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Study of Prevalance of Impaired Glucose Tolerance and Diabetes Mellitus in PCOS Women (15 To 25)

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I. Introduction

Polycystic ovary syndrome is one of the most common endocrine disorders in women of reproductive age, affecting 5% to 10% of women worldwide. This familial disorder inherited as a complex genetic trait[1]. It is characterized by a combination of hyperandrogenism (either clinical or biochemical), chronic anovulation, and polycystic ovaries. It is frequently associated with insulin resistance and obesity[2]. PCOS receives considerable attention because of its high prevalence and possible reproductive, metabolic, and cardiovascular consequences. Studies in first-degree relatives of patients who have PCOS have shown that 24% of mothers and 32% of sisters are affected, suggesting a major genetic association[3].The disease begins soon after puberty mostly 15-25 years of age and commonly manifests during reproductive period. Health consequences of PCOS relate to insulin resistance and hyperandrogenism. They include diabetes, obesity, metabolic syndrome (MS), endometrial hyperplasia, anovulatory infertility, and depression. Risk for diabetes has been shown to be higher in women and adolescents who have PCOS. Studies have shown that in women who have PCOS, 7.5% to 10% had type2 diabetes and approximately 30% to 35% had impaired glucose tolerance[4,5].

Impaired glucose tolerance is known to be a significant risk factor for developing diabetes, as was shown in the Diabetes Prevention Trial. The rate of conversion from IGT to type 2DM is increased 5-15 fold in PCOS[6]. Multiple factors contribute to diabetes risk in women with PCOS. The risk factors are obesity, Insulin resistance, decreased peripheral insulin sensitivity, Centripetal fat distribution, Hyperinsulinemia, Beta-cell dysfunction, Chronic anovulation, Family history of type 2 diabetes, dyslipidemia[7].

Aim and Objectives of the Study

- To study the prevalence of impaired glucose tolerance and diabetes in young women (15 to 25 yrs) with PCOS in relation to age, socioeconomic status, rural and urban areas, Body mass index (BMI), waist/hip circumference ratio, family history of PCOS and diabetes mellitus, so as to facilitate prevention of long term consequences.

II. Review of Literature

Historical Perspective

Multicystic or "sclerocystic" ovaries were recognized as early as the mid-18th century, associated primarily with pelvic pain or menorrhagia[8].

1921-The association between disorders of carbohydrate metabolism and hyperandrogenism was first described by Achard and Thiers. "diabetedes femmes a barbe" (diabetes of bearded lady)[9].

1935-Stein and Leventhal recognized an association between the presence of bilateral polycystic ovaries and signs of amenorrhea, oligomenorrhea, hirsutism and obesity then known as Stein-Leventhal syndrome[10].

1964-Stein reported the reversal to normal menstrual cycles and conceptions after bilateral ovarian wedge resection in a significant number of PCOS patients.

1980-Burghen and coworkers first reported a close association of hyperandrogenism and hyperinsulinemia in PCOS women[11]..

Studies

1. **Elisabeth Lerchbaum et al** [12] in 2014 analysed the association of family history of T2DM and PCOS. Results: A positive FHx of T2DM and PCOS were prevalent in 36.8 and 21.4% of PCOS women respectively.
2. **Vrbikova J et al[13]** in 2014 evaluated the utility of impaired fasting plasma glucose as defined by ADA to identify women with PCOS affected by impaired glucose metabolism. Conclusion- fasting plasma glucose is not sufficiently sensitive for the detection of impaired glucose tolerance and diabetes mellitus type 2 in women with PCOS.

3. **Jamil et al**[14] carried out case–control observational study on 263 women confirmed to have PCOS based on Rotterdam criteria. Although, there were no significant differences in IR, MS and glucose intolerance between the four PCOS phenotypes, women with PCOS are at higher risk of impaired glucose tolerance and undiagnosed diabetes.
4. **Flannery CA etal**[15] in 2013 studied Polycystic ovary syndrome in adolescence. Conclusion- abnormal glucose metabolism is highly prevalent in adolescents with PCOS. In particular, IGT occurs across the spectrum of BMI. A screening OGTT should be considered for adolescents diagnosed with PCOS, independently of their BMI.

DIAGNOSIS

Diagnosis of PCOS is after exclusion of other aetiologies that mimic PCOS
Criteria for the Definition of PCOS-

NIH Statement (1990)[16]

To include all of the following:
1. Hyperandrogenism and/or hyperandrogenemia
2. Oligo-ovulation
3. Exclusion of related disorders - Including but not limited to 21-hydroxylase-deficient nonclassic adrenal hyperplasia, thyroid dysfunction, hyperprolactinemia, neoplastic androgen secretion,drug-induced androgen excess, the syndromes of severe insulin resistance, Cushing's syndrome, and glucocorticoid resistance.

ESHRE/ASRM Statement (Rotterdam, 2003)[17]

To include two of the following, in addition to exclusion of related disorders:
1. Oligo-ovulation or anovulation (e.g., amenorrhea, irregular uterine bleeding)
2. Clinical and/or biochemical signs of hyperandrogenism (e.g., hirsutism, elevated serum total or free testosterone)
3. Polycystic ovaries (by ultrasonography)

AES Suggested Criteria for the Diagnosis of PCOS (2006)[18]

To include all of the following:
1. Hyperandrogenism: hirsutism and/or hyperandrogenemia
2. Ovarian dysfunction: oligo-anovulation and/or polycystic ovaries
3. Exclusion of other androgen excess or related disorders.

Differential Diagnosis of Polycystic Ovary Syndrome

- Idiopathic hirsutism
- Hyperprolactinemia
- Hypothyroidism
- Nonclassic adrenal hyperplasia
- Ovarian tumors or Virilising adrenal tumours
- Cushing's syndrome
- Glucocorticoid resistance
- Current or previous use of oral contraceptives, glucocorticoids, ovulation induction agents, anti-diabetic drugs, sodium valproate, aspirin, statins, and other hormonal drugs.

Consequences of Polycystic Ovarian Syndrome[19]

Short-term consequences

1. Irregular menses
2. Hirsutism/acne/androgenic alopecia
3. Infertility
4. Obesity
5. Metabolic disturbances
6. Abnormal lipid levels and Glucose intolerance

Long-term consequences

1. Diabetes mellitus
2. Cardiovascular disease
3. Endometrial cancer
4. Hypertension and atherosclerosis

Insulin Resistance
Euglycemic glucose clamp studies have demonstrated significant and substantial decreases in insulin-mediated glucose uptake in PCOS. This decrease (approximately 35% to 40%) is of a similar magnitude to that seen in type 2 diabetes and is independent of obesity, glucose intolerance, increases in waist-hip-girth ratio, and differences in muscle mass[20].

Family History of Type 2 Diabetes
First-degree relatives of patients with type 2 diabetes are more likely to experience the stigmata of insulin resistance, including impaired glucose tolerance. Diabetes risk is increased according to the number of relatives affected with type 2 diabetes and the closeness of the relation[21].

The Effects of Age on Insulin Resistance
Glucose tolerance tends to worsen with age,due to progressive beta-cell dysfunction. Impaired glucose tolerance is a risk factor for the development of type 2 diabetes, with an average conversion rate of 1% to 5% per year. Cumulative conversion rates are as high as 80% over 5 years[22].

III. Material And Methods

The present study includes 100 young women aged between 15 to 25 years diagnosed to have polycystic ovarian syndrome presenting to the Department of Obstetrics and Gynaecology, Gandhi Hospital, Secunderabad.

