**SUPPLEMENTARY MATERIAL**

**Table S1: Screening protocol for Gestational Diabetes at the Leicester Royal Infirmary**

|  |  |  |
| --- | --- | --- |
| **OGTT at booking (and repeat at 26-28 weeks if normal)** | **OGTT at 16 weeks (and repeat at 26-28 weeks if normal)** | **OGTT at 26-28 weeks** |
| Previous GDM | BMI >40 kg/m2 at booking | BMI >30 kg/m2 at booking |
|  |  | Previous baby ≥4.5kg at birth |
| First degree relative with diabetes |
| High risk ethnicity (South Asian, Black Caribbean, Middle Eastern, Eastern European) |
| PCOS |
| **OGTT at any gestation <34+0 weeks:**  2+ glycosuria once or 1+ glycosuria on 2 occasions | | |

OGTT: oral glucose tolerance test; GDM: gestational diabetes; BMI: body mass index

**Table S2: Evidence to construct causal Directed Acyclic Graph (DAG)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **Influenced by** | **Relationship** | **Evidence** | **Evidence Level** | **Pregnancy?** |
| **Cardiac Output** | **Height** | ↑es with ↑ing height | Perry 2019 UOG, Ling 2022, Guy 2017 | Observational |  |
| **Weight** | ↑es with ↑ing weight | Perry 2019 UOG, Ling 2022, Guy 2017 | Observational |  |
| **Age** | ↓es with ↑ing age | Perry 2019 UOG, Ling 2021, Guy 2017 | Observational |  |
| **Gestation** | ↑es throughout pregnancy, with plateau at around 34/40 | Meah 2016 Heart | Meta-analysis |  |
| **Heart Rate** | CO = HR x SV | n/a | n/a | n/a |
| **Stroke Volume** | CO = HR x SV | n/a | n/a | n/a |
| **Parity** | Conflicting evidence, so no clear causal effect | Perry 2019 UOG, Ling 2021, Guy 2017 | Observational |  |
| **Ethnicity** | Conflicting evidence, so no clear causal effect | Perry 2019 UOG, Ling 2020, Guy 2017 | Observational |  |
| **Heart Rate** | **Gestation** | ↑es throughout pregnancy | Meah 2016 Heart | Meta-analysis |  |
| **Ethnicity** | ↑ed in Black women cf. White | Ling UOG 2020, Guy 2017 | Observational |  |
| **Height** | ↑es with ↑ing height | Perry 2019 UOG, Ling 2022, Guy 2017 | Observational |  |
| **Weight** | ↑es with ↑ing weight (less extent than HR) | Perry 2019 UOG, Ling 2022, Guy 2017 | Observational |  |
| **Age** | No effect | Guy 2017 | Observational |  |
| **Parity** | No effect | Ling 2019, Guy 2017 | Observational |  |
| **Stroke Volume** | **Gestation** | ↑es in pregnancy, less after 34/40 | Meah 2016 Heart | Meta-analysis |  |
| **Ethnicity** | ↓ed in Black and Asian women cf. White | Perry 2019 UOG, Ling 2020 UOG | Observational |  |
| **Height** | ↑es with ↑ing height | Ling 2022, Perry 2019, Guy 2017 | Observational |  |
| **Weight** | Most studies suggest no influence | Ling 2022, Guy 2017 | Observational |  |
| **Parity** | Most studies suggest no influence | Perry 2019, Guy 2017 | Observational |  |
| **Age** | Most studies suggest no influence | Ling 2021, Perry 2019 | Observational |  |
| **Total Peripheral Resistance** | **Cardiac Output** | TPR = MAP/CO | n/a | n/a | n/a |
| **MAP** | TPR = MAP/CO | n/a | n/a | n/a |
| **Gestation** | ↓es in first half of pregnancy, then ↑es | Meah 2106 Heart | Meta-analysis |  |
| **Parity** | ↓ed with ↑ing parity | Perry 2019 UOG, Turan, Ling 2019 | Observational |  |
| **Age** | ↑es with ↑ing age | Perry 2019 UOG, Ling 2019, Guy 2017 | Observational |  |
| **Height** | ↓es with ↑ing height | Perry 2019 UOG, Ling 2022, Guy 2017 | Observational |  |
| **Weight** | Most studies suggest ↑ed with ↑ing weight | Perry 2019 UOG, Ling 2022 | Observational |  |
| **Ethnicity** | Conflicting evidence, so no clear causal effect | Perry 2019 UOG, Ling 2020 UOG | Observational |  |
| **MAP** | **Gestation** | ↓es in first half of pregnancy, then ↑es | Meah 2106 Heart | Meta-analysis |  |
| **Ethnicity** | ↑ed in non-White ethnicities | Guy 2017, Ling 2020 | Observational |  |
| **Weight** | ↑es with ↑ing weight | Guy 2017, Ling 2020 | Observational |  |
| **Age** | No clear evidence | Guy 2017, Ling 2021 | Observational |  |
| **Parity** | Conflicting evidence, so no clear causal effect | Guy 2017, Ling 2021 | Observational |  |
| **Height** | No evidence of a link | Guy 2017, Ling 2021 | Observational |  |
| **AIx** | **BMI** | ↑es with ↑ed BMI | Li 2017 Postgrad Med 2017 | Meta-analysis |  |
| **Age** | ↑es with ↑ing age | Anness 2022 J of Hypertens | Observational |  |
| **Heart Rate** | ↓es with ↑ing HR | Anness 2022 J of Hypertens | Observational |  |
| **Gestation** | Quadratic relationship | Anness 2022 J of Hypertens | Observational |  |
| **Ethnicity** | No effect | Anness 2022 J of Hypertens | Observational |  |
| **Parity** | No effect | Anness 2022 J of Hypertens | Observational |  |
| **PWV** | **BMI** | ↑es with ↑ed BMI | Li 2017 Postgrad Med | Meta-analysis |  |
| **Heart rate** | ↓es with ↑ing HR | Anness 2022 J of Hypertens | Observational |  |
| **MAP** | ↑es with ↑ing MAP | Kim 2007 J Hum Hypertens | Observational |  |
| **Gestation** | Quadratic relationship | Anness 2022 J of Hypertens | Observational |  |
| **Age** | No association in pregnancy | Anness 2022 J of Hypertens | Observational |  |
| **Ethnicity** | No effect | Anness 2022 J of Hypertens | Observational |  |
| **Parity** | No effect | Anness 2022 J of Hypertens | Observational |  |
| **Need for pharmacological treatment** | **Fasting BM** | ↑ed with ↑fasting values | Pertot 2011  Sapienza 2010, Eleftheriades 2021  Martine-Edith 2021, Wang 2021 | Observational |  |
| **2hr BM** | ↑ed with ↑2-hour values |
| **BMI** | ↑ed with ↑BMI |
| **Ethnicity** | ↑ed in White women – but not in multivariate regression | Pertot 2011  Sapienza 2010, Eleftheriades 2021  Martine-Edith 2021, Wang 2021 | Observational |  |
| **Parity** | No association |
| **Age** | ↑ed with ↑age, but not in multivariate regression |
| **History of GDM** | Conflicting evidence – no clear causal relationship |
| **Gestation at diagnosis** | ↑ed with earlier diagnosis, but not in multivariate regression |

