PEMPS Study

The Psychological Effects of Miscarriage Prediction Score: A Prospective Study

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CONTENTS

KEY WORDS

- Early pregnancy
- Miscarriage prediction
- Psychological impact
- Patient acceptability
- HADS
- PSWQ
- Randomised controlled trial

LIST OF ABBREVIATIONS

Abbreviation	**Meaning**
AE	Adverse Event
CAG	Confidential Advisory Group
CI	Chief Investigator
CRF	Case Report Form

DMC	Data Monitoring Committee
EPR	Electronic Patient Record
EPU	Early Pregnancy Unit
FHR	Fetal Heart Rate
GAfREC	Governance Arrangement for NHS Research Ethics
GSD	Gestational Sac Diameter
HADS	Hospital Anxiety and Depression Score
HRA	Health Research Authority
ICF	Informed Consent Form
PI	Principal Investigator
PIS	Participant Information Sheet
PSWQ	Penn State Worry Questionnaire
QA	Quality Assurance
QC	Quality Control
REC	Research Ethics Committee
SAE	Serious Adverse Event
SDV	Source Data Verification
SOP	Standard Operating Procedure
TMF	Trial Master File
YSD	Yolk Sac

STUDY SUMMARY

STUDY OVERVIEW	
Full title	The Psychological Effects of Miscarriage Prediction Score: A Prospective Study
Objectives	Primary: Assess psychological effects of the miscarriage prediction model. Secondary: Evaluate patient acceptability.
Type of trial	A randomised, single-site trial in pregnant women with ongoing intrauterine pregnancies <12 weeks.
Trial design and methods	Prospective, non-blinded RCT at a single centre. HADS and PSWQ used to assess psychological impact at baseline and day 7.
Health condition(s) or problem(s) studied	Threatened miscarriage, psychological impact in early pregnancy.
Target sample size	372 participants (186 per arm, adjusted for consent/dropout).
Trial duration per participant:	7 days (from consent to follow-up psychological questionnaire).
Main inclusion/exclusion criteria:	Inclusion: Pregnant women >16 years with ongoing singleton intrauterine pregnancy <12 weeks. Exclusion: Non-English speakers, psychiatric treatment, multiple pregnancies, or planned terminations.
Statistical methodology and analysis:	Non-parametric Wilcoxon Mann-Whitney rank sum test. Powered at 80% to detect difference in psychological outcomes. Sample size estimated based on expected variance in HADS scores.
STUDY TIMELINES	
Study Duration/length	1 year
Expected Start Date	April 2026
End of Study definition and anticipated date	Final follow-up of last enrolled participant.
Key Study milestones	IRAS submission, ethics approval, first participant enrolment, data collection completion.
STORAGE of SAMPLES	
Data collected / Storage	PIA Viewpoint Database (King's College Hospital). Anonymised data stored securely on NHS OneDrive.

1 INTRODUCTION

Early pregnancy loss is common and often causes significant psychological distress.(1,2) Approximately 75% of women presenting with pelvic pain and/or vaginal bleeding in early pregnancy will have an ultrasound scan that shows an ongoing pregnancy with a heartbeat. A previous study at Kings developed a miscarriage prediction model so that we can give women their odds that the pregnancy will be ongoing following that scan, but the impact of predicting early pregnancy outcomes on psychological well-being in this situation remains unclear. This study will assess the short-term psychological impact and acceptability of using a miscarriage prediction model in clinical practice. (3)

2 BACKGROUND AND RATIONALE

EPUs provide care for women experiencing abdominal pain, vaginal bleeding, or seeking reassurance following previous pregnancy loss. These units aim not only to offer accurate diagnosis of early pregnancy outcomes by determining the location and viability of the pregnancy, but also aim to reassure women, provide emotional support, and counsel for possible outcomes. Miscarriage, occurring in 1 in 5 pregnancies, is defined by the Royal College of Obstetricians and Gynaecologists (RCOG) as pregnancy loss before 24 weeks and early pregnancy loss as before 13 weeks. (1,4–6)

Miscarriage Predication Models

In recent years, several miscarriage prediction models have been created to aid in counselling and guide decisions regarding further early pregnancy ultrasound scans. Whilst some of these models have been validated, the understanding of their impact on psychological well-being and patient acceptability is not well understood.

