ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

The Prevalence of Polycystic Ovary Syndrome among women with History of Recurrent Miscarriage

Ali El-Shabarawy Ali[1], Safaa Abdel Salam Ibrahim[1], RaafatGamal Mohammed[1], Mai Moustafa Zaitoun[1]

[1]Department of Obstetrics and Gynecology, Faculty of Medicine, Zagazig University, Egypt

Corresponding author: RaafatGamal Mohammed

E-mail:raafatelgandyelgandy1151991@gmail.com

ABSTRACT

Back ground:Polycystic ovary syndrome (PCOS) causes symptoms in approximately 5% to 10% of women in reproductive age (12–45 years old). It is thought to be one of the most common causes of female subfertility.This study aimed to assess the relation between polycystic ovary syndrome and recurrent miscarriage and to evaluate the prevalence of polycystic ovarian syndrome within the recurrent miscarriage population.**Patients and method**:A cross-sectional study was carried out in Zagazig University Maternity Hospital during the period from March 2019 to March 2020. Included 47 pregnant womenwith recurrent miscarriage. All patients were subjected to full history taking, assessment of glycemic status and insulin resistance and ultrasonographyfor diagnosis of polycystic ovaries were done to every patients**.** **Result**: This study revealed that the prevelance of polycystic ovaries syndrome among women with history of recurrent miscarriage is 19.1 and there is disturbed LH/FSH ratio (2.1) and there was significant difference between poly cystic ovary syndrome and non polycystic ovary in ovarian volume.**Conclusion:** Polycystic ovary syndrome patients with recurrent abortions had no significant increase in the age, Parity.

Key words:PCOS, Recurrent Miscarriage, women

Introduction

Polycystic ovarian syndrome (PCOS) is the most common gynecological endocrinopathy. PCOS appears to be associated with an increased risk of metabolic aberrations, including insulin resistance and hyperinsulinism, type 2 diabetes mellitus, dyslipidemia, cardiovascular disease, and endometrial carcinoma[(1)].

It is commonly diagnosed in young women with anovulatory infertility, oligomenorrhea or hyperandogenic problems such as hirsutism and acne. Although associated with obesity, the syndrome is also frequently seen in women of normal body conformation[(2)].

Although the exact definition of PCOS has varied when described by various experts, following a Consensus conference held in Rotterdam in 2003; an internationally accepted definition has been adopted by the European Society for Human Reproduction and Embryology and American Society for Reproductive Medicine, the ESHRE/ASRM Rotterdam consensus (Rotterdam consensus) [(3)].

Estimations of the prevalence of PCOS depend on the population being assessed, as there are ethnic differences in the clinical and biochemical features of PCOS.

The reported prevalence of PCOS ranges between 2.2% to 26% in various countries, depending on the recruitment method, the study population, the criteria used for its definition and the method used to define each criterion. The prevalence of PCOS can be as high as 30% in women with secondary amenorrhea, 40% in women

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

with infertility, 75% in women with oligomenorrhea and 90% in women with hirsutism[4].

Miscarriage is among the most common complications during pregnancy and can be sporadic or recurrent. According to the World Health Organization (WHO), recurrent miscarriage (RM) is defined as three or more consecutive pregnancy losses before the 20th gestation week. Primary RM is defined as having no previous live births, while patients with secondary RM already had at least one live birth. It is estimated that five percent of all couples trying to conceive are affected by two consecutive miscarriages and that one percent is affected by three or more. In 50% of the cases of RM, the underlying cause remains unknown. Potential pathologies leading to RM include genetic abnormalities, infection, immune dysfunction, endocrine disorders, antiphospholipid syndrome, thrombophilic disorders, uterine pathologies, and cervical weakness[5].

Aim of the Work

The aim of this study is to assess the relation between polycystic ovary syndrome and recurrent miscarriage and to evaluate the prevalence of polycystic ovarian syndrome within the recurrent miscarriage population.

