

# Postpartum haemorrhage: interventions and treatment of the nursing professional to prevent hypovolemic shock

## Summary

**Introduction:** In Colombia, postpartum haemorrhage is the second cause of mortality in pregnant women between 24 and 34 years of age, with 6.9 cases per 1,000 live births. After childbirth, it is expected that 8.2% of Latin American women will present with postpartum haemorrhage.

**Objective:** Screening or nursing care for women with postpartum haemorrhage to reduce the risk of hypovolemic shock, through an integrative review of the literature.

**Methods:** Integrative review of literature following on purpose by Sasso, de Campos e Galvão; the research was carried out in Clinical Key, LILACS, CINAHL, Epistemonikos, Cochrane Library, PubMed, Scielo and Google Scholar; the articles published in the last five years, in Spanish, English and Portuguese, are classified by level of evidence and degree of recommendation. This research is low risk due to its documentary nature.

**Results:** We collected forty and definitive articles. The information was organized in: clinical chart, nursing care and difficulties in obstetric and gynaecological care.

**Discussion:** Nursing professionals must identify the barriers to care, assessing the resolution capacity of the institutions and analysing the cases of maternal death. The use of misoprostol with oxytocin or carbetocin alone is recommended in combination with ergometrine and oxytocin according to the volume of bleeding.

**Conclusion:** It is pertinent to perform a physical examination to recognize signs of hemodynamic instability and hypovolemic shock, and the diagnoses and nursing interventions must focus on the provision of quality care, to avoid complications such as death.

**Keywords:** postpartum haemorrhage, nursing care, hypovolemic shock

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## Introduction

Pregnancy is the result of the implantation of the zygote in the uterus until the moment of delivery. This consists of a dilation phase, expulsion period, and delivery period; after it, complications can develop such as: gestational hypertension; infections and postpartum haemorrhage (PPH), this being the most prevalent, which could trigger hypovolemic shock, depending on the degree of blood loss, the speed of placental separation and the effectiveness of uterine contraction.<sup>1,2</sup>

PPH is classified as early if it occurs within the first 24 hours, usually within the first 2 hours, and late if it occurs between 24 and 6 weeks postpartum and is characterized by an estimated loss of >500 mL of blood; loss of all blood volume in 24 hours; bleeding >150 mL/min; 50% volume loss in 20 minutes and/or decreased haematocrit  $\geq 10\%$ .<sup>3</sup> PPH occurs in 5 to 15% of deliveries and represents around 25-30% of deaths in pregnant women <15 years of age, being the most frequent cause of morbidity and mortality in adolescents worldwide.<sup>4,5</sup> After childbirth, it is expected that 8.2% of Latin American women will present severe PPH and in Colombia it is the second cause of mortality in pregnant women, occurring in ages 24 to 34 years with 6.9 cases per 1000 live births.<sup>6,7</sup>

At the international level, the global strategy for the health of women, children, and adolescents 2016-2030 has been implemented, where equity in health care is proposed to put an end to preventable mortality and provide well-being to that population, ensuring that women can enjoy pregnancy and childbirth with well-being.<sup>8</sup> On the

other hand, in Colombia studies have been carried out to mediate maternal mortality to promote appropriate and timely interventions during childbirth that have been established in the red code guidelines.<sup>9</sup>

However, although PPH is 93% preventable, signs and symptoms are not detected early in the puerperium. For this reason, the nursing professional must act in an agile and efficient manner during childbirth and in case of massive haemorrhage to avoid major complications.<sup>10,11</sup> Likewise, at the social and institutional level, PPH is perceived as: "an expression of inequity, inequality and lack of empowerment of women" since, according to PAHO, PPH is an inherent variable of mortality in low-and-middle-income countries, where health care is deficient. Therefore, the provision of services in prenatal visits, childbirth and the puerperium are considered important to prevent PPH.<sup>12</sup> For this reason, we intended to describe nursing care for women with postpartum haemorrhage to reduce the risk of hypovolemic shock, through an integrative review of the literature.

