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| Question | |
| **Should uterine massage by lay provider vs. any other first aid intervention by lay provider be used for women experiencing post partum hemorrhage ?** | |
| **Population:** | People with a uterus/women experiencing post-partum hemorrhage |
| **Intervention:** | Manual external uterine massage administered by a lay provider |
| **Comparison:** | Any other first aid intervention to treat PPH, compared with uterine massage; No intervention done to treat PPH, compared with uterine massage |
| **Main outcomes:** | The following is the TF approved outcomes rated into critical/important:   1. Maternal survival (critical) 2. Blood loss (critical) 3. Future fertility 4. Surgical intervention 5. Organ dysfunction 6. Pain 7. Blood transfusion |
| **Setting:** | First aid in any setting, including pre-hospital and in hospital |
| **Perspective:** | As most people giving birth worldwide do not have access to skilled health professionals, first aid interventions accessible to lay providers such as manual external uterine massage, may do substantial good in reducing morbidity and mortality from PPH. |
| **Background:** | Post-partum hemorrhage (PPH) is the leading cause of maternal mortality and morbidity worldwide, particularly in low-income countries with limited resources (WHO 2012, 1). Approximately 14 million women each year experience PPH, resulting in 70,000 maternal deaths globally. Uterine massage is a maneuver which involves massaging and squeezing the lower abdomen of someone experiencing PPH to help stimulate uterine contractions and reduce hemorrhage (Hofmeyr2013, CD006431). Many systematic reviews and international guidelines recommend external uterine massage as a part of active management of the third stage of labour for the prevention and management of PPH (Saccone 2018, 778; Escobar 2022, 3; Giouleka 2022, 665; Hofmeyr 2013, CD006431; Likis 2015, 1; Prata 2013, 737; Tuncalp 2013, 254; Weeks 2015, 202). Given that attendants at most births worldwide may be considered lay or first aid providers (Bazirete 2020, 66), and that external uterine massage is a simple, inexpensive maneuver akin to many manual interventions taught to first aid providers, uterine massage presents an intervention for PPH appropriate for many low-resource settings served solely by lay birth attendants. Therefore, this systematic review focuses on manual external uterine massage as a treatment option for PPH by lay providers |
| **Conflict of interests:** | The following Task Force members and other authors declared an intellectual conflict of interest, and this was acknowledged and managed by the Task Force Chairs and Conflict of Interest committees: Dr. Grethe Heitmann and Dr. Justus Hofmeyr. |

