Journal Homepage: - www.journalijar.com
INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)
Article DOI: 10.21474/IJAR01/3431
DOI URL: http://dx.doi.org/10.21474/IJAR01/3431
ISSN NO. 2320-5407

RESEARCH ARTICLE

POLYCYSTIC OVARIAN SYNDROME AND EATING DISORDER: ARE THEY ASSOCIATED.

Sadia Rashmeen[1], Nighat Nisar[2] and Sofia Butt[3].

1. Sadia Rashmeen, Postgraduate student of Master of Public Health, Dow University of Health Sciences, Karachi.
2. Professors, Department of Community Medicine Dow University of Health Science, Karachi.
3. Assistant Professor, Gynae unit 3 Civil Hospital Dow Medical College, DUHS, Karachi.

Manuscript Info

Manuscript History

Received: 15 December 2016
Final Accepted: 16 January 2017
Published: February 2017

Key words:-
Poly Cystic Ovary Syndrome, Binge eating disorder, Obesity, subfertility

Abstract

Background: Polycystic ovarian syndrome is a common female endocrine disorder and affecting up to one in five women of reproductive age between 15-49 years. The etiology of polycystic ovarian syndrome is uncertain, but a number of risk factors are associated with polycystic ovarian syndrome is subfertility, obesity, insulin resistance, cardiovascular disease and hormonal disturbance. Hormonal imbalance, behavioral and cognitive health is related to abnormal eating habit like binge eating. Binge eating disorder is characterized by eating large amount of food in a discrete time period and feeling out of control. About one third women of polycystic ovarian syndrome reported binge eating disorder.

Objective: To determine the association of binge eating disorder with polycystic ovarian syndrome in Civil Hospital of Karachi To determine the risk factors associated with polycystic ovarian syndrome in Civil Hospital of Karachi

Methodology: This case control study was conducted in civil Hospital Karachi. Data was collected by using a structured questionnaire with a sample size of 280 (140 cases and 140 controls). Data entry was done in EpiData software and was analyzed by using SPSS Version 21. Descriptive analysis was performed for socio demographic variables. Univariate analysis was done to determine crude association between independent and dependent variables by calculating odds ratio and 95% confidence interval. Multivariable analysis was performed to eliminate the confounder

Results: About 280 women (140 cases and 140 controls) were enrolled into the study. The Univariate analysis showed that polycystic ovarian syndrome among overweight women (BMI 25-29.9) was 2 times more (OR=2.0, 95 % CI=1.41-3.56, pvalue= 0.01) and among obese women (BMI ≥30) was 12 times more (OR=12.1, 95 % CI=5.03-29.24, pvalue=<0.001) as compared to control (normal BMI18.5-24.9) women kilogram per meter square , polycystic ovarian syndrome among binge eating disorder score (≥17) was found 4 times more (OR=4.3, 95 % CI=2.42-7.88, pvalue=<0.001) as compared to control non binge eating score (<17) women . Multivariate analysis showed polycystic ovarian syndrome among obese (BMI ≥30) was found ten times more (AOR=10.4, 95 % CI=4.11-26.4, pvalue=<0.001) as

Corresponding Author:- Sadia Rashmeen.
Address:- Sadia Rashmeen, Postgraduate student of Master of Public Health, Dow University of Health Sciences, Karachi.

compared to control (normal BMI18.5-24.9) women and polycystic ovarian syndrome among women with binge eating disorder score (≥17) was found seventeen times more(AOR=17.8, 95 % CI=1.29-24.63, pvalue=0.03) as compared to non-binge eating score.

Conclusion: Our study concluded that binge eating disorder is significantly associated with polycystic ovarian syndrome. Results will help health care provider making good health choices for preventing and managing not only binge eating disorder but also women having polycystic ovarian syndrome with binge eating disorder.

……

Introduction:-

Polycystic ovarian syndrome is a common female endocrine disorder, affecting up to one in five women of reproductive age between 15-49 years [1, 2]. The global prevalence of polycystic ovarian syndrome is 3-7% [3], in the developed countries prevalence is 4-12% [1], and in Pakistan its prevalence is 52 % [4]. The clinical features are menstrual disorder with an ovulation, clinical and/or biochemical features of hyperandrogenism and the presence of polycystic ovaries in ultrasounography[5]. The etiology of polycystic ovarian syndrome is uncertain, but a number of risk factors were associated with polycystic ovarian syndrome are subfertility, obesity, insulin resistance, cardiovascular disease and hormonal disturbance[6]. Hormonal disturbance lead to behavioral and emotional health condition is related with abnormal eating behavior like binge eating [7, 8].

