



# STUDY OF INSULIN RESISTANCE IN HYPOTHYROIDISM

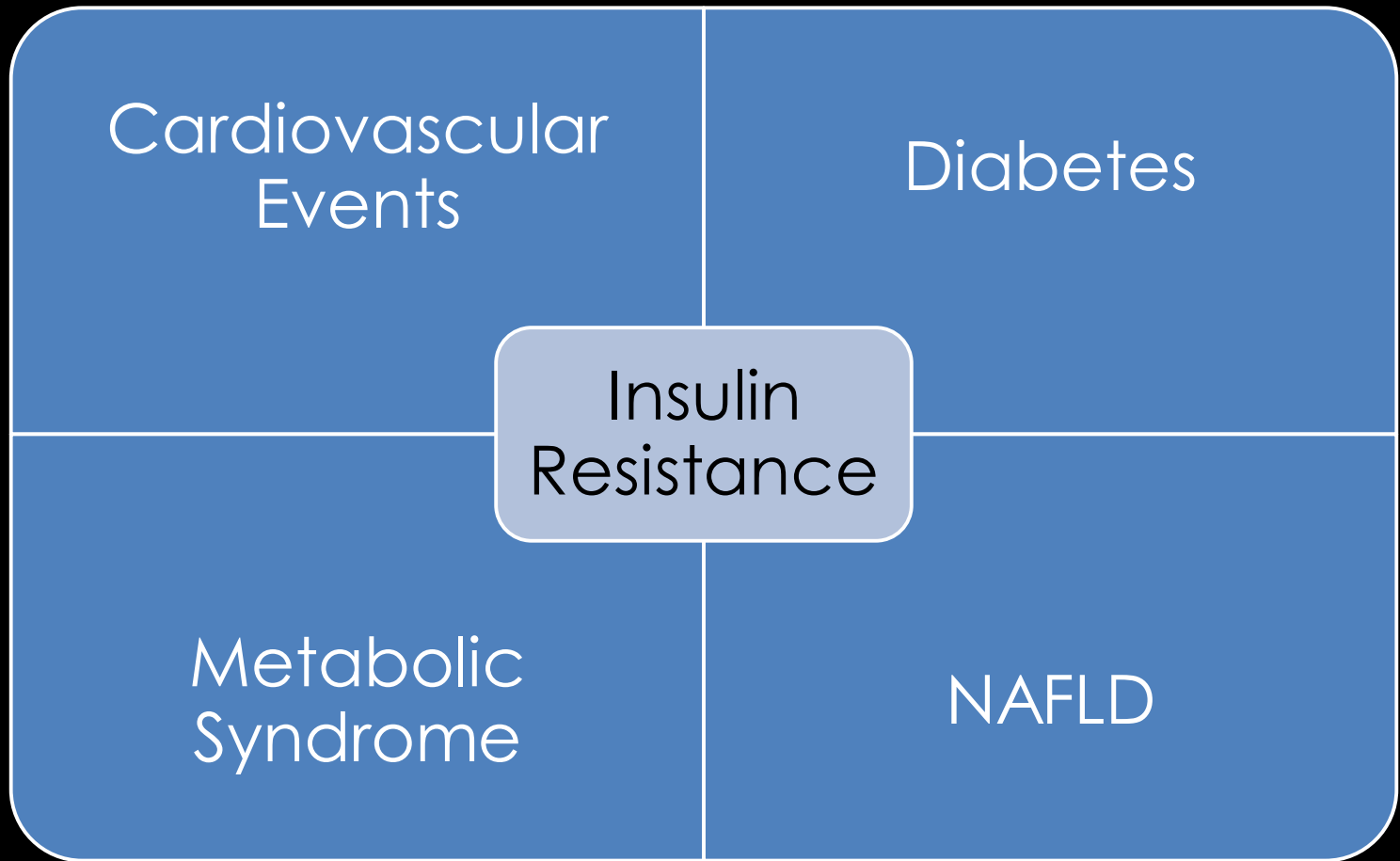
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# INTRODUCTION



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Insulin mediated glucose transport – GLUT4.

Role of thyroid hormones – upregulate the expression of genes for GLUT4 & phosphoglycerate kinase.