# Assessment

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| Problem Is the problem a priority? | | |
| Judgement | Research evidence | Additional considerations |
| ○ No ○ Probably no ○ Probably yes ● Yes ○ Varies ○ Don't know | Post-partum hemorrhage (PPH) remains the leading cause of maternal mortality and morbidity worldwide, particularly in low resource settings (WHO 2012, 1). There are no ILCOR recommendations for first aid response to PPH, and there is a dearth of research on first aid interventions for PPH in current literatures. | Uterine massage is an inexpensive, easily taught treatment option that many systematic reviews and international guidelines recommend as part of active management of the third stage of labour for the prevention and management of PPH, which may provide a treatment option in low-resource settings with poor access to skilled provider (Saccone 2018, 778; Escobar 2022, 3; Giouleka 2022, 665; Hofmeyr 2013, CD006431; Likis 2015, 1; Prata 2013, 737; Tuncalp 2013, 254; Weeks 2015, 202). |
| Desirable Effects How substantial are the desirable anticipated effects? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Trivial ○ Small ○ Moderate ○ Large ○ Varies ● Don't know | The systematic review search identified 1558 studies for screening, of which 18 were selected for full-text screening. One RCT (Ngichabe 2012, 128) was included.  **Blood loss**  For the critical outcome of blood loss, we identified very-low-certainty evidence (include why downgraded) from one RCT (Ngichabe 2012, 128). In Ngichabe et al., people who recently gave birth were advised to perform self-massage queued by an alarm every 15 minutes for the first 120 minutes after birth. Volume of blood loss was measured by weighing a dry sanitary towel provided to each participant, and was compared between alarm and non-alarm groups. Ngichabe et al. measured average blood loss after two hours of uterine massage with alarm reminders to be 45.6 mL (43-46, 95% CI). In the non-alarm group, they measured the average blood loss after two hours of uterine massage without alarm reminders to be 47.1 mL (43-52, 95% CI). They reported a p-value of 0.892, indicating no statistically significant difference in the average blood loss between groups.  **Blood transfusion**  For the important outcome of blood transfusion, we identified very-low-certainty evidence (include why downgraded) in Ngichabe et al. (2012, 128). Blood transfusion was reported qualitatively in the study. The authors noted that two out of 56 participants in the non-alarm group who were not complying to uterine massage developed excessive bleeding and required transfusion 45 minutes into the study. The study authors reported that the average blood loss of these two patients was 98 mL, and that they required two pints of blood each. No participants in the alarm group required blood transfusion. |  |
| Undesirable Effects How substantial are the undesirable anticipated effects? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Trivial ○ Small ○ Moderate ○ Large ○ Varies ● Don't know | In Ngichabe et al., (2012, 128), there were no reported complications in the alarm group after beginning massage monitoring. |  |
| Certainty of evidence What is the overall certainty of the evidence of effects? | | |
| Judgement | Research evidence | Additional considerations |
| ● Very low ○ Low ○ Moderate ○ High ○ No included studies | The certainty of evidence was interpreted as very low due to the single, lower-quality RCT, with limited and not statistically significant findings concerning the outcomes of interest. |  |
| Values Is there important uncertainty about or variability in how much people value the main outcomes? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Important uncertainty or variability ○ Possibly important uncertainty or variability ○ Probably no important uncertainty or variability ● No important uncertainty or variability | There is no important uncertainty of variability in how much people value the critical outcomes of maternal survival and blood loss, or the important outcomes of future fertility, surgical intervention, organ dysfunction, pain, and blood transfusion. |  |
| Balance of effects Does the balance between desirable and undesirable effects favor the intervention or the comparison? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Favors the comparison ○ Probably favors the comparison ○ Does not favor either the intervention or the comparison ○ Probably favors the intervention ○ Favors the intervention ○ Varies ● Don't know | Due to the uncertainty of evidence, it is difficult to balance the undesirable and desirable effects in favour of the intervention or comparison. | The First Aid Task Force recommends uterine massage (weak recommendation), as it is a simple and safe physical maneuver, equivalent to other physical interventions routinely taught to first aid providers, and since PPH is a major source of morbidity and mortality worldwide, particularly in settings with limited access to skilled health care. As such, the TF places a higher value on uterine massage for lay providers and its possible desirable effects in reducing morbidity and mortality from PPH, balanced against the possible risks. |
