

# Pregnancy, Gestational Diabetes Mellitus (GDM) and polycystic ovary syndrome (PCOS): A Retrospective Study at St George's Healthcare NHS Trust

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## 1. Aims

To investigate the prevalence of GDM at St George's Healthcare NHS Trust in women diagnosed with PCOS within the last ten years.

## 2. Introduction

### Gestational diabetes mellitus (GDM)

Gestational diabetes mellitus (GDM) is defined as a degree of glucose intolerance with first onset or recognition during pregnancy<sup>1</sup>. Women who develop GDM are hyperinsulinaemic and are at heightened risk of developing type 2 Diabetes Mellitus (type 2 DM) post-partum. They are also more likely to face maternal complications, including caesarean section delivery due to foetal macrosomia<sup>1</sup>. GDM poses multiple risks to the foetus, including neonatal hypoglycaemia, foetal polycythaemia and increased long term risks of obesity and diabetes<sup>1</sup>.

### Polycystic ovary syndrome (PCOS)

Polycystic ovary syndrome (PCOS) is the most common endocrine condition amongst women, affecting 5-10% of the reproductive female population<sup>2</sup>. In the UK, 65-70% of women with PCOS are insulin resistant (IR) and thus suffer from secondary hyperinsulinaemia<sup>3</sup>. Obesity, prevalent in up to 80% of women with PCOS, further exacerbates the metabolic risks associated with hyperinsulinaemia, most profoundly type 2 DM<sup>2</sup>.

Due to their metabolic profile, women with PCOS are more likely to develop GDM. A study conducted in the UK concluded that more women who suffered from GDM had polycystic ovaries upon ultrasonography when compared to controls (52% vs 27%)<sup>3</sup>. A Swedish study also found that polycystic ovaries were more commonly observed in women with GDM compared to controls (45% vs 6.7%)<sup>4</sup>.

### Metformin

Metformin, an established diabetic drug, is often used to treat PCOS despite a good evidence base. There is interest in using metformin as a preventative agent against GDM for women with PCOS, especially since it is a pregnancy category B drug and little data suggests any teratogenic effects<sup>5</sup>.

## 3. Methods

In November 2012, the Maternal Medicine K2 software system was used to identify every pregnancy booked at St George's Healthcare NHS Trust from 1/1/2002-26/11/12. A total of 61,231 pregnancies were recorded. A database was then compiled containing the relevant maternal data including PCOS status, age, ethnicity, BMI, diabetic status and metformin exposure. PCOS was identified by self-reporting. The prevalence of diabetes and GDM were compared between those previously diagnosed with PCOS and those not reporting PCOS. In addition any previous exposure to metformin was recorded.

## 4. Results

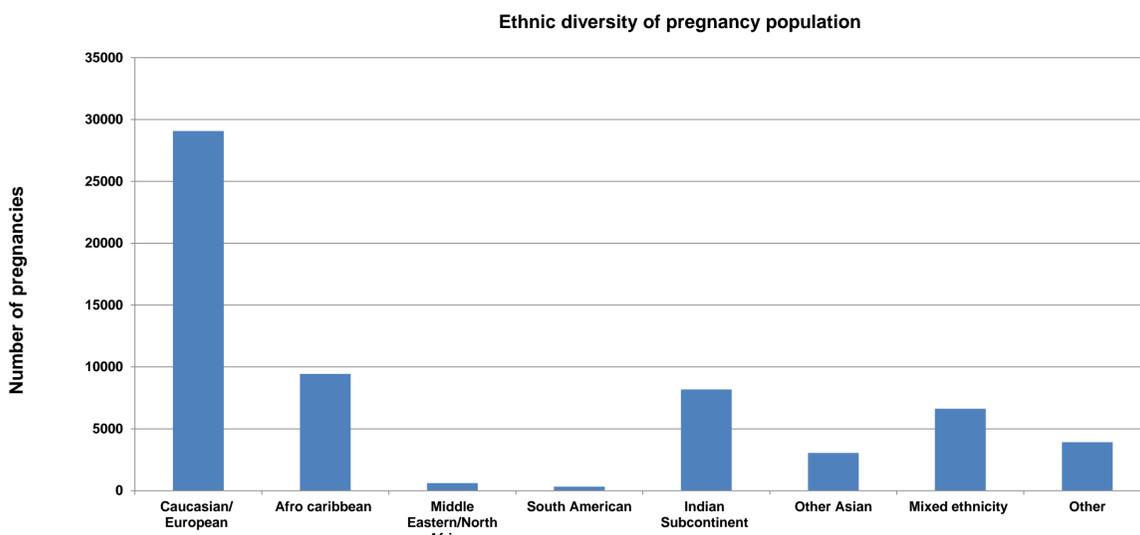
- In the last ten years, 61,231 pregnancies were recorded.
- 2423 of these pregnant women were diagnosed with PCOS (4.0%).
- Table 1 below shows the prevalence of diabetes and GDM in the 61,231 pregnancies. It also displays the mean BMI and age of this pregnant population.

