	9.78	95.38
Caribbean	8.90 (8.03–9.76)	2	6	4 158	0.00	9.78	95.38
Northern America	6.37 (6.09–6.66)	4	12	28 216	3.45	23.10	95.28
Northern America	6.37 (6.09–6.66)	4	12	28 216	3.45	23.10	95.28
Oceania	7.68 (7.36–8.01)	5	15	25 605	2.49	20.00	97.86
Australia/New Zealand	7.68 (7.36–8.01)	5	15	25 605	2.49	20.00	97.86
Multicountry	11.75 (11.50–12.01)	3	8	55 607	5.93	19.46	99.58

showed a higher prevalence. This is also observed in RCTs, where it would be expected that the blood loss was measured carefully. PPH prevalence for rural populations is higher than for the urban settings but the number of datasets for both populations are rather small. The prevalence of PPH in vaginal deliveries is higher than the overall estimate and, when we stratified by parity in this subgroup, we found nulliparous women to have higher rates than multiparous. This has also been demonstrated by some epidemiological studies looking for risk factors. We found no difference between singleton and multiple pregnancies in terms of PPH, a finding that is not supported by the published literature, which suggests that multiple pregnancies have higher PPH rates. It should be noted, however, that only four datasets (out of 120) reported PPH in multiple pregnancies.

The expectant management of labour shows higher rates of PPH, in comparison with active management or the use of uterotonics, both before and after the delivery of the placenta. This finding is supported by published systematic reviews of RCTs. Unexpectedly, the rate of PPH for caesarean section seems to be lower than for vaginal deliveries, but again, the number of datasets is small and does not allow one to draw any firm conclusions.

There is a wide variation of PPH across the different regions of the world, ranging from 2.55% in Asia to 10.45% in Africa, although the rates in Europe, Latin America and the Caribbean, Northern America and Oceania are rather similar. The figures

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Table 4. Severe postpartum haemorrhage prevalence (blood loss ≥1000 mL).

Group/subgroup	% (CI 95%)	No. articles	No. datasets	No. women	% Min	% Max	I^2
Overall	1.86 (1.82–1.90)	25	70	505 379	0.00	16.92	96.85
By method of assessment of blood loss							
Objectively assessed	3.04 (2.90–3.17)	14	48	60 086	0.17	16.92	98.37
Subjectively assessed	1.68 (1.64–1.72)	9	17	440 564	0.00	12.80	96.51
Unspecified	3.83 (3.28–4.37)	2	5	4 729	0.38	7.57	99.17
By place studied							
National/province/ region/city	1.67 (1.64–1.71)	4	8	73 973	0.32	12.80	98.34
Medical facilities	2.95 (2.83–3.07)	21	62	431 406	0.00	16.92	98.05
By study design							
Observational study	1.69 (1.65–1.73)	9	15	448 047	0.51	12.80	97.83
Clinical trial	3.18 (3.04–3.33)	16	55	57 332	0.00	16.92	98.12
By population studied							
Urban	3.64 (3.15–4.14)	3	8	5 487	0.00	4.73	53.90
Rural	3.16 (2.58–3.74)	3	6	3 509	0.25	16.92	99.15
Mixed	1.67 (1.63–1.71)	1	3	423 107	1.60	12.80	99.18
Unspecified	2.79 (2.67–2.90)	18	53	73 276	0.18	9.83	98.15

from Africa perhaps reflect a situation in which facilities and trained personnel are too scarce for a satisfactory management of delivery.

With regard to SPPH, the overall prevalence is around 1.86% and, again, these rates are higher when the outcome is objectively assessed. The pattern seen with PPH is shown in relation to the study design (RCTs vs. observational studies). There is no difference between urban and rural populations but the small number of datasets precludes drawing any solid conclusions.

For vaginal deliveries, the prevalence of SPPH is higher than for the overall estimate, and in the different stratifications the same patterns seen with PPH emerge: higher rates in nulliparous than in multiparous women, in cases of expectant rather than active management or uterotonics given. Studies with smaller sample sizes again had a higher prevalence of SPPH.

Across regions, the figures are relatively similar in Africa, Asia and Europe, being higher in Latin America, the Caribbean and Oceania. However, these figures should be treated cautiously in view of the small number of datasets and women in the latter two regions.

This systematic review has several strengths. The search strategy was extensive, comprehensive and reproducible, as required by standard procedures in systematic reviews. We also performed a rigorous and transparent methodological quality assessment and kept bias risk to a minimum by applying strict eligibility criteria. We accomplished with most of the standard criteria for reviews of observational datasets. Our review provides an up-to-date, critically appraised and reproducible analysis of PPH. However, it must be borne in mind that the quality of the results and conclusions from a systematic review are only as accurate as the data provided by the primary datasets.

The review also has some limitations. With respect to PPH in different countries and across regions, the literature is scarce in terms of datasets describing PPH/

1. **Subjectively assessed 1 .68 (1 .64e1 .72) 9 17 440 564 0 .00 12 .80 96 .51 Anchor Name: assessed subjectivley 95%** *[Agency Switzerland m.waldis@fatzerimbach.ch]*

Table 5. Severe postpartum haemorrhage prevalence (blood loss ≥1000 mL).