Patient and methods

A cross-sectional study was coducted on 47 female patient with history of recurrent miscarriage attending the infertility clinic of zagazig university hospitals during the period from May 2017 till November 2018. Written informed consent was obtained from all participants and the study was accepted by the Research Ethics Committee of the Faculty of Medicine, Zagazig University. Study has been carried out on experiments involving human subjects in compliance with the Code of Ethics of the World Medical Association (Declaration Helsinki).

Inclusion criteria: Women with history of recurrent pregnancy loss 3or more. Women age 20-40years old .Patients diagnosed according to Rotterdam criteria(two of three). Women with normal ultrasonographicmeasurrmentof the uterus.**Exclusion Criteria:** Pregnant women. Women with diabetes melluites.Hypertensive patients.Patients with liver and cardiac diseases.Women with uterine anatomical anomalies.Women with positive tests for APS (LUPUS anti coagulant and anti cardiolipin antibodies).

All patients underwent comprehensive detailed history taking include name, age, residence, occupation, menstrual pattern, family history of polycystic ovaries and past history of recurrent miscariages. Full clinical examination were done (weight, height, BMI) physical examination include pulse BLP temperature and respiratory rate. Both trans abdominal and trans vaginal ultrasound was done between cycle day (2-7) in menstruating females and after withdrawal bleeding in case of amenorrhea. Both ovaries were examined in three planes polycystic ovaries were enlarged more than 5cm whithsubcapsular 12 or more follicles measuring 2-9 mm in diameter, peripherally distributed through out the entire ovary or ovarian volume more than 10cm3 and highly echogenic ovarian stroma, where adefinite diagnosis cloud not be made by trans abdominal ultrasound atrans vaginal u/s was done using 7.5 mhz probe after the patient.

Hormonal investigation:

Under complete aseptic condition blood samples were obtained from allparticipants of the research. Hormonal profile for FSH, LH, TSH, T3, T4 , Prolactin and serum free testosterone. Bloob samples obtained in minimal invasive prosdures

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

under complete aseptic condition on day 2-7 of the cycle in menstruating females and n day 2-7 of with drawal bleeding in case of amenorrhea using oralprogesrerone pills 10mg oral daily for 10 days these samples were examined by Cobas c 702 by (EIA)Enzyme immune assay kits for hormonal test. (LH; FSH) ratios were elevated and rise above 2.

Statistical analysis:

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0**. (**Armonk, NY: IBM Corp**).** Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation, median and interquartile range (IQR). Significance of the obtained results was judged at the 5% level**.**

Result:

Table 1; showed that among the studied cases there were 26 (55.3%) less than 30years and 21 (447%) more than 30 years with mean age 29.83 (±2.66 SD) and range (26-35)years, the mean parity was 4.91 (±2.66 SD) with range (4-6) and the mean history of recurrent abortion was 3.94 (±0.92 SD) with range (3-6).

Table (1):Distribution of the studied cases according to demographic data (N = 47)

	No.	**%**
Age (years)		
<30	52	55.3
≥ 30	42	44.7
Min. – Max.	26.0 – 35.0	
Mean ± SD.	29.83 ± 2.66	
Median (IQR)	29.0 (28.0 – 32.0)	
Parity		
Min. – Max.	4.0 – 6.0	
Mean ± SD.	4.91 ± 0.80	
Median (IQR)	5.0 (4.0 – 6.0)	
History of recurrent abortion		
Min. – Max.	3.0 – 6.0	
Mean ± SD.	3.94 ± 0.92	
Median (IQR)	4.0 (3.0 – 4.50)	
BMI (kg/m^2)	**No.**	**%**
Normal (18.5 – 24.9)	26	27.7
Overweight (25 – 29.9)	48	51.1
Obese (30 – 34.9)	20	21.3
Min. – Max.	23.0 – 33.60	
Mean ± SD.	27.52 ± 2.99	
Median (IQR)	27.50 (24.30 – 29.60)	

IQR: **Inter quartile range** SD: **Standard deviation**

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

Table (2): Relation between PCO and history (N = 47)

