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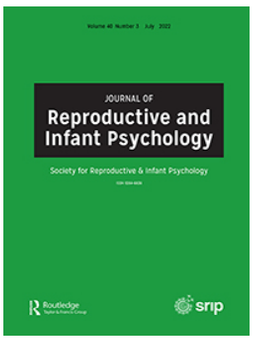

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Psychological flexibility, birth satisfaction and postnatal trauma symptoms in women with abnormally invasive placenta

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ABSTRACT

Background: Abnormally Invasive Placenta is an obstetric condition resulting in significant physical complications and shown to increase the likelihood of developing Post Traumatic Stress Disorder. Dissatisfaction with the care experienced increases the likelihood of Post Traumatic Stress Disorder. Psychological flexibility has been shown to reduce the severity of Post Traumatic Stress Disorder, but there is no research regarding either of these in women with Abnormally Invasive Placenta.

Aim: To investigate if there is a relationship between trauma experience in women with a diagnosis of Abnormally Invasive Placenta, psychological flexibility, and birth satisfaction.

Method: Using a retrospective questionnaire, 126 participants age range 18–45, comprising the Birth Satisfaction Scale Revised Indicator (BSS-RI), Impact of Events Scale Revised (IES-R) and Acceptance and Action Questionnaire (AAQ-2) was completed. A hierarchical regression assessed the predictive relationship of Psychological Flexibility and Birth Satisfaction on Trauma symptoms

Results: The relationship between Birth Satisfaction measured using the BSS-RI and likelihood of Post Traumatic Stress Disorder (IES-R) was not supported ($r(124) = -.08$, $p = .36$). Results did show that Psychological Flexibility (AAQ-2) correlated with Trauma Score (IES-R) ($r(124) = .68$, $p < .001$) in women who had experienced Abnormally Invasive Placenta and explained 45.3% of the variance.

Conclusion: The results suggest that Post Traumatic Stress Disorder in those with Abnormally Invasive Placenta is as high as 1 in 2 and can be mediated by psychological flexibility. In turn, this suggests that interventions to increase Psychological Flexibility in those with the diagnosis may reduce trauma symptom severity.

Abbreviations: AAQ-2 - Acceptance and Action QuestionnaireAIP - Abnormally Invasive PlacentaBAME – Black Asian or other Minority EthnicitiesBSS-RI Birth Satisfaction Scale Revised IndicatorEPH – EPH Gestosis (Pre eclampsia/Eclampsia)DSM – Diagnostic Statical ManualIES-R - Impact of Events Scale RevisedPAS - Placenta Accreta SpectrumPTSD – Post Traumatic Stress Disorder

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Introduction

Abnormally Invasive Placenta (AIP), otherwise known as Placenta Accreta Spectrum (PAS), is a rare but increasingly common obstetric condition, defined in the literature as the deep trophoblast penetration of part or all the placenta into the myometrium of the uterine wall (Usta et al., 2005). The diagnosis is associated with post-partum PTSD and increased mortality (Matsubara et al., 2019; Tol et al., 2019), and includes the subtypes of placenta accreta, increta and percreta (Alhubaishi, 2019). AIP is a high-risk obstetric condition affecting approximately 1–3 in every 10,000 births in Europe with higher occurrence suggested in the USA (Alhubaishi, 2019; Thurn et al., 2016). Risk factors include prior Caesarean delivery, the number of which have increased in developed nations and are likely to increase further (J. A. Martin et al., 2014; Guleria et al., 2013; Silver et al., 2006), maternal age greater than 35 years, previous uterine scar or surgery, recurrent miscarriage, infertility treatment and previous curettage (Palacios-Jaraquemada, 2013). Post-partum haemorrhage during delivery is common with AIP (Hudon et al., 1998) and it is the main cause of Emergency Postpartum Hysterectomy (Machado et al., 2011; Shellhaas et al., 2009). A diagnosis of AIP is rare, requires significant intervention, intensive care unit admission and is linked to longer term negative psychological outcomes (Crocetto et al., 2022; Warshak et al., 2010)

The complex physical characteristics of AIP results in high and not easily altered risk to life, greater risk of psychological harm and subsequently greater risk of developing PTSD (Ballard et al., 1995; Tol et al., 2019). Broader research into the development of PTSD from childbirth suggests that factors such as individual predispositions, negative appraisal, and subjective dissatisfaction with the professional care provided, are as important in the development of trauma symptomology as severity of the trauma or in the case of AIP the complexity of the obstetric condition (Dikmen-Yildiz et al., 2017; Goodman et al., 2004; Harris & Ayers, 2012; Harvey et al., 2002; Sawyer et al., 2013; Waldenström et al., 2004). Research has shown that the psychological effects of AIP on women can be evaluated using an individual's negative appraisal and a measure of birth satisfaction along with perceived level of support (C. R. Martin et al., 2017; Sawyer et al., 2013). Studies have previously shown that levels of subjective satisfaction are correlated with increased risk of developing PTSD (Patterson et al., 2019). Identifying individual modifying characteristics in the development of PTSD in AIP population is important to provide effectual evidence-based prevention or treatment.