## Materials and methods

Secondary research, with an integrative literature review design, following the proposal by Sasso, de Campos and Galvão,<sup>13,14</sup> which suggests six phases for this process. In the first, the PICO question was established: What is the nursing care for women with postpartum haemorrhage to reduce the risk of hypovolemic shock? In the second phase, search equations were formulated with the Boolean operators AND and OR, using the DeCS: Hemorragia pós-parto, Postpartum Haemorrhage, Nursing Care, shock; and the MeSH: Immediate

Postpartum Haemorrhage, Delayed Postpartum Haemorrhage, Nursing Care Management, Circulatory Failure, Circulatory Collapse, Hypovolemic shock.

Articles were searched in databases such as Clinical Key, LILACS, CINAHL, Epistemonikos, Cochrane Library, PubMed interface, Scielo article bank and Google Scholar metasearch engine. The search was carried out in March 2020 considering the following selection criteria: articles published in the last five years, in Spanish, English and Portuguese; expert consensus and research that cited post-caesarean women and/or with haematological and cardiac pathologies as antecedents were excluded.

In the development of the third phase, grey literature was reviewed at the national and international levels related to management guidelines proposed for the red code and the interventions developed by the World Health Organization (WHO) and the Pan American Health Organization (PAHO). After this, a matrix was built in Excel to record the search and extraction of analysis units,<sup>15</sup> selected by title, abstract and full text, and classified by level of evidence and grade of recommendation according to the Center for Evidence-Based Medicine (CBM).<sup>16</sup>

The initial search yielded 11,089 articles, of which 11,048 were discarded, resulting in 41 definitive ones that report the main nursing care in the prevention of hypovolemic shock secondary to PPH. These

articles contributed to the construction of three themes as follows: Clinical picture (n=32), where the pathophysiology, factors, causes and diagnosis of PPH are specified; prevention, treatment, and nursing interventions (n=35) and difficulties that arise during gynaecological-obstetric care (n=15). It should be noted that some units contributed to more than one category (Figure 1).

Within the fourth phase, assessment instruments were used for critical reading: for systematic review studies CASPe<sup>17</sup> with a score of 9 out of 10 points; for observational studies STROBE<sup>18</sup> with a score of 17 out of 21 points; for CONSORT randomized clinical trials<sup>19</sup> with a score of 21 out of 37 points and AGREE II<sup>20</sup> for clinical practice guidelines. This research complied with the ethical considerations contemplated in Resolution 8430 of 1993 and is classified as risk-free research, since no modifications are made to the variables of the individuals,<sup>21</sup> and with the provisions of Law 44 of 1993 corresponding to copyright and the considerations of Law 911 of 2004.<sup>22,23</sup>

## Results

Within the selected units of analysis, 17 were identified in English (41.5%), 18 in Spanish (43.9%) and 6 in Portuguese (14.6%), mostly published in 2019 (36,5%). Regarding the level of evidence, it was found that grade 3A (favourable recommendation) was the most prevalent with 41.46%, and in the same way, 56% of primary investigations were included (Table 1).

