# CLINICAL AND SUBCLINICAL FEATURES OF PREGNANT WOMEN AFTER IN VITRO FERTILISATION

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# INTRODUCTION

- GDM is a common endocrine disorder in pregnant women
- GDM is associated with increased risk of maternal and fetal, such as pre-eclampsia, caesarean deliver, perinatal mortality
- Pevalence of GDM: 1 – 14% depending on the population studied and the diagnostic test used. In recent years: ↑ ~ 40%
- Advances in ART → pregnant women after IVF is increasing
- Risk factors of GDM: multiple pregnancies, advanced maternal age, PCOS → common at pregnant women after IVF
- ART → ↑ 28% likelihood of GDM (Wang et al.)
- To raise awareness about GDM- related diseases in order to provide timely diagnosis and appropriate care

# OBJECTIVES OF THE STUDY

1

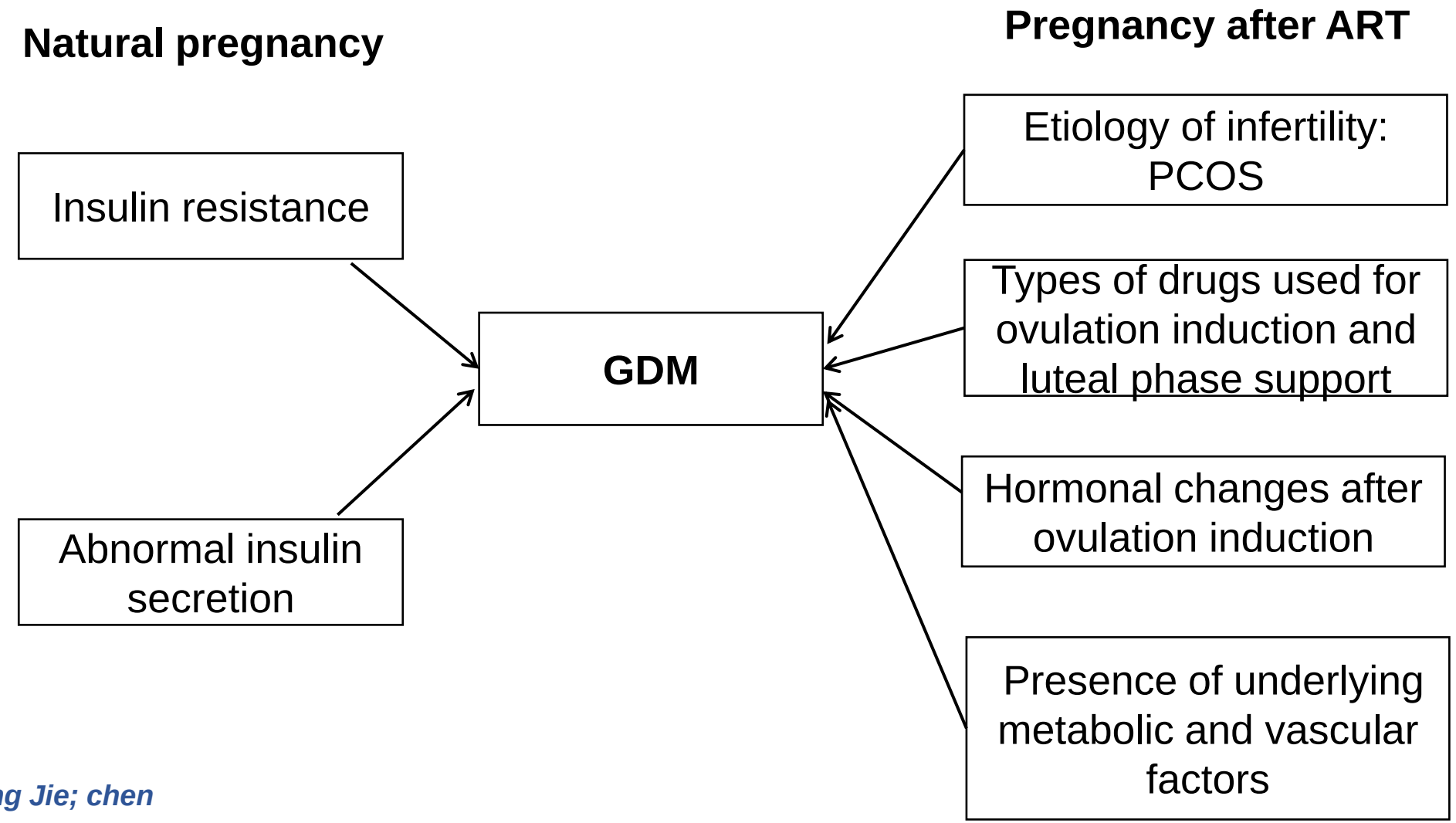
- ***Determine the rate of gestational diabetes mellitus in pregnant women after in vitro fertilization, gestational age from 24 to 28 weeks***

