

IS GESTATIONAL DIABETES A RISK FOR LONG-TERM DIABETIC RETINOPATHY?

IMPERIAL

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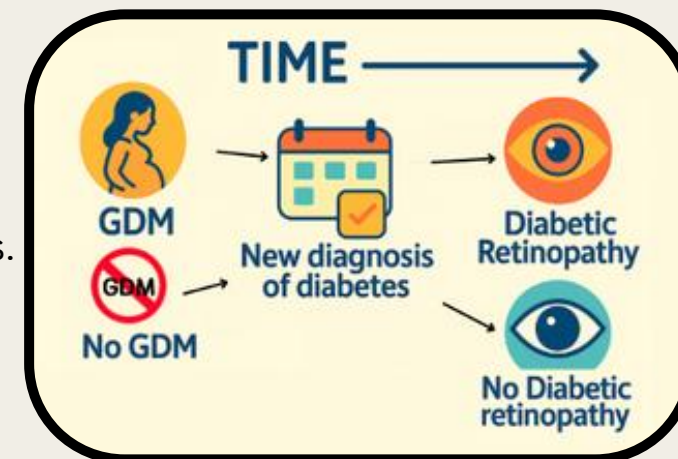
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INTRODUCTION

Gestational diabetes (GDM) affects 4-5% of pregnancies yearly
- associated with a variety of long-term cardiovascular complications
- association with diabetic retinopathy (DR) not well-described in the literature
A pilot study (manuscript submitted) showed that women with GDM had a significant increase in their risk for DR over 10 years vs. women without diabetes.

AIMS

To assess whether a background in GDM augments the risk of long-term DR in a cohort of women with incident diabetes



METHODS

Cohort definition

- Records of women >18 yo with a coding for DM or an antidiabetic prescription between 2007-2013 extracted from CPRD Aurum.
- Algorithm developed to define the point at which INCIDENT diabetes was diagnosed, taking into account the first of the following three pieces of evidence
 - A first observation indicative for diabetes in the primary or secondary care record
 - A first prescription of an anti-diabetic medication
 - A first glycaemic test reaching a diagnostic threshold for diabetes
- Further refinements were needed to disambiguate DM from GDM where the coding was equivocal (e.g.; 'diabetes in pregnancy' or when a subject's evidence for diabetes came from a prescription for metformin or insulin or a diagnostic glycaemic test, which could also be suggestive of GDM), and also from PCOS (see Fig. 1 & 2).
- Once timepoint of diagnosis of diabetes had been defined, only subjects for whom it fell between 2007-2013 were included. Those with a diagnosis of GDM more than 1 year prior to that date (to account for incidental DM found in pregnancy and misdiagnosed as GDM) were entered into the GDM group and the others were entered in the NON-GDM group.