Group/subgroup		% (CI 95%)	No. articles	No. datasets	No. women	% Min	% Max	I^2
By type of delivery								
Vaginal		2.94 (2.82–3.07)	21	61	72 662	0.00	16.92	97.98
Parity	Nulliparous	4.18 (3.52–4.85)	1	1	3 464	4.18	4.18	–
	Multiparous	0.45 (0.23–0.69)	2	4	3 286	0.32	0.67	0.00
	Unspecified	3.00 (2.87–3.13)	18	56	65 912	0.00	16.92	97.87
Gestation	Singleton	3.01 (2.54–3.48)	5	11	5 150	0.39	8.83	97.37
	Multiple	–	–	–	–	–	–	–
	Unspecified	2.94 (2.81–3.07)	16	50	67 512	0.00	16.92	98.13
Management of labour	Expectant management	3.84 (3.31–4.37)	6	6	4 999	0.51	16.92	99.22
	Active management	2.99 (2.80–3.18)	10	21	30 608	0.00	4.73	95.45
	Uterotonic before placenta delivery: NO or NOT specified cord management	2.47 (2.06–2.88)	7	11	5 585	0.25	11.21	97.63
	Uterotonic after placenta delivery	2.08 (1.39–2.77)	2	2	1 635	0.98	3.17	92.44
	Unspecified	2.88 (2.69–3.07)	4	21	29 835	0.18	9.83	98.63
Caesarean section		6.38 (5.45–7.31)	1	3	2 647	4.32	7.57	79.27
Unspecified		1.65 (1.61–1.69)	3	6	430 070	0.38	12.80	98.64
By Sample Size								
≤1000		3.75 (3.49–4.00)	18	44	21 354	0.00	16.92	96.60
>1000		1.78 (1.74–1.82)	10	26	484 025	0.18	7.57	98.32

SPPH as the main outcome for prevalence. Most of the articles involved in this review correspond to countries in Europe, Africa and Asia. Also, in terms of the number of women included, most of articles are from Europe and Asia, with little contribution from the other regions. In particular, Europe contributes 86.4% of the women in the PPH studies and 85.6% in the SPPH studies. This bias in regional representation makes it very difficult to estimate accurately the PPH and SPPH rates for the different regions. Furthermore, most of the studies were looking either for risk factors for PPH or for interventions to reduce PPH, instead of having magnitude and distribution of PPH as the main objective. The absence of data in many countries is of concern, and efforts should be made to implement data collection and reporting for substantial statistics. From our methodological quality assessment, it can be seen that around half of the datasets fail to measure PPH objectively; this proportion increases when the sample sizes are considered. This situation is improved in the datasets reporting SPPH but this improvement is small so the overall quality of the datasets is not good. There is a high degree of heterogeneity across studies not allowing for pooling the results in a single statistics summary estimate. This situation remains when we stratified for those factors considered as potential confounders.

In summary, the figures we obtained give a rough idea of the magnitude of the problem and suggest that some regional variations might exist. Although we stratified by

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Table 6. Severe postpartum haemorrhage prevalence (blood loss ≥1000 mL).

Group/subgroup	% (CI 95%)	No. articles	No. datasets	No. women	% Min	% Max	I^2
By continent/region							
Africa	2.21 (2.01–2.41)	8	18	20 692	0.00	16.92	98.21
Eastern Africa	2.80 (1.36–4.25)	1	2	499	1.95	3.70	34.00
Middle Africa	3.07 (2.38–3.76)	2	3	2 410	0.98	7.42	97.88
Northern Africa	0.26 (0.09–0.43)	1	2	3 411	0.18	0.35	9.63
Southern Africa	3.80 (3.09–4.51)	1	2	2 814	3.62	3.98	0.00
Western Africa	2.20 (1.93–2.46)	5	9	11 558	0.00	16.92	97.31
Asia	1.78 (1.62–1.95)	10	26	25 345	0.25	6.33	94.80
Eastern Asia	1.01 (0.74–1.28)	3	6	5 240	0.39	2.02	76.97
South-Central Asia	0.68 (0.48–0.88)	2	3	6 501	0.25	1.24	75.95
South-Eastern Asia	2.67 (2.33–3.00)	3	7	8 776	0.51	6.33	98.12
Western Asia	2.51 (2.06–2.95)	3	10	4 828	0.72	4.29	83.51
Europe	1.75 (1.71–1.79)	7	18	432 616	1.60	12.80	96.84
Northern Europe	1.69 (1.65–1.72)	4	9	425 553	1.60	12.80	97.43
Western Europe	5.49 (4.96–6.02)	4	9	7 063	4.18	9.83	76.74
Latin America and the Caribbean	5.33 (4.49–6.18)	1	2	2 719	3.60	7.07	94.44
South America	5.33 (4.49–6.18)	1	2	2 719	3.60	7.07	94.44
Northern America	–	–	–	–	–	–	–
Northern America	–	–	–	–	–	–	–
Oceania	4.33 (3.66–5.01)	1	2	3 483	3.93	4.73	26.86
Australia/New Zealand	4.33 (3.66–5.01)	1	2	3 483	3.93	4.73	26.86
Multicountry	3.12 (2.88–3.36)	2	4	20 524	0.38	3.97	99.00

the main confounders, heterogeneity persists. Thus, taking into account all the above-mentioned considerations, to have a reliable picture of PPH and SPPH worldwide – of its magnitude, distribution and consequences – a global survey tackling this condition is mandatory.

Practice points

- PPH (≥ 500 mL of blood loss) prevalence is 6%.
- SPPH (≥ 1000 mL of blood loss) prevalence is 1.86%.
- A wide variation of PPH rates exists between regions of the world.

Research agenda

- Well-designed and rigorously conducted PPH prevalence studies are needed.
- A global survey of the prevalence of PPH is mandatory.

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