2

- ***Comment some clinical and para- clinical features and related factors***

# OVERVIEW

## PATHOLOGY OF GESTATIONAL DIABETES MELLITUS




*Zhang Jie; chen*

# OVERVIEW

## STUDIES ON THE RATE OF GDM IN PREGNANT WOMEN AFTER ART

- Y.A. Wang (2013): ART mothers had 28% increased likelihood of GDM.
- Asrafi (2014): the risk of GDM is two-fold higher in women with singleton pregnancies conceived following ART
- Zhang Jie (2015): significant difference in incidence of GDM between ART group and NC group (11,2% vs 6,81; OR = 1,73)
- Trieu Thi Thanh Tuyen (2015): incidence of GDM after IVF :25,4%

# MATERIALS AND METHODS

- Methods: prospective cross-sectional describe study in pregnant women after IVF with gestational age 24-28 weeks.
- Time: Since 2015 November to 2016 October
- Location: Endocrine Dept _ BachMai hospital, The national hospital of Obstetric and Gynecology

# MATERIALS AND METHODS

- **Risk factors of GDM**: *( the 4th international Workshop-Conference on GDM)*

✓ **Maternal age** ≥ 35

✓ **Preconceptional BMI:** ≥ 23 kg/m2

✓ **Urine Glucose Test: positive**

✓ **Family history of Diabetes**

✓ **Delivering large babies** ≥ 4 kg

✓ **History of GDM**

✓ **Bad obstetric history**

- **Classification of weight by Prepregnancy BMI** *( WHO criteria for the Asia-Pacific area in 2000*)

✓ **Underweight :** BMI < 18,5

✓ **Normal range:** BMI 18,5 – 22,9

✓ **Overweight:** BMI ≥ 23

# MATERIALS AND METHODS

- **Maternal complications**

✓ **Hypertension:** ≥ 140/90 mmHg (JNC VII)

✓ **Preeclampsia**: hypertension, edema, proteinuria ≥ 0,5 g/24h

✓ **Pre-term labor:** 28 → < 37 weeks

✓ **polyhydraminos:** AFI > 240mm or the deepest vertical pool > 80mm

✓ **Still-birth** : > 48 hours

✓ **Urinary tract infection :** WBC > 5000/ml

- **Neonatal complications**

✓ **Macrosomia :** > 4 kg

✓ **Low birth weight :** < 2,5 kg

✓ **Hypoglycemia in the newborn:** ≤ 2,2 mmol/l

✓ **Birth aphysia:** Apgar ≤ 7

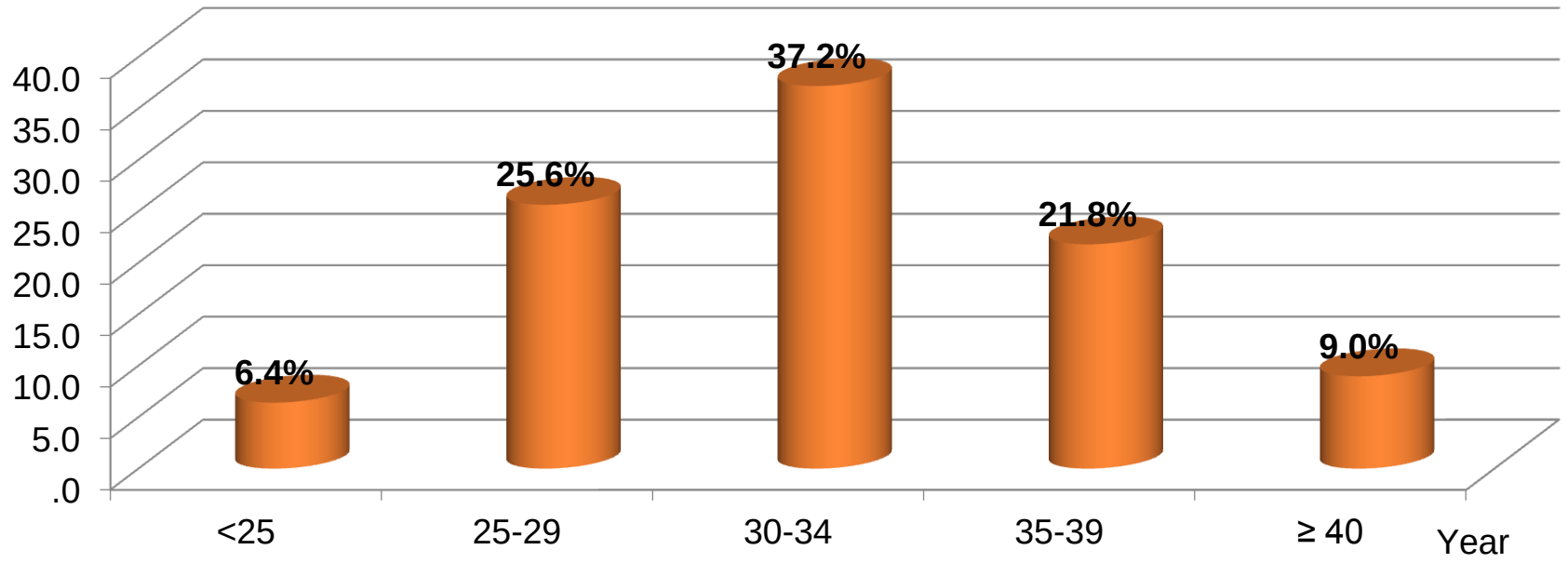
✓ **Abnormalities:**

- gastrointestinal abnormalities
- Neural tube defects
- Other Abnormalities:

