

# Retrospective Cohort Study Comparing Current Third Stage Management to Expedient Squatting Third Stage Management

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Homebirth Practice

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## Research Article

**Keywords:** postpartum hemorrhage, Shorter third stages, PPH rates, British Columbia

**DOI:** <https://doi.org/10.21203/rs.3.rs-142795/v1>

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# Abstract

**Background:** Active management of the delivery of the placenta results in 5% postpartum hemorrhage, 1% blood transfusions and an average blood loss of 500 cc. Shorter third stages are associated with decreased hemorrhage rates. The third stage can be shortened by instructing the birthing woman to squat and push out the placenta at 3 minutes postpartum. The objective of this study was to compare blood loss and PPH rates using Judy's 3,4,5 minute third stage expedient squatting protocol to variations of active and expectant third stage management among similar populations.

**Methodology:** A retrospective cohort study was carried out comparing 1,098 planned homebirths attended in Israel, in which Judy's 3,4,5 expedient squatting third stage technique was practiced, to 2,899 planned homebirths attended by midwives in British Columbia, Canada, where currently accepted third stage management was used. The inclusion criteria for both groups were: Singleton fetus in cephalic presentation; gestational age 37+0 to 41+6 weeks; spontaneous onset of labor; history of up to one previous cesarean; absence of significant pre-existing disease and absence of significant disease arising during pregnancy. The main outcomes were postpartum hemorrhage and manual removal of the placenta.

**Results:** Using identical inclusion criteria and similar management, variations of active and expectant management resulted in 4% PPH over 1000 cc and 1.0% manual removal. Expedient squatting resulted in 2/1098 cases of PPH>500 cc, zero cases of PPH over 1000 cc and 0.7% manual removal.

**Conclusion:** Judy's 3,4,5 minute third stage management minimizes postpartum bleeding compared to other third stage protocols, reproducing postpartum hemorrhage rates indigenous to primates.

## Background

Cochrane reviews found no evidence that active management reduces the risk of primary postpartum hemorrhage (PPH) over 1000 cc and found active management increases afterbirth pains, increases the need for postpartum analgesia, increases the incidence of postpartum diastolic blood pressure greater than 90 mmHg, and results in increased rehospitalizations due to bleeding. [1] The PPH rate at vaginal birth was 5% both before and after the adoption of Active Management. [2-4] Active Management appears to have superior outcomes only when compared to the 13% PPH rates associated with Expectant Management. [1] The failure of Active Management to prevent PPH is not surprising since it is based on the presumption that women evolved to require external administration of synthetic Oxytocin in order to avoid hemorrhage. Humans share the same placental physiology as apes and chimpanzees who never hemorrhage unless the birth is interfered with by humans. [5,6] It follows that if humans deliver the placenta the way apes and chimps do, they also would not hemorrhage. A demonstration of this appears on YouTube: <https://www.youtube.com/watch?v=AAJPW4p6rzU>

Before antibiotics, infection caused nearly all maternal deaths. Infection caused the deaths of 1.5% of mothers 1911-1935 in the United Kingdom (UK). Maternal death in the UK in that period from PPH was a

rare result of poorly managed low lying placenta or trauma to the cervix or uterus at delivery. [7]

Why is excess blood loss currently acceptable at birth?

Birth is the only circumstance for which losing 500 cc of blood is considered acceptable. The Cochrane review explains that the current average blood loss of 500 cc at vaginal birth is acceptable since people who donate blood also lose 500 cc without deleterious effects. [1] This is a strange justification in light of the facts that blood donation is not done to improve health but rather a compromise of one persons well being to save the lives of others; pregnant women are ineligible to donate blood; postpartum blood loss is not an exact amount like blood donation; and postpartum blood losses of 500 cc in the first hour can be mistaken for actual blood loss of 1000 cc. [1,4] Paramedics are not trained to wait until a victim has lost 500 cc to act. Adults don't watch a child's nose bleed but rather immediately stop the bleeding. Upon cutting one's finger, pressure is immediately applied. Maternal postpartum blood loss appears to be a modern day form of bloodletting. It would be more logical to define and treat postpartum blood loss the way all other types of bleeding: as deleterious and worthy of preventing but this is not the case. Academic pursuit of a genetic basis for PPH is similarly illogical. [8,9] It would be more logical to assume that any genes involved in primate PPH were eliminated by natural selection millions of years ago since PPH is a deadly trait.