Psychological flexibility can be defined as the ability to adapt to changing events by accepting and experiencing fully the associated thoughts and feelings (Levin et al., 2012). It has been shown to alleviate PTSD symptoms in other populations

(Ben-Zion et al., 2019; Meyer et al., 2019; Reddy et al., 2011). The mechanisms through which Psychological Flexibility mitigates the negative effects of trauma are focused on achieving valued living despite distress (Bryan et al., 2015). The targeting of negative appraisal in Psychological Flexibility interventions, is not to change them rather not to allow them to interfere with value-orientated action to achieve goals.

There is currently a lack of research specifically in women who experience AIP. In particular, in understanding possible intervening psychological factors that could be helpful in reducing trauma in this group of women. This study aims to address Psychological Flexibility and Birth Satisfaction and how this may impact on self reported measures of trauma symptoms. This study will therefore examine the relationship between individual

Psychological Flexibility and Birth Trauma in women with previous diagnoses of AIP measured postnatally. Additionally, it will investigate if self-reported Birth Satisfaction and Psychological Flexibility will significantly predict increased Birth Trauma.

We hypothesise that in a population of women with AIP those with greater psychological flexibility scores will have lower birth trauma scores. We also hypothesise that birth trauma scores will be related to birth satisfaction scores.

Method

Design

A correlational design investigating birth satisfaction, psychological flexibility and trauma symptoms of women who had a diagnosis of AIP was employed. Extraneous variables were recorded these included age, ethnicity, previous experience of trauma defined as a diagnosis from a medical professional (yes/no), a previous or current diagnosis of PTSD, whether the AIP resulted in Emergency Postpartum Hysterectomy (yes/no) and previous caesarean section.

Participants

One hundred and thirty-two female participants were recruited internationally through online support communities for AIP, co-ordinated by the National Accreta Foundation. Recruiting through an international support community allowed us to sample as broadly as possible from the AIP population. For inclusion, women were required to have had the specific diagnosis of Placenta Accreta, Increta or Percreta, diagnosed either antenatally or postnatally. All participants were between the ages of 18 and 45 and able to provide informed consent. Participant data was excluded if the data sets were incomplete. Of the 126 complete data sets utilised in the final analysis, 115 were from participants who identified as White, inclusive of the subcategories of White-British, White Australian, White-United States, White-European and White-Jewish. Five identified as Hispanic, two as Mixed Race, two as Asian and one as Black.

Materials

The questionnaire consisted of an introduction in the form of participant information, an informed consent check box followed by the validated Birth Satisfaction Survey Revised Indicator (BSS-RI; C. R. Martin et al., 2017). The Birth Satisfaction Scale Revised Indicator (C. R. Martin et al., 2017) captured participants experience of the care provided and their experience of the birth and labour. The measure used a 6 item self-report design using a 3-point Likert scale with a Cronbach's alpha of 0.94. The measure used captured two factors: stress during childbearing and quality of care (C. R. Martin et al., 2017). The scores range from 0 to 12 with higher scores indicating greater satisfaction with the Birth.

The BSS-RI was followed by the validated measure of Psychological Flexibility, The Acceptance and Action Questionnaire (AAQ-2; Bond et al., 2011). The Acceptance and Action Questionnaire (AAQ-2) is used as a measure of psychological flexibility. Utilising a 7-item self-report and a 7-point Likert scale with a Cronbach's alpha of 0.84. Higher total scores indicate less flexibility and lower scores more flexibility

Following this, the validated PTSD screening measure the Impact of Events Scale – Revised (IES-R; Brown, & Hyer, 2008). The IES – R is a validated measure utilised to screen for PTSD. It can indicate the likelihood that a participant may be suffering from PTSD if assessed formally by a clinician. This measure uses a 22-item self-report with a 5-point Likert scale. Scores above 33 suggest a high likelihood of PTSD, between 24 and 32 suggest that there may be some likelihood and below 24 indicate a lower likelihood that PTSD is clinically present. The IES-R was chosen to provide comparable results to previous research into abnormally invasive placenta and trauma (Tol et al., 2019). Additional questions and demographics were included at the end of the questionnaire.

The Questionnaire was delivered online through the PsyToolKit (Stoet, 2017).

Participants were advised of their right to withdraw their completed responses up to 48 h after completion. Data was collected anonymously. Participants were informed that individual feedback from the questionnaire would not be provided.

The study was undertaken following ethical approval from The University of the West of Scotland Education and Social Sciences Ethics review Committee, Approval Number 2020–12,058-10,333.