Our retrospective study of 5,427 pregnancies demonstrated that our miscarriage prediction model which included maternal factors (ethnicity, smoking, age, bleeding history) alongside ultrasound markers significantly improved predictive accuracy (AUC = 0.88, CI 0.87–0.80). (7) A strength of this model, is the data for these maternal factors are routinely collected. However, prospective validation is required. Before conducting a large validation study (~1,800 patients), it is crucial to first assess whether the model improves psychological well-being and is acceptable to patients.

Psychological impact of early prediction models

Early pregnancy loss, including miscarriage and ectopic pregnancy, frequently causes profound psychological distress, with around 20% of women reporting moderate depression, 18–32% experiencing anxiety, and 25–39% showing symptoms of post-traumatic stress

disorder (PTSD) within 4–6 weeks of the loss.(8) While these rates typically resolve to baseline levels within a year, the psychological toll in the immediate aftermath can be significant.(8)

Threatened miscarriage, defined as vaginal bleeding with a closed cervix and no fetal loss, is also associated with heightened levels of depression and anxiety.(9) This raises important questions about the role of prediction models in mitigating or exacerbating such distress.

Research on the psychological impact of early pregnancy prediction models remains limited and inconclusive. For example, one prospective randomised controlled study found that progesterone testing significantly reduced anxiety among women with an uncertain early pregnancy diagnosis, with 82% of participants indicating they would opt for the test again.(10) In contrast, a separate single-centre randomised trial found no objective psychological benefit when a viability prediction score was provided to women with an intrauterine pregnancy of uncertain viability, although the majority still perceived it as being helpful.(11)

These conflicting findings underscore the need for further investigation. Our study seeks to address this gap by exploring our miscarriage prediction model psychological impact and acceptability among women whose pregnancies have been shown to be ongoing despite their symptoms.

3 OBJECTIVES

This study aims to evaluate the psychological effects (via HADS & PSWQ scores) and acceptability of the miscarriage prediction model among women attending the EPU.

3.1 Primary Objective

Primary: Assess the psychological effects of using the miscarriage prediction model

3.2 Secondary Objectives

Secondary: Evaluate patient acceptability of the predictive model

4 STUDY DESIGN

Study design

The Null Hypothesis:

Providing individuals with their miscarriage prediction score at the time of assessment has no significant impact on psychological distress, including anxiety, depression (HADS), and worry (PSWQ), compared to those who do not receive their score.

This is a prospective, two-arm, non blinded randomised controlled trial. It is a single-centre study taking place at King's College Hospital, Early Pregnancy Unit.

We will apply to the NHS Research Ethics committee and all the participants will be asked to give written consent.

Methods:

The inclusion criteria for this study include a singleton correctly sited intrauterine pregnancy with a visible fetal heartbeat less than 12 weeks gestational age. The patient should be over the age of 16. Exclusion criteria include multiple pregnancy, patients who intend to terminate their pregnancy, , patients who are being investigated or treated for a psychiatric condition or those who are non-English speaking.

Eligible patients who consent to take part in the study will be given an information leaflet and verbal explanation of the study.

At their appointment, the patients' demographic details, clinical history, ultrasound measurement and images will be documented on a computer database (PIA Foetal Database, Viewpoint Bildverarbei-tung GnbH, Munich, Germany). For the purpose of this study the clinical data collected will include: maternal age, ethnicity, smoking status during pregnancy, parity and indication of presentation.

A transvaginal ultrasound scan will be performed by a Gynaecologists who is specifically trained in early pregnancy ultrasound. The purpose of the transvaginal ultrasound scan includes determining the location of pregnancy, the viability and where appropriate recording of number of embryos. This is done with measurement of CRL, FHR, GSD and YSD. Pregnancy dating is based on CRL of a live embryo. In pregnancies < 7 weeks the greatest length of the embryo is taken as the CRL as crown and rump are not clearly visualised. Beyond 7 weeks, the CRL is measured in sagittal section of the embryo whilst excluding the yolk sac. The fetal heart rate is calculated as beats per minute using the software of the ultrasound machine after measurement with electronic calipers of the distance between two heart waves on a frozen M-mode image. The GSD is calculated as the average of three perpendicular diameter with the calipers placed at the inner edges of the trophoblast. The YSD is calculated as the average of three perpendicular diameter with the calipers placed at the center of the yolk sac wall. This is all part of routine clinical care.