**Table 1** Characterization of the analysis units

Unit	Country	Idiom	Design	Level of evidence	Grade of recommendation
Borovac <sup>24</sup>	Brazil	English	Prospective cohort study	2B	Favourable recommendation
Escobar <sup>25</sup>	Colombia	English	Descriptive, cross-sectional, observational study	2 C	Favourable recommendation
Okada <sup>26</sup>	Japan	English	Retrospective cohort study	2B	Favourable recommendation
Son <sup>27</sup>	South Korea	English	cross-section	3B	Favourable recommendation
Pileggi <sup>28</sup>	Brazil	English	Systematic review of the literature	2A	Favourable recommendation
Camacho <sup>29</sup>	Colombia	English	Systematic review	2A	Favourable recommendation
Durmaz <sup>30</sup>	Turkey	English	Systematic review - Meta-analysis	2A	Favourable recommendation
Feduniw <sup>31</sup>	Poland	English	Systematic review	3A	Favourable recommendation
Court <sup>32</sup>	USA	English	Systematic review - Meta-analysis	1A	Extremely favourable
Crespo <sup>33</sup>	Ecuador	Spanish	Longitudinal retrospective, cross section	2 C	Favourable recommendation
Hernandez <sup>34</sup>	Chili	Spanish	Cross section description	2 C	Favourable recommendation
Garcia <sup>35</sup>	Mexico	Spanish	Retrospective systematic review	3A	Favourable recommendation
Lopez <sup>36</sup>	Colombia	English	Descriptive, series of cases.	4	Favourable but inconclusive recommendation
Tanaka <sup>37</sup>	Taiwan	English	Systematic review	3A	Favourable recommendation
Ferreira <sup>38</sup>	Brazil	Portuguese	Systematic review	3A	Favourable recommendation
Shock <sup>39</sup>	Peru	Spanish	Descriptive, retrospective, cross section	2 C	Favourable recommendation
Nursing care guide for women in the postpartum period <sup>1</sup>	Colombia	Spanish	Clinical practice guide	1 C	Highly recommended
Columbia <sup>40</sup>	Cuba	Spanish	Descriptive, cross section, prospective	3A	Favourable recommendation
Peace <sup>41</sup>	Peru	Spanish	cross-section	2 C	Favourable recommendation
Erazo <sup>42</sup>	Ecuador	Spanish	Descriptive, case series, explanatory	3A	Favourable recommendation

Table Continued...

Unit	Country	Idiom	Design	Level of evidence	Grade of recommendation
Rojas <sup>43</sup>	Colombia	Spanish	Cross-sectional descriptive, analytical	2 C	Favourable recommendation
Gamez <sup>44</sup>	Mexico	Spanish	Clinical case	3B	Favourable recommendation
Rosemary <sup>45</sup>	Colombia	Spanish	cross-section	2 C	Favourable recommendation
Flowers <sup>46</sup>	Ecuador	Spanish	Cross-sectional descriptive, retrospective	3A	Favourable recommendation
Tapia <sup>47</sup>	Ecuador	Spanish	Cross-sectional retrospective cohort	2A	Favourable recommendation
Lavaven <sup>48</sup>	Ecuador	Spanish	Literature review	3A	Favourable recommendation
Nagua <sup>49</sup>	Ecuador	Spanish	Case analysis description	3A	Favourable recommendation
Olive <sup>50</sup>	Peru	Spanish	Cases and controls study	3A	Favourable recommendation
Lucky <sup>51</sup>	Brazil	Portuguese	Bibliographic review	3A	Favourable recommendation
By Siqueira <sup>52</sup>	Brazil	Portuguese	Systematic review of the literature	3A	Favourable recommendation
Da Silva <sup>53</sup>	Brazil	Portuguese	Bibliographic review	3A	Favourable recommendation
Fortes <sup>54</sup>	Cape Verde	Portuguese	Literature review	3A	Favourable recommendation
Koch <sup>55</sup>	Brazil	English	cross-section	2 C	Favourable recommendation
PPH CPG Work Group <sup>56</sup>	Canada	English	Clinical practice guide	1 C	Highly recommended
Qayum <sup>57</sup>	Pakistan	English	Randomized clinical trial	1 B	Highly recommended
King <sup>58</sup>	Sierra Leone	English	cross-section	2A	Favourable recommendation
Kwon <sup>59</sup>	Korea	English	Number of cases	4	Favourable but inconclusive recommendation
El-Garghy <sup>60</sup>	Egypt	English	Cohort study	2B	Favourable recommendation
Treviño <sup>61</sup>	Mexico	Spanish	Systematic review	3A	Favourable recommendation
Teixeira <sup>62</sup>	Brazil	Portuguese	Systematic review	3A	Favourable recommendation
Morels <sup>63</sup>	Spain	Spanish	Bibliographic review	3A	Favourable recommendation

The information was organized into three themes: clinical picture, where the pathophysiology, factors, causes and diagnosis of PPH are specified; the prevention, treatment, and nursing interventions and finally the difficulties that arose during the gynaecological obstetric care.