**Table 1. Prevalence and mean data concerning the non PCOS and PCOS pregnant population**

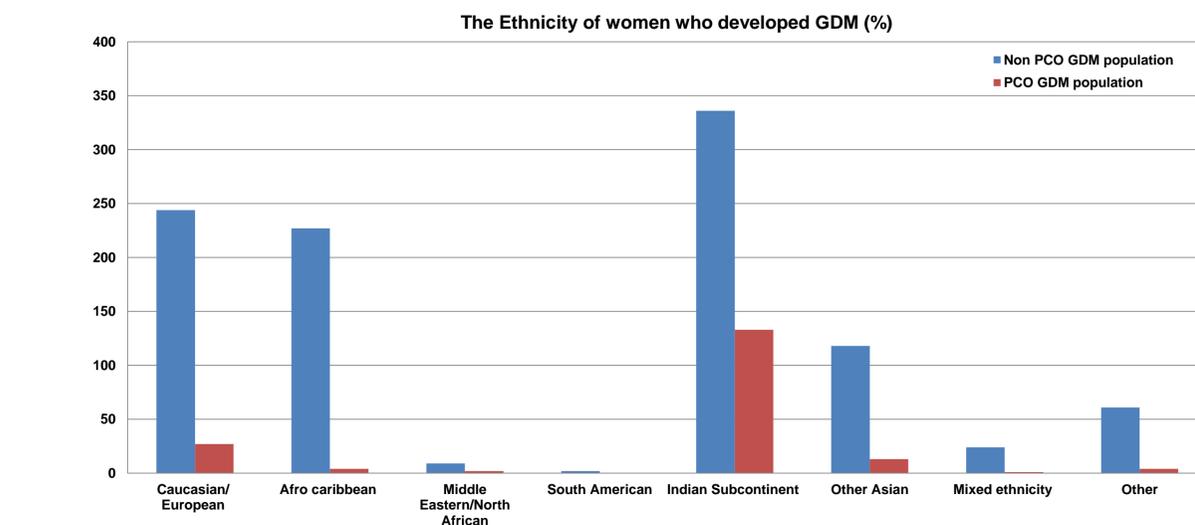
Prevalence	Non PCOS	PCOS
Diabetes	0.60%	2.80%
GDM	1.80%	3.70%
Mean	Non PCOS	PCOS
Age (years)	30.3 (13-53)	31.0 (16-50)
BMI (kg/m <sup>2</sup> )	24.9 (10-63.1)	26.2 (14.2-62)
BMI (diabetic population)	28.9 (18.4-56)	32.6 (18.1-52.7)
BMI (GDM population)	28.9 (17.9-63.1)	30.5 (20-46)

- Of these 61,231 pregnancies, 1153 were reported to have developed GDM
- 88 of these women were diagnosed with PCOS

**Figure 1. Ethnic diversity of all women booking at St George's Healthcare NHS Trust from 1/1/2002-26/11/12.**



**Figure 2. The ethnicity of women who developed GDM (%) in both PCOS and non PCOS groups**



## 5. Discussion

- The study reveals that 4.0% of the pregnant population at St George's Healthcare NHS Trust were diagnosed with PCOS. In reality, this number is likely to be higher, as many patients described symptoms that are indicative of PCOS, but the condition was not formerly diagnosed.
- On average, pregnant women with PCOS were more likely to be older and have a higher BMI than their non PCOS counterparts.
- GDM was more common in women with PCOS (3.7% vs 1.8% respectively) – this concurs with the literature<sup>3,4,6,7</sup>.
- Diabetes was also more common in PCOS (2.8% vs 0.6%). A distinction between Type 1 and Type 2 DM could not be made due to a lack of differential data recorded in the K2 system.
- There is a positive correlation between increased BMI and both GDM and diabetes in the PCOS population.
- Women from the Indian subcontinent were most at risk of developing GDM, in both PCOS and non PCOS groups.
- Women from the Indian subcontinent with PCOS developed GDM at a ratio of 16:1 compared to their Caucasian/European counterparts.
- 7.0% of women with PCOS (including diabetics) were exposed to metformin, compared to 0.2% of non PCOS women.
- Women exposed to metformin who went on to develop GDM were from the Indian subcontinent or other Asian background.

## 6. Conclusion

- GDM was more prevalent at St George's Healthcare NHS Trust in the PCOS population and was positively associated with BMI and being from the Indian subcontinent.
- Women with PCOS who were exposed to metformin were more likely to have a larger BMI than those not exposed and are thus a higher risk group for developing GDM.
- 3.7% of women exposed to metformin went on to develop GDM. This group was almost exclusively composed of women from the Indian subcontinent.

## 7. References

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