At the end of their appointment, participants will be asked to complete a baseline HADs score. The HADs score is a widely used screening tool used to assess psychological distress, including anxiety and depression in clinic settings. It is a self-rating patient reported outcome measure. Fourteen items are divided equally in two subscales for anxiety (HADS-A) and for depression (HADS-B). The ratings of the 14 items are summed to give a final score ranging from 0 to 42. The HADs score has been used frequently in pregnant populations.

The PSWQ is a 16-item self-report scale which is designed to measure the trait of worry in adults.

The patients will be asked how they would like to be contacted in 7 days to repeat the HADS and PSWQ score. We will enquire if they consent to being contacted via email, telephone or text message.

Women will be randomly allocated to either receive their miscarriage prediction score or to the control group who do not receive any intervention. Randomisation will be carried out by the means of a computer-generated random numbers. To prevent selection bias, allocation will be concealed, and a secure online system (REDCap) will assign patients automatically.

For the patients allocated to intervention, the clinician will then calculate their score but inputting the patient's data on to a excel spreadsheet which will calculate the patient miscarriage prediction score using the following equation:

Y= -2.382+ 0.052 x maternal age (years with decimals) + 0.482 if Afro-Caribbean -0.341 if South Asian + 0.393 if East Asian -0.073 if Mixed ethnic origin+ 0.213 if Parous +0.647 if Smoker -0.165 if Abdominal pain as indication of the scan +0.709 if Vaginal bleeding as indication of the scan + 0.239 if previous miscarriage as indication of the scan -0.226 if previous ectopic pregnancy as indication of the scan -0.241xCRL (mm) -0.036x delta FHR (bpm)-0.178 x delta Gestational sac diameter (mm) +0.633 x delta Yolk sac diameter (mm) -0.005 x (CRL x delta GSD) +0.038 x (CRL x delta YSD) -0.003 (delta FHR x delta GSD) +0.104 x (delta GSD x delta YSD)

The patients randomized to intervention will then receive their score on the same day and could choose to do so either face to face or over the telephone. The General Practitioner will be informed of the patient's participation in the study.

For both groups 7 days after their initial assessment a repeat HADS and PSWQ score will be performed. This will be sent to the patient as previously consented. The patient will be sent two questions about the acceptability of the

1. Did receiving the miscarriage prediction score help you feel more informed and prepared about your pregnancy outcome? *(Yes/No, with an optional text box for further explanation.)*
2. Would you recommend that other women in early pregnancy receive a miscarriage prediction score as part of their care? *(Yes/No, with an optional explanation.)*

The primary outcome will be the difference in HADS and PSWQ at 7 days between cases and controls.

A power calculation was conducted to determine the required sample size for assessing the psychological impact of providing an individual with their miscarriage prediction score at the time of assessment. Given the non-parametric nature of Hospital Anxiety and Depression (HADs) scores, the Wilcoxon Mann-Whitney rank sum test was chosen.

The study was calculated to have 80% power and to detect a probability shift of 0.362 with a 0.05 two-sided significance level. We estimated a 75% acceptance level and 20% dropout rate. Based on these parameters, an initial required sample size was calculated to be 104 participants per group, giving a total of 208 participants. After the adjustments for dropout rates and consent rates, this would equate to 186 participants per group and a total of 372 participants.

5 STUDY SCHEDULE

Screening (Day 0)

- Record demographics and ultrasound findings in the Viewpoint clinical records
- 2D transvaginal ultrasound scan
- Verify eligibility based on inclusion/exclusion criteria.
- Provide information leaflet and verbal explanations
- Obtain and document consent from potential participant on screening consent form.
- Allocate a study number and record the patient's MRN / NHS number in the site file (paper)
- Use of the prediction model to calculate risk of miscarriage (study excel spreadsheet on NHS Onedrive)
- Randomisation into intervention or control group. If intervention, to be given miscarriage prediction score.
- Patients to complete HADS and PSWQ score
- Consent patient how they would like to be contacted for follow up

Repeat testing (Day 7)

- 7 days after initial assessment the patient will be sent follow up HADS, PSWQ score and acceptability questions.
- If patient does not complete score on this day, a reminder will be sent as per patients contact requests.

Table 1: Schedule of Assessments

	Screening	**7 Days**
Visit No	**1**	**2**
Window of flexibility for timing of visits:	+/- 2 days	+/- 2 days
Informed Consent	X	
Medical History	X	
2D TVUS	X	
Eligibility confirmation	X	
HADS/PSWQ Score	X	X
Acceptability Questions		X
Randomisation	X	
Adverse Events Review		X

6 CONSENT

Informed consent will be obtained from all. Participants will be provided with a written Participant Information Sheet (PIS) that explains the study purpose, procedures, potential risks, and benefits in clear, non-technical language. This will be supplemented by a verbal explanation given by a member of the research team, with ample opportunity for the participant to ask questions.