Procedure

Participants were asked to complete the combined questionnaire distributed through the National Accreta Foundation home page and the Facebook Accreta Survivor Support Groups. The questionnaire was ordered with the BSS-RI, then AAQ-2 and then the IES-R. At the end of the survey, participants then completed a demographics section including questions relating to the additional variables.

Analysis

To determine whether Psychological Flexibility Score (AAQ-2) Previous diagnosis of AIP, fertility loss defined by post-partum hysterectomy and previous trauma, defined by a diagnosis from a medical professional, predict trauma scores (IES-R), in participants with a diagnosis of AIP a five-stage hierarchical regression was carried out using Statistical Package for the Social Sciences V25 (IBM SPSS 25). Prior to carrying out a hierarchical multiple regression, the assumptions of linear regression were tested. The sample size of 126 was adequate for the analysis of five independent predictor variables (Tabachnick & Fidell, 2001). The predicted probability (p. -P) plot determined that the residuals were normally distributed. The data was also confirmed as homoscedastic through the plotting of the predicted values and residuals on a scatterplot. The check for multicollinearity showed all VIF values = <1.41, meeting the standard of less than 10. The correlations were then examined (see, Table 2.) finding that the independent variables were not highly correlated. The multicollinearity assumption was considered to have been met. The Mahalanobis distance probability scores revealed six multivariate outliers of less than .001. These were removed prior to running the inferential analysis.

A hierarchical regression was employed to account for the possibility that the variables of interest being entered into the model cannot be considered truly independent of each other. The order in which the variables were entered into the model were defined by the

intercorrelations and were entered into the model in the following order: T1 Psychological Flexibility, T2 Birth Satisfaction Total Score, T3 Previous Diagnosis of AIP, T4 Fertility Loss and T5 Previous Trauma (see Table 3). Results

The descriptive statistics reported in Table 1 show the mean score for Trauma in this population is greater than 33. Based upon the IES-R scoring, a score of 33 or greater in individual participants suggests a high likelihood of PTSD if participants were to be clinically assessed. 63 or 50% of the participants scored 33 or above in the IES-R with an additional 17 or 13.49% scoring between 24 and 32 which suggests some likelihood of clinical diagnosis of PTSD if assessed. Additionally, the AAQ-2 advises that a score of greater than 24 is indicative of a lower level of psychological flexibility and meets the cut off for other measures of anxiety and depression. Again, the mean score in the AIP sample was slightly higher than 24, indicating that the mean participant score for psychological flexibility was in the less flexible range. The mean score for Birth Satisfaction was below half of the possible total which suggests that the scores tend towards less satisfaction with the birth experience.

Intercorrelations between the variables are reported in Table 2. The results showed a moderate positive correlation between Trauma Score and Psychological Flexibility Score, r (124) = .68, $p < .001$ indicating that the higher the Trauma Score, the less Psychologically Flexible the participant. There was also a moderate positive correlation between Previous Abnormally Invasive Placenta and Fertility Loss, r (124) = .49, $p < .001$ suggesting that participants who have experienced Previous Abnormally Invasive Placenta have an increased likelihood of Fertility Loss. There were weak but significant correlations between Trauma Score and Previous Abnormally Invasive placenta, r (124) = −.19, $p < .05$ and Psychological Flexibility Score and Previous Abnormally Invasive Placenta, r (124) = −.19, $p < .05$ indicating that a previous diagnosis of Abnormally Invasive Placenta increases the likelihood of an increase in Trauma Score and a lower level of Psychological Flexibility. There was, however, no statistically

Table 1. Descriptive statistics.

	N	Mean	Std. Deviation
Trauma score	126	34.28	20.09
PF score	126	24.10	10.74
BSS-RI score	126	4.94	2.76 .45
Previous AIP	126	1.27	.37
Fertility loss	126	1.17	.28
Previous trauma	126	1.91	

Note. *Trauma Score = IES-R score, PF Score = Psychological Flexibility Score, BSS-RI = Birth Satisfaction Score, Previous AIP = Previous Abnormally Invasive Placenta.*

Table 2. Intercorrelations between all variables showing r values and probability denoted by *, ** & ***.

Pearson correlation	Trauma score	PF score	BSS-RI score	Previous AIP	Fertility loss	Previous trauma
Trauma score	1.00	.68***	−.08	−.19*	−.06	−.09
PF score		1.00	.01	−.19*	.04	−.02
BSS-RI score			1.00	−.03	.13	.06
Previous AIP				1.00	.49***	.06
Fertility loss					1.00	.14
Previous trauma						1.00

Note. $N = 126$; *$p < .05$, **$p < .01$, ***$p < .001$.

Table 3. Summary of hierarchical regression analysis for variable predicting trauma.