# RESULTS & DISCUSSION

## General features

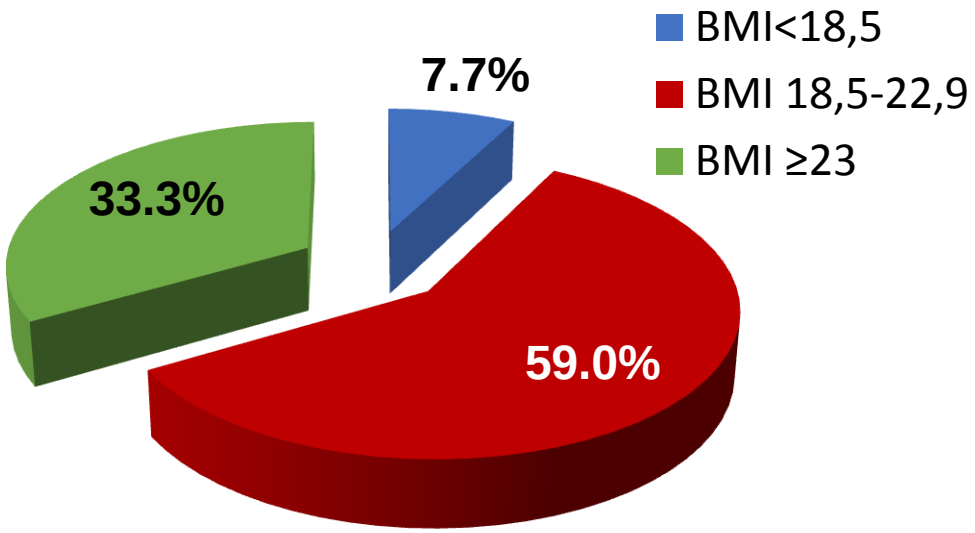
**Mean Age: 32,18  5,0**




***Age distribution***

***Phạm Thị Tân***
***Asrafi (2014): 32,5 9  5,0 year***

**Mean BMI : 22  3,4 kg/m2**

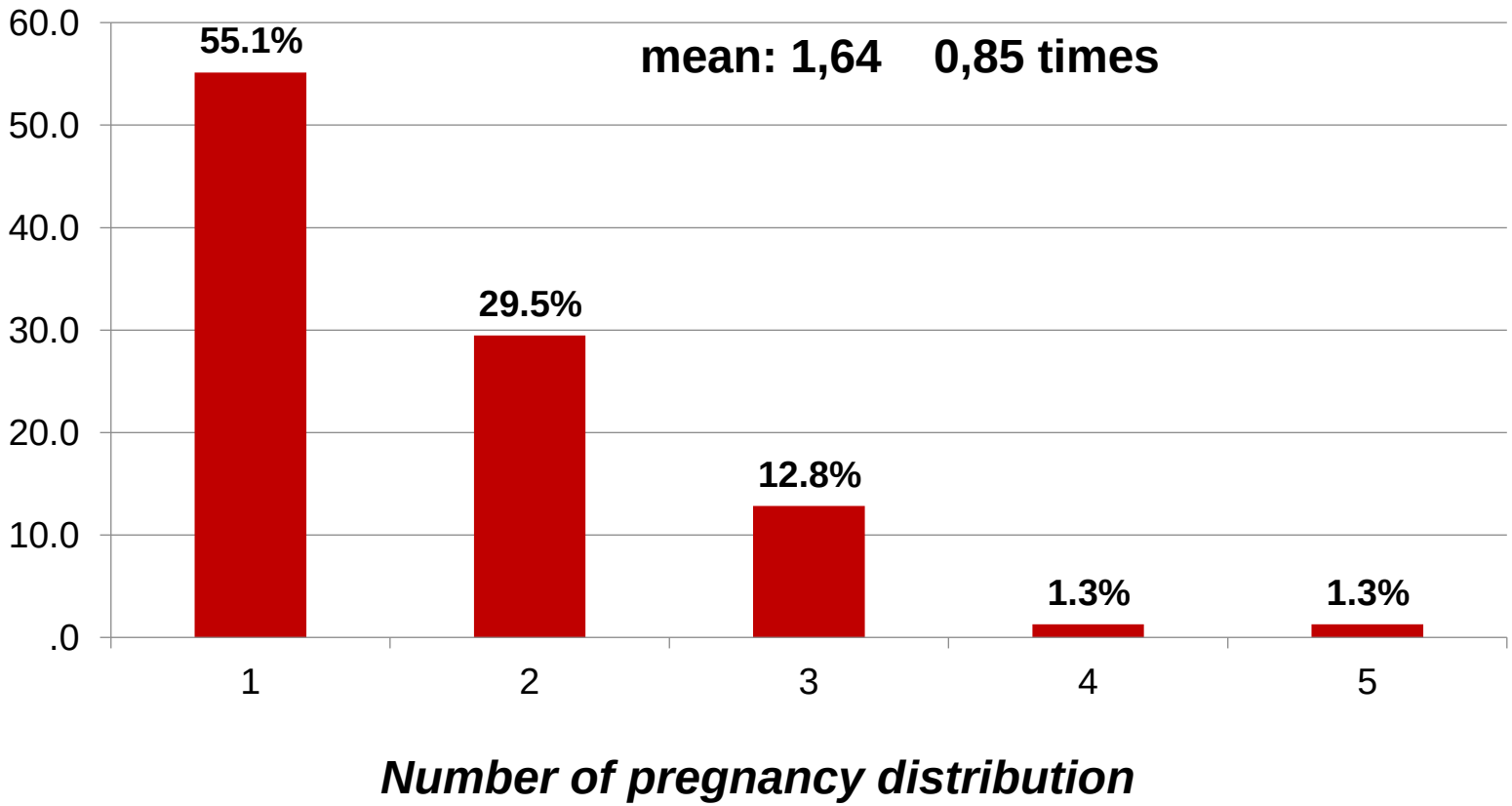


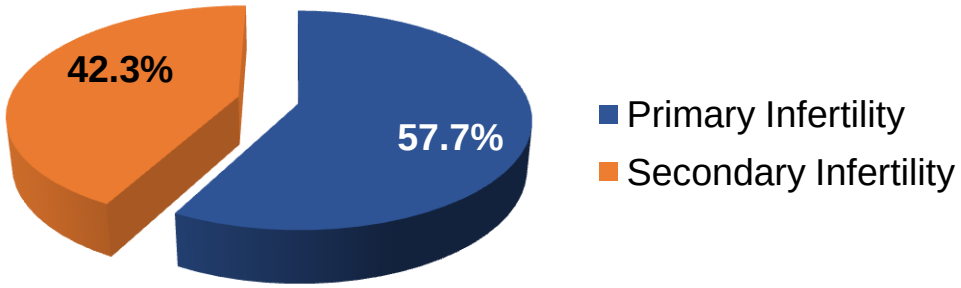

***Prepregnancy BMI Distribution***

***Weight gain in pregnancy***

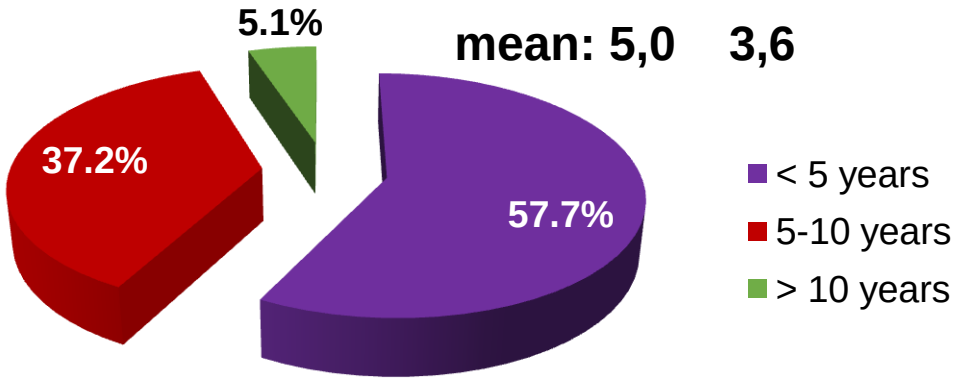
| Mean weight gain | Min - max |
|---|---|
| 8,4  4,1 | 1 - 22 |

*Asrafi, Iran (2014): BMI 26,6  4,4 kg/m2; TC 11,2  2,6 kg*