| Resources required | | |
| Judgement | Research evidence | Additional considerations |
| ○ Large costs ○ Moderate costs ● Negligible costs and savings ○ Moderate savings ○ Large savings ○ Varies ○ Don't know | No studies examined the cost of manual uterine external massage. | Although the included study by Ngichabe et al. (2012, 128) did not report how participants were taught to perform uterine massage, nor the costs associated with training participants, uterine massage is a simple physical maneuver equivalent to many manual interventions taught to first aid and lay providers. There would be few materials required to train lay providers to perform uterine massage, and the amount of training required to perform this maneuver is minimal. Therefore, the associated costs for training lay providers to perform uterine massage are likely negligible. |
| Certainty of evidence of required resources What is the certainty of the evidence of resource requirements (costs)? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Very low ○ Low ○ Moderate ○ High ● No included studies | As Ngichabe et al. (2012, 128) did not provide details on how they trained participants to perform uterine massage, there is no data for the necessary resources to train lay providers to perform uterine massage. |  |
| Cost effectiveness Does the cost-effectiveness of the intervention favor the intervention or the comparison? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Favors the comparison ○ Probably favors the comparison ○ Does not favor either the intervention or the comparison ● Probably favors the intervention ○ Favors the intervention ○ Varies ○ No included studies | Cost effectiveness was not addressed in the included study. | External uterine massage has no direct cost, so it probably favours the intervention. |
| Equity What would be the impact on health equity? | | |
| Judgement | Research evidence | Additional considerations |
| ○ Reduced ○ Probably reduced ○ Probably no impact ● Probably increased ○ Increased ○ Varies ○ Don't know | Very few of the characteristics listed in the Cochrane checklist for equity, PROGRESS-Plus, were reported in the included study. It was noted that despite the various education levels of participants, no difficulty learning or performing uterine massage was reported, indicating that uterine massage may be an accessible intervention for people of many education levels. | PPH is a condition that results in maternal morbidity and mortality, increasing health inequities for women and dependent children. Improved care and prevention for PPH can therefore improve health equity. PPH also disproportionately affects people giving birth in lower-resource settings, so improved first aid management of PPH may therefore improve health equity.  Additionally, the simplicity and ease of the maneuver suggests that uterine massage taught to lay providers may be particularly useful in low-resource settings, where people giving birth often do not have access to a skilled health provider. |
| Acceptability Is the intervention acceptable to key stakeholders? | | |
| Judgement | Research evidence | Additional considerations |
| ○ No ○ Probably no ● Probably yes ○ Yes ○ Varies ○ Don't know | The included study did not address acceptability to key stakeholders. However, the included study measured compliance to a protocol of self-administered uterine massage, resulting in 67% compliance at 120 minutes in the intervention group versus 9% compliance in the control group (p-value <0.0001). This high level of compliance in the intervention group demonstrates the acceptability of the intervention to the participants. | Due to the various reviews and guidelines which recommend external uterine massage as part of active management of the third stage of labour of the prevention and management of PPH (Saccone 2018, 778; Escobar 2022, 3; Giouleka 2022, 665; Hofmeyr 2013, CD006431; Likis 2015, 1; Prata 2013, 737; Tuncalp 2013, 254; Weeks 2015, 202), it is very likely that this intervention is acceptable to stakeholders. |
| Feasibility Is the intervention feasible to implement? | | |
| Judgement | Research evidence | Additional considerations |
| ○ No ○ Probably no ● Probably yes ○ Yes ○ Varies ○ Don't know | The included study reported no participant difficult in learning or performing uterine massage. Additionally, the included study measured compliance to a protocol of self-administered uterine massage, resulting in 67% compliance at 120 minutes in the intervention group versus 9% compliance in the control group (p-value <0.0001). This high level of compliance in the intervention group demonstrates the feasibility of the intervention. | Given the simplicity of uterine massage, it is likely feasible to implement as a part of first aid curricula. |