Variable	β	*t*	*R*	R^2	ΔR^2	F
Step 1	.68	10.22***	.68	.46	.45	104.38
PF score						
Step 2	.68	10.26*** −1.33	.68	.47	.46	53.39
PF score	-.09					
BSS-RI score						
Step 3	.66	9.89*** −1.33	.69	.47	.46	35.96
PF score	-.09	−1.03				
BSS-RI score	-.07					
Previous AIP						
Step 4	.67	9.88*** −1.18	.69	.47	.45	27.01
PF score	-.08	-.56				
BSS-RI score	-.04	-.75				
Previous AIP	-.06					
Fertility loss						
Step 5	.67	9.86*** −1.13	.69	.48	.45	21.83
PF score	-.08					
BSS-RI score						
Previous AIP	−.04	−.57				
Fertility loss	-.05	-.63				
Previous trauma	-.07	-1.02				

Note. $N = 126$; *$p < .05$, **$p < .01$, ***$p < .001$.

significant correlation between Trauma Score and BSS-RI Score, $r\ (124) = -.08$, $p = .36$. The results partially support the hypothesis as Trauma Score and Psychological Flexibility are positively correlated. However, Trauma Score and BSS-RI Score and Psychological Flexibility Score and BSS-RI Score are not significantly correlated.

A five-stage hierarchical multiple regression was carried out to investigate whether Psychological Flexibility and Birth Satisfaction as the main study variables and the additional variables of Previous AIP diagnosis (more than one diagnosis), Fertility Loss and exposure to a Previous Trauma could significantly predict Trauma Score in women who had experienced Abnormally Invasive Placenta variable. Trauma Score was entered in the analysis as the dependent variable. Psychological Flexibility was included at stage one followed by Birth Satisfaction Total Score at stage two, Previous Diagnosis of AIP at stage three, Fertility Loss at stage four and Previous Trauma at stage five.

The analysis revealed that Step one, Psychological Flexibility contributed significantly to the regression model, $F\ (1,124) = 104.38$, $p < .01$) and that this accounted for 45.3% of the variation in Trauma Score in women with previously diagnosed Abnormally Invasive Placenta. The Step two inclusion of BSS-RI Score was significant, $F\ (2,123) = 53.39$, $p < .001$, with the addition explaining 0.8% of the variation, however this was not a significant change in ΔR^2. Adding Step three, previous AIP to the regression model was also significant, $F\ (3,122) = 35.96$, $p < .001$, this addition explained 0.5% of the variation, again not producing a significant change in ΔR^2. Step four saw the inclusion of Fertility Loss again the result was significant, $F\ (4,121) = 27.01$, $p < .001$, accounting for an additional 0.2% of the variation in Trauma score and again not a significant change in ΔR^2. Finally, the addition of Previous Trauma to the regression model explained 0.5% of the variation and whilst significant, $F\ (5,120) = 21.83$, p

< .001 again did not produce a significant change in ΔR^2. Psychological Flexibility was the most significant predictor of Trauma Score uniquely explaining 45.3% of the variation in Trauma Score.

The BSS-RI Total score showed no significant correlations with the variables, additionally it did not add to the predictor model. However, when a paired-samples t-test was conducted on the BSS-RI subscales to compare BSS-RI Quality and BSS-RI Stress during Childbirth there was a significant difference in the scores; BSS-RI Quality (M = 3.22, SD = 1.28) and BSS-RI Stress (M = 1.71, SD = 2.36); t (125) = 6.54, p < .001. This suggests that within the AIP population measured that there was a significantly greater level of satisfaction with the quality of care received despite less satisfaction and increased levels of stress during childbearing.

Discussion

Consistent with the hypothesis, Psychological Flexibility predicted Trauma Score in women who had experienced AIP. Greater psychological flexibility, which has been shown to be adaptable to therapeutic intervention (Richardson & Jost, 2019) is correlated and predictive of Trauma in this population. Suggesting that specific psychological intervention to increase

Psychological Flexibility, either ante or postnatally, may result in Trauma symptom mitigation. The results indicate that those with more flexibility will have less Trauma symptoms and that psychological Flexibility is important in determining outcomes for women with Abnormally Invasive Placenta. This supports previous research findings in other populations that Psychological Flexibility mitigates Trauma symptoms (Meyer et al., 2019; Miron et al., 2015; Richardson & Jost, 2019).