Binge eating disorder is characterized by eating large amount of food in a discrete time period and out of control [9]. The remission of binge eating in diagnosed binge eating disorder is reported as 67% in a 12 year follow-up study[10].Binge eating can lead to other serious physical health problems and death[7].There is an important role of polycystic ovarian syndrome in the pathogenesis of binge eating disorder [11]. Polycystic ovarian syndrome patients have reduced the secretion of cholecystokinin and changes in insulin sensitivity and androgen levels which lead to abnormal appetite regulation and tendency to binge eating[12].About one third women of polycystic ovarian syndrome reported binge eating disorder.[13] Therefore polycystic ovarian syndrome symptoms become worse when polycystic ovarian syndrome diagnosed with binge eating[13].

Binge eating disorder is also associated with Obesity [14].The risk of obesity is also higher in women with polycystic ovarian syndrome as compared to healthy controls [15]. The healthy controls and polycystic ovarian syndrome women had found a linear correlation with body mass index [16].Body mass index of polycystic ovarian syndrome women were strongly correlated with type 2 diabetes mellitus [17, 18]. Risk of developing type 2 diabetes mellitus is increased in polycystic ovarian syndrome women as compared to non-polycystic ovarian syndrome (control) women [19, 20]. About fifty to seventy five percent of women with polycystic ovarian syndrome occurred type 2 diabetes mellitus [21].Family history of type 2 diabetes mellitus particularly with obesity both increase risk of type 2 diabetes mellitus in polycystic ovarian syndrome women[22].

Women with polycystic ovarian syndrome are increased risk of anovulation infertility. Infertility was important characteristic of polycystic ovarian syndrome defined by Stein and Leventhal[1]and is one of the common presenting complaints [23]. The infertility burden is increasing among the women with polycystic ovarian syndrome[24].Infertility due to an ovulation affected 75% of women with polycystic ovarian syndrome[25].Women with polycystic ovarian syndrome were reported 50% primary infertility and 25% reported secondary infertility [26]. In Pakistan, this type of research study had not been conducted that's why this study was undertaken to explore the relationship between polycystic ovarian syndrome and binge eating disorder. The data from this study can be helpful for future research studies.

Objectives:-

To determine the association of binge eating disorder with polycystic ovarian syndrome in Civil Hospital of Karachi
To determine the risk factors associated with polycystic ovarian syndrome in Civil Hospital of Karachi

Rationale Of The Study:-
In Pakistan, this research study had not been conducted that's why this study was undertaken to explore the relationship between polycystic ovarian syndrome and binge eating disorder while a same pilot study was done at Stavanger university hospital with a small sample size and this study was used appropriate sample size . Data of this study provide information of binge eating disorder developing the risk of polycystic ovarian syndrome. Early evaluation of individual with binge eating disorder will improve eating pattern and will reduce binge eating. This study explored association should help to decrease serious health outcomes related to it and lower spending on its medical treatment

Methods And Materials:-

Sample Description:-
The sample size was calculated by using openEpi version 3. The sample size of the study was calculated on the basis of references (Proportion of binge eating among polycystic ovarian syndrome group = 20% and Proportion of binge eating among control group = 8.3%) taken from study conducted at University of Oslo [27] Sample size was calculated 280 (140 of case and 140 of control)

Criteria For Sample Selection:-
Sample selection was made through following selection criteria:

Inclusion Criteria:-
The study included, cases those who fulfilled the Rotterdam diagnostic criteria for polycystic ovarian syndrome mentioned in operational definition, non-pregnant and non-lactating, married or single of reproductive age 15-49 years of age and willing to participate in the study

Exclusion Criteria:-
The study excluded, operated cases of polycystic ovarian syndrome, women with any psychiatric problem or using psychiatric medications, women with sign and symptoms of hypothyroidism (my edema), women with sign and symptoms of Cushing syndrome, women with another gynaecological problem and women who refuse to participate

Research Design:- A Case control study

Methods:-

Sample Technique:-
Non Probability Consecutive sampling technique was used. Consecutively all the participant (case and control) was included while duration of study and fulfilling inclusion criteria

Duration Of Study:-
This study was completed in 7 month after approval of BASR.