### Topic I. Clinical picture

#### Pathophysiology of postpartum haemorrhage

The myometrium is the muscular component of the uterus; during childbirth, its fibres contract and retract, causing thickening and a decrease in uterine volume; when the placenta separates by itself, it causes the blood vessels to break, thus producing a bleeding of 600 to 900 ml of blood. In response, contractions occur in the myometrium, leading to the formation of a retroplacental clot; this happens in approximately 15 to 35 minutes, and when the time is extended it is considered prolonged labour. However, a failure can occur in this physiological process called uterine atony, which does not allow contraction and produces hemorrhage.<sup>24,41-43,48,49</sup>

#### Pathophysiology of hypovolemic shock

Due to PPH, tissue hypoperfusion is generated, which causes the loss of oxygen at the cellular level; this triggers a state of shock, characterized by intracellular metabolic disorders that culminate in organ failure and death. As a compensatory mechanism, catecholamines are released, which activates the sympathetic nervous system, which in turn increases heart rate and contractility, systemic and pulmonary vascular resistance; consequently, blood flow to the kidney, spleen,

skin, and uterus decreases, preserving cardiac, cerebral, and adrenal perfusion. When the volume loss exceeds 25% (approximately 1500 ml) the compensatory mechanisms fail, at which time tissue hypoxia is generated and consequently metabolic acidosis.<sup>43-47</sup>

#### Risk factors for postpartum haemorrhage

Several studies have found that women may have pre-existing conditions and intrapartum conditions, which represent a higher risk of developing PPH. Among these, the most frequent are prolonged labour, multiple pregnancy, placental disorders, multiparity, labour induction with oxytocin and polyhydramnios Table 2.<sup>25,30,31,38-40,41-50,51-55,58-60,63</sup>

#### Causes of postpartum haemorrhage

Within the literature, postpartum clinical conditions are mentioned that are classified as “the 4Ts”: tone, trauma, tissue and thrombin that can trigger complications in this stage.<sup>1,25,29,31,36,53</sup> Tone alterations develop more frequently (70%), uterine atony is characteristic, presenting in 60%-85% of women,<sup>31,33,39,40,42-52,54,55,58-63</sup> followed by uterine hypotony (82%),<sup>36,45,47</sup> as well as different placental conditions,<sup>31,35,39,40,43,44,46,49,59,60,62</sup> of which placenta accreta occurs in 81.6% of cases and placenta previa in 29%-54.4%, while the rest are less common: placenta increta 11.8% and placenta percreta 6.6%. Within these anomalies, the ones that develop PPH the least are uterine inversion (2.8%-5%) and uterine rupture (2.8%).<sup>35,39,40,43-46,54,55,62,63</sup>

Trauma is the second cause of PPH and involves injuries to the genital tract such as tears and episiotomy, presenting between 19%

and 35% of cases,<sup>31,33,39,40,42-50,54,55,58,62,63</sup> On the other hand, it occurs in 10% - 21% due to alterations in the tissue, either due to placental anomalies (9.5% - 36%) or due to retention of placental remains (9% - 35%).<sup>31,40,42-50,52,54,53,62</sup> Finally, the least frequent causes are coagulation disorders (1% - 7.4%), since they usually occur in women with haematological disorders.<sup>31,35,39,42-46,48-50,55,62</sup>

**Table 2** Predisposing factors associated with PPH, reported in the literature

Factors	%
History of PPH	4.70%
Multiparity	53% - 95%
Placental alterations	95%
Previous placenta	
Placental retention	
Placenta accreta	
Placental abruption	
Age <20 - >35 years	31.7% - 60%
Chorioamnionitis	1.40%
Anaemia	6.9% - 34%
BMI > 35kg/m2	24%
Foetal macrosomia	14.8% -32.9%
Hypertensive disorders	36.10%
pre-eclampsia	
HELLP syndrome	
Labour induction	28.3% - 84.7%
Multiple pregnancy	61.6% - 95%
Vaginal tract lacerations	35.20%
tears	
Episiotomy	
Polyhydramnios	70%
Prolonged labour	100%
Amniotic fluid embolism	2.80%

**Diagnosis of postpartum haemorrhage**

According to Romero and others,<sup>4,5</sup> the nursing staff identifies the PPH and activates the immediate response in 60% of the cases.