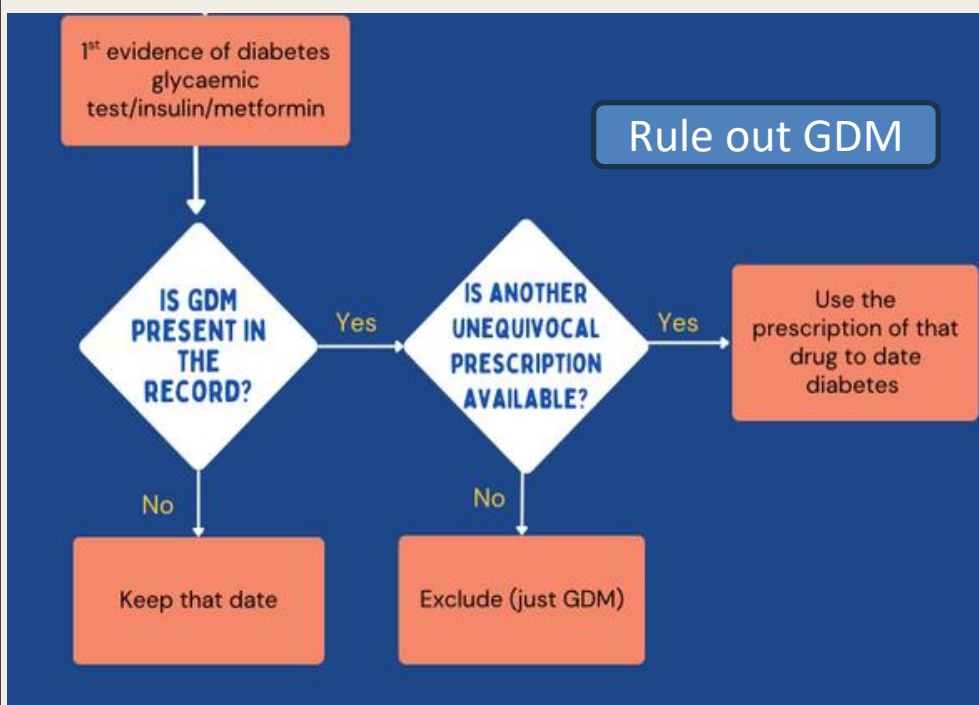


Fig. 1: Algorithm used to exclude cases of PCOS and ensure diabetes diagnosis date pertains to diabetes instead of PCOS

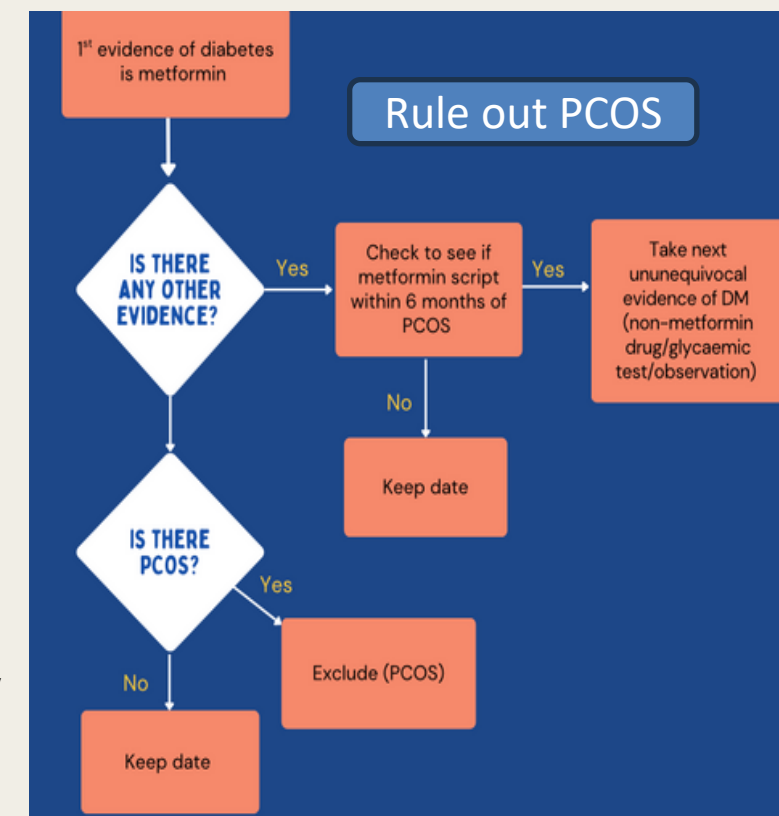


Fig. 2: As per Fig. 1 but for GDM

Statistical analysis

Demographic characteristics of the two groups are presented in the Table in the Results.
As the aim of the project was to demonstrate that GDM could be a useful flag for a later increased risk of DR rather than to explore causality, time-to-event analysis did not have to be adjusted for co-variables. Therefore, univariable analysis was performed using Kaplan-Meier (KM) survival analysis and the log-rank test. A p value of <0.05 was used to define statistical significance. All analysis was performed in R (latest version).