Source Of Data:-
Polycystic ovarian syndrome case and control group women were selected from gynae. OPD in civil hospital Karachi

Tool For Data Collection:-
The data was collected by administering questionnaire for assessment of eating behavior among the women with polycystic ovarian syndrome and women in control group by used binge eating scale (BES) was used.[35]

Instrument:-

Binge Eating Scale (Bes) [9, 28, 29]
The binge eating scale (Gormally, Black, Daston and Rardin, 1982) [9, 28] is gold standard for binge eating disorder and internal Consistency is 0.89, sensitivity 84.6%, specificity 94.9 % [29]. The questionnaire is based on behavioral characteristic (e.g. large amount of food consume) and feelings or cognitive and (e.g. guilt or shame). It consists of 16 items, eight items describe the behavior characteristic and eight describe cognitive or feeling characteristics. Each item contains three to four response options that statement reflects a range of each characteristic measure. The total score range from 0-46. A cut off value point 17 was used. The individuals were characterized in two groups. These

groups were described as; no binge eating (score < 17) and binge eating (score ≥17). Analysis of each item (0-3), 0 indicates no binge eating problem, 1-3 indicate binge eating problems.

Human Subjects:-
CASE:-
Participants who was diagnosed for polycystic ovarian syndrome condition according to the selection criteria was selected from gynaecological outpatient department of civil hospital

Control:-
The participant who was normal on ultrasound investigation and free from polycystic ovarian syndrome symptoms

Data Collection:-
Study Setting:-
The study was conducted in the gynaecological outpatient department (OPD) of Civil Hospital Karachi

Study Population:-
Women attended the gynae. OPD of civil hospital Karachi

Ethical Consideration:-
The study was approved by Institutional Review Board (IRB) of Dow University of Health Science. Informed consent was obtained from those who were willing to participate in the study after explaining the study purpose.

Procedure Of Data Collection:-
Data was collected after obtaining the permission from concerned hospital authorities. The structured interview was conducted by using binge eating scale in polycystic ovarian syndrome women (cases) and normal women (control). Prior to the study the participant was seated in comfortable area and informed consent was obtained from both the cases and controls. The data was collected by the investigator herself both from the cases and control groups from gynae OPD of civil hospital Karachi. Cases were collected from gynae. Opd of civil hospital whose fulfill Rotterdam criteria (above mention in operational definition) and control was also selected in same setting population. The questionnaire was translated into Urdu and if other language participant participated so interpreter was helped with (i.e. her relative or any other same language person available at that time) who was translated in her language and got appropriate answers of question.

Statistical Analysis:-
Data entry was done on EpiData software. Data was double entered for removing the missing value or check error rate which should be <0.001. Cleaning and coding of the data was done prior to analysis Using Statistical package for social science (SPSS) version 21. Descriptive Analysis was carried out for socio demographic variables. Mean and Standard Deviation for age, height and weight was calculated. Frequency and percentage was calculated for age, BMI, age at marriage and household income marital status, education, addiction, ethnic group, family history of PCOS, menstrual irregularity, subfertility, obesity, history of diabetes, family history of diabetes and binge eating disorder.

For Inferential statistics the sample was divided into two groups: those having PCOS and those did not have PCOS. These two groups were compared according to socio-demographic variables and variables related to binge eating disorder by means of odds ratio and 95% confidence interval , p-value ≤0.05 was taken as significant. Univariate analysis was run to determine crude association by odds ratio between independent and dependent variable. Association between risk factors and the outcome was determined by logistic regression analysis. Adjusted odds ratio and then 95% confidence interval was calculated to eliminate the confounders.

Results:-

Sociodemographic Characteristics:-
The socio demographic characteristics of study participants are presented in Table 1 (a), (b).

Table 1 a:- Socio demographic characteristic of study participants (n=280).