History	PCO				Test of Sig.	p
	No (n = 38)		Yes (n = 9)			
	No.	%	No.	%		
Age (years)						
<30	20	52.6	6	66.7	χ^2=0.580	FE p=0.711
≥ 30	18	47.4	3	33.3		
Min. – Max.	26.0 – 35.0		26.0 – 33.0		t=1.332	0.189
Mean ± SD.	30.08 ± 2.73		28.78 ± 2.17			
Median	29.0		28.0			
Parity						
Min. – Max.	4.0 – 6.0		4.0 – 6.0		t=0.350	0.728
Mean ± SD.	4.89 ± 0.83		5.0 ± 0.71			
Median	5.0		5.0			
History of recurrent abortion						
Min. – Max.	3.0 – 6.0		3.0 – 5.0		t=1.397	0.169
Mean ± SD.	4.03 ± 0.91		3.56 ± 0.88			
Median	4.0		3.0			

SD: Standard deviation **t: Student t-test**
χ^2: Chi square test **FE: Fisher Exact**
p: p value for comparing between different categories
*: Statistically significant at $p \leq 0.05$

Table 2; there was statistically significant relation between the PCO and BMI and no statistical relation between PCO and Age, Parity and History of recurrent abortion Figure 1.

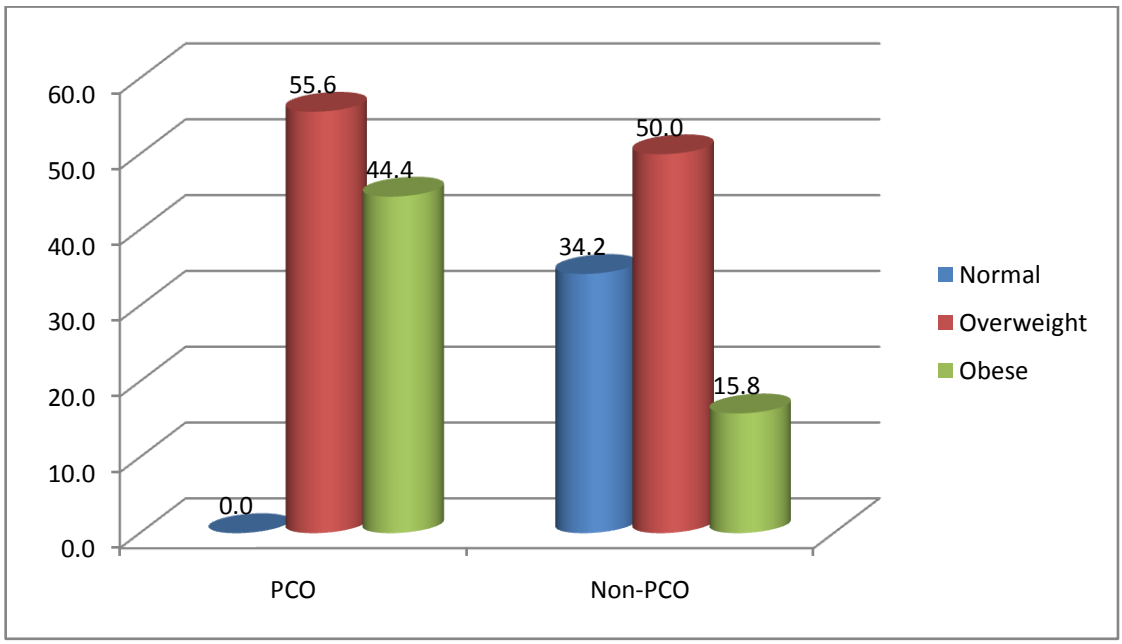

Figure (1): Relation between PCO and BMI

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

Table (3): Relation between PCO and Hyper-androgenic characteristics (N = 47)

Hyper-androgenic characteristics	PCO				Test of Sig.	p
	No (n = 38)		Yes (n = 9)			
	No.	%	No.	%		
Alopecia	6	15.8	9	100.0	χ^2=23.747	<0.001*
Acne	4	10.5	2	22.2	χ^2=0.894	0.344
Hirsutism	3	7.9	7	77.8	χ^2=21.216	<0.001*

SD: Standard deviation t: Student t-test
χ^2: Chi square test FE: Fisher Exact
p: p value for comparing between different categories
*: Statistically significant at $p \leq 0.05$

Table 3; there was high statistically significant relation between the PCO and alopecia and hirsutism.

