Study Protocol

1. **Title**

   A meta-analysis of the risk factors of meconium aspiration syndrome in newborns

2. Objects (in PICOs manner)

   1）Population

Newborn infants

   2）Intervention

Non-interventional. Newborns who developed meconium aspiration syndrome (MAS)

   3）Control

Newborn infants did not develop MAS

   4）Outcome

MAS, which is defined as whatever the individual study defines

   5) Type of eligible studies

   Cohort studies that reported on the risk factors for MAS or case-control studies that aimed on analyzing risk factor for MAS

3. Literature searching

   1）Similar studies

Review: Monfredini C, Cavallin F, Villani PE, Paterlini G, Allais B, Trevisanuto D. Meconium Aspiration Syndrome: A Narrative Review. Children (Basel). 2021 Mar 17;8(3):230. doi: 10.3390/children8030230.

No similar meta was found

   2）Searched database

We will search databases including PubMed, Ovid MEDLINE (1946 to present), Embase.com (1947 to present), Scopus (1823 to present), Web of Science, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials. No language or location restrictions are set in the searching strategy.

   3）Key words/Search terms

"meconium aspiration syndrome", "meconium aspiration syndrome", "aspiration syndrome, meconium", "syndrome, meconium aspiration", "meconium aspiration", "aspiration, meconium", "meconium inhalation", "newborn", "infant", "infant, newborn", "infants, newborn", "newborn infant", "newborn infants", "newborns", "neonate", "neonates", "infants", "risk factor", "risk factors", "factor, risk", "social risk factors", "factor, social risk", "factors, social risk", "risk factor, social", "risk factors, social", "social risk factor", "health correlates", "correlates, health", "population at risk", "populations at risk", "risk scores", "risk score", "score, risk", "risk factor scores", "risk factor score", "score, risk factor".

4）Primary retrieved results

All search strategies were completed in June 2022, and a total of 2090 results were exported to endnote. Notably, 1204 records were deleted after using the deduplication. A total of 886 unique records remained in the project library.

4. Study Selection

1）Inclusion criteria

The inclusion criteria were cohort studies that reported on the risk factors for MAS or case-control studies that aimed on analyzing risk factor for MAS; the sample size and raw data were provided.

2）Exclusion criteria

Studies were excluded if they were an interventional study, review, meta-analysis or cases report; lack control groups; had incomplete data; the full text was unavailable; included animals; did not report raw data for the included analyzed risk for MAS.

Literature evaluation

1）Risk of bias assessing tool

The assessment of the risk of bias of the included studies will be carried out according to NOS (Newcastle-Ottawa Scale).

2）Evaluation method

Two investigators will conduct evaluation independently. If any disagreement occurs, it will be resolved by a third investigator

6. Data extraction and statistical analysis

Risk factors that impact the incidence of MAS are of interest to this study. For each study, when data were available, the below information was extracted by one investigator and confirmed by the second: number of women whose maternal age > 34, maternal parity, number of infants with small for gestational age, number of infants with large for gestational age, number of infants with non-reassuring or abnormal fetal heart rate tracing, number of infants born through induction labor, number of infants delivered through cesarean delivery, number of infants born through oligohydramnios, number of infants born through meconium-stained liquor, infant gender, Apgar scores. Maternal comorbidities were also extracted, including maternal fever, and maternal diabetes, maternal hypertensive disorders, premature rupture of the membranes, chorioamnionitis, and maternal pathological conditions raised by particular articles (maternal obesity, elevated maternal body mass index, smoking, postdate pregnancy, etc.). Obstetric practice raised by particular articles as risk factors were also extracted. In studies only providing data on rates, manual calculation was performed to convert the rates in the original study into number of cases in the present study.

The studies with same extracted risk factors were combined by the factor and meta-analysis was performed using Review Manager (RevMan Version 5.4. The Cochrane Collaboration, 2020). Pooled odds ratios (ORs) were calculated using Mantel-Haenszel method as case-control studies were included.