Study Design - Observational study
Duration of The Study – 2014- 2015

Selection of the patients:
The following patients are included in to the study with inclusion criteria:

Inclusion criteria:
Patients who were diagnosed to have PCOS according to Rotterdam criteria 2003 were included in the study.
The Rotterdam criteria are the following

- Oligo or anovulation (fewer than six menstrual periods in the preceding year).
- Clinical and/or Bio-chemical evidence of Hyperandrogenism.
- Polycystic ovaries, Presence of 12 or more follicles in each ovary measuring 2-9 mm in diameter and/or increased ovarian volume (> 10 ml).

PCOS was defined when at least two of the above features were present after exclusion of other conditions that mimic PCOS.

Exclusion criteria:

- Hypothyroidism
- Hyperprolactinemia
- Cushing's syndrome
- Congenital adrenal hyperplasia
- Adrenal tumors
- Current or previous (within the last months) use of oral contraceptives, glucocorticoids, antiandrogens, ovulation induction agents, anti diabetic drugs, sodium valproate, aspirin, statins and other hormonal drugs.
- Known Diabetic

Informed consent is obtained from all subjects after explanation of the nature and purpose of the study. A detailed history regarding their age, place, socio-economic status, health status, menstrual history, hirsutism, acne, weight gain, height, weight, food habits, life style,menstrual history, obstetric history, use of meditations including O.C. pills, family history of PCOS, diabetes mellitus is taken.

IV. Methods

Height is measured bare foot to the nearest 0.5 Cm. Weight is measured to the nearest 0.5 Kg. Body mass Index (BMI), waist/hip ratio is calculated. The presence of hirsutism was noted in every woman quantitating the presence of terminal hairs over nine body areas (i.e. upper lip, chin, chest, upper and lower abdomen, upper and lower back, upper arm and things) according to Ferriman-Gallway score. The presence or absence of acne, androgenic alopecia, acanthosis nigricans was recorded. After a 3-day carbohydrate diet (150 g/day) and an over -night fasting for 8 to 10 hours, a standard OGTT (1.75 g/kg or a maximum of 75 g of glucose) was performed for all subjects.

Oral Glucose Tolerance Test

Fasting plasma glucose levels and plasma glucose levels 2 hours after oral administering 75 grams of glucose in 200 ml of water were measured by glucose oxidase-peroxidase method. Glucose levels are interpreted according to WHO CRITERIA - WHO GLYCEMIC CRITERIA for Diagnosis of different categories of glucose intolerance by 75 g, 2 HR OGTT

CRITERIA	FPG mg/dl	2hr PG mg/dl
Normal Glucose Tolerance (NGT)	<110	<140
Impaired Fasting Glucose (IFG)	110-125	-
Impaired Glucose Tolerance (IGT)	-	140-199
Diabetes Mellitus (DM)	> OR =126	>200

Prevalence of impaired glucose tolerance and diabetes in PCOS in relation to age, socioeconomic status, Domicile- rural and urban areas, BMI, waist/hip circumference ratio, family history of PCOS and diabetes mellitus was measured.

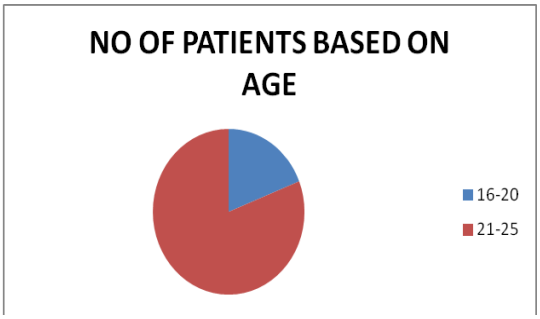
Statistical Analysis

Data analysis- observations were tabulated on a sheet by using Microsoft excel. Statistical analysis of the patients was carried out with chi square test using SPSS software. A "p" value <0.05 was considered statistically significant.

V. Results

Table 1 - Distribution of patients according to the age

Age in Years	No of Patients
16-20 yrs	19
21-25 yrs	81



GRAPH 1- Distribution of patients according to the age

Table 2 - Distribution of patients based on domicile

Domicile	No of Patients
Rural	35
Urban	65

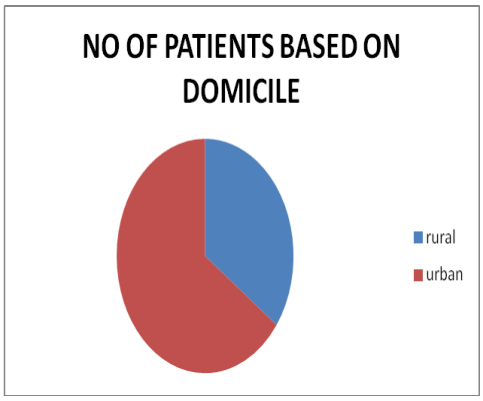
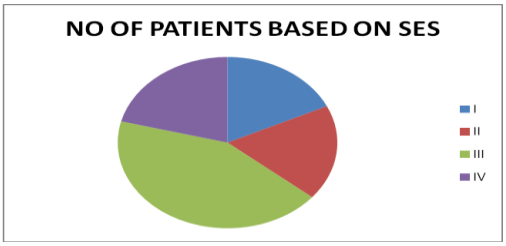


Table3 - Distribution of patients based on Socio Economic Status (S.E.S)

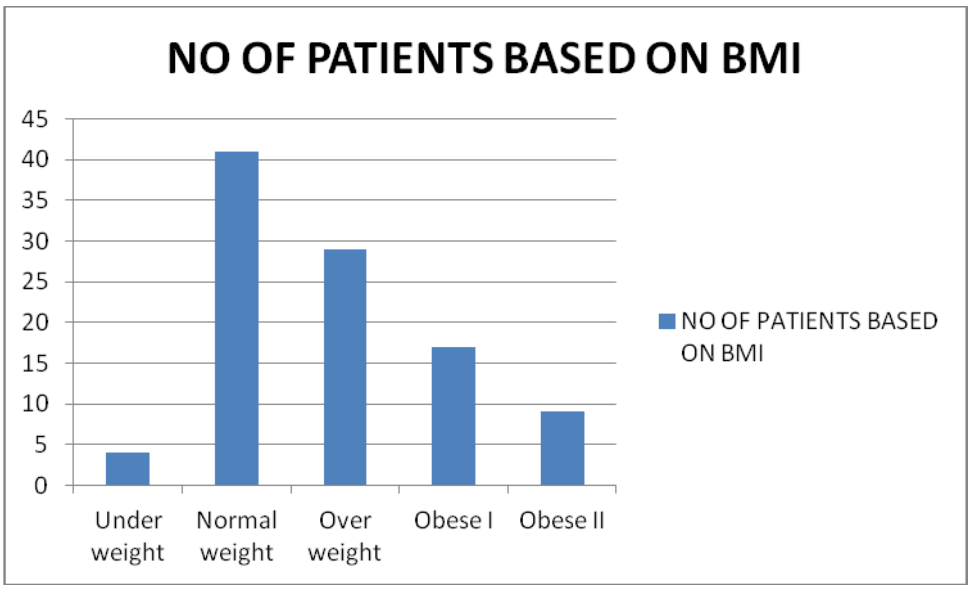
S.E.S	No of Patients
CLASS I	18
CLASS II	18
CLASS III	43
CLASS IV	21