The study results demonstrate a significant relationship between AIP in previous pregnancies with loss of fertility. Given the risk factor of Emergency Postpartum Hysterectomy associated with the condition, logically more than one diagnosis of AIP increases the likelihood of loss of fertility. Loss of fertility, however, was not found to be a significant predictor of Trauma Score. This is supported by the results of Tol et al. (2019) who also found that in women with Abnormally Invasive Placenta, Trauma likelihood was not increased by Loss of Fertility. This is a specific population finding for AIP survivors and does not apply to women in general, where loss of fertility is associated with increased Trauma Score (Jauniaux et al., 2018). This study also found that whilst there was a significant correlation between having experienced more than one diagnosis of AIP and increased Trauma Score, Previous diagnosis was not a significant predictor of Trauma in the model. Finding that loss of fertility and multiple exposure were not significant predictors, may be the result of the inherently traumatising nature of the condition itself, with numerous clinical interventions and threat to life even when fertility is preserved. AIP is a rare and life-threatening diagnosis, meeting the DSM criteria for a trauma event, and with ante-natal diagnosis of the conditions more accurately defined as prolonged traumatic experience. It may also be that previous experience of AIP prepared women with more information and established clearer interventional plans. Whilst not examined in this study, the women who had previous AIP may have had established relationships with their clinical care providers, access to more experienced obstetric care and have more ready access to additional supports such as the online forum groups. Follow-on research

into how those with more than one experience of AIP (multiple trauma exposure) categorised or indexed the trauma may highlight increased severity on the Trauma score (Priebe et al., 2018).

The Birth satisfaction (BSS-RI total score) whilst having a mean score suggesting less satisfaction in the participants with their birth experience overall was not significantly correlated with Trauma score. It is likely that the use of a standardised measure such as the Revised Indicator used in this international and cross-cultural study may have failed to capture the full appraisal of participants' birth experience. Use of the international standard of measuring Birth Satisfaction using the BSS-R, three factor and 10 questions model may improve future research in this area. Particularly, if the measure is adapted to the population. Previous adaptations have changed the spelling to the US version 'Labor' (Barbosa-Leiker et al., 2015); however, for this specific population with planned caesarean section being the norm, many women do not experience being in 'labour' or are not awake for the birth. Future studies for this specific population should consider making these adaptions. An examination of the BSS-RI subscales does highlight that women in the sample rated their quality of care with greater satisfaction when compared to their rating of stress experienced due to childbearing. Suggesting that whilst the experience is traumatising, the quality of care is high. Previous research has also suggested that quality multi-disciplinary care is important as a physical and psychological protective factor (Silver et al., 2015).

The importance of the supportive role of the lead professional in providing information about the condition and the care planning that may be required is identified in this complex condition to reduce the psychological impacts (Alhubaishi, 2019) as is prompt access to mental health care (Tol et al., 2019). Additional support during birth and in postpartum support has been found to potentially reduce PTSD symptomology (Alhubaishi, 2019; Ayers, Bond, Bertullies, & Wijma, 2016). The results of this study suggest that despite ratings of quality of care being high and different to the levels of stress experienced, this did not significantly impact on the Trauma Score. This highlights a need for further research addressing not just postpartum care but also antenatal support that could provide further resilience to the potential for negative outcomes in women with AIP. Recommendations for the management of Abnormally Invasive Placenta include multi-disciplinary care, led by a maternal-foetal medicine specialist, caesarean delivery with prior planned interventions and coordination with oncology, anaesthesiology, haematology, neonatologists, critical care specialists and interventional radiologists (Alhubaishi, 2019; Shamshirsaz et al., 2017). Successful co-ordination of these groups of professionals and appraisal of the care as positive may not offset the potential complications of delivery which can include, postpartum haemorrhage, blood transfusion, Emergency Postpartum Hysterectomy, organ injuries and potentially death. The risk factors associated with the condition make the diagnosis traumatising and in this study quality of care does not mitigate this.

Limitations

Strengths of the results include a relatively large number of participants in what is a rare population. However, it should be noted that self-selection on the part of participants is a potential source of bias in the data. The study design set no limit on time since the birth for participation, to increase sample size, this also has the potential to create bias and therefore should be acknowledged as a further limitation. Further research examining time since birth may impact on the severity of trauma symptoms rated and give insight into the long term

psychological impacts of the diagnosis. There was also no distinction in the data between those diagnosed antenatally and those diagnosed postnatally as this was beyond the scope of the current study, however follow on research may focus on whether antenatal or postnatal diagnosis impacts on Birth Trauma and if interventions to increase Psychological Flexibility are equally effective antenatally or postnatally. The role of quality of care in the analysis supports previous findings of the importance of clear communication and high quality care, yet despite greater care, half of the respondents still met the cut off score for high likelihood of clinically diagnosable PTSD. This in turn suggests that the BSS-RI is ineffective in capturing the birth experience of this specific population. Broader measures may well prove to be more useful given the numerous complications and different pathways that Abnormally Invasive Placenta creates for the birth experience, specifically those diagnosed antenatally. Broader measures may well prove to be more useful given the numerous complications and different pathways that Abnormally Invasive Placenta creates for the birth experience, specifically those diagnosed antenatally. Finally, a further limitation includes the omission of demographic information in the analysis. Whilst beyond the scope of the current study, these variables warrant further investigation in relation to AIP.