HPO –

- impaired binding of insulin to receptor.
- impaired translocation of GLUT4.
- Dyslipidemia

# OBJECTIVE

**Primary objective – To study insulin resistance in patients with hypothyroidism**

**Secondary objectives –**

- **Blood sugar levels between HPO & EU**
- **Sr.Insulin levels between HPO & EU**
- **Co-relation of TSH with sr insulin**

# METHODOLOGY

## Study Design

- Case-Control Study

## Study area

- NSCB Govt. Medical Collrge Jabalpur

## Sample Size

- 30 cases
- 30 controls

## Target Population

15 to 60 years

## Inclusion criteria

Case:- C/F of hypothyroidism and/or biochemically diagnosed

Controls :- Apparently healthy Euthyroid age & sex matched

## Exclusion criteria

Diagnosed cases of

- 1.DM2
- 2.HTN
- 3.CKD
- 4.CLD
- 5.Acute infectious diseases
- 6.PCOD

# Measures

- **Serum fasting insulin (3-25 mU/L)**  
(method-electro chemiluminescence)
- **Fasting blood glucose (<100mg/dL)**
- **Homeostatic Model Assessment of insulin resistance (HOMA-IR)**

$$\text{HOMA-IR} = (\text{FBS})(\text{Sr. Insulin}) / 405$$

Insulin resistance > 1.0

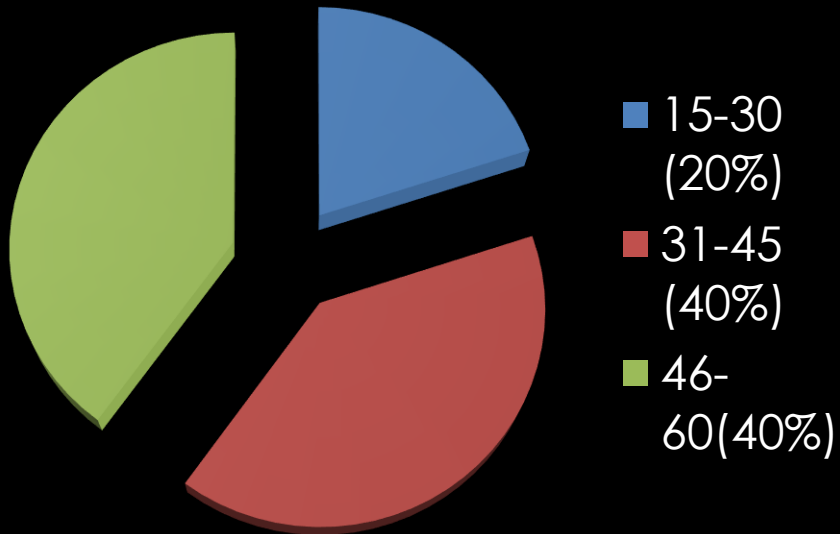
# Observations & Analysis



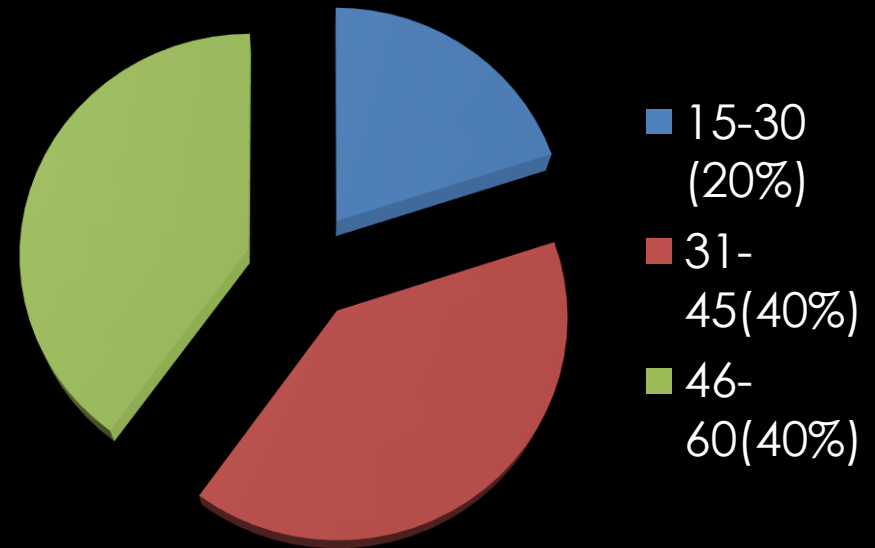


# AGE WISE DISTRIBUTION OF CASES & CONTROLS (TOTAL N=60,p=0.974)

Cases

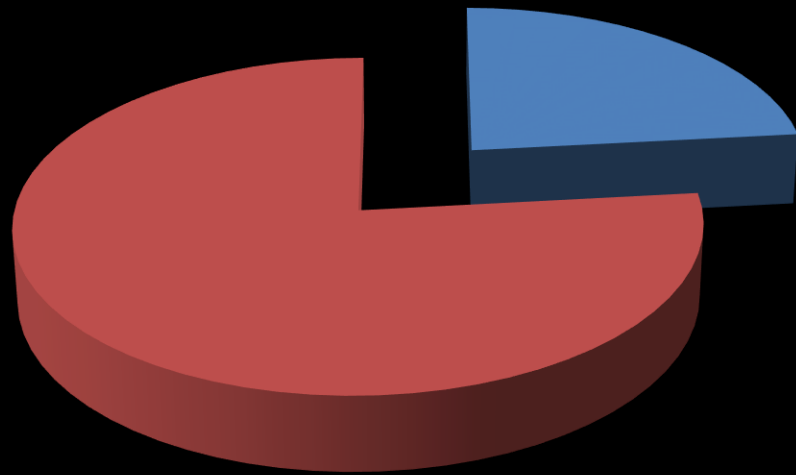


Controls



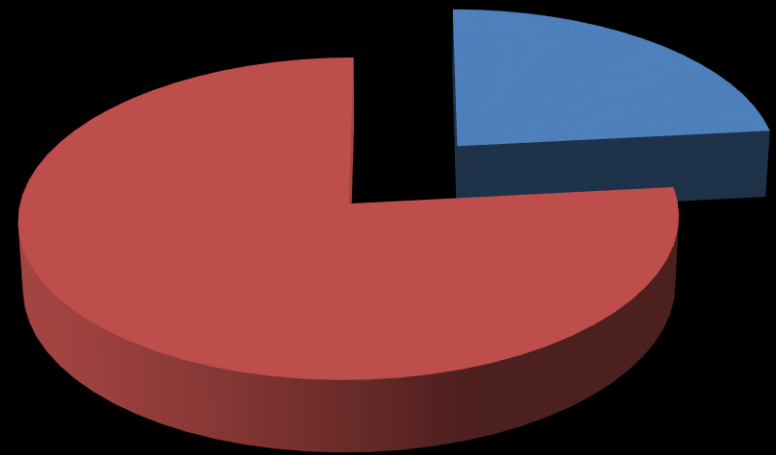
# SEX WISE DISTRIBUTION OF CASES & CONTROLS (TOTAL N=60)