GRAPH3 - Distribution of patients based on Socio Economic Status (S.E.S)

Table 4 - Distribution of patients based on BMI

BMI KG/M^2	No of Patients
Under weight(<18.5)	4
Normal weight(18.5 to 24.99)	41
Over weight(25 to 29.99)	29
Obese I(30 to 34.99)	17
Obese II(35 to 39.99)	9



GRAPH 4 - Distribution of patients based on BMI

Table 5 - Distribution of patients based on Family H/O PCOS

Family H/O PCOS	No of Patients
Positive	14
Negative	86

Table 6 - Distribution of patients based on Family H/O DM

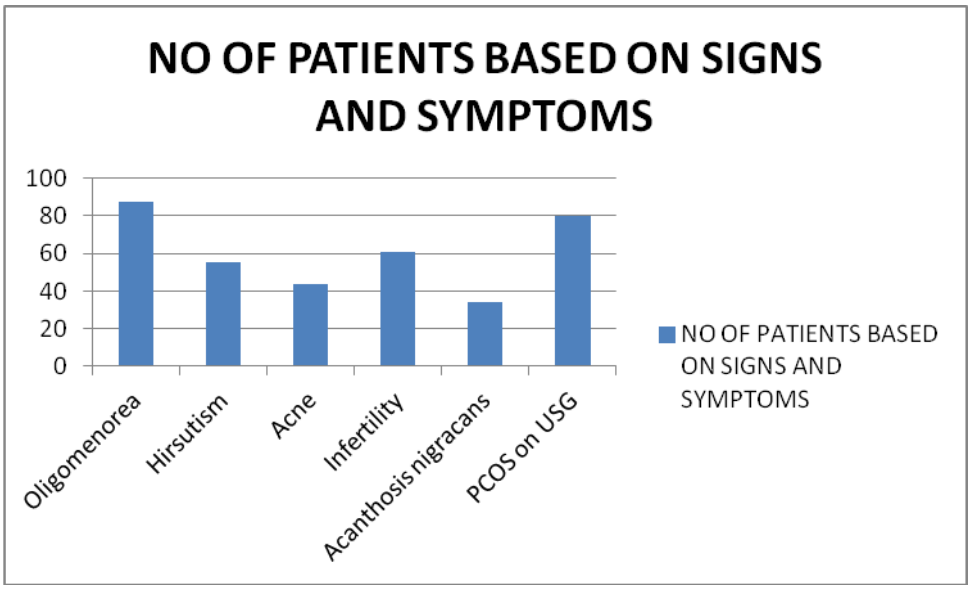
Family H/O DM	No of PATIENTS
Positive	29
Negative	71

Table 7 - Distribution of patients based on Waist/Hip circumference ratio

W/H RATIO	No of Patients
< 0.85	73
= OR > 0.85	27

Table 8 - Distribution of patients based on signs and symptoms

Symptom	PCOS Total
Oligomenorrhoea	87
Hirsutism	55
Acne	44
Infertility	61
Acanthosis nigricans	34
PCOS on USG	80



GRAPH 8- Distribution of patients based on signs and symptoms

Table 9 - Distribution of patients based on marital status

Marital Status	No of Patients
Unmarried	21
Married	79

Table-10 Prevalence of glucose tolerance

TOTAL PCOS	NGT	IGT	DM
100	73	22	5

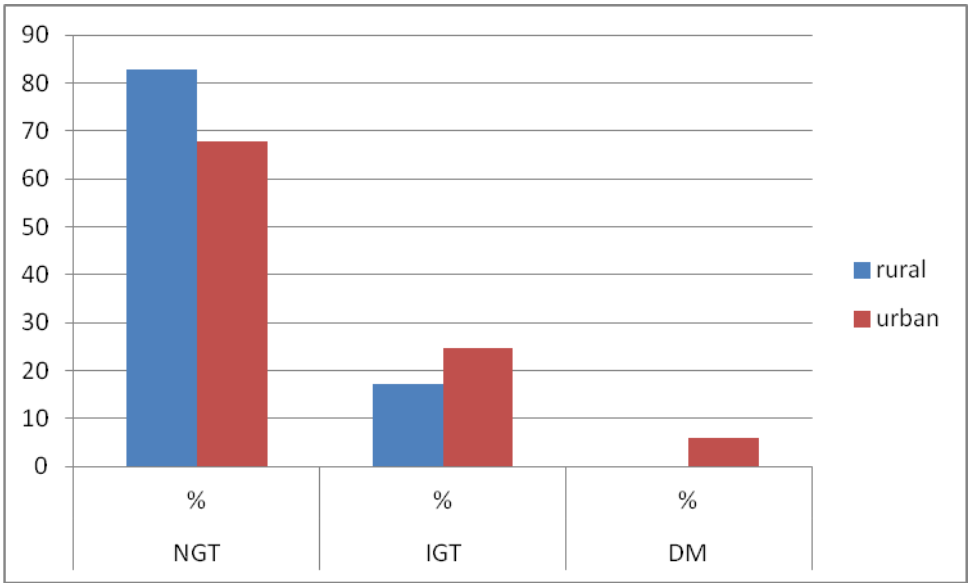
Table 11- Prevalence of glucose intolerance by age in PCOS

Age in years	PCOS Total	NGT		AGT(IGT+DM)		IGT		DM	
		NO	%	NO	%	NO	%	NO	%
6-20	19	14	73.68	5	26.31	5	26.31	0	0
21-25	81	59	72.84	22	27.16	17	20.98	5	6.1

In the present study Prevalence of glucose intolerance is increasing with age.
p value >0.05, Association is not statistically significant.

Table12-Prevalence of glucose intolerance by domicile -rural / urban background

Domicile	PCOS Total	NGM		AGT(IGT+DM		IGT		DM	
		NO	%	NO	%	NO	%	NO	%
Rural	35	29	82.85	6	17.17	6	17.14	0	0
Urban	65	44	67.69	21	32.3	16	24.61	5	7.69



GRAPH 12-Prevalence of glucose intolerance by domicile -rural / urban background

Prevalence of glucose intolerance is more in urban population compared to rural population as BMI is high in urban population probably due to life style. p value is 0.05, association is significant.

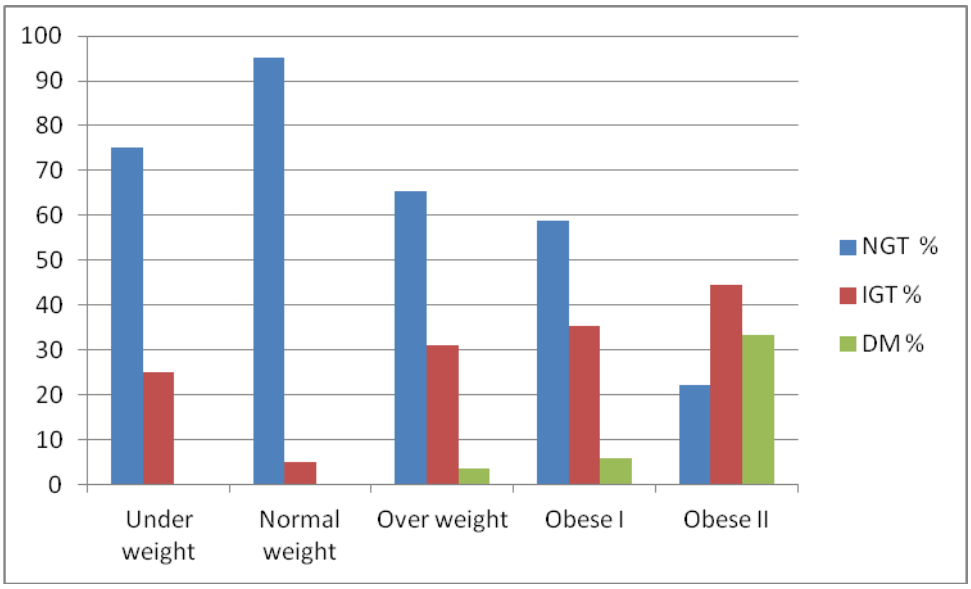
TABLE 13-Prevalence of glucose intolerance by Socio economic status