# Summary of judgements

|  | **Judgement** | | | | | | |
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| **Problem** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |
| **Desirable Effects** | Trivial | Small | Moderate | Large |  | Varies | **Don't know** |
| **Undesirable Effects** | Trivial | Small | Moderate | Large |  | Varies | **Don't know** |
| **Certainty of evidence** | **Very low** | Low | Moderate | High |  |  | No included studies |
| **Values** | Important uncertainty or variability | Possibly important uncertainty or variability | Probably no important uncertainty or variability | **No important uncertainty or variability** |  |  |  |
| **Balance of effects** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | **Don't know** |
| **Resources required** | Large costs | Moderate costs | **Negligible costs and savings** | Moderate savings | Large savings | Varies | Don't know |
| **Certainty of evidence of required resources** | Very low | Low | Moderate | High |  |  | **No included studies** |
| **Cost effectiveness** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | **No included studies** |
| **Equity** | Reduced | Probably reduced | Probably no impact | **Probably increased** | Increased | Varies | Don't know |
| **Acceptability** | No | Probably no | **Probably yes** | Yes |  | Varies | Don't know |
| **Feasibility** | No | Probably no | **Probably yes** | Yes |  | Varies | Don't know |

# Type of recommendation

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| Strong recommendation against the intervention | Conditional recommendation against the intervention | Conditional recommendation for either the intervention or the comparison | **Conditional recommendation for the intervention** | Strong recommendation for the intervention |
| ○ | ○ | ○ | **●** | ○ |

# Conclusions

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| Recommendation |
| We suggest external uterine massage, including self-massage, in the immediate postpartum period (I) in comparison with no intervention (c) to prevent postpartum hemorrhage, which can lead to maternal death (weak recommendation, very low certainty of evidence).  **Technical remarks:** In the sole included study (Ngichabe 2012, 128), people who recently gave birth were advised to perform self-massage queued by an alarm every 15 minutes for the first 120 minutes after birth. The details of how participants were taught to perform the external uterine massage was not reported. This study occurred in an in-hospital setting.  The immediate postpartum period, or fourth stage of labour, refers to the first three hours after birth. |
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| Justification |
| This topic was prioritized by the FA Task Force based on the observation that (a) many systematic reviews and international guidelines recommend external uterine massage as a part of active management of the third stage of labour for the prevention and management of PPH (Saccone 2018, 778; Escobar 2022, 3; Giouleka 2022, 665; Hofmeyr 2013, CD006431; Likis 2015, 1; Prata 2013, 737; Tuncalp 2013, 254; Weeks 2015, 202), (b) external uterine massage is a simple and safe physical maneuver equivalent to many manual interventions taught to first aid and lay providers, (c) that PPH is a major cause of global morbidity and mortality and gender-based health inequity, (d) that attendants at most births worldwide have limited professional health education and may be considered lay or first aid providers (Bazirete 2020, 66), (e) that intrapartum and postnatal care has traditionally been omitted from the first aid corpus, and that (f) first aid interventions designed to serve low-resource settings and particularly people giving birth in these settings may therefore do substantial good by reducing morbidity and mortality.  In making this recommendation, the FA Task force considered:  • That external uterine massage is a ubiquitous standard for professional birth attendants and first responders for the prevention and management of PPH.  • That external uterine massage is a simple and safe physical maneuver, equivalent to other physical interventions routinely taught to first aid providers (e.g.: moving a patient, splinting an injured limb, applying direct pressure or a tourniquet to a bleeding wound).  • That PPH is a major source of global morbidity and mortality, especially in settings with limited or no access to professional healthcare providers, professional prehospital care, hospital care, or professional birth attendants. Therefore, recommendations that limit external uterine massage to professionalized contexts would potentially compound health inequities.  • We considered that first aid includes self-management for the prevention and treatment of time-sensitive conditions.  • In making a weak recommendation, we considered that only a single RCT was identified where postnatal patients were taught to administer self-external uterine massage and that the study did not demonstrate a statistically significant reduction in the volume of postpartum hemorrhage or transfusion. It did however demonstrate that external uterine massage can be taught to lay providers.  • We also considered that the only available study involving lay providers occurred in hospital. |

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| Subgroup considerations |
| We initially considered conducting subgroup analyses based on location, and comparing interventions which occurred in low-income and middle-income countries to those which occurred in high-income countries. However, as we only identified one study, this was not possible. |
| Implementation considerations |
| See above |

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| Monitoring and evaluation |
| See above |
| Research priorities |
| * There were a few excluded studies which reported on manual uterine external massage done by trained health professionals, extrapolating that it could be an effective intervention for lay provider use. As such, more studies with robust methodology examining lay provider use of manual uterine external massage, particularly in out of hospital settings, are needed. * More studies examining non-self lay providers, such as traditional birth attendants, are needed. * Pressure/firmness of the uterine massage may affect the effectiveness of the intervention, the included study could not measure or regulate the strength/firmness of the uterine massage by study participants, and did not describe if or how this was controlled or taught. * As primary PPH can occur up to 24 hours after the birth of a baby, it is possible that symptoms of PPH occurred after the intervention, as patients in the included study were only monitored for 120 minutes, and did not receive follow-up. * Aspects of equity were not well reported in the included study, and may affect the care received by people experiencing PPH. |

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