RESULTS

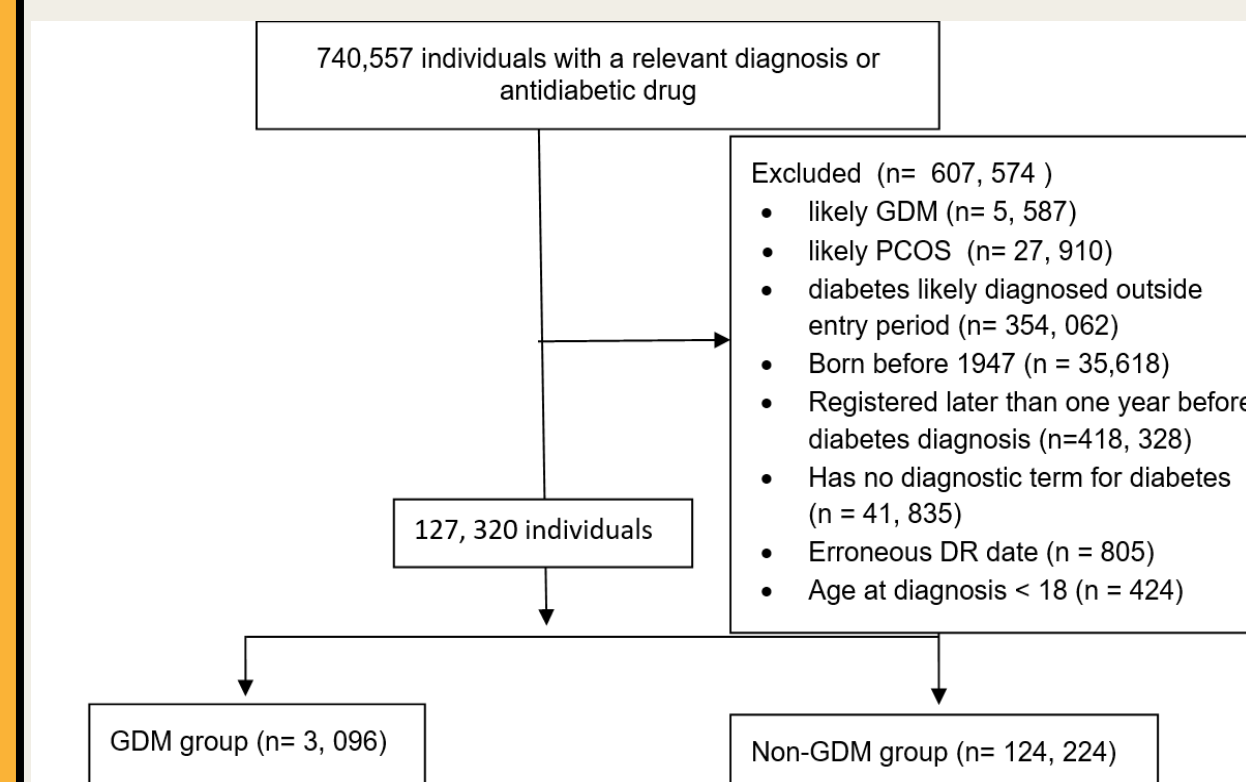


Fig 3: CONSORT diagram

The description of the cohort in terms of group sizes and demographics are shown above.

Below, time-to-DR survival curves are demonstrated in Fig 4.