S. No.	Characteristics	Mean	Standard Deviation (SD)
1	**Weight (Kg)**	64.76	±9.56
2	**Height (meter)**	1.567	±0.076
		Frequency (n)	**Percentage (%)**
3	**Age (years)**		
	Mean(SD)27(±4.34)		
	15-30	233	83.2
	31-45	47	16.8
4	**Body Mass Index[a] (BMI)**		
	Normal	84	30
	Underweight	9	3.2
	Overweight	133	47.5
	Obese	54	19.3
5	**Marital status**		
	Unmarried	144	52.5
	Married˜	136	47.5
6	**Age at marriage(n=136)**		
	≤25	86	64.7
	>25	50	35.3
7	**Education**		
	Illiterate*	90	32.1
	1 to 10 years of schooling	155	55.4
	Greater than 10 years of schooling	35	12.5
8	**No. of Children(n=136)**		
	≤2	46	34.3
	>2	88	65.7
9	**Monthly household income(PKR)****		
	≤10000	128	47.5
	>10000	152	54.3

* cannot read and write, **Pakistani Rupees, ˜married (married, divorce, separated),

[a] BMI classification according to the recommended of the WHO (normal18.5-24.9, underweight<18.5, overweight25-29.9,obese≥30

Table 1 b:- Socio demographic characteristic of study participants (n=280).

S. No.	Characteristics	Frequency (n)	Percentages (%)
10	**Family History of PCOS[A]**		
	Yes	64	22.9
	No	216	77.1
11	**Addiction of any substance**		
	Yes	109	38.9
	No	171	61.1
12	**Type of Addiction**		
	Smokeless Addiction[b]	88	80.7
	Smoke Addiction	21	19.3
13	**Obesity**		
	Yes	54	19.3
	No	226	80.7
14	**Type of Obesity[c]**		
	Class I(High)	48	88.9
	Class II (Very High)	5	9.3

	Class III (Extremely High)		1	1.9
15	**History of Diabetes**			
	Yes		0	0
	No		280	100
16	**Family History of Diabetes**			
	Yes		64	22.9
	No		216	77.1
17	**Exercise**			
	Yes		15	5.4
	No		265	94.6
18	**Binge eating disorder**			
	Binge Eating (≥17)		76	27.1
	Non Binge Eating(<17)		204	72.9
[^]polycystic ovarian syndrome ,[b]niswar, pan, others				
[c] Obesity classification according to the recommended of the WHO (class I(high)30-34.9,class II (very high)35-39.9,class III(extremely high)>40)				

The mean height of study participants was 1.56±0.07. The mean weight of study participants was 64.7±9.56. The study participants mean age was 27±4.34 and 83.2% were range of 15-30 years of age. The body mass index showed 30% normal (18.5-24.9), 3.2 % underweight (<18.5), 47.5% overweight (25-29.9) and 19.3% obese (≥30) kilogram per meter square. Just half 52.5% unmarried and 47.5% were married. The age at marriage of study participants (n=136) less than equal to 25 years was 64.7% and greater than 25 years of age was 35.3%. Regarding no of children 34.3% had equal and less than 2 children and 65.7% were greater than 2 children. The 32.1% were illiterate and majority of study participants had education 1 to10 years of schooling was 55.4%. Those having monthly house hold income less than equal to 10,000 Pakistani rupees were 45.7% where as those having greater than 10,000 were 54.3%. About 38.9% of study participants were used addiction and among these 80.7% used smokeless addiction (niswar, pan, gutka, others).The study participants having family history of polycystic ovarian syndrome were 22.9%. The study participants with family history of diabetes were 22.9% while the study participants 100% were non-diabetic. Only 5.4% study participants were exercise daily. The study participants having binge eating (≥17) were 27.1% while 72.9% were non-binge eating (<17)

Scoring:-

The score of binge eating among polycystic ovarian syndrome and non-polycystic ovarian syndrome is summarized in Table 2.

Table 2:- Binge Eating Scores , Frequency(n) and percentages(%) in PCOS(n=140) and Non-PCOS(n=140). "Non-polycystic ovarian syndrome.

			PCOS[º](Cases)		**NON-PCOS"(Controls)**	
S.No.	**Characteristics**	**Total scoring**	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
1	**Binge Eating ***	≥17	57	40.7	19	13.6
2	**Non Binge Eating ****	<17	83	59.3	121	86.4
º Polycystic ovarian syndrome, *binge eating scale scores (≥17), **non-binge eating scale scores (<17) ,						

In patients with polycystic ovarian syndrome 40.7% had score ≥17 and in non-polycystic ovarian syndrome women only 13.6% has score ≥17 according to binge eating scale. In polycystic ovarian syndrome 59.3% had score <17 and in non-polycystic ovarian syndrome 86.4% has score <17 according to binge eating scale

Unadjusted Odd Ratio:-

Table 3 (a), (b) shows,

Table 3 a:- Association of polycystic ovarian syndrome with socio demographic characteristics of study participant (n=280) (Unadjusted).