60.0
50.0
40.0
30.0
20.0
10.0
.0
55.1%
29.5%
12.8%
1.3%
1.3%
mean: 1,64 0,85 times
1
2
3
4
5
Number of pregnancy distribution




***Classification of Infertility***




***Duration of Infertility***

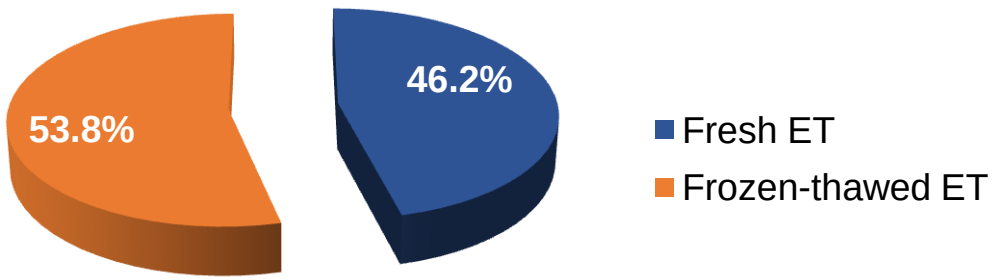
***Reason for infertility***

| | N | % |
|---|---|---|
| No apparent reason | 21 | 26,9 |
| **Ovulation Disorders** | **19** | **24,4*** |
| Tubal factor | 17 | 21,8 |
| Abnormal semen quality | 17 | 21,8 |
| Uterine malformation | 3 | 3,8 |
| Abnormal chromosome | 1 | 1,3 |
| **Total** | 78 | 100 |