Written consent will be obtained using a study-specific Informed Consent Form (ICF), which will be signed and dated by the participant and the person obtaining consent. A copy of the signed form will be provided to the participant, and the original will be securely filed in the study records.

Consent will be recorded in the participant's clinical notes and in the site file. Only individuals with delegated authority and appropriate GCP training will obtain consent.

This study will include only participants who are able to speak and understand English, as the psychological tools used (HADS and PSWQ) have not been validated in translation and the prediction model requires clear explanation to ensure understanding. Therefore, non-English speakers are excluded. Vulnerable populations, such as those undergoing psychiatric treatment, are also excluded for ethical and clinical reasons.

Participants will be informed that participation is voluntary and that they may withdraw from the study at any time without affecting their standard medical care.

7 ELIGIBILITY CRITERIA

7.1 Inclusion Criteria

In order to be eligible to participate in this study, an individual must meet all of the following criteria:

- Have capacity to understand the study and to provide signed and dated informed consent.
- Willing to comply with all study procedures and be available for the duration of the study including consenting to follow up of the pregnancy outcome by letter, phone or email according to individual preference.
- Age 16 years or over
- Single live ongoing intrauterine pregnancy less than 12 weeks gestation

7.2 Exclusion Criteria

An individual who meets any of the following criteria will be excluded from participation in this study:

- Women with pregnancies of unknown location, ectopic pregnancies or early pregnancy prior to an embryo being seen or an embryo without a heartbeat.
- Multiple pregnancies
- Those undergoing assessment or treatment for a psychological condition by a psychiatrist
- Those who do not speak English or require a translator
- Women who have taken part in another clinical trial in the last 3 months.

8 RECRUITMENT

Eligible participants will be recruited from the Early Pregnancy and Acute Gynaecology Unit at King's College Hospital. Recruitment will occur during routine clinical appointments for women undergoing early pregnancy ultrasound scans.

Recruitment Schedule:
Recruitment is planned to begin in April 2026 and will continue over a 12 month period until the required sample size of 372 participants is achieved.

Identification and Approach:
Patients presenting with a single live intrauterine pregnancy at less than 12 weeks' gestation will be identified by the clinical team as part of routine care. A delegated member of the research team will approach eligible patients after their clinical scan, explain the study, and provide the Participant Information Sheet (PIS).

9 STATISTICAL METHODS

Sample Size Derivation:
The planned sample size was calculated to detect a clinically meaningful difference in psychological distress scores (HADS and PSWQ) between the intervention and control groups. Based on prior studies, a non-parametric Wilcoxon Mann-Whitney rank sum test was selected due to the expected distribution of psychological score data.

Calculation Method:
The study was powered at 80% to detect a probability shift of 0.362 with a two-sided significance level of 0.05. Accounting for a 75% consent rate and 20% attrition, the adjusted total sample size is 372 participants (186 per arm). Statistical support was provided by

internal collaborators, and calculations were cross-verified using standard power analysis tables.

Justification for Design and Analysis Plan:
A randomised controlled trial (RCT) design was selected to allow unbiased assessment of the psychological impact of providing a miscarriage prediction score. The use of validated psychometric tools (HADS and PSWQ) permits a robust and reproducible outcome assessment. Analysis will compare between-group changes in scores from baseline to 7 days post-assessment.

Baseline Data Summary:
Demographic and clinical data, including maternal age, ethnicity, parity, smoking status, and presenting symptoms, will be summarised at baseline using descriptive statistics. Comparability of groups at baseline will be assessed.

10 PATIENT AND PUBLIC INVOLVEMENT (PPI)

During the development phase, informal feedback was gathered from patients who had previously attended the Early Pregnancy Unit (EPU) at King's College Hospital. Their experiences highlighted the importance of understanding psychological outcomes during uncertain early pregnancy scenarios and informed the decision to focus on the emotional impact of miscarriage risk prediction.

Although patients were not formally involved in co-designing the study protocol or selecting outcome measures, the choice of psychological tools (HADS and PSWQ) reflects concerns previously voiced by patients regarding anxiety and uncertainty during early pregnancy care.