S. No.	Characteristics	PCOS[^]	NON-PCOS"	Unadjusted	p-value
		(cases)	(controls)	OR~(95%CI°)	
1	**Age (years)**				
	15-30	111	122	0.56(0.29-1.07)	0.08
	31-45	29	18	1	
2	**Body Mass Index[a] (BMI)**				
	Underweight	2	7	0.60(0.11-3.10)	0.5
	Overweight	65	68	2.0(1.41-3.56)	0.01
	Obese	46	8	12.1(5.03-29.24)	<0.001
	Normal	27	57	1	
3	**Marital status**				
	Married*	74	60	1.53(0.96-2.46)	0.07
	Unmarried	66	80	1	
4	**Age at marriage**				
	≤25	38	29	0.40(0.2-0.83)	0.01
	>25	36	31	1	
5	**Education**				
	Illiterate*	46	44	2.26(1.05-4.87)	0.03
	1 to 10 years of schooling	71	31	1.23(0.73-2.08)	0.4
	Greater than 10 year of schooling	23	29	1	
6	**No. of Children**				
	≤2	44	39	0.72(0.35-1.48)	0.3
	>2	28	21	1	
7	**Monthly household income(PKR)****				
	≤10000	74	86	1.78(1.11-2.87)	0.01
	>10000	66	54	1	

~odd ratio, °confidence interval, *married (married, divorce, separated),* cannot read and write, **Pakistani Rupees, [^]polycystic ovarian syndrome, "non-polycystic ovarian syndrome

[a] BMI classification according to the recommended of the WHO (normal18.5-24.9, underweight<18.5, overweight25-29.9,obese≥30)

Table 3 b:- Association of polycystic ovarian syndrome with socio demographic characteristics of study participant (n=280) (Unadjusted)

S. No.	Characteristics	PCOS[^]	NON-PCOS"	Unadjusted	p-value
		(cases)	(controls)	OR~(95%CI°)	
8	**Family History of PCOS[^]**				
	Yes	41	25	1.76(1.006-3.13)	0.04
	No	99	115	1	
9	**Addiction of any substance**				
	Yes	68	41	2.28(1.39-3.73)	0.001
	No	72	99	1	
10	**Type of Addiction**				
	Smokeless Addiction[b]	62	15	5.9(3.64-17.89)	<0.001
	Smoke Addiction	6	26	1	
11	**Obesity**				
	Yes	15	132	8.0(3.64-17.89)	<0.001
	No	26	8	1	
12	**Family History of Diabetes**				
	Yes	41	23	2.1(1.18-3.75)	0.01

	No		99	117	1	
13	**Exercise**					
	Yes		9	5	2.0(0.69-6.24)	0.1
	No		131	134	1	
14	**Binge eating disorder**					
	Binge Eating* (≥17)		57	19	4.37(2.42-7.88)	<0.001
	Non Binge Eating**(<17)		83	121	1	
₹odd ratio, ° confidence interval, ^ polycystic ovarian syndrome ,[b]smokeless addiction(niswar, pan ,huqa, others)						
*binge eating scale scores (≥17), **non-binge eating scale scores (<17),"non-polycystic ovarian syndrome						