Case



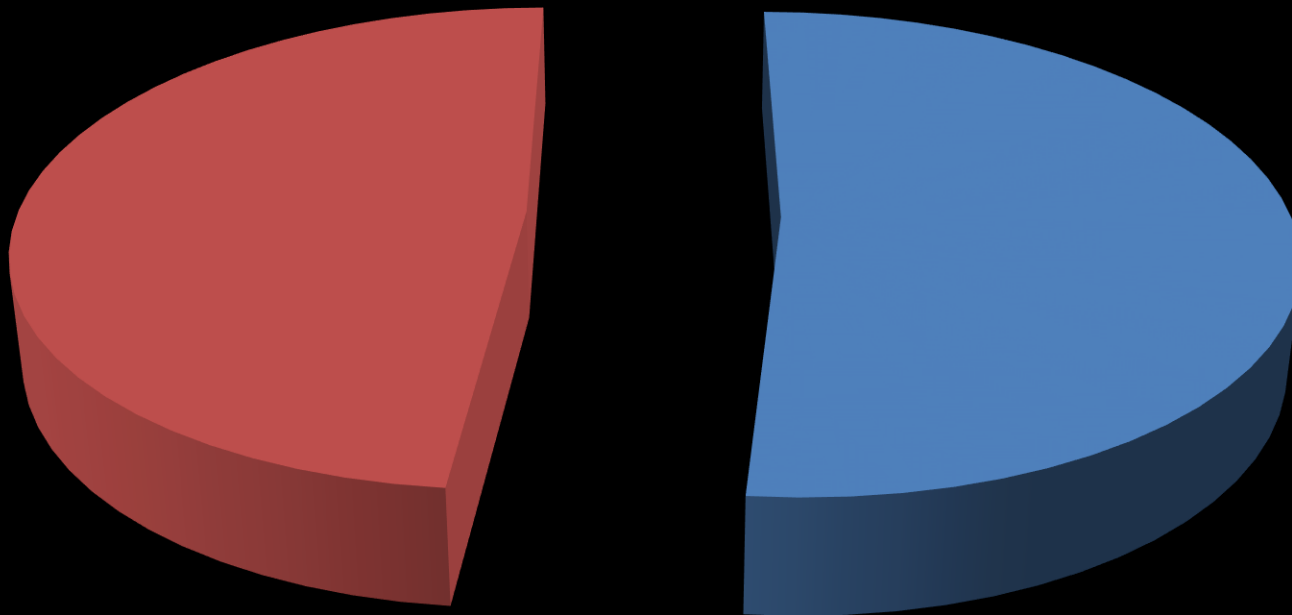
■ Male 23.3% ■ Female 76.7%

Control



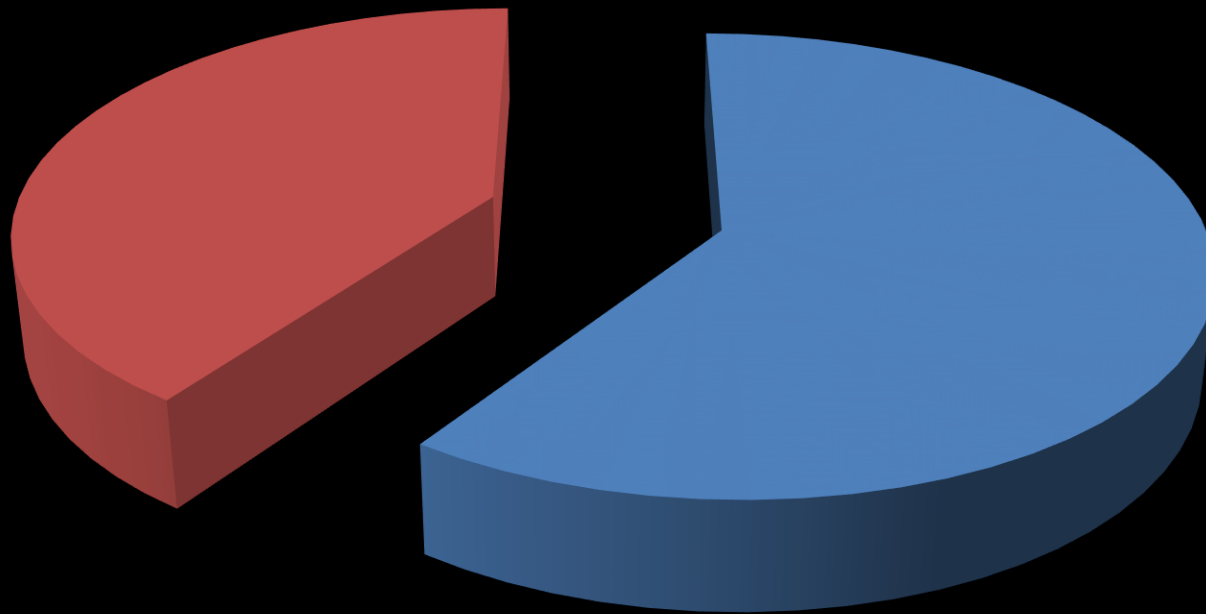
■ Male 26.6% ■ Female 74.4%

# MEAN FBS (Cases Vs Controls)<sub>p=0.316</sub>



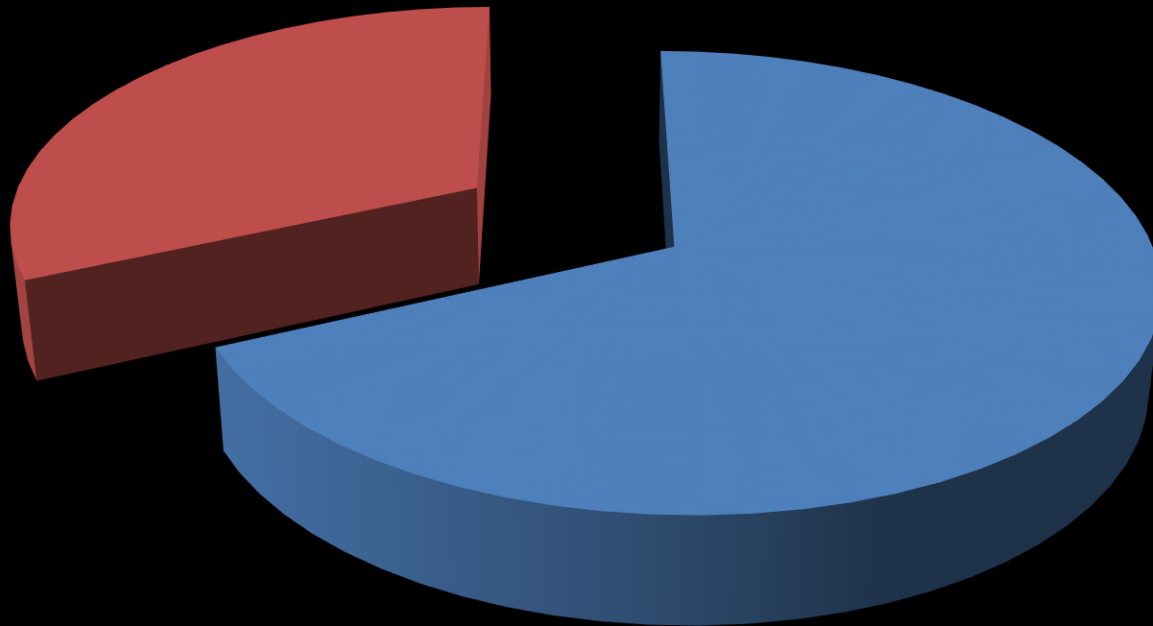
■ Cases 86.81   ■ Controls 81.6

# MEAN SERUM INSULIN (Cases Vs Controls) $p=0.0242$



■ Cases 5.87   ■ Controls 3.96

# MEAN HOMA-IR (Cases Vs Controls) $p=0.0181$

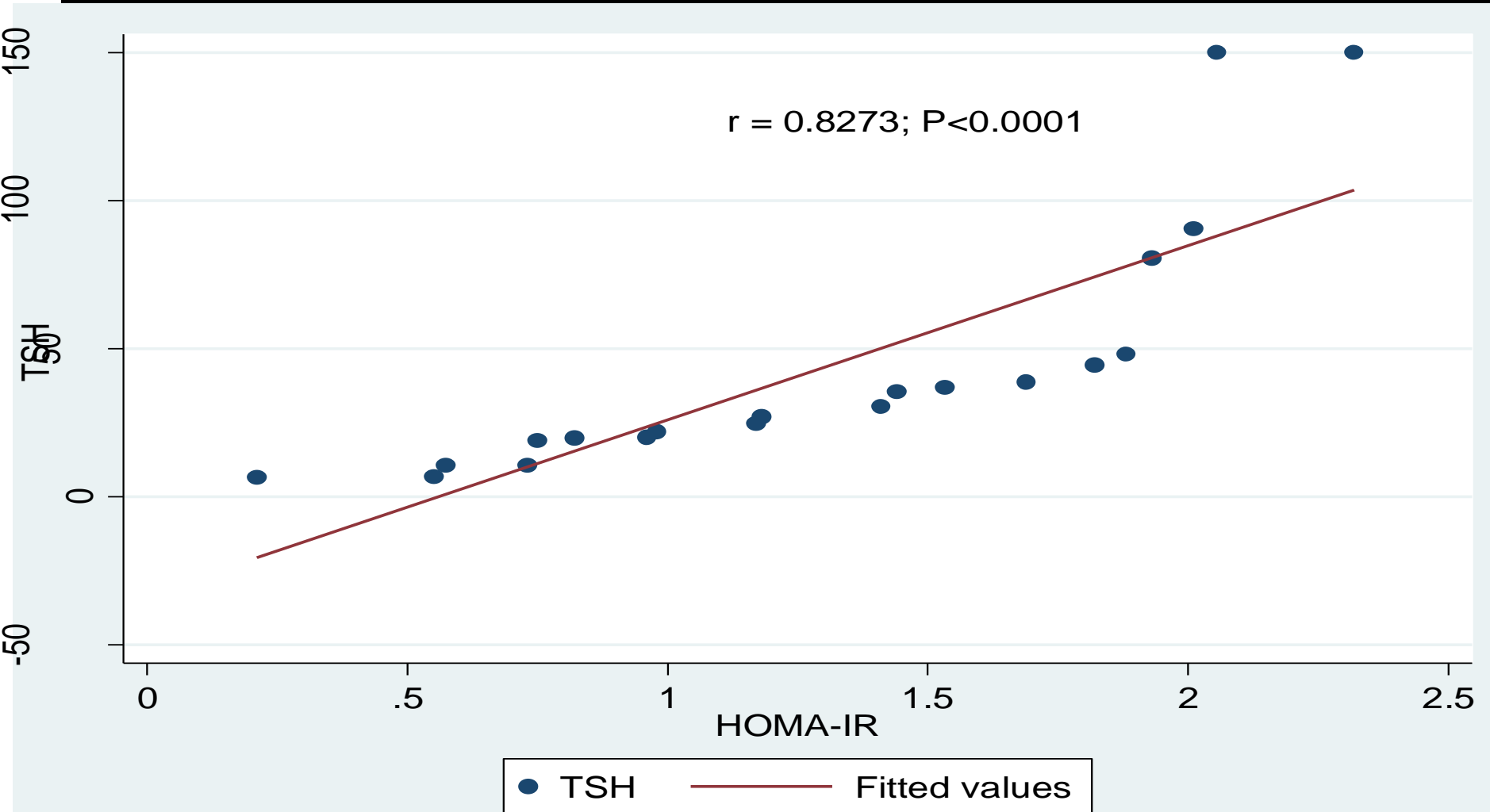


■ Cases 1.8   ■ Controls 0.84

# RESULTS (MEAN +/- SD)

Parameters	Cases	Controls	T-test	P-value
Age	39.90 +/- 9.51	39.80 +/- 9.53	0.03	0.974
FBS	86.81 +/- 19.77	81.60 +/- 11.69	1.01	0.316
BMI	26.8 +/- 1.8	25.9 +/- 1.5	0.90	0.47
Sr.insulin	5.87 +/- 2.68	3.96 +/- 2.46	2.35	<b>0.0242</b>