***PCOS: 19,2% (15 pregnant women)**

***Hoang Van Hung (2015): primary 54,7%***
***Pham Thi Tan (2015): primary 53,8%***

***Szymanska (2011): PCOS 16,7%***
***Zhang Jie (2014): PCOS 12,85%***

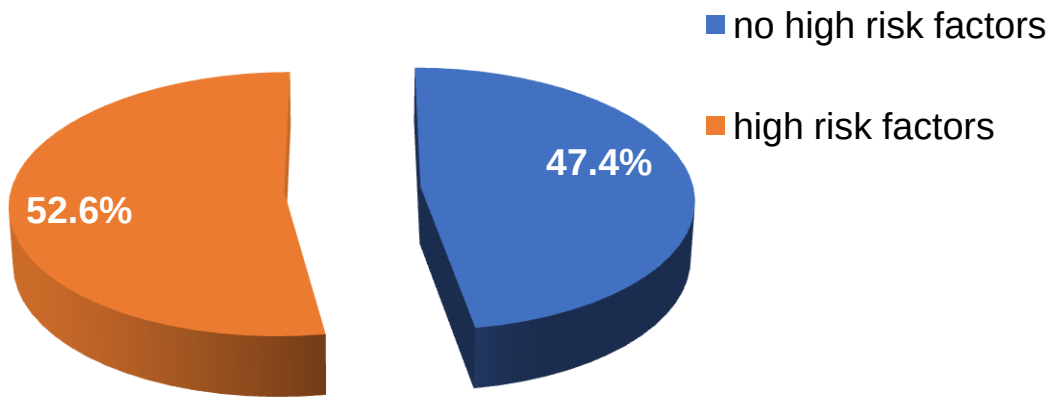



***Controlled Ovarian Hyperstimulation Program***

***Different number of fetuses***

| Number of fetuses | N | (%) |
|---|---|---|
| 1 | 35 | 44,9 |
| **2** | **42** | **53,8** |
| 3 | 1 | 1,3 |
| **Total** | 78 | 100 |

***Basirat (2016): no significant difference***



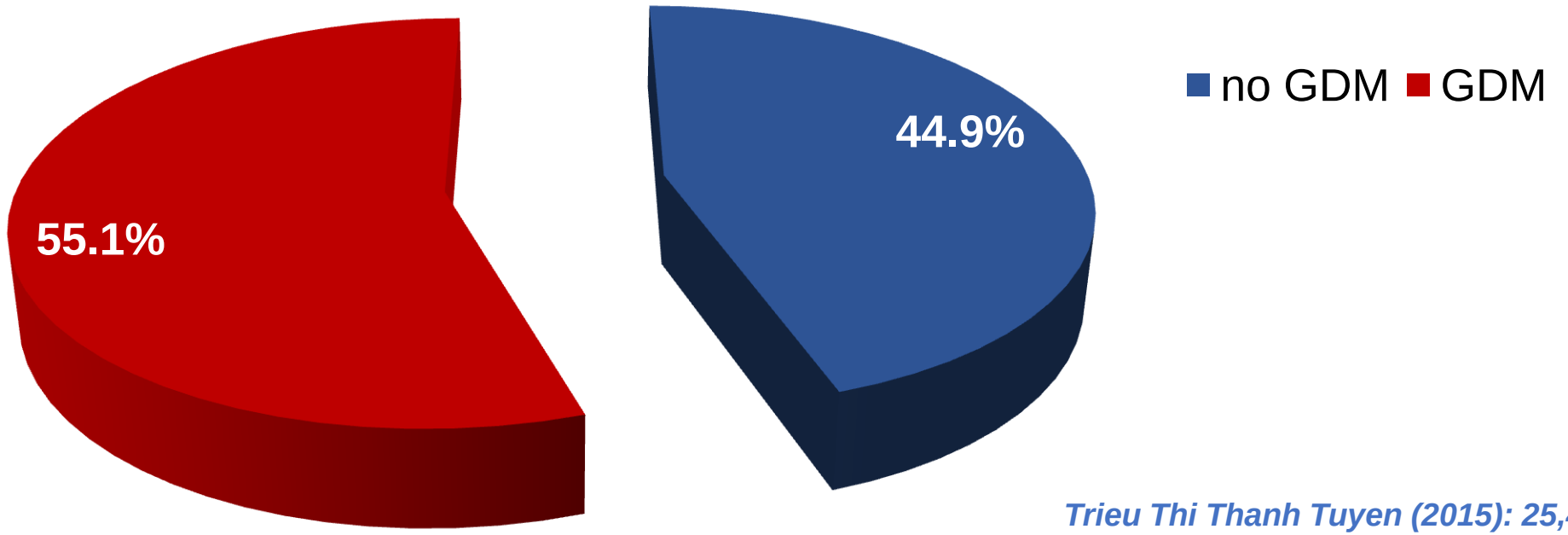

***Classification of high risk factors***

***Proportion of high risk factors***

| | N | (%) |
|---|---|---|
| **Overweight** | **26/78** | **33,3%** |
| Family history of diabetes | 19/78 | 24,4% |
| Glucose urine test (+) | 13/78 | 16,7% |
| Macrosomia ( ≥ 4kg) | 1/78 | 1,3% |
| History of GDM | 1/78 | 1,3% |
| History of Impaired glucose tolerance | 0/78 | 0% |

