

Gestational Diabetes Mellitus and Stillbirth: A Systematic Review and Meta-Analysis

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1. INTRODUCTION

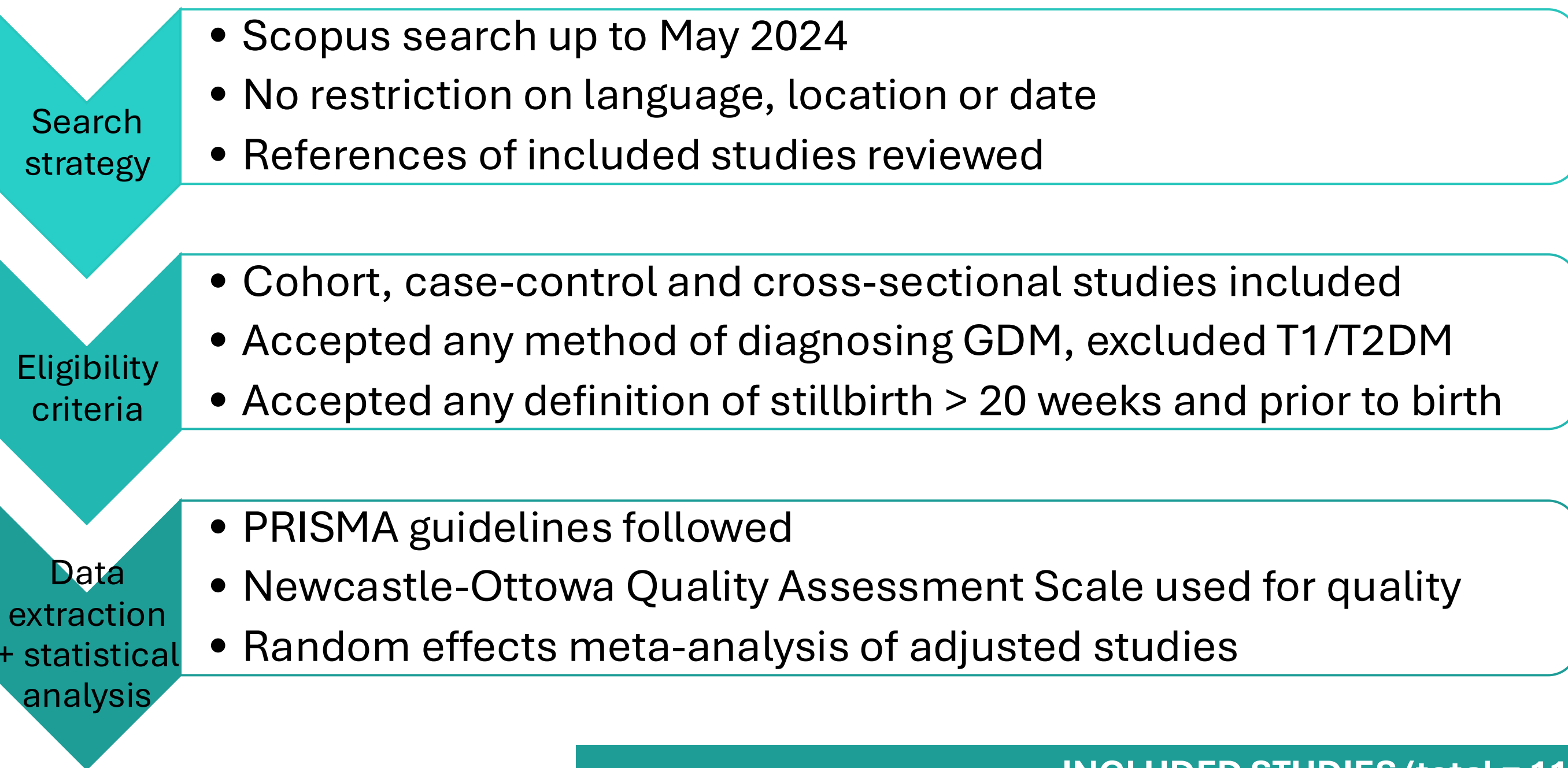
- Gestational Diabetes Mellitus (GDM) affects 1 in 6 pregnancies worldwide^[1]
- Stillbirth affects 2.6 million pregnancies each year and 98% of these occur in low and middle income countries^[2]
- Studies conducted to assess the relationship between GDM and stillbirth have yielded inconsistent results^[3]
- Screening methods for GDM vary widely worldwide. Universal screening involves offering testing to all women. Risk based, or selective screening involves only offering testing to those deemed at high risk of GDM^[4]
- FIGO and the (WHO) now recommend universal screening. However, a Cochrane review comparing method of screening found that there was insufficient evidence to evaluate the most appropriate method for GDM^[4-6]