Following study completion, a summary of findings will be prepared in lay language and disseminated to participants upon request. There are currently no plans for patients to be involved in data analysis, but PPI will be considered in dissemination strategies and future protocol development based on the study's findings.

11 FUNDING AND SUPPLY OF EQUIPMENT

The study funding has been reviewed by the KCH Research & Innovation Office and deemed sufficient to support the conduct of the study.

The research costs for the study have been supported internally by King's College Hospital NHS Foundation Trust. No external funding body is involved, and no formal funding award has been issued.

There are no external sub-contractors or additional sites involved in this study, and thus no external funding arrangements or third-party support are required.

The primary equipment used in this study includes ultrasound scanners and the PIA Viewpoint Database system, which are part of standard clinical infrastructure in the Early Pregnancy and Acute Gynaecology Unit at King's College Hospital. These tools will be used for routine ultrasound measurements and data collection. No additional equipment is being supplied by external bodies.

12 DATA HANDLING AND MANAGEMENT

Clinical and research data for this study will be initially recorded in the electronic patient record (EPR) and the PIA Viewpoint Database at King's College Hospital. This system forms the source data and includes ultrasound findings and clinical notes recorded during the participant's visit.

Electronic data, including demographic and outcome measures (HADS and PSWQ scores), will be exported in pseudonymised form to a password-protected Microsoft Excel file and stored securely on the NHS OneDrive. Hard copies of consent forms and screening logs will be stored in a locked clinical office at the Early Pregnancy and Acute Gynaecology Unit.

Data will not be transferred to any external institutions. All data handling and analysis will be conducted within the research team at King's College Hospital. Only delegated members of the study team will have access to pseudonymised datasets, and no identifiable data will be shared.

Confidentiality will be strictly maintained in line with NHS information governance standards. All data will be pseudonymised using unique participant study IDs, and no names or NHS numbers will be used in the exported research datasets.

No formal data monitoring committee is required due to the minimal risk, non-interventional nature of the study. The Principal Investigator and Chief Investigator will act as data custodians and will oversee all aspects of data collection, quality control, and storage.

13 PEER AND REGULATORY REVIEW

The study has been peer reviewed in accordance with the requirements outlined by King's College Hospital (KCH) Research & Innovation (R&I) Office.

This study has been peer reviewed within KCH, by an independent and relevant peer reviewer on 15 March 2025. The Sponsor has accepted these reviews as adequate evidence of peer review.

The study will require regulatory approvals from the following bodies, all of which will be obtained prior to study commencement:

- HRA (Health Research Authority)
- REC (Research Ethics Committee)

Approval from the Confidentiality Advisory Group (CAG) is not required, as no identifiable data will be used without consent.

14 ADVERSE EVENTS AND INCIDENT REPORTING

14.1 Definitions of Adverse Events

Term	Definition
Adverse Event (AE)	Any untoward medical occurrence in a patient or study participant, which does not necessarily have a causal relationship with the intervention/treatment/procedure involved.
Serious Adverse Event (SAE).	Any adverse event that: • results in death, • is life-threatening*, • requires hospitalisation or prolongation of existing hospitalisation**, • results in persistent or significant disability or incapacity, or • consists of a congenital anomaly or birth defect
*A life- threatening event, this refers to an event in which the participant was at risk of death at the time of the event; it does not refer to an event which hypothetically might have caused death if it were more severe. ** Hospitalisation is defined as an in-patient admission, regardless of length of stay. Hospitalisation for pre-existing conditions, including elective procedures do not constitute an SAE.	

14.2 Assessments of Adverse Events

Each adverse event will be assessed for severity, causality, seriousness and expectedness as described below.

Severity

Category	Definition
Mild	The adverse event does not interfere with the participant's daily routine, and does not require further procedure; it causes slight discomfort

Moderate	The adverse event interferes with some aspects of the participant's routine, or requires further procedure, but is not damaging to health; it causes moderate discomfort
Severe	The adverse event results in alteration, discomfort or disability which is clearly damaging to health

Causality

The assessment of relationship of adverse events to the procedure is a clinical decision based on all available information at the time of the completion of the case report form.