***Thai Thi Thanh Thuy (2011): Risk Factors 19,3%; BP 7%; HF 9,3%***

# The prevalence rate of GDM in women with IVF conceived pregnancy




*Trieu Thi Thanh Tuyen (2015): 25,4%;*

*Wang (2013): 7,6%/5,0% (AOR= 1,28)*

*Zhang Jie (2015): 11,2%/ 6,81 (OR =1,73)*

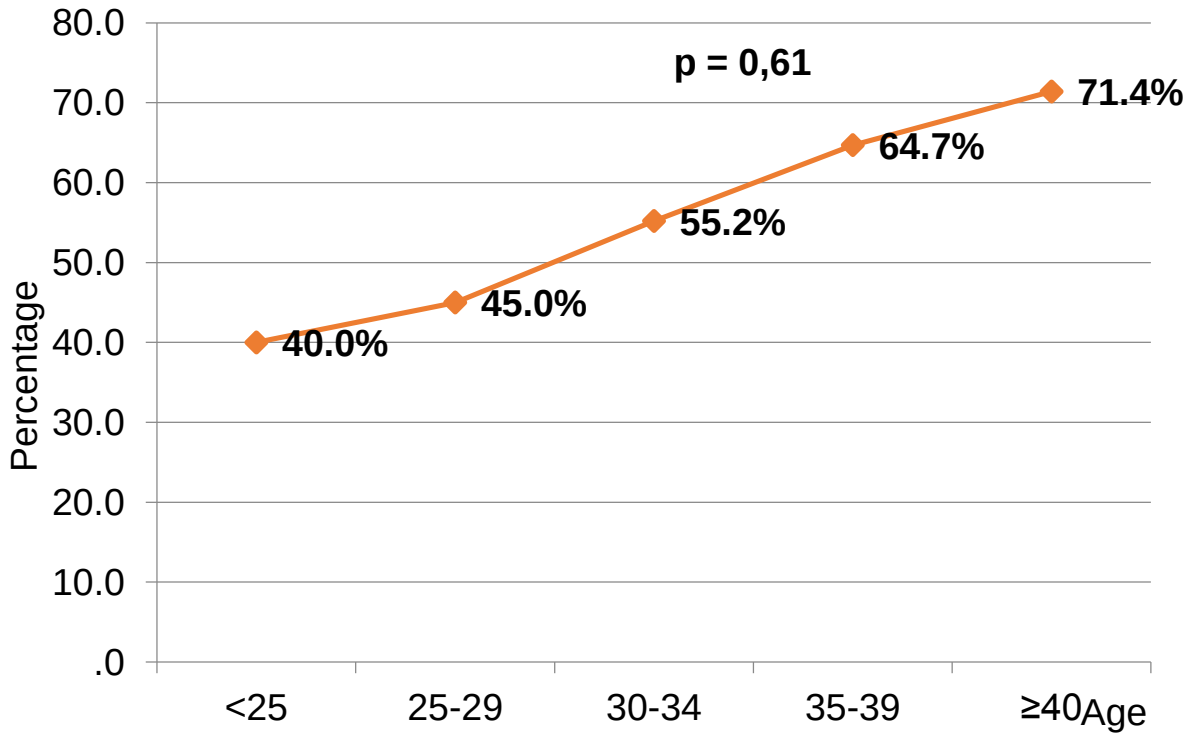
*Thai Thi Thanh Thuy (2011): 39%*

# Clinical,paraclinical features and some related factors in the women with GDM

***Comparisons of clinical features between GDM and non-GDM women***

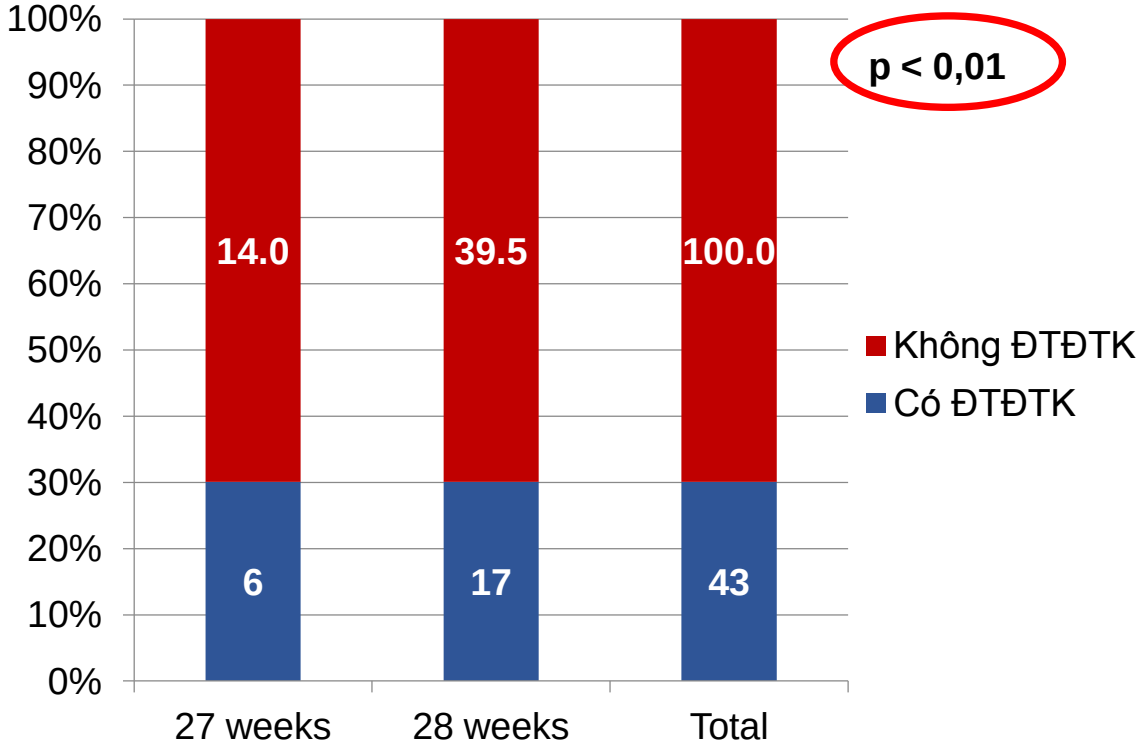
| | GDM (n=43) | Non-GDM (n=35) | p |
|---|---|---|---|
| **Age ( year )** | 31,06 5,2 | 31,3 4,2 | 0,11 |
| **Prepregnancy BMI (kg/m$^2$)** | **22,8 3,5** | **21,1 3,1** | **0,03** |
| **Weight gain (kg)** | 9,1 4,5 | 7,7 3,6 | 0,14 |
| **Nulliparous (%)** | 79,1% | 82,9% | 0,67 |