**Table 3** Clinical signs of PPH

Volume loss (%) and ml for a woman between 50-70 kg	Consciousness state	Systolic blood pressure (mmHg)	Heart rate (bpm)	Perfusion	Urinary output	Degree of shock
10-15% 500-1000ml	Normal	Normal	60-90	Normal	Normal	Compensated
16-25%	Normal and/or agitated	80-90	91-100	palleness, coldness	Normal	Mild
26-35% 1500-2000ml	agitated and confused	70-80	101-120	Palleness, coldness, and sweating	Oliguria	Moderate
>35% 2000-3000ml	Lethargic, collapsed and unconscious	<70	>120	Palleness, coldness, sweating, and capillary refill >3 seconds	Anuria	Severe

**Font:** Nursing care guide for women in the postpartum period. Evidence-Based Nursing (EBE). District Secretary of Health. Mayor's Office of Bogotá DC 2015

*Variables to evaluate in PPH:* Its early detection is essential, by monitoring hemodynamic variables, and it is recommended to take vital signs every 15 minutes for one hour, except for temperature.<sup>53,54</sup> The variables to be monitored are described physiologically below:

- I. Heart rate. Because of the decrease in preload, there is an increase in heart rate related to the magnitude of hypovolemia.<sup>44</sup>
- II. Blood pressure. The volume loss generates an adrenergic discharge that increases vasomotor tone, which lowers pulse pressure and maintains systolic pressure. Once 30% of blood volume has been lost, hypotension begins to occur.<sup>44</sup>

Therefore, it is pertinent to carry out a thorough physical examination, which consists of bimanual palpation of the uterus with the aim of identifying uterine rupture, placental retention, clots, and lacerations, if incomplete cotyledons are discovered in the placenta, the uterine cavity should be cleaned;<sup>44,47</sup> similarly, the cervix and vagina should be inspected for bruises or tears.<sup>44</sup>

Additionally, it is essential to assess blood loss by visual estimation and compresses; PAHO (2018) proposes a formula to calculate volume loss by weighing the compresses, considering that 1 gram of weight is equal to 1 millilitre of blood.<sup>43,50,53</sup>

$$\text{Weight of bloody pads (grams)} - \text{Calculated weight of dry pads (grams)} = \text{Estimated volume of blood lost (millilitres)}$$

Likewise, the ABO and Rh classification must be obtained for cross tests, haemoglobin levels, haematocrit and platelet count, prothrombin time and thromboplastin, where coagulation alterations will be evaluated.<sup>44</sup> After this, the signs of hemodynamic instability and shock must be recognized, which are related to the loss of blood volume (Table 3).<sup>43,47,50</sup>

**Topic 2. Nursing care**

*Prevention of PPH:* Different authors affirm that health personnel should be trained to use protocols that imply maintaining hemodynamic stability, having the experience and knowledge to manage obstetric emergencies, identifying risk factors.<sup>34,43,45,54,62</sup> Active management of the third stage of labour includes administration of uterotonics, sustained traction, umbilical cord clamping associated with the Brandt-Andrews manoeuvre, and fundal massage every 15 minutes for the first 2 hours postpartum.<sup>31,39-43,45-49,51-53</sup> The drug of choice for prophylaxis is oxytocin,<sup>31,39,40,43,45-47,51,53</sup> in doses of 10-30 IU intravenously (IV) that have a duration of action between 2-4 hours and 8-12 hours, respectively, and doses of 5-10 IU intramuscularly (IM) immediately after birth. Other alternatives are misoprostol 400-600 micrograms orally or sublingually, which reduces 8% of cases<sup>31,39,46,52</sup> or the administration of 100 micrograms of carbetocin<sup>31,39</sup> IV or IM; on the other hand, there is an effective reduction of PPH with the administration of tranexamic acid<sup>31,57</sup> within 3 hours after delivery in doses of 0.5-1 g intravenously.