The Trauma prevalence rates in the sample studied show a high possibility of clinical diagnosis of PTSD for 50% of respondents with a further 13.49% in the moderate risk grouping supporting the usefulness of the IES-R as a measure capturing trauma symptoms in this population. Therefore, the risk of developing PTSD may be as high as 1 in 2 in this population. It is possible that these results are skewed by the retrospective nature of the study, and recollection bias. There is also a potential limitation of selection bias, with those who have had a more negative birth experience potentially more likely to respond. However, Michelet et al. (2015) also found prevalence rates of PTSD in women who experienced EPH to be 64%. Supporting the prevalence of 1 in 2 in this study and suggesting that it may be a conservative estimation of the population prevalence. It is therefore recommended that all women with AIP whether diagnosed ante or postnatally are screened following delivery for Trauma symptoms. Conclusion

In conclusion, the study provides the first empirical evidence that Psychological Flexibility is predictive of Trauma in women with Abnormally Invasive Placenta. This in turn suggests that increasing psychological flexibility through trauma-informed practice could be seen as a preventative measure for women with a diagnosis of AIP.

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No potential conflict of interest was reported by the authors.

References

Alhubaishi, L. Y. A. (2019). Psychological repercussions of Morbid Adherent Placenta (MAP) patients. *Open Journal of Obstetrics and Gynecology*, *9*(9), 1284–1289. https://doi.org/10.4236/ojog.2019.99124

Ayers, S., Bond, R., Bertullies, S., & Wijma, K. (2016). The aetiology of post-traumatic stress following childbirth: A meta-analysis and theoretical framework. *Psychological Medicine*, *46* (6), 1121–1134. Epub 2016 Feb 16. PMID: 26878223 https://doi.org/10.1017/S0033291715002706

Ballard, C. G., Stanley, A. K., & Brockington, I. F. (1995). Post-traumatic stress disorder (PTSD) after childbirth. *The British Journal of Psychiatry*, *166*(4), 525–528. https://doi.org/10.1192/bjp.166.4.525

Barbosa-Leiker, C., Fleming, S., Hollins Martin, C. J., & Martin, C. R. (2015). Psychometric properties of the birth satisfaction scale-revised for US mothers. *Journal of Reproductive and Infant Psychology*, *33*(5), 504–511. https://doi.org/10.1080/02646838.2015.1024211

Ben-Zion, Z., Fine, N. B., Keynan, N. J., Admon, R., Halpern, P., Liberzon, I., Hendler, T., & Shalev, A. Y. (2019). Neurobehavioral moderators of post-traumatic stress disorder (PTSD) trajectories: Study protocol of a prospective MRI study of recent trauma survivors. *European Journal of Psychotraumatology*, *10*(1), 1683941. https://doi.org/10.1080/20008198.2019.1683941

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., Waltz, T., & Zettle, R. D. (2011). Preliminary psychometric properties of the acceptance and action questionnaire–II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy*, *42*(4), 676–688. https://doi.org/10.1016/j.beth.2011.03.007

Bryan, C. J., Ray-Sannerud, B., & Heron, E. A. (2015). Psychological flexibility as a dimension of resilience for posttraumatic stress, depression, and risk for suicidal ideation among Air Force personnel. *Journal of Contextual Behavioral Science*, *4*(4), 263–268. https://doi.org/10.1016/j.jcbs.2015.10.002

Crocetto, F., Barone, B., Bonito, E., Maggi, M., Caputo, V., Di Girolamo, A., Trama, F., Di Spiezio Sardo, A., & Zizolfi, B. (2022). Psychological impact of abnormally invasive placenta: An underestimated and hidden morbidity. *Journal of Basic and Clinical Physiology and Pharmacology*. https://doi.org/10.1515/jbcpp-2021-0384

Dikmen-Yildiz, P., Ayers, S., & Phillips, L. (2017). Factors associated with post-traumatic stress symptoms (PTSS) 4–6 weeks and 6 months after birth: A longitudinal population based study. *Journal of Affective Disorders*, *221*(15), 238–245. https://doi.org/10.1016/j.jad.2017.06.049

Goodman, P., Mackey, M. C., & Tavakoli, A. S. (2004). Factors related to childbirth satisfaction. *Journal of Advanced Nursing*, *46*(2), 212–219. https://doi.org/10.1111/j.1365-2648.2003.02981.x

Guleria, K., Gupta, B., Agarwal, S., Suneja, A., Vaid, N., & Jain, S. (2013). AIP: Changing trends in diagnosis and management. *Acta Obstetricia Et Gynecologica Scandinavica*, *92*(4), 461–464. https://doi.org/10.1111/aogs.12083