***Pham Thi Ngoc Y: age: 30,3 55,8; BMI 20,8 5,8***



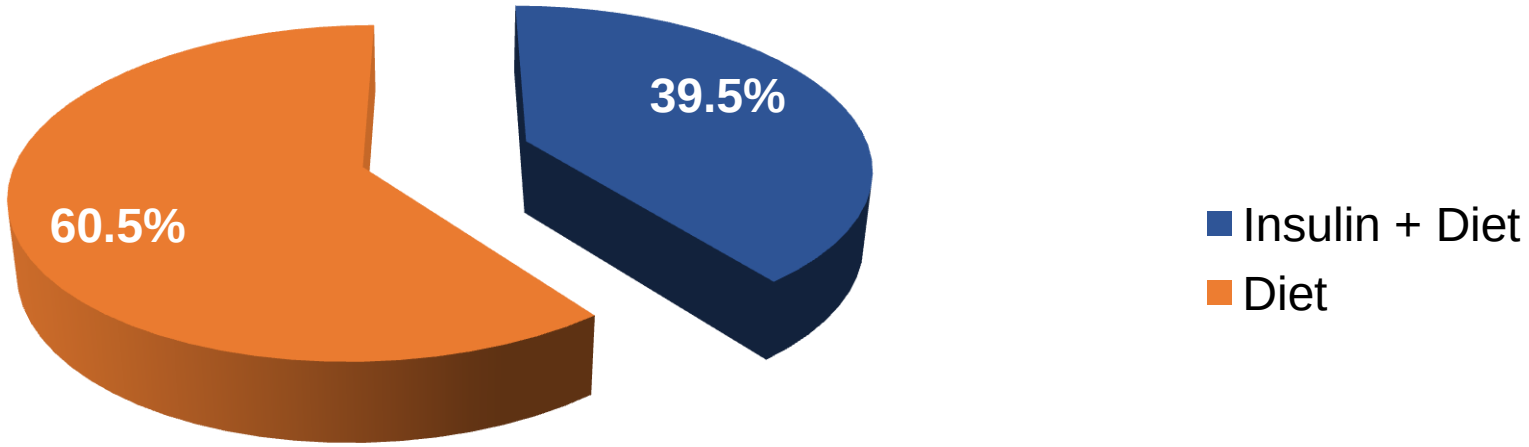

***Prevalence of GDM by maternal age***

***Wang (2013): 5,1 %(<25) → 13,5% (≥45); p < 0,01***




***Prevalence of GDM by BMI***

***Persson (2012): GDM ↑ BMI***




***Distribution of GDM women according to method of glycemic management***

***Pham Thi Ngoc Yen (2015): 6,7%***

***OGTT results and HbA1C in women with GDM***

| | mean SD | Min - max |
|---|---|---|
| OGTT 0h (mmol/l) | 5,41 1,24 | 4,0 – 11,5 |
| OGTT 1h (mmol/l) | 11,37 1,73 | 8,0 – 16,6 |
| OGTT 2h (mmol/l) | 10,15 2,40 | 6,5 – 19,2 |
| HbA1c (%) | 5,51 0,56 | 4,7 – 7,1 |

***Pham Thi Ngoc Yen: 5,1 0,4; 8,2 1,2 & HbA1c 5,2 0,3***

***Correlation using Logistic regression analysis on high risk factors in women with GDM***

| Risk factors | | Non-GDM (n= 35) | GDM (n= 43) | $p^1$ OR(95%CI) | $p^2$ AOR(95%CI) |
|---|---|---|---|---|---|
| **Family history of DM** | No | 26 (74,3%) | 33 (76,7%) | 0,80<br>0,89 (0,31-2,45) | 0,35<br>0,57 (0,18-1,84) |
| | Yes | 9 (25,7%) | 10 (23,3%) | | |
| **History of GDM** | No | 34 (97,1%) | 43 (100%) | 0,45** | 1,00** |
| | Yes | 1 (2,9%) | 0 (0%) | | |
| **History of macrosomia** | No | 35 (100%) | 42 (97,7%) | 1,00** | 1,00** |
| | Yes | 0 (0%) | 1 (2,3%) | | |
| **Urine Glucose** | No | 33 (94,3%) | 32 (74,4%) | **0,02**<br>**5,67 (1,17-27,62)** | **0,04**<br>**5,64 (1,05- 30,29)** |
| | Yes | **2 (5,7%)** | **11 (25,6%)** | | |
| **BMI ≥ 23 kg/m²** | no | 27 (77,1%) | 25 (58,1%) | 0,09<br>2,43 (0,90-6,57) | 0,19<br>2,02 (0,70-5,83) |
| | yes | 8 (22,9) | 18 (41,9%) | | |