**Large Directed Acyclic Graph Adjustment Set**

"MAP": "total": ["Ethnicity", "Gestation", "Weight"],

"direct": [ "Age", "Ao Aix", "Ao PWV", "BMI", "Br Aix", "CO", "Ethnicity", "TPR"]

"h/o GDM": "total":

"TPR": "total": ["Age", "CO", "Gestation", "Height", "MAP", "Weight"],

"CO": "total": ["Age", "Gestation", "HR", "Height", "SV", "Weight"],

"direct": ["Age", "Gestation", "HR", "Height", "MAP", "SV", "TPR", "Weight"]

"Ao Aix": "total": ["Age", "BMI", "Gestation", "HR"]

"Br Aix": "total": ["Age", "BMI", "Gestation", "HR"]

"Ao PWV": "total": ["BMI", "Gestation", "HR", "MAP"]

"Fasting BM": "total":

"2hr BM": "total":

"gest at diagnosis": "total":

"BMI": "total": ["Height", "Weight"]

"direct\_gest": ["Age", "Ao Aix", "Ao PWV", "Br Aix, "Gestation", "HR", "Height”, "MAP", "Weight"]

"direct\_no\_gest": ["Age", "Ao Aix", "Ao PWV", "Br Aix", "CO", "Ethnicity", "MAP", "TPR"],

**Smaller Directed Acyclic Graph Adjustment Set**

"MAP": "total": ["Ethnicity", "Gestation", "Weight"]

"direct": ["Ao Aix", "Ao PWV", "BMI", "Br Aix", "CO", "TPR"],

"TPR": "total": ["Age", "BMI", "CO", "Gestation", "HR", "MAP"]

"CO": "total": ["Age", "Gestation", "HR", "Height", "MAP", "Weight"]

"direct": ["Age", "BMI", "Gestation", "HR", "MAP", "TPR"]

"Ao Aix": "total": ["Age", "BMI", "Gestation", "HR"]

"Br Aix": "total": ["Age", "BMI", "Gestation", "HR"]

"Ao PWV":"total": ["BMI", "Gestation", "HR", "MAP"]

"Fasting BM": "total":

"2hr BM": "total":

"BMI": "total": ["Height", "Weight"]

"direct": ["Ao Aix", "Ao PWV", "Br Aix", "CO", "MAP", "TPR