The following categories will be used to define the causality of the adverse event:

Category	Definition
Definitely:	There is clear evidence to suggest a causal relationship, and other possible contributing factors can be ruled out.
Probably:	There is evidence to suggest a causal relationship, and the influence of other factors is unlikely
Possibly	There is some evidence to suggest a causal relationship (e.g. the event occurred within a reasonable time after administration of the study procedure). However, the influence of other factors may have contributed to the event (e.g. the participant's clinical condition, other concomitant events).
Unlikely	There is little evidence to suggest there is a causal relationship (e.g. the event did not occur within a reasonable time after administration of the study procedure). There is another reasonable explanation for the event (e.g. the participant's clinical condition).
Not related	There is no evidence of any causal relationship.
Not Assessable	Unable to assess on information available.

Expectedness

Category	Definition
Expected	An adverse event which is consistent with the available information about the intervention/treatment/procedure in use in this study.
Unexpected	An adverse event which is not consistent with the available information about the intervention/treatment/procedure in use in this study*

* this includes listed events that are more frequently reported or more severe than previously reported

14.3 Procedures for recording adverse events

All adverse events will be recorded in the medical records in the first instance.

AEs will not be collected in the CRFs for this study, as the psychological nature and short follow-up period of the research make routine AE reporting unnecessary. However, all serious adverse events (SAEs) will be recorded in the CRF.

All adverse events will be recorded with clinical symptoms and accompanied by a brief description of the event, including relevant dates.

All adverse events will be recorded in the CRF until the participant completes the study (i.e. 7 days post-enrolment).

14.4 Procedures for recording and reporting Serious Adverse Events

All serious adverse events will be recorded in the medical records and the CRF.

All SAEs (except those specified in section 16.2 as not requiring reporting to the Sponsor) must be recorded on a serious adverse event (SAE) form. The CI/PI or designated individual will complete an SAE form and the form will be emailed to the R&I Office (kch-tr.researchqualityassurance@nhs.net) within 1 working day of becoming aware of the event.

Where the event is unexpected and thought to be related to the intervention/treatment/procedure this must be reported by the Investigator to the REC and Health Research Authority, using the SAE Report form for non-CTIMPs (available from the HRA website) within 15 days.

14.5 Serious Adverse Events that do not require reporting

Given the nature of this low-risk, observational study involving non-invasive procedures and no investigational products, no specific Serious Adverse Events (SAEs) are expected to occur on a regular basis**.** Therefore, all SAEs will be reviewed on a case-by-case basis.

However, if psychological distress is reported that does not require hospitalisation or intervention beyond standard care (e.g. transient anxiety or low HADS scores not meeting clinical thresholds), these will **be** documented in the CRF and medical records**,** but will not be reported via an SAE form to the CI or R&I Office unless their severity or frequency is considered unusual.

This approach ensures meaningful SAE reporting while minimising unnecessary burden for events that are anticipated within the study context and pose no additional safety concerns.

14.6 Reporting Urgent Safety Measures

If any urgent safety measures are taken the CI/ PI shall immediately and in any event no later than 3 days from the date the measures are taken, give written notice to the relevant REC, Health Research Authority and R&I office of the measures taken and the circumstances giving rise to those measures.

14.7 Protocol deviations and notification of protocol violations

A deviation is usually an unintended departure from the expected conduct of the study protocol/SOPs, which does not need to be reported to the sponsor. The CI will monitor protocol deviations.