***Comparisons of the rate of PCOS between women with GDM and non-GDM***

| PCOS / GDM | no (n = 63) | yes (n = 15) | p | OR (95%CI) |
|---|---|---|---|---|
| **no** | 28 (44,4%) | 7 (46,7%) | 0,94 | 0,97 (0,40 – 2,37) |
| **yes** | 35 (55,6%) | 8 (53,3%) | | |

***Comparisons of obstetric histories between women with GDM and non-GDM***

| *obstetric histories* | Non-GDM (n = 35) | GDM (n = 43) | p |
|---|---|---|---|
| **Number of pregnancy (TB SD)** | **1,49 0,70** | **1,77 0,95** | 0,15 |
| **Pre-term labor (N (%))** | 1 (2,9%) | 1(2,3%) | 1,00 |
| **Miscarriage, stillbirth (N (%))** | 14 (40%) | 20 (46,5%) | 0,56 |

***Comparisons the rate of women with GDM between different COH programs***

| ET / GDM | Fresh embryo ET (n = 36) | Frozen-thawed embryo ET (n = 42) | p | OR (95%CI) |
|---|---|---|---|---|
| **no** | 13 (36,1%) | 22 (54,2%) | 0,15 | 0,51 (0,21 – 1,28) |
| **yes** | **23 (63,9%)** | **20 (47,6%)** | | |

***Zhang Jie (2014): Tỷ lệ ĐTĐTK PT cao hơn (12,13 vs 6,81; p<0,01)***

***Comparisons the rate of GDM women between singleton and multiple pregnancy***

| Number of fetus / GDM | singleton (n = 35) | multiple (n = 43) | p | OR (95%CI) |
|---|---|---|---|---|
| **no** | 16 (44,4%) | 19 (45,2%) | 0,94 | 0,97 (0,40 – 2,37) |
| **yes** | **20 (55,6%)** | **23 (54,8%)** | | |

***Zhang Jie (2014): MQH số thai và ĐTĐTK (AOR = 2,21)***

***Compare maternal complications between women with GDM and non-GDM***

| Complications | Non-GDM (n = 35) N(%) | GDM (n = 43) N(%) | p |
|---|---|---|---|
| **Hypertension** | 1 (0%) | 4 (7%) | 0,37 |
| **Preeclampsia** | 0 (0%) | 1 (2,3%) | 1,00 |
| **UTI** | 1 (2,9%) | 2 (4,7%) | 0,45 |
| **Polyhydraminos** | 3 (8,6%) | 3 (7,0%) | 1,00 |

## *Neonatal complications between women with GDM and non-GDM*

| complications | Non-GDM (n = 20) N(%) | GDM (n = 32) N(%) | p |
|---|---|---|---|
| **Low birth weight (< 2,5kg)** | **5 (25%)** | **18 (56,3%)** | **0,03** |
| **Neonatal hypoglycemia** | 1 (5,0%) | 1 (3,1%) | 1,00 |
| **Congenital Malformations** | 0 (0%) | 1# (3,1%) | 0,28 |
| **Macrosomia (≥ 4 kg)** | 0 (0%) | 0 (0%) | - |
| **Perinatal mortality** | 0 (0%) | 0 (0%) | - |
| **Birth aphysia** | 0 (0%) | 0 (0%) | - |

***Pham Thi Ngoc Yen: 5,6%***
***Grady(2011)***

# CONCLUSIONS

**1. The prevalence rate of GDM in women with IVF conceived pregnancy :** 55,1 % ( ADA 2011)

**2. Clinical, paraclinical features and some related risk factors in women with GDM.**

- **Clinical features:**

✓ Age: 31,06 ± 5,2 years

✓ Prepregnancy BMI : 22,8 ± 3,5 kg/$m^2$. Pre-pregnancy increases in BMI may increase a woman's risk of GDM pregnancy

✓ 39,5% women : require insulin therapy in addition to diet modification for glycemic control.

- **Some related risk factors:**

✓ Positive urine glucose is One of risk factors relating to gestational diabetes (OR = 5,67).

✓ The incidence of LBW is significantly higher in women with GDM than non-GDM. (56,3% vs 25%; p = 0,03).

✓ No relations between PCOS and multiple pregnancy with GDM

✓ No difference in the prevalence of PCOS and Multiple pregnancy between women with GDM and non-GDM.

# RECOMMENDATIONS

- ✓Women received IVF treatment should be evaluated for risks of GDM and managed before treatment for infertility.
- ✓Early screening for gestational diabetes in pregnant women after in vitro fertilization to minimize adverse pregnancy outcomes for both mother and fetus.

# THANKS FOR YOUR ATTENTION!