- III. Skin. To preserve cerebral, coronary, and visceral perfusion, vasoconstrictor mechanisms are activated, which in turn are responsible for producing signs such as cold, pale, sweaty skin, and prolonged capillary refill.<sup>44</sup>
- IV. Diuresis. When volume depletion occurs, a redistribution of blood flow to other vital organs is generated, which causes oliguria.<sup>44</sup>
- V. Metabolic acidosis. If the shock progresses, the anaerobic metabolic pathway is activated, which produces lactic acid,

while hepatic tissue hypoperfusion decreases lactate, which leads to metabolic acidosis.<sup>44</sup>

- VI. Laboratory changes. In case of hypovolemia, water and sodium are conserved in the kidneys, this produces an increase in blood urea nitrogen, BUN/creatinine ratio >20, urinary osmolarity >450 mmol/kg and urinary sodium <25 mEq/l.<sup>44</sup>
- VII. Fibrinogen. It is essential for platelet aggregation, however, in PPH its levels decrease and may indicate the need for massive transfusion of blood products, as well as the risk of triggering coagulopathy.<sup>26,47</sup>
- VIII. h. Lactate. It is crucial to determine if a massive transfusion of blood products is necessary, since lactate is a cellular product of anaerobic metabolism.<sup>26,27</sup>
- IX. Shock index (CI). Clinical parameter that indicates the loss of blood volume during the postpartum period, the need for massive transfusion and reflects the hemodynamic status of the patient. The shock index is calculated with the formula: (Maternal heart rate ÷ Systolic blood pressure = If CI greater than or equal to 0.9: massive transfusion).<sup>24-27,41,44,51,53,60</sup>

The main related Diagnoses are described below with the recommended interventions (Table 4).

**Table 4** Nursing diagnoses

Nursing diagnoses	IAS
Fluid volume deficit R/C Active fluid volume loss E/P Decreased urine output, decreased blood pressure, dry mucous membranes, thirst, weakness.	Perform bladder catheterization.
Fluid deficit R/C excessive blood loss secondary to uterine atony.	Monitor hemodynamic status every 15 minutes.
Decreased cardiac output R/C altered preload E/P cold and sweaty skin, decreased peripheral pulses, prolonged capillary refill time.	Administer IV crystalloid solutions, preferably warm (normal saline, Ringer's lactate), colloids, blood products, oxytocic, or inotropes as prescribed.
Risk of shock R/C hypovolemia <sup>1,44,49,54,63</sup>	Perform control of liquids administered and eliminated.
Hypothermia. <sup>54</sup>	Maintain a patent intravenous line.
Impaired gas exchange R/C ventilation-perfusion imbalance E/P abnormal arterial pH, abnormal breathing pattern, drowsiness, tachycardia. <sup>44</sup>	Observe haemoglobin levels, haematocrit, PT, PTT, fibrinogen, platelet count.  Maintain the proper position to ensure peripheral perfusion with the legs elevated.  Increase frequency of fundal massage  Quantify blood loss  Auscultate lung sounds and check for crackles or other sounds.  Monitor electrolyte levels. <sup>40,42,44,49,53,54,60,61,63</sup>  Observe the colour and temperature of the skin.  Adjust the room temperature to the needs of the patient.  Administer oxygen therapy as appropriate. <sup>44</sup>

## Pharmacotherapy

Pharmacological interventions aim immediate control of blood volume loss, to mitigate the risk of hypovolemic shock. On the other hand, uterotonics<sup>28</sup> are used to increase uterine contractility and tone; drugs of first choice are oxytocin and ergometrine,<sup>24</sup> since its onset of action is 2 to 3 minutes, the first manages an initial dose of 10 IU IM or 10-40 IU IV and a maximum dose of 60 IU/day; the second has an initial dose of 0.2-0.4mg IV or IM over 15 to 20 minutes, every 4 to 6 hours up to a maximum of 1mg; as an alternative, misoprostol 600-1000 mcg sublingually or rectally is administered; carboprost 0.25 mg IM every 15 to 90 minutes for a maximum of 8 doses and tranexamic acid 1g IV every 4 hours, maximum 4 g.<sup>32,51</sup> Maintenance doses should be continued simultaneously: 10-30 IU IV oxytocin or 100 µg bolus IV carbetocin<sup>31</sup>. these drugs must be sealed, away from light and kept at a temperature of up to 30°C.<sup>1,39,44,45,47,48,53,54</sup>