Expedience: Seconds count

There is a direct relationship between the occurrence of postpartum hemorrhage and the length of the third stage: the longer the third stage the more PPH. The difference between a shorter stage and a longer stage can be a minute or less. [3,10] "For third stages of labor more than 10 minutes compared with third stages less than 10 minutes there was twice the risk of postpartum hemorrhage. For a third stage of labor more than 20 minutes compared with less than 20 minutes there was four times the risk of postpartum hemorrhage, and for third stages over 30 minutes compared to those less than 30 minutes there was 6 times the risk of PPH." [3] In the Magann et.al. study, women were routinely given a shot of IM Pitocin as the shoulder of the newborn delivered. The study concludes Pitocin is key in preventing PPH even though the data shows delay in the delivery of the placenta to be the key to preventing PPH. [3] The results of the Ohio University Hospital study also showed a delay of a minute or two to be a key factor in PPH. [11]

Except in the rare case of placenta accreta, the placenta detaches within a minute of the birth as a result of the dramatic change in shape of the uterus as the baby delivers. [12] In current practice, women lay supine in bed with the heavy, flaccid, detached placenta lying on the posterior or dorsal wall of the uterus below the level of the cervix while the wound where the placenta was previously attached, is bleeding into the uterus and the cervix is closing. When the woman is supine, in order to deliver, the detached placenta has an uphill ascent against the forces of gravity. Requiring the placenta to ascend against gravity delays the delivery. Any delay provides additional time for the wound to bleed as well as additional time for the cervix to close. A closing cervix creates the need to squeeze the placenta through a narrower passage, sometimes leaving bits behind resulting in PPH due to retained placenta. Delivering the placenta at 3 minutes after birth in squatting, uses expedience, gravity, the downward force of the diaphragm and the

abdominal muscles to deliver the placenta completely and before uterine atony or placental retention can cause excess bleeding. [13-16] The woman gets into squatting at 3 minutes after the birth and the practitioner reminds her to push out the placenta without waiting for the sensation of a uterine contraction. There is no reason not to cut the cord unless the newborn is not breathing and requires resuscitation. By 1 minute after birth, the placenta has detached from the uterus and newborn cord/placental circulation has been shunted to the lungs. However, where there is objection to cutting the cord at 3 minutes, the woman can squat and deliver the placenta with the cord attached to the newborn. Once the complete placenta is delivered, the uterus contracts thereby closing off uterine blood vessels that previously fed the placenta, preventing uterine atony, the cause of the majority of PPH. The protocol can be carried out in any setting, requiring no equipment other than a way to accurately time 3 minutes, such as a digital watch. It is likely that less bleeding would occur if the woman squatted BEFORE 3 minutes but in general, women appreciate three minutes to recover from the birth of the baby.

The objective of this retrospective cohort study was to compare the efficacy of Judy's 3,4,5 minute third stage algorithm to variations of active and expectant third stage management among similar homebirth populations during the same time period.

## Methodology

Two populations with identical participant selection criteria, similar labor management, and different third stage management were compared. Both groups consist of women planning attended homebirths in countries with free, socialized medicine, with midwives who are similarly trained to limit medical interventions in labor.

The study group was all births attended from Jan. 1, 2000- Dec. 31, 2020 by the All The Way Home Birth Service serving the Jewish population in Israel, a population of approximately 5 million. All midwives working for All The Way Home Birth Service are formally trained and licensed. All The Way Home birth practice provides free homebirth to any qualified woman who cannot afford the generally affordable fee. Each birth outcome was recorded in a patient record and an Excel spreadsheet immediately following the birth. The criteria for inclusion in the study were: Singleton fetus; cephalic presentation; gestational age greater than 36 and less than 41 completed weeks of pregnancy; spontaneous onset of labor; history of up to one previous cesarean; absence of significant pre-existing disease including heart disease, hypertensive chronic renal disease or type 1 diabetes; absence of significant disease arising during pregnancy including pregnancy-induced hypertension with proteinuria (> 0.3 g/L by urine dipstick), antepartum hemorrhage after 20 weeks' gestation, gestational diabetes requiring insulin, active genital herpes, placenta previa or placental abruption. All participants gave written informed consent to deliver the placenta using Judy's 3,4,5 minute algorithm and to have their outcomes anonymously published. The study group's third stage was managed by cutting the cord exactly 3 minutes after the birth if the woman consents to it, pushing out the placenta in squatting at 3 minutes; getting into bed by 4 minutes and checking the abdomen to make sure the uterus is contracted at 5 minutes and to massage it to

contract if it is not. A 0.125 mg pill of Methergine was given orally at 10 minutes postpartum to women who had lost 250 cc by 10 minutes postpartum.

The first 500 births were delivered on plastic sheets without absorbent pads, measuring blood loss with a measuring cup. Clots of blood were collected, formed into a ball and blood loss calculated according to the diameter of the ball: 3 cm diameter round clot = 15 cc blood loss, 4 cm = 33 cc; 5 cm = 65 cc blood loss; 6 cm = 113 cc, 7 cm = 180cc; 8 cm diameter ball = 270 cc blood loss; 9 cm= 380 cc; 10 cm = 523 cc; 12 cm = 900 cc blood loss. Both PPH over 500 cc and over 1000cc were documented.