2. AIMS

Primary aim: To estimate the association between GDM and stillbirth

Secondary aims: To identify the association between country income level and universal vs. risk based screening for GDM

3. METHODS



4. RESULTS

- 110 studies were included, see table 1
- Pooling adjusted cohort studies found that worldwide there was no clear evidence that GDM increases the risk of stillbirth (aOR 0.88 [95% CI: 0.69 – 1.12]), however in high income countries GDM was associated with a 26% reduction in stillbirth (aOR 0.75; [95% CI 0.65-0.84]) (Figure 2).
- When stratified by type of screening, there was no clear difference between universal screening (aOR 0.94 [95% CI: 0.61 – 1.45]) and risk based (aOR 0.85 [95% CI: 0.74 – 0.97]) (Figure 3).

INCLUDED STUDIES (total = 110)			
Study design	Income level	Screening method	Quality
94 cohort	71 high	53 universal	54 good
15 case-control	37 middle	15 risk-based	1 fair
1 cross-sectional	2 low	42 not stated	55 poor

Table 1. Summary of included studies

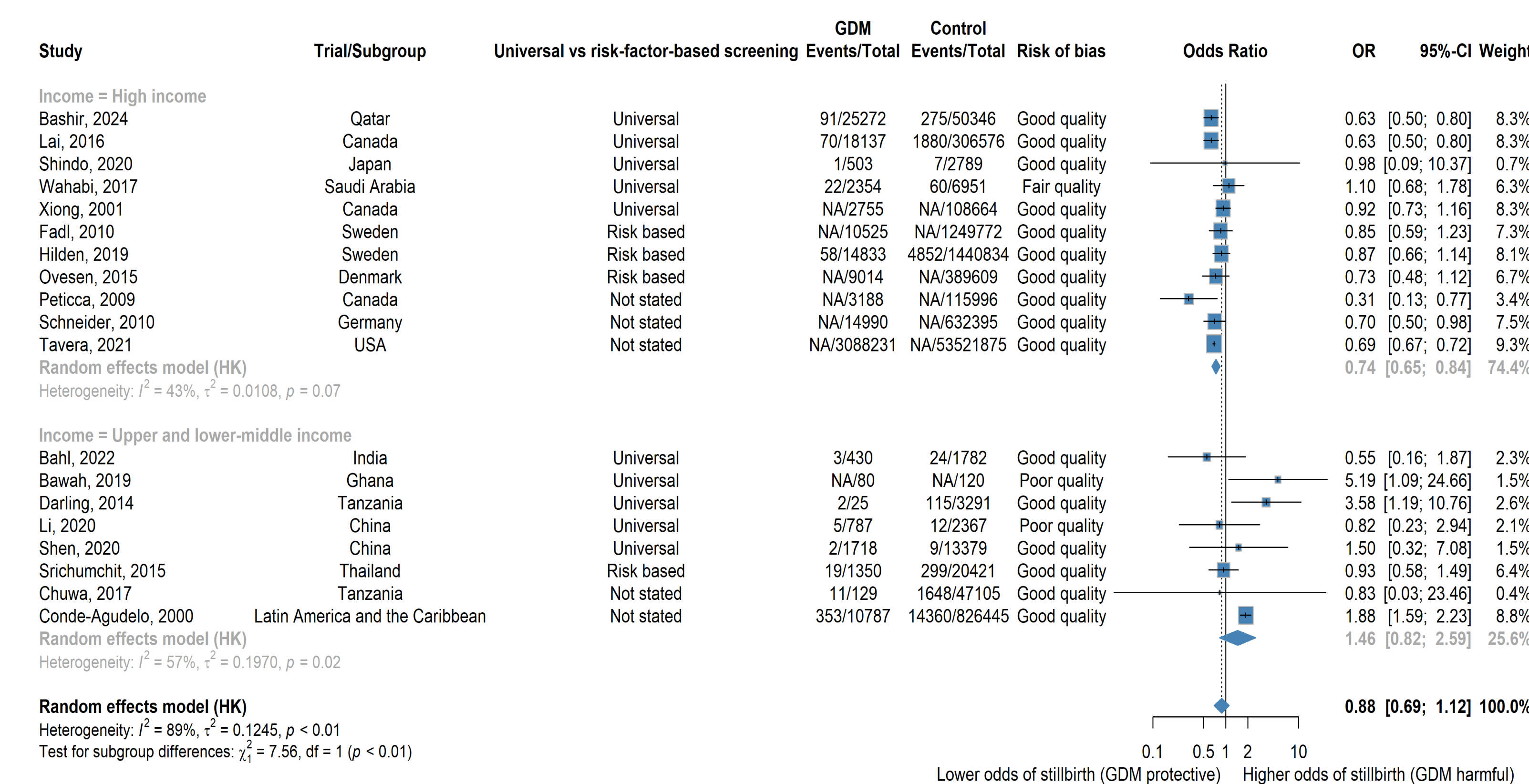
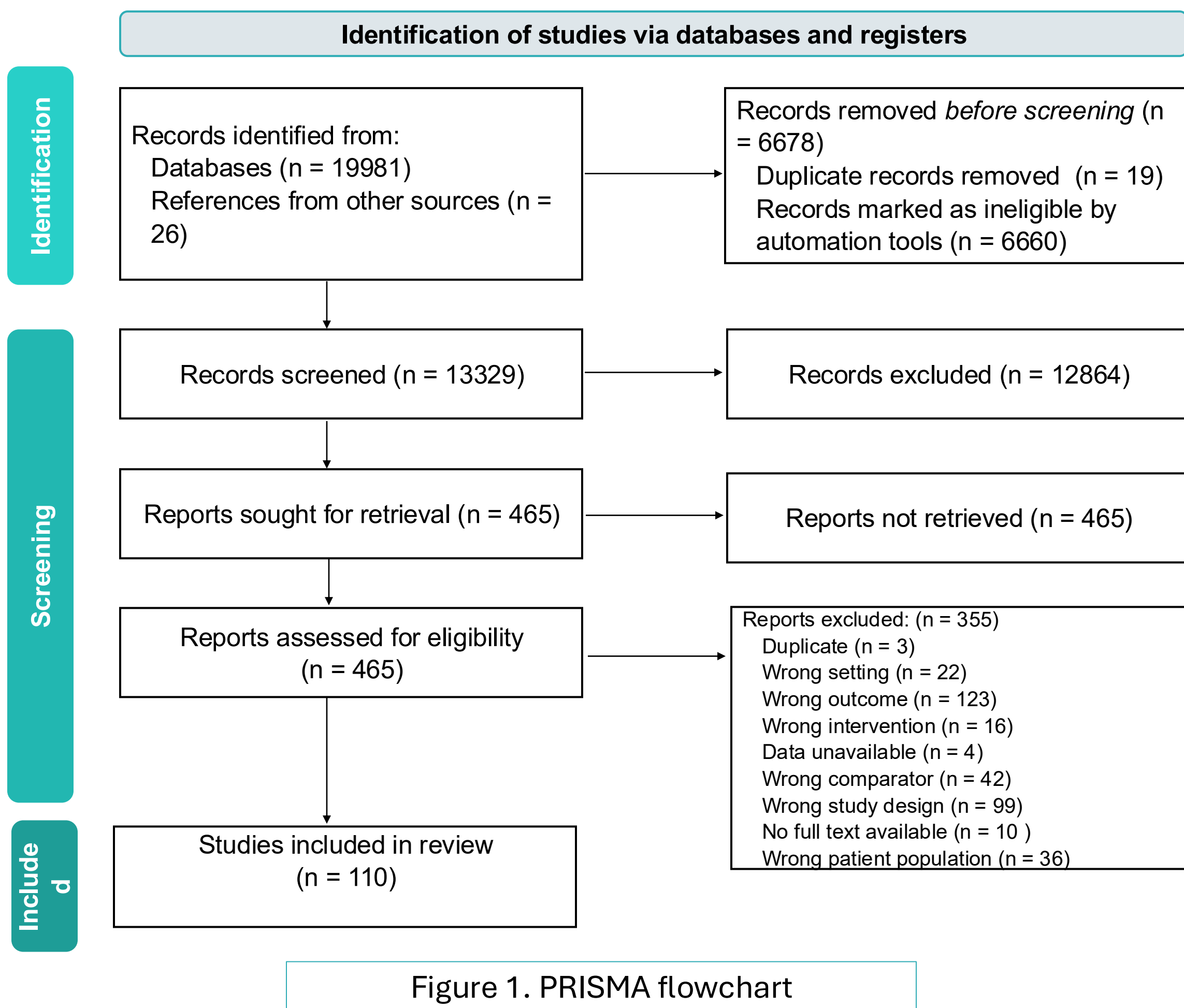