Harris, R., & Ayers, S. (2012). What makes labour and birth traumatic? A survey of intrapartum 'hotspots'. *Psychology & Health*, *27*(10), 1166–1177. https://doi.org/10.1080/08870446.2011.649755

Harvey, S., Rach, D., Stainton, M. C., Jarrell, J., & Brant, R. (2002). Evaluation of satisfaction with midwifery care. *Midwifery*, *18*(4), 260–267. https://doi.org/10.1054/midw.2002.0317

Hudon, L., Belfort, M. A., & Broome, D. R. (1998). Diagnosis and management of placenta percreta: A review. *Obstetrical & Gynecological Survey*, *53*(8), 509–517. https://doi.org/10.1097/00006254-199808000-00024

Hyer, K. P., Brown, M.P.P., & Lisa, M. (2008, November). PhD the Impact of Event Scale – Revised: A quick measure of a patient's response to trauma., AJN. *The American Journal of Nursing*, *108*(11), 60–68.

Jauniaux, E., Chantraine, F., Silver, R. M., & Langhoff-Roos, J. (2018). FIGO placenta accreta diagnosis and management expert consensus panel. FIGO consensus guidelines on placenta accreta spectrum disorders: Epidemiology. *International Journal of Gynecology & Obstetrics*, *140*(3), 265–273. https://doi.org/10.1002/ijgo.12407

Levin, M. E., Hildebrandt, M. J., Lillis, J., & Hayes, S. C. (2012). The impact of treatment components suggested by the PF model: A meta-analysis of laboratory-based component studies. *Behavior Therapy*, *43*(4), 741–756. https://doi.org/10.1016/j.beth.2012.05.003

Machado, C. L., de Azevedo, R. C., Facuri, C. O., Vieira, M. J. N., & Fernandes, A. M. S. (2011). Posttraumatic stress disorder, depression, and hopelessness in women who are victims of sexual violence. *International Journal of Gynecology & Obstetrics*, *113*(1), 5862. https://doi.org/10.1016/j.ijgo.2010.10.016

Martin, J. A., Hamilton, B. E., & Osterman, M. J. (2014). *Births in the United States, 2013 (No. 175)*. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics.

Martin, C. R., Martin, C. H., & Redshaw, M. (2017). The birth satisfaction scale-revised Indicator (BSS-RI). *BMC Pregnancy and Childbirth*, *17*(1), 277. https://doi.org/10.1186/s12884-017-1459-5

Matsubara, S., Takahashi, H., & Takei, Y. (2019). Modified hysterectomy for placenta increta and percreta: Modifications of what? *Archives of Gynecology and Obstetrics*, *299*(6), 1751–1752. https://doi.org/10.1007/s00404-019-05114-y

Meyer, E. C., La Bash, H., DeBeer, B. B., Kimbrel, N. A., Gulliver, S. B., & Morissette, S. B. (2019). Psychological inflexibility predicts PTSD symptom severity in war veterans after accounting for established PTSD risk factors and personality. *Psychological Trauma: Theory, Research, Practice, and Policy*, *11*(4), 383. https://doi.org/10.1037/tra0000358

Michelet, D., Ricbourg, A., Gosme, C., Rossignol, M., Schurando, P., Barranger, E., Mebazaa, A., & Gayat, E. (2015). Emergency hysterectomy for life-threatening postpartum haemorrhage: Risk factors and psychological impact. *Gynécologie Obstétrique & Fertilité*, *43*(12), 773779. https://doi.org/10.1016/j.gyobfe.2015.10.010

Miron, L. R., Sherrill, A. M., & Orcutt, H. K. (2015). Fear of self-compassion and psychological inflexibility interact to predict PTSD symptom severity. *Journal of Contextual Behavioral Science*, *4*(1), 37–41. https://doi.org/10.1016/j.jcbs.2014.10.003

Palacios-Jaraquemada, J. M. (2013). Caesarean section in cases of placenta praevia and accreta. *Best Practice & Research. Clinical Obstetrics & Gynaecology*, *27*(2), 221–232. https://doi.org/10.1016/j.bpobgyn.2012.10.003

Patterson, J., Hollins Martin, C., & Karatzias, T. (2019). PTSD post-childbirth: A systematic review of women's and midwives' subjective experiences of care provider interaction. *Journal of Reproductive and Infant Psychology*, *37*(1), 56–83. https://doi.org/10.1080/02646838.2018.1504285

Priebe, K., Kleindienst, N., Schropp, A., Dyer, A., Krüger-Gottschalk, A., Schmahl, C., Steil, R., & Bohus, M. (2018). Defining the index trauma in post-traumatic stress disorder patients with multiple trauma exposure: Impact on severity scores and treatment effects of using worst single incident versus multiple traumatic events. *European Journal of Psychotraumatology*, *9*(1), 1486124. https://doi.org/10.1080/20008198.2018.1486124