Janssen et. al. 2009 was selected as the control group because it reports the lowest PPH rate among the high quality homebirth studies. [17,18] Janssen et.al. 2009 most closely matches the study group in time period, Jan. 1, 2000, to Dec. 31, 2004, population, and birth management and most importantly, had identical inclusion criteria to the study group. British Columbia, a province of Canada, had a population of 4.4 million at the time of the study. Like Israel, midwifery care is accessible to all women in the province who meet the standards for low obstetric risk. The midwives in British Columbia use variations and combinations of active and expectant management. [19] Their database defines PPH as  $\geq 1000$  mL blood loss. [20]

The primary outcome measure was the rate of postpartum hemorrhage over 1000 cc. Secondary outcome measure was manual removal of placenta. Statistical analysis: RR was determined for PPH. Formal ethical approval of this research was received from the Hadassah Medical Organization Helsinki Committee Institutional Review Board on April 14, 2014.

## Results

During the study period, 2,899 women attended by a registered midwife began labour with the intention of giving birth at home in British Columbia and 2,691 did so, using currently accepted third stage management; 1,098 women attended by a registered midwife began labor with the intention of giving birth at home in Israel of which 1,093 births did so using the 3,4,5 third stage protocol.

Parameters of control group vs study group

Maternal age

Control group / Study group

15-19 2% / 0.4%

20-24 12% / 6%

25-29 31% / 30%

30-34 35% / 39%

≥ 35 21% / 24%

Single Parent 3% / 3%

Average BMI 22.8 / 22.4

Illicit Drug Use during Pregnancy : 1% / 0.4%

Smoking during Pregnancy: 6% / 0.2%

Vaginal Birth 93% / 99%

Nulliparous 42% / 26%

Multiparous: 58% / P1-5: 51%

GrandMultiparous: P6-12: N/A / 23%

Medical Induction : 0 / 0

Augmentation of Labor 24% / 20%

Amniotomy 19% / 5%

Uterotonic postpartum 6% / 5%

Epidural 8% / 0%

Narcotic 4% / 50% (one of the following: one Percocet 5 mg, one Rokacet, or 5 mg Codeine PO (orally))

Vaginal 90% / 99.5%

Assisted 3% / 0.1%

Cesarean 7% / 0.3%

Episiotomy among vaginal deliveries 3% / 0

First or second degree tear 44% / 3%

Third or Fourth degree tear 1% / 0%

Cervical tear 0.1% / 0.1%

Blood Transfusions 2/2899 1/1098

Obstetric shock 1/2899 0/1098

Manual Removal of Placenta (28/2899) 1% / (8/1093) 0.7%

Variations of active and expectant third stage protocols resulted in 4% (110/2899) PPH over 1000 cc in the first two hours. The 345 protocol resulted in zero PPH > 1000 cc in the first two hours. The 3,4,5 minute third stage protocol resulted in blood losses of an average of 100 cc in the first hour; one PPH = 800 cc in the first hour of a grandmultiparous woman who's birth followed shortly after the violent murder of her brother. After the birth of the placenta, she screamed uncontrollably and continuously that she wished she was dead. This made it appear that PPH was psychological in origin. The other PPH was 500 cc, a late PPH starting 5 hours after birth in a 26 year old, P3, 41+1, after 16 hour labor, 3600 gm baby, hemoglobin = 8.0 at the start of labor. She received one unit of blood. No negative side effects of third stage squatting protocol were observed among 1,093 vaginal births. The RR of PPH using active/expectant third stage vs. expedient squatting = 20.

## Discussion

The 345 is logical, has been tried on a large sample and is proven to reduce PPH as well as average blood loss. In the study population, Judy's 3,4,5 third stage protocol decreased average postpartum bleeding in the first hour from 500 cc to 100 cc; decreased PPH over 1000 cc from 4% to 0%; and did so without negative side effects or financial expense. No other protocol has reported an average blood loss of less than 500 cc in the first hour and 0% postpartum hemorrhage over 1000 cc. [21] Without exception, all other low risk populations report higher PPH rates: 4.4% PPH over 1000 cc. [19] 4.6% PPH over 1000 cc. [22] 9.3% over 500 cc. [23] and 11.7% PPH over 500 cc. [24] The two largest high quality homebirth studies: Birthplace and DeJonge et.al. did not document PPH rates at all. [25,26] Large hospital studies looking at multiple sites and reporting on tens of thousands of vaginal births, continue to report 5% PPH at vaginal birth. [4]