HOMA-IR	1.80 +/- 0.59	0.84 +/- 0.58	2.47	<b>0.0181</b>
T3	0.75 +/- 0.24	1.8 +/- 0.27	4.13	<b>0.0002</b>
T4	5.40 +/- 4.06	8.49 +/- 1.37	3.23	<b>0.0025</b>
TSH	43.59 +/- 42.48	4.14 +/- 0.57	4.15	<b>0.0002</b>

# LINEAR REGRESSION ANALYSIS – TSH Vs HOMA-IR



# CONCLUSIONS

- Females 76.6%
- Mean Sr.insulin in cases 5.87 +/- 2.68
- Mean Sr.insulin in controls 3.96 +/- 2.46
- Mean HOMA-IR in cases 1.80 +/- 0.59
- Mean HOMA-IR in controls 0.84 +/- 0.58
- TSH levels positively co-related with HOMA-IR



# Take home message



- **Screen for Hypothyroidism.**
- **Treat Hypothyroidism at an early stage.**
- **Frequent monitoring with glucose & insulin in hypothyroid patients.**
- **Patient education.**

# References

- Adhau SR et al, .Int J Res Med Sci (2015,June) – Insulin resistance in hypothyroidism
- Vyakaranam et al, .Int J Health Sci Res (2014,Sept) – Study of insulin resistance in hypothyroidism
- Ujwal Upadya B et al, .Journal of ckinical & diagnostic research (2015,Feb) – Effect of Insulin resistance in assessing the clinical outcome of hypothyroid patients
- Kumar et al, . Saudi Med J 2009;Vol 30(7)-Thyroid hormones in metabolic syndrome
- E Maratou et al, .European journal of Endocrinology(2009)-Studies of insulin resistance in patients with hypothyroidism

# Thank you for having me! 😊

I wake up every day planning to be productive. Then my thyroid says, "Ha, that's a good one!", and we laugh, and laugh and then, I take a nap.

Hashi Humor

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