Figure 2, there was high statistically significant relation between the PCO and total number of follicles, number of follicles ≥ 18 mm and endometrial thickness.

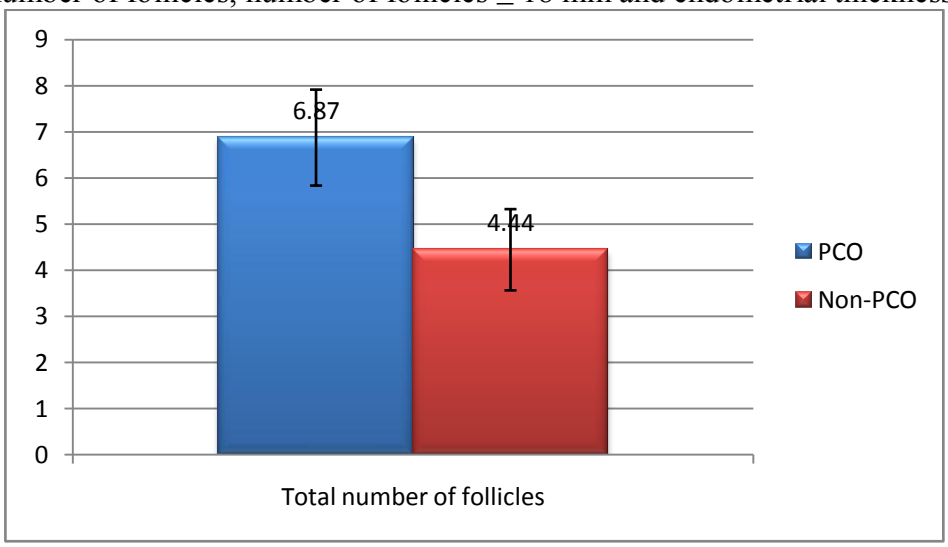

Figure (2a): Relation between PCO and Total number of follicles

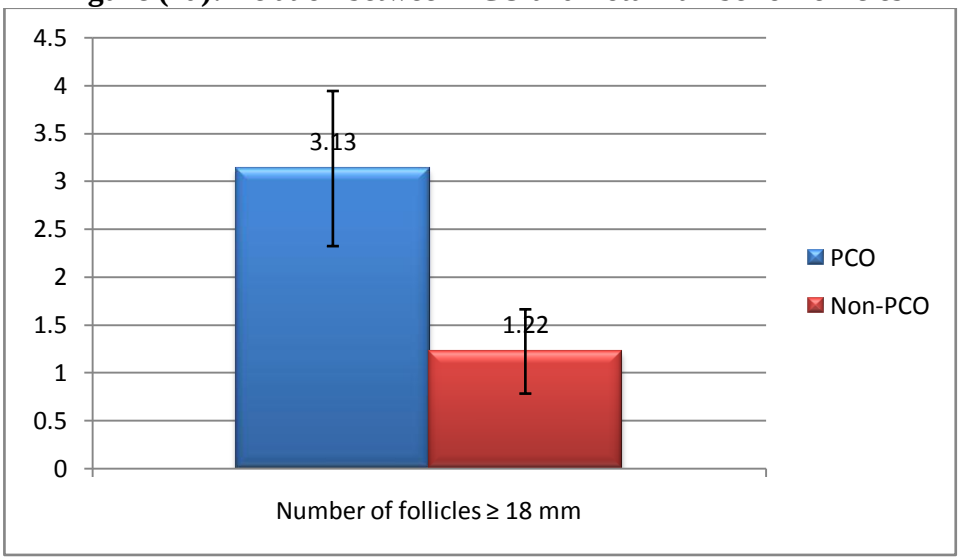

Figure (2b): Relation between PCO and Number of follicles ≥ 18 mm

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

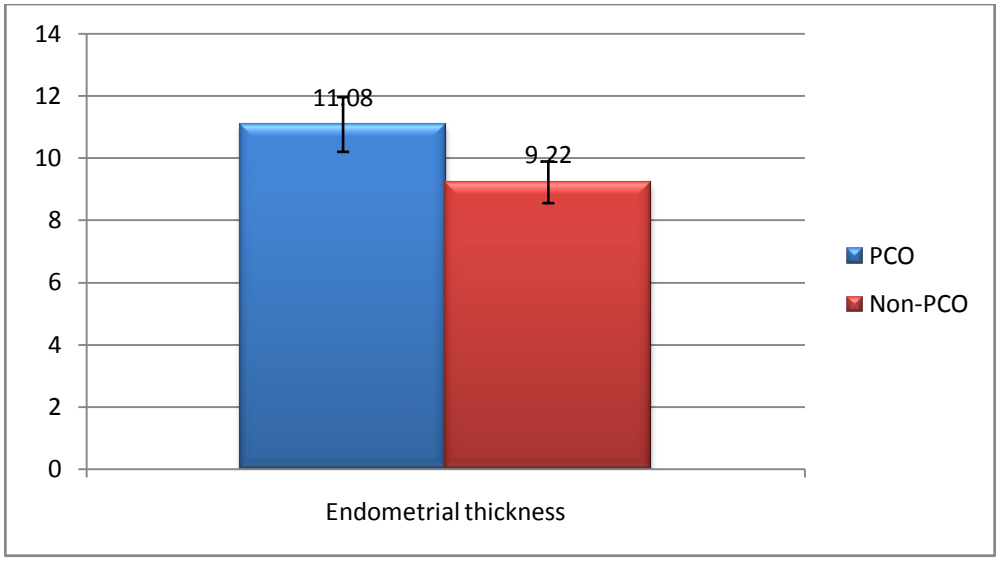

Figure (2c): Relation between PCO and Endometrial thickness

Figure (2a,bc): Relation between PCO and Ultrasound

Table (4): Relation between PCO and hormonal profile (N = 47)

Hormonal profile	PCO		U	p
	No (n = 38)	Yes (n = 9)		
FSH				
Min. – Max.	2.10 – 8.60	2.10 – 9.30	90.50*	0.028*
Mean ± SD.	5.41 ± 1.94	7.04 ± 2.27		
Median	5.40	7.30		
LH				
Min. – Max.	1.20 – 10.70	5.20 – 15.30	61.50*	0.002*
Mean ± SD.	5.31 ± 2.76	9.58 ± 3.61		
Median	5.35	8.20		
LH/FSH ratio				
Min. – Max.	0.20 – 3.70	0.60 – 2.70	106.0	0.081
Mean ± SD.	1.10 ± 0.73	1.54 ± 0.73		
Median	1.05	1.50		
TSH				
Min. – Max.	0.52 – 3.72	0.81 – 3.38	156.0	0.700
Mean ± SD.	2.07 ± 1.02	2.20 ± 0.95		
Median	2.06	2.24		
Testosterone hormones				
Min. – Max.	0.13 – 0.43	0.42 – 0.76	3.500*	<0.001*
Mean ± SD.	0.29 ± 0.10	0.63 ± 0.11		
Median	0.28	0.62		

SD: Standard deviation U: Mann Whitney test

p: p value for comparing between different categories

*: Statistically significant at $p \leq 0.05$

Table 4; there was high statistically significant relation between the PCO and testosterone hormones and statistically significant relation between the PCO and FSH and LH.