## Non-pharmacological treatment

Different alternatives are listed in the literature, taking as a first measure the replacement of crystalloid fluids and/or blood products according to losses.<sup>24-27,31,34,36,37,42-47,49,51,55,59,61,63</sup> Administration of fresh frozen plasma and/or red blood cells is recommended; a peripheral line should be cannulated with a large calibre catheter (16-18)<sup>29,42,43</sup> exclusively used for the transfusion of blood components; in case of emergency 2 units of red blood cells are administered.<sup>1,43-45</sup> 12-15 ml/kg of fresh frozen plasma is suggested for every 6 units of red blood cells, maintain monitoring of vital signs, guide and monitor adverse reactions during transfusion.<sup>1,31,37,43</sup>

On the other hand, control diuresis through a Foley catheter; bladder emptying promotes uterine contraction, adequate diuretic volume is >30 mL/hour.<sup>29,32,42,63</sup> In relation to other alternatives, there is the Bakri balloon, it is a minimally invasive silicone device that is used in uterine packing, it has a double lumen to monitor and quantify uterine bleeding, it increases the pressure of the parenchyma and the uterine vasculature; it should be filled with saline to produce sufficient tamponade. This method has been shown to be 90% effective for 12-24 hours.<sup>25,31,36,42,44,47,48,50,51,53,55,59,60</sup> Otherwise, manual compression with sterile gauze pads and compresses is performed on the uterine cavity; it has an effectiveness of approximately 2 to 3 hours, and/or bimanual uterine compression where a fist is placed through the vaginal tract and with the other hand the uterine fundus is compressed.<sup>39,42,48,50</sup>

Finally, the anti-shock suit is a garment with six segments (malleoli, legs, thighs, pelvis, and abdomen) that exert pressure from 20 to 40 mmHg to reduce blood supply in these regions to promote blood flow to vital organs, counteracting hypovolemic shock in an estimated time of 48 to 72 hours.<sup>25,28,53,61</sup>

Recommendations for use: 1. Place the patient on the open suit. 2. Check the position: the upper segment should be immediately below the last rib and the pressure balloon above the navel. 3. Close the suit starting at the ankle segments and work your way up. 4. Verify fit by placing one or two fingers below the top edge of the segment. 5. Ask if you can breathe. 6. Watch for dyspnoea or decreased urine output as signs that the suit is too tight.<sup>29</sup>

To remove it, it must be done from the distal to the proximal point, applying the 20/20 rule, which consists of 20 minutes passing from one level to another, during which time it must be verified that the systolic blood pressure does not drops more than 20 mmHg, or the heart rate increases more than 20 beats per minute. It should not be withdrawn suddenly since it would produce a redistribution of blood volume towards the lower limbs, increasing the probability of sudden vascular collapse.<sup>29,61</sup>

## Treatment of hypovolemic shock

Systemic resuscitation is performed during the management of hypovolemic shock; first, the airway is secured through endotracheal intubation and the risk of aspiration is verified. Secondly, 2 large-calibre venous accesses are channelled for the administration of IV fluids, a volume of 1-2 litres is provided during the first hour, with strict monitoring of vital signs; the solutions used are crystalloids, colloids and blood<sup>44</sup>. Finally, vasopressor drugs such as Desmopressin 0.3µg/kg, uterotonic drugs such as Oxytocin 30 IU/30 min are administered, and if these drugs are ineffective, Sulprostone 500 mg is administered in 1 hour; and additional sodium bicarbonate to counteract lactic acidosis.<sup>31,32</sup>

### Topic 3. Difficulties in obstetric care

Barriers are identified that prevent timely and quality care from being provided, increasing the incidence of events such as PPH; detection and appropriate treatment allows to avoid complications such as hypovolemic shock and death.<sup>3,4</sup> In low-and-middle-income countries<sup>62</sup> there is a higher incidence of PPH due to factors such as: inadequate prenatal care,<sup>34-39</sup> the autonomy of the patient not to follow a prenatal control either due to cultural preferences, poor quality care, limited access to health services or economic condition,<sup>42,48,51</sup> care in first-rate hospitals with limited resources to provide adequate treatment,<sup>59,60</sup> and delay in the transfer to third or fourth level institutions for care of complex situations.<sup>24,40,60</sup>