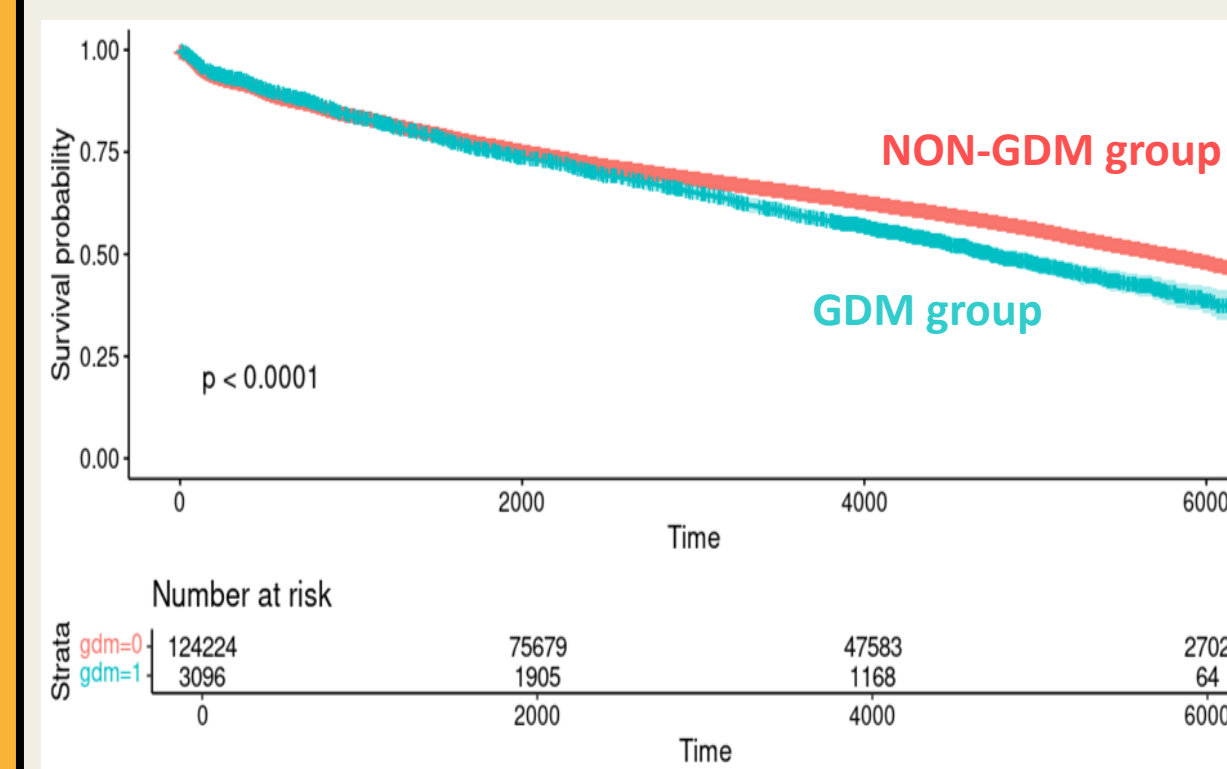


Fig 4: Kaplan-Meier Survival curve for time to development of DR

Total (n = 127,320)	GDM (n = 3,096)	Non-GDM (n=124,224)
Age at diagnosis*	38 (11)	48 (18)
Ethnicity (n/%)		
White	1,575 (50.9)	75248 (60.6)
Asian/Asian British	651 (20.9)	11104 (8.9)
Black/Black British	324 (10.5)	6386 (5.14)
Mixed	40 (1.3)	1051 (0.8)
Other	121 (3.9)	2825 (2.3)
Missing	385 (12.4)	27,610 (22.2)
BMI (n/%)		
Underweight	17 (0.5)	1749 (1.4)
Normal weight	449 (14.5)	24,679 (19.9)
Overweight	769 (24.8)	28,989 (23.3)
Obese	1,793 (57.9)	65,709 (52.9)
Missing	68 (2.2)	3098 (2.5)
Smoking status (n/%)		
Never smoker	1,158 (37.4)	36,941 (29.7)
Ever smoker	1,938 (62.6)	87,227 (70.2)
Missing	0 (0.0)	54 (0.0)
IMD (n/%)		
1	168 (5.4)	6,270 (5.0)
2	176 (5.7)	6,441 (5.2)
3	182 (5.9)	6,918 (5.6)
4	159 (5.1)	6,949 (5.6)
5	197 (6.4)	9,858 (7.9)
6	299 (10.0)	11,583 (9.3)
7	286 (9.2)	11,032 (8.8)
8	379 (12.2)	11,983 (9.6)
9	339 (10.9)	13,719 (11.0)
10	443 (14.3)	15,681 (12.6)
Missing	468 (15.1)	23,790 (19.2)

Table: Cohort's demographic characteristics
* Presented as median/interquartile range

Discussion - demographics

- GDM group more ethnically mixed (as expected given screening criteria).
- GDM group on average 10 years younger at the point of diabetes diagnosis, perhaps due to screening for diabetes in this group, but group sizes are very different so hard to interpret.
- High rate of obesity in both groups (mean BMI 37.8 vs. 32.4 in non-GDM vs. GDM)

CONCLUSION

KM curve clearly demonstrates long-term increased risk in DR amongst women with a background of GDM.

Multivariable analysis to follow.

Clinical studies investigating development of DR from the point at which GDM is diagnosed onwards are now required to demonstrate this effect in practice.

Should this effect be demonstrated, women should start screening for DR after GDM, even before formal diagnosis of DM.

With new attachments to smartphones which provide retinal images, the ability to undertake screening for DR at home in the future (and DM by extension), screening could be rendered more practical for patients. This would improve screening uptake and earlier diagnosis..