Figure 2. Forest plot showing meta-analysis of all adjusted cohort studies with sub-group analysis by country income level

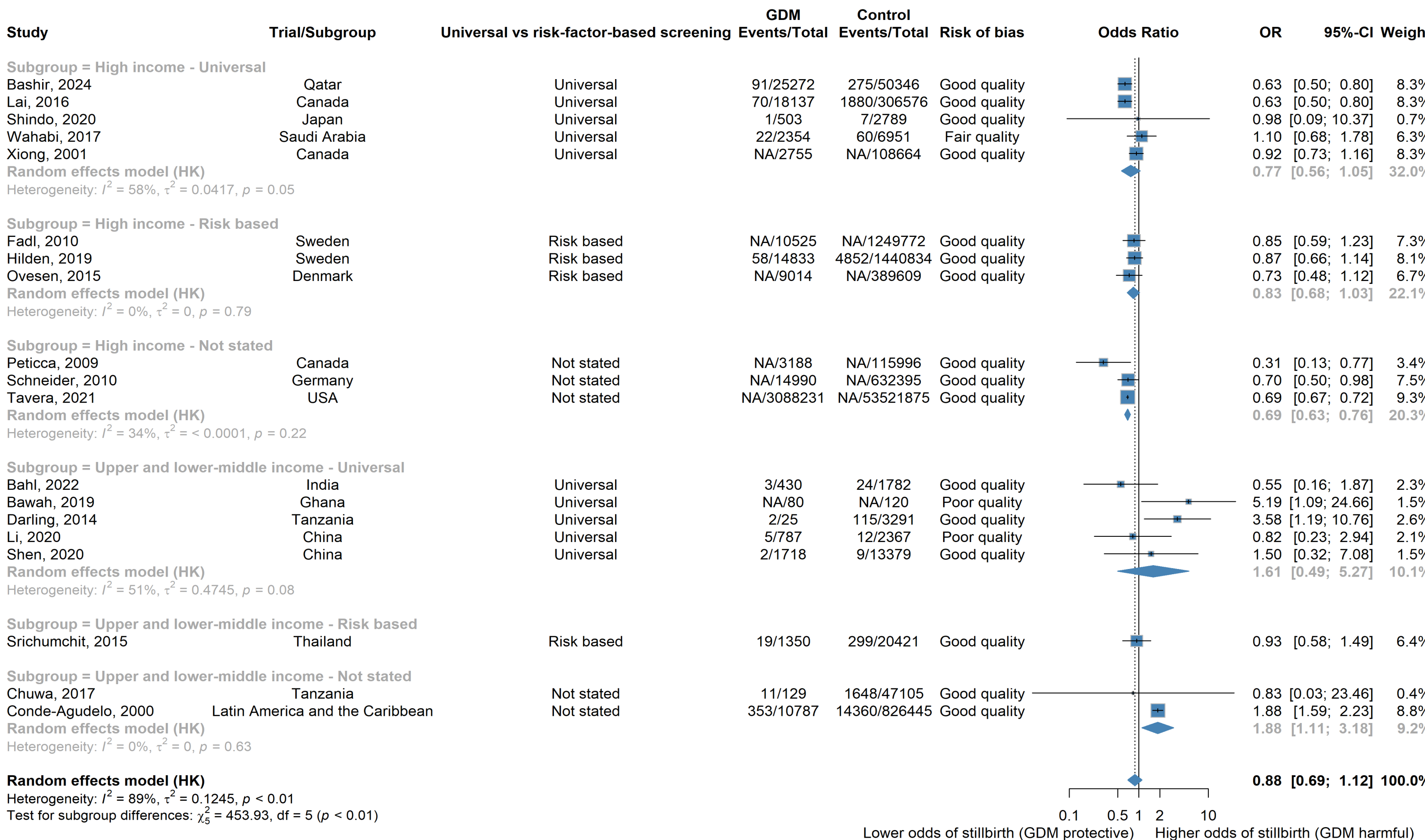


Figure 3. Forest plot showing meta-analysis of all adjusted cohort studies with sub-group analysis by country income level and GDM screening method

5. DISCUSSION

- Our study supports the findings of a previous systematic that the relationship between stillbirth and GDM remains unclear^[3] but our subgroup analysis has provided new insights.
- Reduction in stillbirths in high income countries is likely due to closer antenatal monitoring and earlier delivery.
- Risk based screening may be favourable. Subgroup analysis by country income level found that there was a reduction in high income countries for both methods, suggesting that country income level may be driving this observation and more research is required to examine this further
- Strengths of this review are the rigorous methodology and analysis of adjusted, high quality studies. Limitations are inclusion of only observational data and high levels of heterogeneity due to the nature of the topic

6. CONCLUSION

Women diagnosed with GDM in high income countries are at reduced risk of stillbirth compared to those without GDM, likely due to increased monitoring antenatal care and delivery at earlier gestation. Implementing high quality screening and GDM management programmes in low and middle income settings is likely to reduce preventable stillbirths worldwide.