S.E.S	PCOS Total	NGT		AGT		IGT		DM	
		NO	%	NO	%	NO	%	NO	%
I	18	11	61.11	7	38.88	5	27.77	2	11.11
II	18	12	66.66	6	33.33	4	22.22	2	11.11
III	43	33	76.74	10	23.25	9	20.93	1	2.32
IV	21	17	80.95	4	19.04	4	19.04	0	0

Glucose intolerance is more in higher socio economic status compared to lower socio economic status probably due to high BMI and life style changes. Chi-square value is 2.64, p value >0.5, Association is not statistically significant.

TABLE 14-Prevalence of glucose intolerance by BMI in PCOS

BMI	PCOS Total	NGT		AGT		IGT		DM	
		NO	%	NO	%	NO	%	NO	%
Under weight	4	3	75	1	25	1	25	0	0
Normal weight	41	39	95.12	2	4.87	2	4.87	0	0
Over weight	29	19	65.51	10	34.48	9	31.08	1	3.44
Obese I	17	10	58.82	7	41.17	6	35.29	1	5.88
Obese II	9	2	22.22	7	77.77	4	44.44	3	33.33

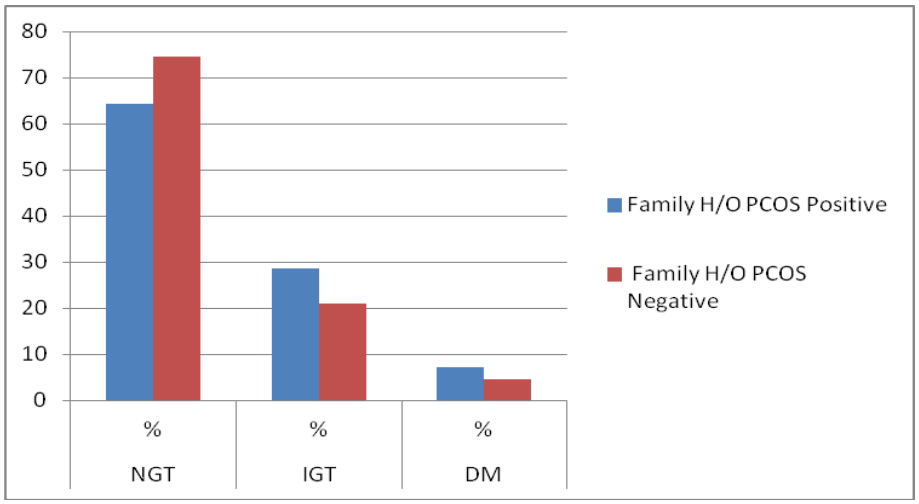


GRAPH 14-Prevalence of glucose intolerance by BMI in PCOS

Glucose intolerance is more in PCOS women with high BMI as insulin resistance increases with obesity. When IGT and DM compared in non-obese and obese women p value is <0.05, Association is statistically significant.

Table 15-Prevalence of Glucose intolerance by Family H/O PCOS

	PCOS Total	NGT		AGT(IGT+DM)		IGT		DM	
		NO	%	NO	%	NO	%	NO	%
Family H/O PCOS Positive	14	9	64.28	5	35.71	4	28.57	1	7.14
Family H/O PCOS Negative	86	64	74.45	22	25.58	18	20.93	4	4.65

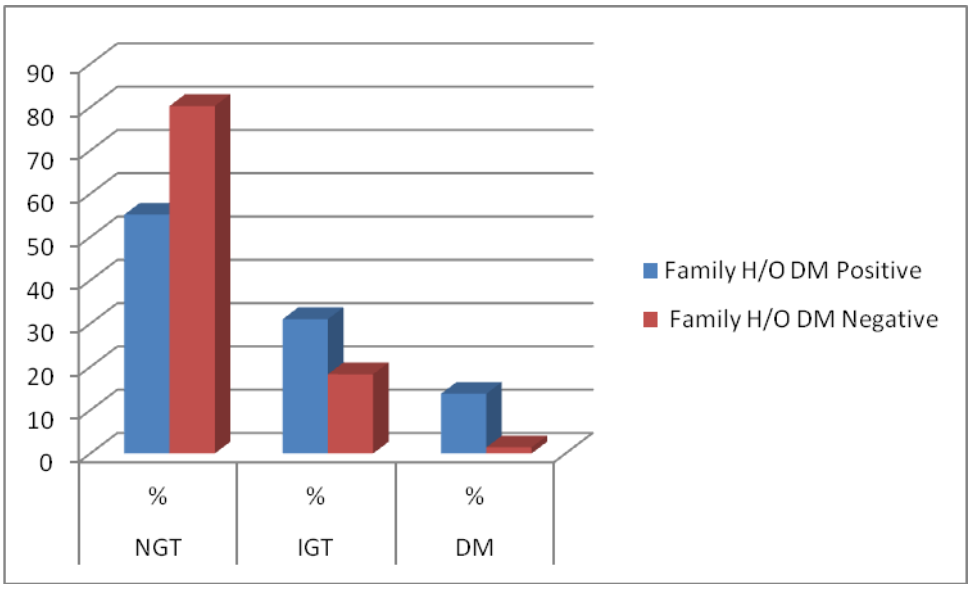


GRAPH 15-Prevalence of Glucose intolerance by Family H/O PCOS

Glucose intolerance more common is women with family H/O PCOS probably due to genetic causes. In the present study p value is >0.05, Association is not statistically significant.

Table 16-Prevalence of Glucose intolerance by Family H/O DM

Family H/O DM	PCOS Total	NGT		AGT		IGT		DM	
		NO	%	NO	%	NO	%	NO	%
Family H/O DM Positive	29	16	55.17	13	44.82	9	31.03	4	13.79
Family H/O DM Negative	71	57	80.28	14	19.71	13	18.30	1	1.4