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

Table (5): Relation between PCO and insulin resistance (N = 47)

Insulin Resistance	PCO		Test of Sig.	p
	No (n = 38)	Yes (n = 9)		
FBG				
Min. – Max.	71.0 – 100.0	84.0 – 102.0	t=1.960	0.065
Mean ± SD.	85.08 ± 9.97	90.22 ± 6.20		
Median	83.50	89.0		
Fasting serum insulin levels				
Min. – Max.	2.30 – 6.30	3.50 – 6.30	U=154.50	0.661
Mean ± SD.	4.34 ± 1.24	4.51 ± 0.92		
Median	4.15	4.40		
Homa-IR				
Min. – Max.	0.50 – 1.50	0.70 – 1.30	U=136.0	0.357
Mean ± SD.	0.92 ± 0.32	1.01 ± 0.22		
Median	0.85	1.0		

SD: Standard deviation t: Student t-test U: Mann Whitney test
p: p value for comparing between different categories

Table 5; there was no statistically significant relation between the PCO and insulin resistance.

Discussion

In this study we found that among the studied cases there were 26 (55.3%) less than 30years and 21 (447%) more than 30 years with mean age 29.83 (±2.66 SD) and range (26-35) years, the mean parity was 4.91 (±2.66 SD) with range (4-6) and the mean history of recurrent abortion was 3.94 (±0.92 SD) with range (3-6).

Mayrhofer et al.[6]found that Negative results for the selected risk factors for Recurrent Miscarrage were present in 283 (62.6%). Mean age of the sample population was 33.8 ± 6.1 years, Primary RM was observed in 318 (70.4%) cases, secondary RM appeared in 134 (29.6%) cases. The majority of patients had three previous miscarriages (322, 71.2%); while 78 (17.3%) had four and 52 (70.4%) had five or more previous miscarriages.

In this study we found that there was statistically significant relation between the PCO and BMI and no statistical relation between PCO and Age, Parity and History of recurrent abortion.

Hussein et al. [7]illustrated that the mean ages in the PCOS and non-PCOS groups were 29.5 ± 5.45 years versus 32.9 ± 6.95 years, respectively (P = 0.00061). Most women in the PCOS group (30.2%) were aged 25 - 29 years, while in the non-PCOS group most (24.3%) were aged 35 - 39 years.

Ashaq et al. [8]found thatWomen with PCOS with recurrent abortions were slightly older than the controls, with a mean age of 33.1 years (21 - 50) compared to 31.9 years (21 - 47), but the result was not statistically significant (p-value > 0.05).

Chakraborty et al.[9]found that Both groups were similar in terms of age and marriage duration. However, BMI has been found to be significantly greater (p value<0.01) in PCOS group.

In this study we demonstrated that there was high statistically significant relation between the PCO and alopecia and hirsutism..

Hussein et al. [7]reported that the women in the PCOS group had more coarse hair growth (hirsutism) than women in the non-PCOS group (P = 0.000). Acne was

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

not significantly more prevalent among women with PCOS than in women without PCOS: 22.6% versus 18.7% respectively (P = 0.405). There was a statistically significant difference between the two groups in reporting greasy skin and history of scalp hair loss.

Mostafa et al.[10]found that the hirsutism (FerrimanGallway score>8) was significantly more common in PCOS Women compared to non PCOS women (20(86.95%) versus 5 (18.5%).

In study in our hands, we found that there was high statistically significant relation between the PCO and total number of follicles, number of follicles ≥ 18 mm and endometrial thickness.

Odera et al.[3]found that the mean ovary size of the study participants with PCOS was noted to be significantly larger, the right ovary being 17.7cm3+/-8.6cm3 and the left ovary being 15.8cm3+/-6.4 cm3 in women with PCOS compared to a mean right ovarian size of 8.3cm3+/-3.7 cm3 and left ovarian size of 9.6cm3+/-6.9cm3 in those without.

In this study we found that there was high statistically significant relation between the PCO and testosterone hormones and statistically significant relation between the PCO and FSH and LH.

Mayrhofer et al.[6]found that Women in the PCOS group revealed significantly higher LH, testosterone, and AMH levels ($p < 0.05$).

Hussein et al.[7]reported that the incidence of elevated LH level was significantly higher in PCOS group than in non-PCOS group (17% Versus 8.4% respectively, P = 0.000). The incidence of elevated FSH level was not significantly higher in the non-PCOS group than in the PCOS group (15% versus 10.4% respectively = 0.476). There was no statistically significant difference between the two groups in terms of the LH/FSH ratio and total testosterone level. Progesterone was measured in the mid-luteal phase to confirm ovulation and there was a statistically significant difference between the two groups; 90.7% of the non-PCOS group versus 7.5% of PCOS group showed ovulatory cycles.