In the study group, 20% of labors were augmented with bilateral nipple massage which results in oxytocin receptor stimulation, the goal of IV Pitocin. The lack of use of IV Pitocin in the study group to augment labor is unlikely to explain a 0% PPH because prior to the the synthesis and use of Pitocin starting in 1953, the PPH rate was also 5% [2] and PPH rates in the absence of Pitocin augmentation in hospital are currently 4%. [4] Theories extrapolated from in vitro studies suggest that Pitocin augmentation in labor causes PPH because it attenuates oxytocin-induced contractility of human myometrium. [27-29] A theory for how Pitocin continuously augments uterine contractions in labor, yet immediately after birth the receptors that were sensitive to Pitocin become insensitive to Pitocin, is lacking. The association of Pitocin augmentation with PPH is more likely due to an increased delay in delivery of the placenta at births augmented with Pitocin, perhaps due to a feeling that the freely flowing Pitocin will protect the woman from PPH.

The published association between longer duration of the second stage as causing increased PPH also lacks a logical theory because indeed, during long second stages, the uterus continues effectively contracting until the fetus emerges and no reason has been provided for why it should not contract afterwards. [30] Long second stages are usually a result of a large fetus or an anesthetized or

unmotivated woman. Where women push for 15, 17 and even 22 hours, no increase in PPH was observed as long as the placenta is delivered within 5 minutes of the birth. [31]

A likely critique by practitioners who have never tried the 345, is that the study group midwives are underreporting excess postpartum bleeding and PPH. Underreporting of PPH is suspected even in the highest quality studies. [1] The best definition of PPH is a larger than 20 g/L drop in Hgb level compared to the level before the birth but this requires documentation of routine and reliable blood testing before and after the birth. Erickson et al. suggests it is reasonable to use the term PPH for both PPH over 500 cc and those over 1000 cc since it is very challenging to distinguish between them. [4- page 610] Indeed, both 600 cc and 1050 cc of blood cover an entire 60X90 pad. Therefore indeed it is agreed that it is difficult, if not impossible to distinguish between 500 cc and 1000 cc blood loss combined as it always is with amniotic fluid on a 60 by 90 pad. However, it is impossible to confuse 100 cc blood loss with blood loss of 500 cc at birth. Blood loss of 100 cc in the first hour typically means one tablespoon attached to the placenta, another 35 cc on the 60x90 pad she gives birth on, and 4 tablespoons or 50 cc seen one hour after birth on the pad used starting from 5 minutes after birth when she got into bed.

The study group had fewer nulliparas: 26% vs. 44%. Nulliparity is associated with higher rates of PPH. [4] The difference in nulliparity rates could account for a slightly lower PPH rate in the study group but not a 20 times smaller rate. On the other hand, although the control group did not report grandmultiparity, it is likely the study group had a higher rate of grandmultiparity, as the fertility rate in Israel is higher than in British Columbia. Grandmultiparity is associated with higher rates of PPH. [4] No increase in PPH was found among grandmultiparas when Judy's 3,4,5 was used. The findings suggest the associations with PPH pinned on nulliparity or grandmultiparity disappear when the placenta is delivered at 3 minutes.

Except for exceptional cases, women appear not to experience PPH where the placenta is delivered in squatting expediently. Women prefer for the placenta to deliver effortlessly while they sit in bed, however where it is explained that laying in bed results in 5% PPH of over a liter of blood, they agree that it is better to expediently squat it out. No mother objected to not holding her baby for the one minute that it takes to deliver the placenta in squatting. Several fathers were raving after the birth about how special it was for them to hold a baby so soon after birth. As practitioners garnered more experience with expedient squatting, less methergine was administered.

## **Conclusion**

Evidence supports less postpartum bleeding and postpartum hemorrhage when women deliver the placenta in squatting 3 minutes after birth. Based on documented outcomes and the zero financial cost of trying the protocol, it would be logical for practitioners to try it.

## **Declarations**

Ethics approval and consent to participate- Formal ethical approval of this research was received from the Hadassah Medical Organization Helsinki Committee Institutional Review Board on April 14, 2014. All methods were performed in accordance with guidelines and regulations provided in the ethics approval. All participants gave written consent to participate and have their outcomes published anonymously. Consent for publication- all participants gave written consent for their outcomes to be published anonymously.

Availability of data and materials- The datasets used and analyzed during the current study available from the corresponding author on reasonable request.

available on request.

Competing interests- all authors declare no competing interests.

Funding- all expenses out of pocket, No funding was provided by anyone else.

Authors' contributions- JSC wrote most of the paper. REB did analysis and proofing the paper.

Acknowledgments- thanks to all participants, authors, peer reviewers and editor.

Authors' information (optional)

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