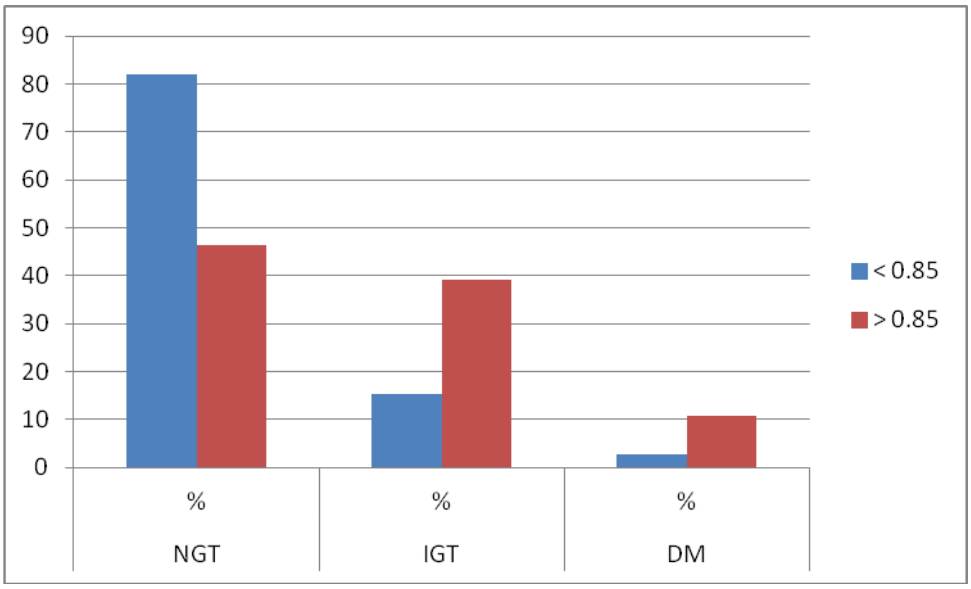


GRAPH 16-Prevalence of Glucose intolerance by Family H/O DM

Glucose intolerance more common is women with family H/O DM probably due to genetic causes. p value <0.5, Association is statistically significant.

Table 17 - Prevalence of Glucose intolerance by W/H Ratio

W/H Ratio	PCOS Total	NGT		AGT		IGT		DM	
		NO	%	NO	%	NO	%	NO	%
< 0.85	73	60	81.94	13	18.05	11	15.27	2	2.77
> 0.85	27	13	46.42	14	53.58	11	40.74	3	10.71



GRAPH 17 - Prevalence of Glucose intolerance by W/H Ratio

Prevalence of glucose intolerance is high is women with W/H circumference ratio >0.85 as Insulin resistance is associated with central obesity.

TABLE 18 - Prevalence of oligomenorrheoa in different categories of Glucose intolerance

CATEGORY	NGT	IGT	DM
% Of patients with oligomenorrhoea	87.67	90.90	100

TABLE 19- Prevalence of Hirsutism in different categories of Glucose intolerance

CATEGORY	NGT	IGT	DM
% of patients with hirsutism	52.05	63.63	60

TABLE 20- Prevalence of Acne in different categories of Glucose intolerance

CATEGORY	NGT	IGT	DM
% of patients with Acne	42.46	45.45	60

TABLE 21- Prevalence of Infertility in different categories of Glucose intolerance

CATEGORY	NGT	IGT	DM
% of patients with infertility	56.16	72.72	80

TABLE 22- Prevalence of Acanthosis Nigricans in different categories of Glucose intolerance

CATEGORY	NGT	IGT	DM
% of patients with Acanthosis nigricance	26.02	54.54	60

TABLE 23- Prevalence of PCOS on USG in different categories of Glucose intolerance

CATEGORY	NGT	IGT	DM
% of patients having PCOS on USG	75.34	90.9	100

VI. Discussion

PCOS is most frequently encountered endocrinopathy in women of reproductive age. Having the disorder may significantly impact the quality of life of women during the reproductive years, and it contributes to morbidity and mortality by the time of menopause, like increased risk for IGT and type 2 diabetes mellitus compared to concurrently studied age, weight, comparable reproductively normal women.

In general women with PCOS, even those who are glucose intolerant, often have a normal Fasting Blood Glucose. Currently, guidelines from the Androgen Excess Society recommend that a 2-hour OGTT be performed on all women with PCOS. Strategies designed to prevent or delay its onset have recently received great attention. One approach is to identify populations highly predisposed to NIDDM especially IGT were targeted to allow intervention at a point prior to its development., since if left untreated, NIDDM will develop at an average rate of 6% per year, with rates as high as almost 9%.

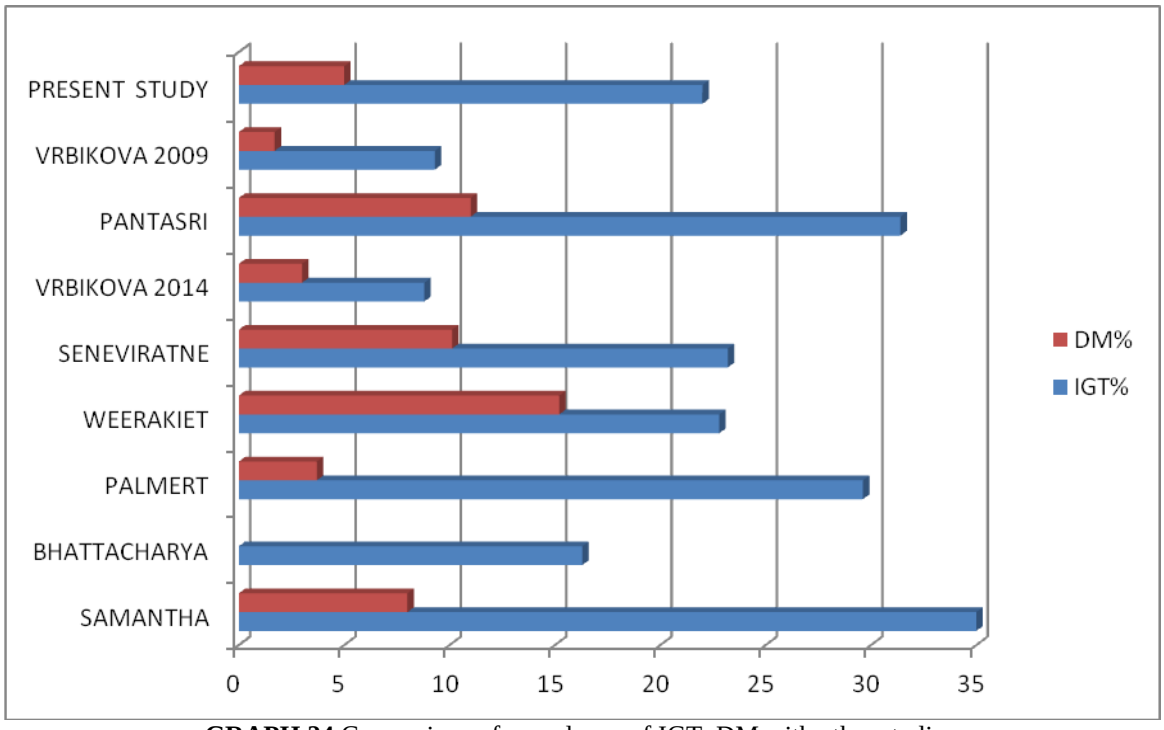
In the present study 100 young women with PCOS, age between 15 to 25 years are screened for abnormal glucose tolerance and diabetes mellitus.