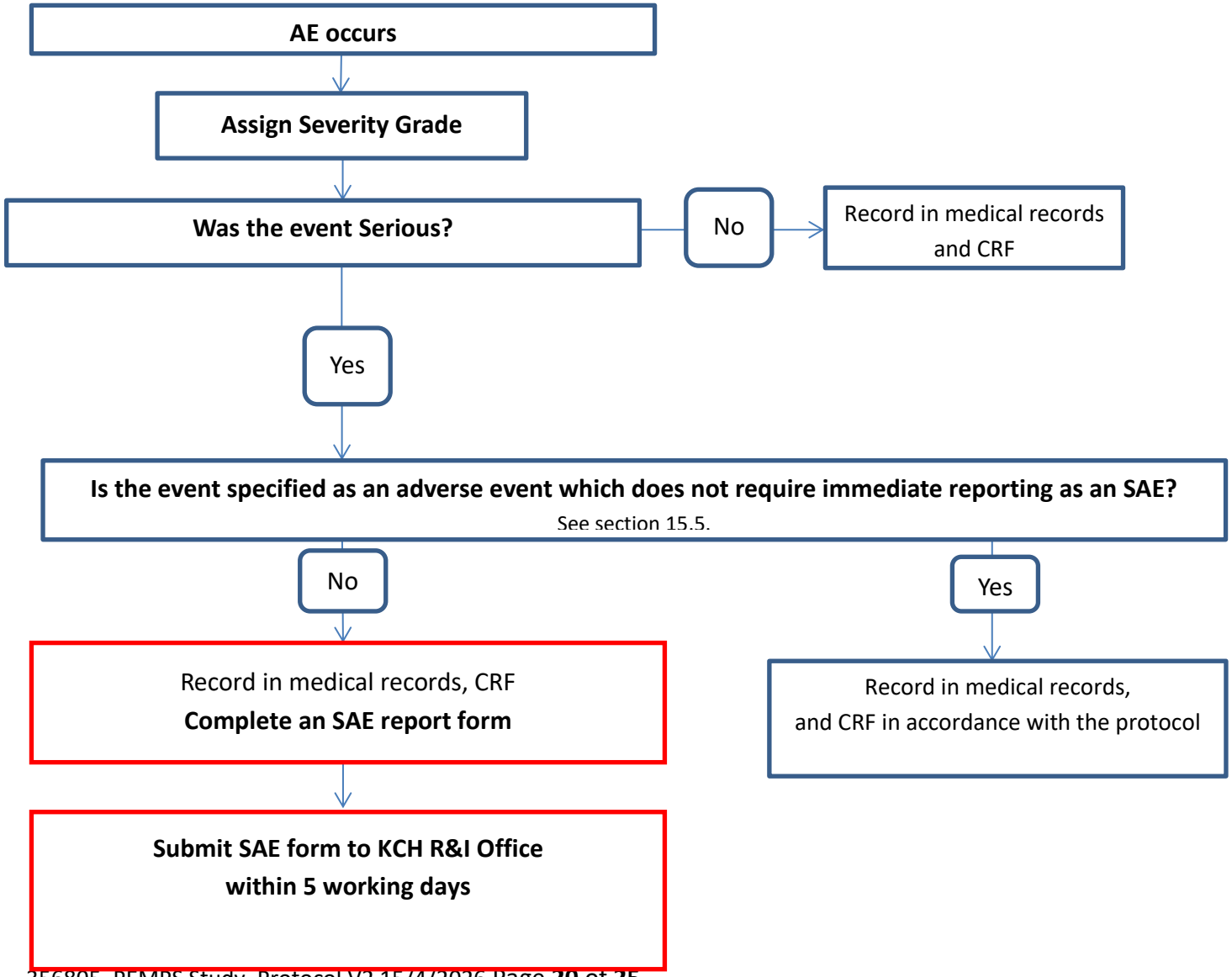
A protocol violation is a breach which is likely to effect to a significant degree –

(a) the safety or physical or mental integrity of the participants of the study; or

(b) the scientific value of the study.

The CI and R&I Office should be notified immediately of any case where the above definition applies during the study conduct phase.

Flow Chart for SAE reporting



14.8 Trust incidents and near misses

An incident or near miss is any unintended or unexpected event that could have or did lead to harm, loss or damage that contains one or more of the following components:

a. It is an accident or other incident which results in injury or ill health.

b. It is contrary to specified or expected standard of patient care or service.

c. It places patients, staff members, visitors, contractors or members of the public at unnecessary risk.

d. It puts the Trust in an adverse position with potential loss of reputation.

e. It puts Trust property or assets in an adverse position or at risk.

Incidents and near misses must be reported to the Trust through DATIX as soon as the individual becomes aware of them.

A reportable incident is any unintended or unexpected event that could have or did lead to harm, loss or damage that contains one or more of the following components:

a) It is an accident or other incident which results in injury or ill health.
b) It is contrary to specified or expected standard of patient care or service.
c) It places patients, staff members, visitors, contractors or members of the public at unnecessary risk.
d) It puts the Trust in an adverse position with potential loss of reputation.
e) It puts Trust property or assets in an adverse position or at risk of loss or damage.

15 MONITORING AND AUDITING

The Chief Investigator will ensure there are adequate quality and number of monitoring activities conducted by the study team. This will include adherence to the protocol, procedures for consenting and ensure adequate data quality.

The Chief Investigator will inform the sponsor should she have concerns which have arisen from monitoring activities, and/or if there are problems with oversight/monitoring procedures.

15.1 Additional Monitoring Support

No formal Data Monitoring Committee (DMC) is required for this single-site, low-risk observational study. Monitoring will be conducted internally by the study team, with oversight by the Chief Investigator.