In addition to this, the lack of knowledge and skills in nursing professionals<sup>38,42,45,48</sup> contributes to untimely identification of signs of PPH<sup>24,36</sup> leading to late diagnosis,<sup>40</sup> consequently, the delay of the interventions.<sup>34,40,48</sup> All these situations represent disappointment in patient care.<sup>51</sup>

Likewise, in health facilities there is low adherence to the clinical practice guidelines to activate the red code<sup>36,42,48</sup> and intervene quickly with the interdisciplinary team according to the requirements. Therefore, nursing professionals are recommended to develop protocols that address care actions,<sup>62</sup> and enhance their knowledge about PPH, pharmacological treatment, use of equipment, ability to perform procedures.<sup>4,5</sup> In addition, to establish channels of communication with family members about the patient's condition, to improve and strengthen the role as professionals.<sup>34,42,43</sup>

## Discussion

PPH is the main risk factor for maternal mortality, this being an indicator of countries' development; therefore it is essential to make efforts to avoid these complications in pregnant women as much as possible; for this the nursing professional must take actions regarding patient safety, from the evaluation and analysis of mortality cases, the resolution capacity of health institutions to identify errors and/or barriers in care, promotion of teamwork, strengthening of communication skills and implementation of evidence-based clinical practice guidelines.<sup>64</sup>

It is essential that the nursing professional establishes universal prevention measures that allow recognizing the signs, symptoms, risk factors and psychological impact, and in the same way perceive that PPH generates pain, fear and anguish in women; for this reason, their intervention should focus on providing quality care that allows these aspects to be stabilized, so that the mother is able to effectively fulfil her maternal role, safe and confident that the nursing team will make decisions based on in respect preserving the intimacy of the binomial.<sup>65,66</sup>

In addition to this, the importance of the contribution of the standardized language in the NANDA, NIC and NOC taxonomies is highlighted, where the domains, patterns and needs are related to the nursing care processes, considering the priority interventions in risk situations. for patients, thus reducing indicators of maternal morbidity and mortality.<sup>67</sup>

For pharmacological treatment, the use of uterotonics such as oxytocin is recommended, which is essential to counteract PPH and therefore hypovolemic shock; its use varies according to availability and degree of bleeding. According to the literature, the concomitant use of Misoprostol with oxytocin or the administration of Carbetocin alone are more effective in preventing bleeding  $\geq 500$  ml, and the combination of Ergometrine with oxytocin in preventing PPH  $\geq 1000$  ml.<sup>68</sup>

Based on the evidence, the use of the Bakri balloon is preferred as it is affordable due to its low cost; bearing in mind that it is a first-line device in advanced non-surgical and non-pharmacological management of PPH, it should be used if the uterotonics of choice fail. If this is not effective in controlling bleeding, the need for laparotomy or other surgical intervention is confirmed.<sup>69</sup>

## Conclusion

It is pertinent to carry out a thorough physical examination, which consists of bimanual palpation of the uterus with the aim of identifying and recognizing risk factors, causes (4 Ts), signs of hemodynamic instability, and hypovolemic shock through the continuous evaluation of severity criteria to prevent PPH up to 93%. Regarding the nursing diagnoses directly related to PPH, it is important to note that they are oriented to the loss of fluid volume and hemodynamic instability that leads to impaired gas exchange, hypothermia and decreased cardiac output; for which the interventions proposed in the taxonomy (NIC) focus on providing quality care, all this to carry out timely management and treatment to avoid complications such as death. Finally, it is evident that PPH is the second cause of maternal mortality with the highest incidence in low-and-middle-income countries due to difficulties in obstetric care. Therefore, it is necessary to train nursing professionals by promoting adherence to clinical practice guidelines, as well as the implementation of therapeutic and/or pharmacological measures; in addition to having the experience and knowledge to manage PPH.

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## Conflicts of interest

The author declares there is no conflict of interest.

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