Table 24- Comparison of mean age, BMI, prevalence of IGT, DM with other studies

STUDY	MEAN AGE IN YEARS	MEAN BMI	TOTAL NO OF PCOS	IGT %	DM%
ELISABETH	27	24.2	714	12.8	1.5
CRISTANO	25.5	28.5	85	37	4.8
DAVID EHRMANN	25.5		122	35	10
KAVITA MANDRELLE	26.15	25.95	120	11.7	5.8
DALE WILLIAM	26.6	29.2	78	14	
MAIDA YOUSIF	29	30	100	28	7
MARCELA NUR	15.3	33.2	101	3.9	1.9
FLANNERY	15		66	15.2	1.5
POOMTHAVARAM	14.9			12	3
VRBIKOVA 2007	27.4	27.5	244	9.4	1.6
CELIK	24.8	26.1	252	14.3	2
PRESENT STUDY	23.05	26.32	100	22	5
LEGRO 1999	29		254	31	7.5

Table 24 Comparison of prevalence of IGT, DM with other studies

STUDY	TOTAL NO OF PCOS	IGT%	DM%
SAMANTHA		35	8
BHATTACHARYA	203	16.3	
PALMERT	27	29.62	3.7
WEERAKIET	79	22.8	15.2
SENEVIRATNE	168	23.21	10.12
VRBIKOVA 2014	330	8.8	3
PANTASRI	70	31.4	11
VRBIKOVA 2009	225	9.3	1.7
PRESENT STUDY	100	22	5

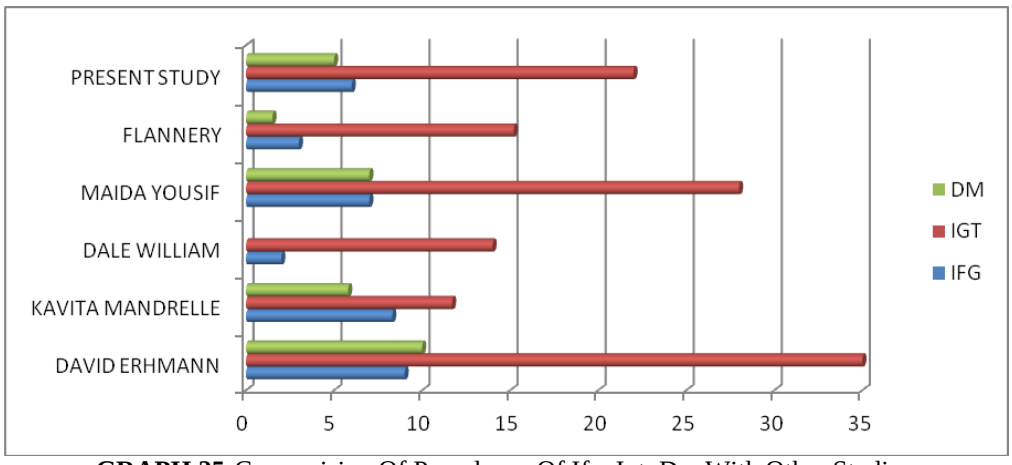


GRAPH 24 Comparison of prevalence of IGT, DM with other studies

The results of present study are consistent with studies done by Maida Yousif, Weerakiet, Seneviratne. Prevalence of IGT in studies of Cristano, David Ehrmann, Legro are higher than in present study as mean age, and BMI are higher in those studies than in present study. Age and BMI are risk factors for impaired glucose metabolism. In present study, the subjects were young, with an average age of 23.05 years. As age was identified as a confounder for BMI and BMI is related to insulin resistance, the young age of our study population may explain the low incidence of IGT in present study. Prevalence of IGT in studies of Palmert, Pantasri are higher than in present study may be due to smaller sample size.

TABLE 25 Comparision of prevalence of IFG, IGT, DM with other studies

STUDY	IFG	IGT	DM
DAVID ERHMANN	9	35	10
KAVITA MANDRELLE	8.3	11.7	5.8
DALE WILLIAM	2	14	
MAIDA YOUSIF	7	28	7
FLANNERY	3	15.2	1.5
PRESENT STUDY	6	22	5



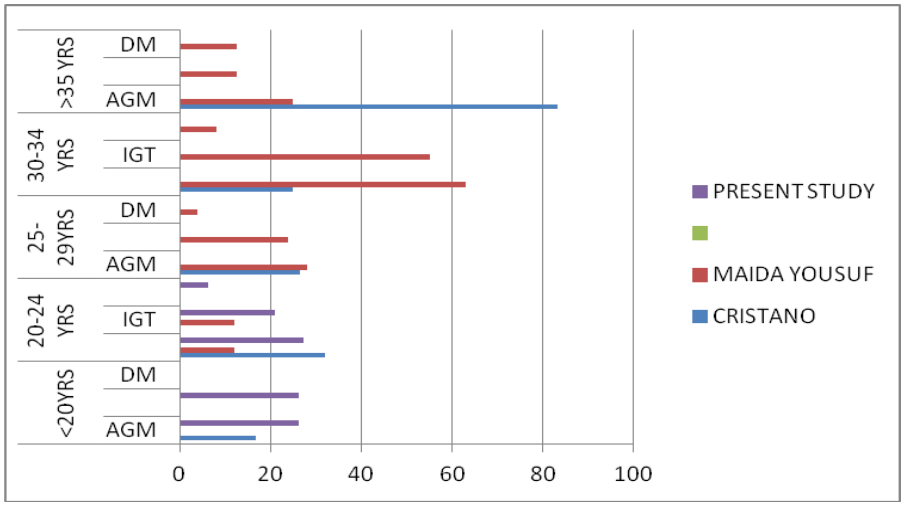
GRAPH 25-Comparision Of Prevalence Of Ifg, Igt, Dm With Other Studies

Like other studies we noted that the FPG test failed to predict the majority of the subjects with IGT. If we considered only the fasting plasma glucose value as a diagnostic criterion for Abnormal glucose metabolism (AGM), 17 patients would be missed.

In present study, the prevalence of impaired glucose went from 6% using the FPG test to 22% with the 2-hour OGTT, reinforcing the recommendation that women with PCOS be screened for glucose intolerance with the 2-hour OGTT.

TABLE 26 Comparision of prevalence of AGM (IGT+DM), IGT, DM % by age in PCOS women

AGE	<20YRS			20-24 YRS			25-29YRS			30-34 YRS			>35 YRS		
	AGM	IGT	DM	AGM	IGT	DM	AGM	IGT	DM	AGM	IGT	DM	AGM	IGT	DM
CRISTANO	16.7			32			26.5			25			83.3		
MAIDA YOUSIF	0	0	0	12	12	O	28	24	4	63	55	8	25	12.5	12.5
PRESENT STUDY	26.3	26.3	0	27.16	20.98	6.17									

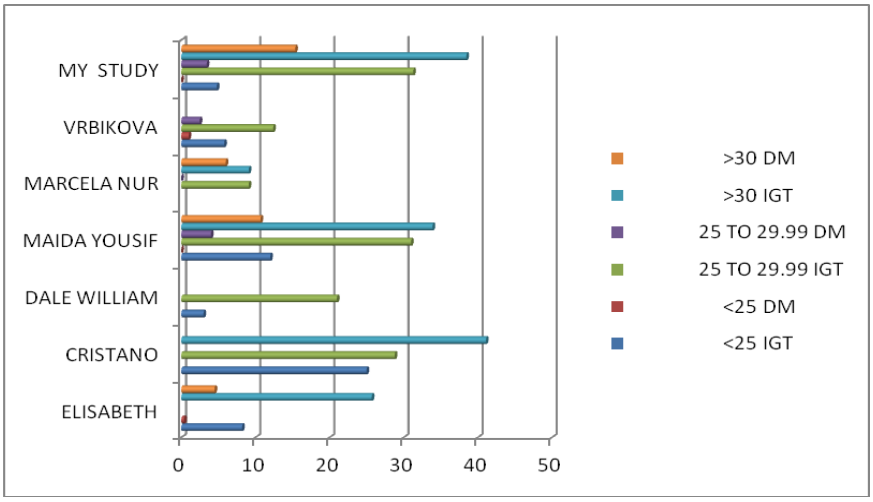


GRAPH 26 COMPARISION OF PREVALENCE OF AGM (IGT+DM), IGT, DM % BY AGE IN PCOS WOMEN

Although IGT and diabetes were detected in young women, the prevalence of both were increased with age. The results are consistent with studies by Cristano and Maida Yousif.