15.2 Events That Do Not Require Reporting on a Serious Adverse Event Form

Psychological distress symptoms identified through routine study questionnaires (e.g. HADS and PSWQ scores indicating mild or moderate anxiety or depression) will not require SAE reporting unless the severity is deemed clinically significant or requires unplanned medical intervention. These events will still be documented in the CRF and medical records as appropriate but will not trigger formal SAE reporting to the R&I Office unless they are unexpected or serious in nature.

15.3 Events that may require the study to be suspended or terminated prematurely

The study may be suspended or terminated prematurely under the following circumstances:

- Unanticipated participant distress or harm - If a significant number of participants report psychological harm or distress attributable to the miscarriage prediction score or study procedures, the study may be paused for review or terminated to protect participant well-being.
- Ethical or regulatory concerns - If requested by the Research Ethics Committee (REC), Sponsor, or NHS R&D office due to ethical, safety, or regulatory issues.
- Significant protocol non-compliance - If repeated or serious deviations from the approved study protocol are identified that could affect the integrity of the data or participant safety.
- Inadequate recruitment or retention - If participant recruitment or completion rates are significantly lower than expected, and the study is no longer feasible or likely to answer the research question.
- Interim analysis identifies futility or harm - If interim data review indicates that continuing the study is unlikely to produce meaningful results, or suggests harm to participants, the study may be discontinued.

16 TRAINING

The Chief Investigator will ensure that all staff involved in the conduct of the study have the appropriate qualifications, experience, and training required for their delegated duties. This includes Good Clinical Practice (GCP) training, familiarity with the study protocol, and understanding of consent procedures, data collection methods, and SAE reporting.

Specific training requirements include:

- GCP certification for all clinical research staff involved in consent or data handling
- Ultrasound scanning qualifications for clinicians performing early pregnancy assessments
- Familiarity with the use of the PIA Viewpoint Database and the HADS/PSWQ tools
- Training on the miscarriage prediction score calculator and randomisation process

Training records will be reviewed prior to staff delegation and maintained in the site file. Refresher training will be provided as required, particularly if there are protocol amendments or changes in personnel.

17 INTELLECTUAL PROPERTY

All intellectual property rights and know-how in the protocol and in the results arising directly from the study, but excluding all improvements thereto or clinical procedures developed or used by each participating site, shall belong to KCH.

18 INDEMNITY ARRANGEMENTS

KCH will provide NHS indemnity cover for negligent harm, as appropriate and is not in the position to indemnify for non-negligent harm. NHS indemnity arrangements do not extend to non-negligent harm and NHS bodies cannot purchase commercial insurance for this purpose; it cannot give advance undertaking to pay compensation when there is no negligence attributable to their vicarious liability. The Trust will only extend NHS indemnity cover for negligent harm to its employees, both substantive and honorary, conducting research studies that have been approved by the R&D Department. The Trust cannot accept liability for any activity that has not been properly registered and Trust approved. Potential claims should be reported immediately to the R&I Office

19 ARCHIVING

All study documentation, including consent forms, case report forms, screening logs, and source data, will be archived in accordance with the King's College Hospital NHS Foundation Trust research governance policy.

Documents will be retained securely in the designated research archive at King’s College Hospital for a minimum of 5 years following the end of the study, or longer if required by applicable regulations or sponsor guidance. Access will be restricted to authorised personnel only.

Electronic data stored on NHS OneDrive will be retained in line with Trust data retention schedules and subject to secure deletion protocols at the end of the archiving period.

No data or records will be destroyed without prior written authorisation from the Sponsor.

20 PUBLICATION AND DISSEMINATION POLICY

The results of this study will be submitted for publication in a peer-reviewed journal relevant to obstetrics and gynaecology, with preference given to journals that focus on early

pregnancy care or psychological health. Conference presentations and poster submissions will also be considered.

As this is a single-site study, authorship will be based on substantial contributions to study design, conduct, data analysis, and manuscript preparation, in accordance with ICMJE guidelines.

There are no external funding bodies, and therefore no restrictions on publication timing or content.

Participants will be offered a lay summary of the study findings upon request. The study findings will also be shared internally within the Early Pregnancy and Acute Gynaecology Unit and may inform future clinical practice or patient information tools within King's College Hospital.

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22 APPENDICES

Appendix 1: PROTOCOL VERSIONS

Versions No	Version Date	Status
1	01.06.2025	Archived
2	15.04.2026	Current

Appendix 2: Schematic Design