Reddy, M. K., Meis, L. A., Erbes, C. R., Polusny, M. A., & Compton, J. S. (2011). Associations among experiential avoidance, couple adjustment, and interpersonal aggression in returning Iraqi war veterans and their partners. *Journal of Consulting and Clinical Psychology*, *79*(4), 515. https://doi.org/10.1037/a0023929

Richardson, C. M., & Jost, S. A. (2019). PF as a mediator of the association between early life trauma and psychological symptoms. *Personality and Individual Differences*, *141*, 101–106. https://doi.org/10.1016/j.paid.2018.12.029

Sawyer, A., Ayers, S., Abbott, J., Gyte, G., Rabe, H., & Duley, L. (2013). Measures of satisfaction with care during labour and birth: A comparative review. *BMC Pregnancy and Childbirth*, *13*(1), 108. https://doi.org/10.1186/1471-2393-13-108

Shamshirsaz, A. A., Fox, K. A., Erfani, H., Clark, S. L., Salmanian, B., Baker, B. W., Salmanian, B, Baker, B, Coburn, M, Shamshirsaz, A A, Bateni, Z H, Espinoza, J, Nassr, A A, Popek, E J, Hui, S, Teruya, J, Tung, C S, Jones, J A, Rac, M, Dildy, G A, and Belfort, M A, et al. (2017). Multidisciplinary team learning in the management of the morbidly adherent placenta: Outcome improvements over time. *American Journal of Obstetrics and Gynecology*, *216*(6), 612.e1–5. https://doi.org/10.1016/j.ajog.2017.02.016

Shellhaas, C. S., Gilbert, S., Landon, M. B., Varner, M. W., Leveno, K. J., Hauth, J. C., . . . Miodovnik, M. (2009). The frequency and complication rates of hysterectomy accompanying cesarean delivery. *Obstetrics and Gynecology*, *114*(2 Pt 1), 224. https://doi.org/10.1097/AOG.0b013e3181ad9442

Silver, R. M., Landon, M. B., Rouse, D. J., Leveno, K. J., Spong, C. Y., Thom, E. A., . . . Sorokin, Y. (2006). Maternal morbidity associated with multiple repeat cesarean deliveries. *Obstetrics and Gynecology*, *107*(6), 1226–1232. https://doi.org/10.1097/01.AOG.0000219750.79480.84

Silver, R. M., Fox, K. A., Barton, J. R., Abuhamad, A. Z., Simhan, H., Huls, C. K., … Wright, J. D. (2015). Center of excellence for placenta accreta. *American Journal of Obstetrics and Gynecology*, *212*(5), 561–568. https://doi.org/10.1016/j.ajog.2014.11.018

Stoet, G. (2017). PsyToolkit: A novel web-based method for running online questionnaires and reaction-time experiments. *Teaching Psychology*, *44*(1), 24–31. https://doi.org/10.1177/0098628316677643

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th Edn ed.). Allyn and Bacon.

Thurn, L., Lindqvist, P. G., Jakobsson, M., Colmorn, L. B., Klungsoyr, K., Bjarnadóttir, R. I., … Krebs, L. (2016). AIP—prevalence, risk factors and antenatal suspicion: Results from a large population-based pregnancy cohort study in the Nordic countries. *BJOG: An International Journal of Obstetrics & Gynaecology*, *123*(8), 1348–1355. https://doi.org/10.1111/1471-0528.13547

Tol, I. D., Yousif, M., & Collins, S. L. (2019). Post-traumatic stress disorder (PTSD): The psychological sequelae of AIP (AIP). *Placenta*, *81*, 42–45. https://doi.org/10.1016/j.placenta.2019.04.004

Usta, I. M., Hobeika, E. M., Musa, A. A. A., Gabriel, G. E., & Nassar, A. H. (2005). Placenta previa-accreta: Risk factors and complications. *American Journal of Obstetrics and Gynecology*, *193*(3), 1045–1049. https://doi.org/10.1016/j.ajog.2005.06.037

Waldenström, U., Hildingsson, I., Rubertsson, C., & Rådestad, I. (2004). A negative birth experience: Prevalence and risk factors in a national sample. *Birth*, *31*(1), 17–27. https://doi.org/10.1111/j.0730-7659.2004.0270.x

Warshak, C. R. M. D., Ramos, G. A. M. D., Eskander, R. M. D., Benirschke, K. M. D., Saenz, C. C. M. D., Kelly, T. F. M. D., Moore, T. R. M. D., & Resnik, R. M. D. (2010). Effect of predelivery diagnosis in 99 consecutive cases of placenta accreta. *Obstetrics and Gynecology*, *115*(1), 65–69. https://doi.org/10.1097/AOG.0b013e3181c4f12a