Odera et al.[3]found that there was also a statistically significant difference in the total serum testosterone levels in the participants with PCOS compared to those without PCOS. Elevated serum testosterone, as part of hyperandrogenaemia, is one of the diagnostic criteria of PCOS according to the Rotterdam 2003 criteria.

In this thesis we demonstrated that there was no statistically significant relation between the PCO and insulin resistance.

Chakraborty et al. [9]found that Both Fasting and post-prandial (PP) insulin was found to be significantly higher (p value<0.0001) in PCOS population along with HOMA2-IR values (PCOS: 2.39±0.91 vs. non-PCOS: 1.51±1.34).

Conclusion:

In this study we concluded that the prevalence of PCOS seems slightly increased in women with Recurrent Miscarriage, PCOM on the other hand show a rather high prevalence compared to the general population. PCOS patients with recurrent abortions had no significant increase in the age, Parity. There was statistically significant relation between the PCO and BMI. The hormonal profile (prolactin, LH, FSH, LH/FSH ratio, TSH, testosterone) was comparable between the cases and the controls.

ISSN:0975-3583,0976-2833 VOL12,ISSUE04,2021

REFERENCES

1- Orbetzova, M. M. (2020). Clinical Impact of Insulin Resistance in Women with Polycystic Ovary Syndrome.In *Polycystic Ovarian Syndrome*.IntechOpen.

2- Chauhan, P., Siddiqui, M. I., &Chauhan, A. S. (2021). A study to evaluate the effectiveness of structured teaching programme on knowledge regarding polycystic ovarian syndrome and related infertility among female students in Isabella Thoburn College at Lucknow. *Asian Journal of Nursing Education and Research*, *11*(1), 71-78.

3- Odera, F. O. (2019). Prevalence of polycystic ovary syndrome among women presenting with amenorrhea and oligomenorrhea at the kenyatta national hospital.

4- Papadakis, G., Kandaraki, E. A., Tseniklidi, E., Papalou, O., &Diamanti-Kandarakis, E. (2019). Polycystic ovary syndrome and NC-CAH: distinct characteristics and common findings. A systematic review. *Frontiers in endocrinology*, *10*, 388.

5- Talaulikar, V. S., &Matjila, M. (2019). Miscarriage and recurrent miscarriage. *Oxford Textbook of Obstetrics and Gynaecology*, 477.

6- MayrhoferD, HagerM, WalchK, etal.(2020): ThePrevalenceand ImpactofPolycysticOvarySyndromeinRecurrentMiscarriage:A RetrospectiveCohortStudyandMeta-Analysis.J.Clin.Med,9; 27001-15.

7- **Hussein, B., &Alalaf, S. (2013).** Prevalence and characteristics of polycystic ovarian syndrome in a sample of infertile Kurdish women attending IVF infertility center in maternity teaching hospital of Erbil City. Open Journal of Obstetrics and Gynecology, 2013

8- Ashaq, L., Al Mazer, Y., & Al Qahtani, N. (2017). Recurrent Pregnancy Loss in Patients with Polycystic Ovary Syndrome: A Case Control Study. Open Journal of Obstetrics and Gynecology, 7(11), 1073-1085.

9-**Chakraborty, P., Goswami, S. K., Rajani, S., Sharma, S., Kabir, S. N., Chakravarty, B., & Jana, K. (2013).** Recurrent pregnancy loss in polycystic ovary syndrome: role of hyperhomocysteinemia and insulin resistance. PLoS One, 8(5), e64446.

10- Mostafa, R., Al-Sherbeeny, M. M., Abdelazim, I. A., Elshehawy, Y., Wahba, K. A., &Abuel-Fadle, A. (2015). Frequency of insulin resistance in Egyptian women with polycystic ovary syndrome. MOJ Womens Health, 1(2), 00007.