TABLE 27- Comparision Of Prevalence Of Igt, Dm % By Bmi In Pcos Women

BMI	<25		25 TO 29.99		>30	
STUDY	IGT	DM	IGT	DM	IGT	DM
ELISABETH	8.2	0.4			25.7	4.5
CRISTANO	25		28.8		41.1	
DALE WILLIAM	3		21			
MAIDA YOUSIF	12	O	31	4	33.9	10.7
MARCELA NUR			9.1	O	9.1	6
VRBIKOVA	5.8	1	12.4	2.5		
MY STUDY	4.8	0	31.3	3.44	38.46	15.38

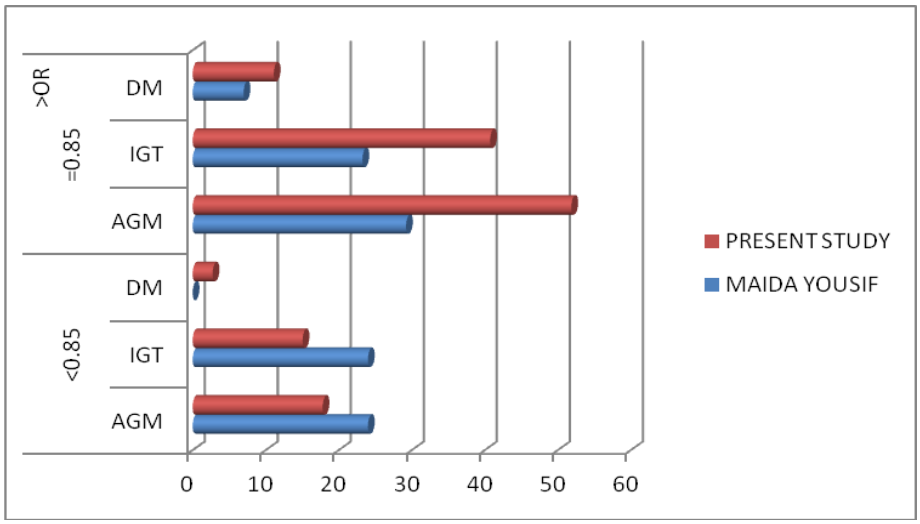


GRAPH 27- Comparision Of Prevalence Of Igt, Dm % By Bmi In Pcos Women

Prevalence OF IGT, DM is more in women with high BMI in present study, similar to other studies. Prevalence of IGT in study of Cristano are higher than in present study as mean BMI are higher in that study than in present study. Prevalence of IGT in present study is more than in study by Elisabeth, Kavitha mandrelle where mean BMI is low in obese women, excess insulin and androgens may contribute to the development of PCOS and metabolic abnormalities. The android pattern of fat distribution may be the result as well as the cause of hyperandrogenism, setting up a vicious circle of hyperinsulinism, hyperandrogenism, central adiposity, and metabolic abnormalities.

TABLE 28- Comparision Of Prevalence Of Agm (Igt+Dm), Igt, Igt, Dm % By W/H Circumference Ratio In Pcos

W/H RATIO	<0.85			>OR =0.85		
	AGM	IGT	DM	AGM	IGT	DM
MAIDA YOUSIF	24	24	0	29.22	23.25	6.97
PRESENT STUDY	17.80	15.06	2.73	51.85	40.74	11.11

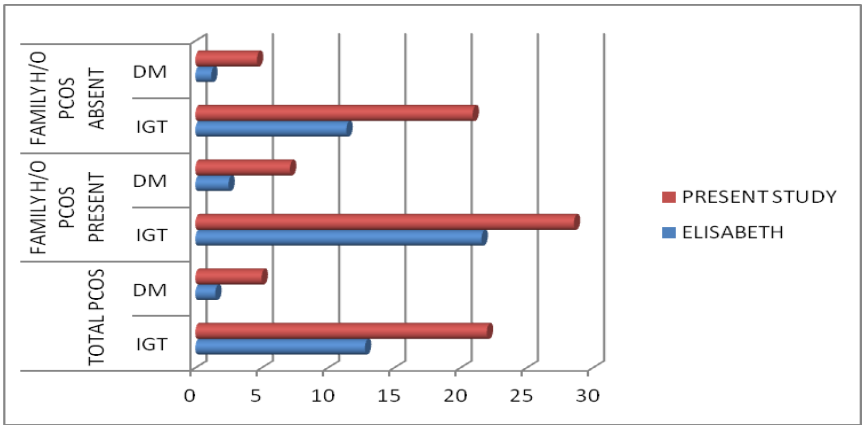


GRAPH 28- Comparision Of Prevalence Of Agm (Igt+Dm), Igt, Igt, Dm % By W/H Circumference Ratio In Pcos

Prevalence of AGM is high in women with waist/hip circumference ratio >OR =0.85 in present study as in study by MAIDA YOUSIF. It indicates central obesity which is associated with insulin resistance causes abnormal glucose metabolism.

TABLE 29- Comparision Of Prevalence Of Igt, Dm % By Family H/O Pcos

STUDY	TOTAL PCOS		FAMILY H/O PCOS PRESENT		FAMILY H/O PCOS ABSENT	
	IGT	DM	IGT	DM	IGT	DM
ELISABETH	12.8	1.5	21.6	2.5	11.4	1.2
PRESENT STUDY	22	5	28.57	7.14	20.93	4.65

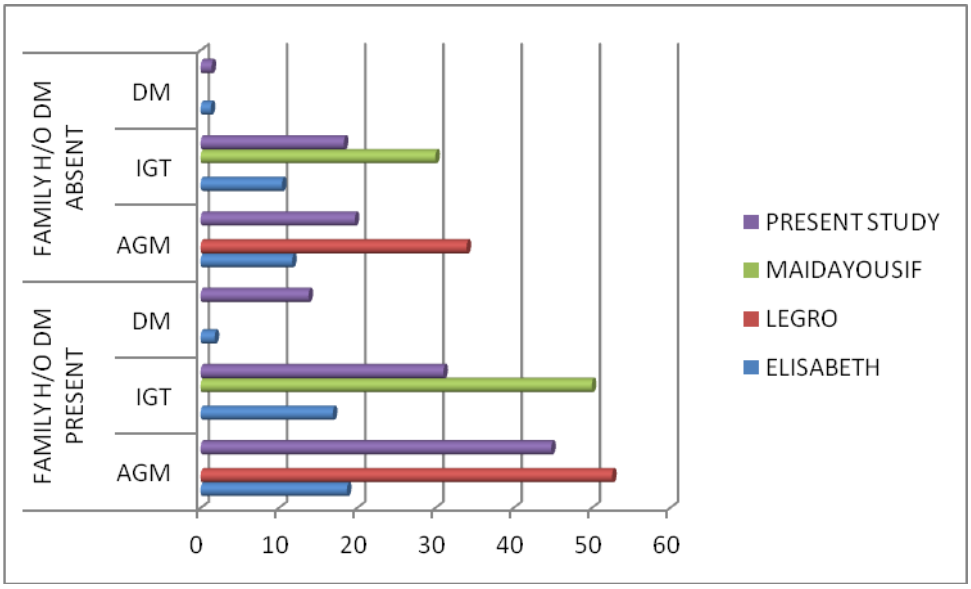


GRAPH 29- Comparision Of Prevalence Of Igt, Dm % By Family H/O Pcos

PCOS women with a positive PCOS family history have more impaired glucose tolerance suggesting a common genetic background of both diseases. The higher prevalence in this study compared to ELISABETH study could be a result of our smaller sample size.