REFERENCES: [1] Saeedi P, Petersohn I, Salpea P, Malanda B, Karuranga S, Unwin N, et al. Global and regional diabetes prevalence estimates for 2019 and projections for 2030 and 2045: Results from the International Diabetes Federation Diabetes Atlas, 9. *Diabetes Res Clin Pract.* 2019;157:107843. [2] Frøen JF, Friberg IK, Lawn JE, Bhutta ZA, Pattinson RC, Allanson ER, et al. Stillbirths: progress and unfinished business. *The Lancet.* 2016;387(10018):574-86. [3] Lemieux P, Benham JL, Donovan LE, Moledina N, Pytlypjuk C, Yamamoto JM. The association between gestational diabetes and stillbirth: a systematic review and meta-analysis. *Diabetologia.* 2022;65(1):37-54. [4] Tieu J, McPhee AJ, Crowther CA, Middleton P, Shepherd E. Screening for gestational diabetes mellitus based on different risk profiles and settings for improving maternal and infant health. *Cochrane Database Syst Rev.* 2017;8(8):Cd007222. [5] Hod M, Kapur A, Sacks DA, Hadar E, Agarwal M, Di Renzo GC, et al. The International Federation of Gynecology and Obstetrics (FIGO) Initiative on gestational diabetes mellitus: A pragmatic guide for diagnosis, management, and care[#]. *International Journal of Gynecology & Obstetrics.* 2015;131(S3):S173-S211. [6] Diagnostic criteria and classification of hyperglycaemia first detected in pregnancy: a World Health Organization Guideline. *Diabetes Res Clin Pract.* 2014;103(3):341-63.