TABLE 30- Comparision Of Prevalence Of Agm (Igt+Dm), Igt, Dm % By Family H/O Dm

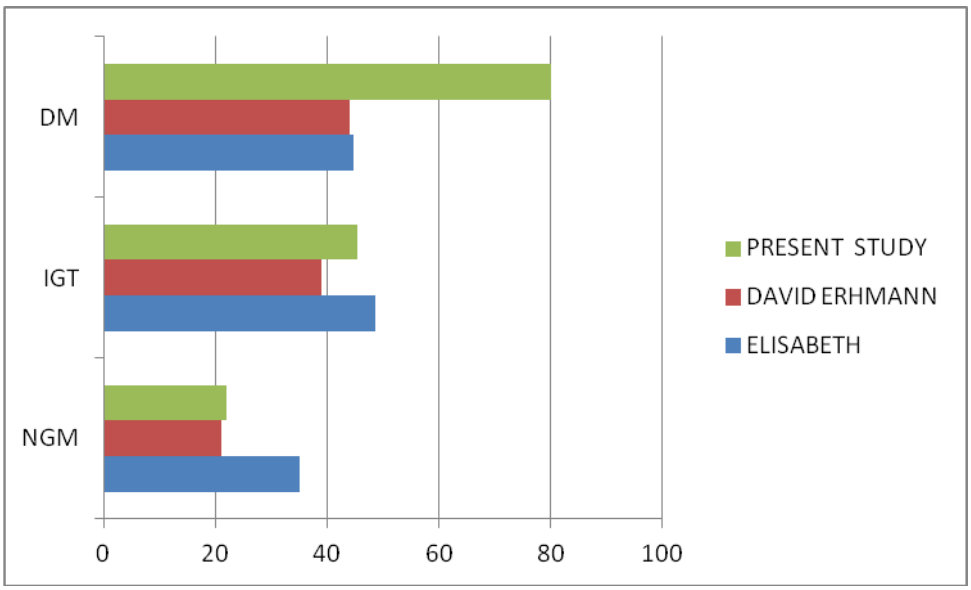
STUDY	FAMILY H/O DM PRESENT			FAMILY H/O DM ABSENT		
	AGM	IGT	DM	AGM	IGT	DM
ELISABETH	18.7	16.9	1.8	11.7	10.4	1.3
LEGRO	52.6			34		
MAIDAYOUSIF		50			30	
PRESENT STUDY	44.82	31.03	13.79	19.70	18.30	1.40



GRAPH 30- COMPARISION OF PREVALENCE OF AGM (IGT+DM), IGT, DM % BY FAMILY H/O DM

TABLE 31- COMPARISION OF PREVALENCE OF POSITIVE FAMILY H/O DM IN NGT, IGT, DM

STUDY	NGM	IGT	DM
ELISABETH	35.1	48.7	44.7
DAVID ERHMANN	21	39	44
PRESENT STUDY	21.9	45.45	80



GRAPH 31- COMPARISION OF PREVALENCE OF POSITIVE FAMILY H/O DM IN NGT, IGT, DM

Present study found an about 1.7-fold increased risk of of glucose intolerance in PCOS women with a positive FHx of T2DM. Thus, our findings are consistent with a genetic basis for metabolic disturbances in PCOS. The higher prevalence in this study compared to ELISABETH study could be a result of our smaller sample size.

Further, Ehrmann et al found a 2.6-fold higher prevalence of first-degree relatives with T2DM in 12 PCOS women with T2DM compared with 67 PCOS women with normal glucose tolerance (83 vs 31%). That study again differed from present study with respect to BMI (mean BMI 33.4, 36.9 and 41.0 kg/m2 for women with normal glucose tolerance, IGT and T2DM respectively). A larger study by Ehrmann including 408 women with PCOS found a positive FHx of T2DM in 44% of the 16 diabetic PCOS women, 39% of the 94 women with impaired glucose tolerance and 21% of the 298 women with normal glucose tolerance. Positive Family H/O of T2DM is independently associated with metabolic disturbances such as central fat accumulation, obesity, prediabetes. Conversely, the prevalence of IGT and T2DM was significantly higher in PCOS women with a positive FHx of T2DM, which is in line with the findings of our study. Again, that study was conducted in the US and included women with a mean BMI of 36.2 kg/m2

A positive FHx of PCOS, however, was independently associated with clinical and biochemical hyperandrogenism and prediabetes. PCOS women with a positive FHx of both T2DM and PCOS had the highest prevalence of metabolic disturbances and hyperandrogenism . 2-hr OGTT should be carried out in all women with PCOS, which has also been suggested by the new Endocrine Society Clinical Practice Guidelines.

Further, the assumption of a common genetic background of PCOS and T2DM is strengthened by our results showing that both obese as well as non-obese PCOS women with a positive T2DM FHx are more likely to have a positive PCOS FHx. First and clinically most important, the simple assessment whether a relative is affected by T2DM or not might allow risk stratification of PCOS women. It might help identify PCOS women at high metabolic risk in whom further evaluation including a regular follow-up as well as intensified treatment are indicated.

In the present study Prevalence of glucose intolerance

1. is more in urban population compared to rural population as BMI is high in urban population probably due to life style changes. p value is 0.05, association is significant.
2. is more in higher socio economic status compared to lower socio economic status probably due to high BMI and life style changes.

In the present study oligomenorrhoea, hirsutism, Acne, infertility, acanthosis nigricans are more prevalent in PCOS women with impaired glucose tolerance than in women with normal glucose tolerance. Hirsutism, acanthosis nigricans are caused by hyperinsulinemia.

VII. Conclusion

PCOS women have significantly increased prevalence rates of IGT and diabetes with

1.With obesity -especially central and increasing with the BMI, but also can occur even in young, non-obese PCO women.
2.Increasing age.
3.With a positive T2DM Family history will have an adverse metabolic profile.
4. With a positive PCOS Family history have increased prevalence of clinical and biochemical hyperandrogenism.
5. Women with a positive Family history of both T2DM and PCOS had the highest prevalence of metabolic and endocrine disturbances. Assessment of Family history might allow risk stratification of PCOS women.

The main focus of the majority of PCOS women who seek treatment at hospital is their reproductive problem ranging from the menstrual to the infertility problem, but are not aware of the risk of developing metabolic and cardiovascular complications in later life.

Fasting glucose levels are poor predictors of diabetes in PCOS women. &. IGT occurs across the spectrum of BMI . But glucose levels at 2 hours on the OGTT (the WHO criteria) identified more patients than fasting glucose level. Thus, to adequately define the at-risk population, oral glucose tolerance testing is advisable in all PCOS women at the time of diagnosis and yearly thereafter .

Hence a screening OGTT should be considered for adolescents diagnosed with PCOS, independently of their BMI. During this process of screening we can implement primary prevention that includes health education, healthy life style modification, weight reduction. Taken together, it appears that women with PCOS are an ideal population for implementing strategies for the prevention of NIDDM.

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