The odds of having polycystic ovarian syndrome among overweight women (BMI 25-29.9) was found 2 times more (OR=2.0, 95 % CI=1.41-3.56, pvalue= 0.01) and among obese women (BMI ≥30) was 12 times more (OR=12.1, 95 % CI=5.03-29.24, pvalue=<0.001) more as compared control (normalBMI18.5-24.9) women kilogram per meter square. The odds of having polycystic ovarian syndrome among illiterate women were found 2 times more (OR=2.26, 95 % CI=1.05-4.87, pvalue=0.03) as compared tocontrol women greater than ten years of schooling. The odds of having polycystic ovarian syndrome among monthly household income less than ten thousand was reported 2 times more (OR=2, 95 % CI=1.11-2.87,pvalue=0.01) as compared to control women who had monthly income more than ten thousand Pakistani rupees. The odds of having polycystic ovarian syndrome among addictive who reported 2 times more (OR=2.28, 95 % CI=1.39-373, pvalue=0.001) as compared to control(non-addictive) women. The odds of having polycystic ovarian syndrome among smokeless addictive (niswar, pan, gutka, others) was reported 6 times more (OR=5.9, 95 % CI=2.08-17.06, pvalue=0.001) as compared to control (smoke addiction) women. The odds of having polycystic ovarian syndrome among those who had family history of polycystic ovarian syndrome were 2 times more (OR=1.76, 95 % CI=1.006-3.13, pvalue=0.04) as compared to control women who did not have polycystic ovarian syndrome history in their family. The odds of having polycystic ovarian syndrome among those who had family history of diabetes was found 2 times more (OR=2.1, 95 % CI=1.18-3.75, pvalue=0.01) as compared to control women who did not have family history of diabetes. The odds of having polycystic ovarian syndrome among binge eating score (≥17) were reported 4 times more (OR=4.3, 95 % CI=2.42-7.88, pvalue=<0.001) as compared to control non-binge eating score (<17) women.

While other variables results were not statistically significant difference in age, underweight, marital status, age at marriage, no of children, one to ten year of schooling and exercise. ADJUSTED ODD RATIO

Table 4 (a), (b) shows,

Table 4 a:- Association of polycystic ovarian syndrome with socio demographic characteristics of study participant (n=280) (Adjusted).

S. No.	**Characteristics**	**PCOS^**	**NON-PCOS"**	**Adjusted**	**p-value**
		(cases)	**(controls)**	**AOR₹(95%CI°)**	
1	**Age (years)**				
	15-30	111	122	0.4(0.18-1.26)	0.1
	31-45	29	18	1	
2	**Body Mass Index[a] (BMI)**				
	Underweight	2	7	0.6(0.11-3.30)	0.5
	Overweight	65	68	1.75(0.96-3.18)	0.06
	Obese	46	8	10.4(4.11-26.4)	<0.001
	Normal	27	57	1	
3	**Marital status**				
	Married	74	60	2.5(0.48-13.0)	0.2
	Unmarried	66	80	1	
4	**Age at marriage**				
	≤25	38	29	3.6(0.80-16.5)	0.09
	>25	36	31	1	
5	**Education**				
	Illiterate*	29	44	0.74(0.04-12.1)	0.8

	1 to 10 years of schooling		71	31	0.70(0.04-10.7)	0.8
	Greater than 10 year of schooling		23	29	1	
6	**No. of Children**					
	≤2		44	39	0.37(0.08-1.67)	0.2
	>2		28	21	1	
7	**Monthly household income(PKR)****					
	≤10000		74	86	7.3(1.35-39.9)	0.02
	>10000		66	54	1	
ǂAdjusted odd ratio, °confidence interval, ˜married (married, divorce, separated),* cannot read and write, **Pakistani Rupees,						
[a] BMI classification according to the recommended of the WHO (normal18.5-24.9, underweight<18.5, overweight25-29.9,obese≥30),						
^polycystic ovarian syndrome, "non-po ovarian	Syndrome					

Table 4 b:- Association of polycystic ovarian syndrome with socio demographic characteristics of study participant (n=280)(Adjusted)

S. No.	Characteristics		PCOS^ (cases)	NON-PCOS" (controls)	Adjusted AOR˜(95%CI°)	p-value
8	**Family History of PCOS^**					
	Yes		41	25	0.54(0.11-2.60)	0.4
	No		99	115	1	
9	**Addiction of any substance**					
	Yes		68	41	1.25(0.55-2.80)	0.5
	No		72	99	1	
10	**Type of Addiction**					
	Smokeless Addiction[b]		62	15	9.2(1.13-75.4)	0.03
	Smoke Addiction		6	26	1	
11	**Obesity**					
	Yes		43	132	7.5(2.46-23.0)	<0.001
	No		97	8	1	
12	**Family History of Diabetes**					
	Yes		41	23	2.5(0.48-13.0)	0.2
	No		99	117	1	
13	**Exercise**					
	Yes		9	5	1.6(0.48-5.8)	0.4
	No		131	134	1	
14	**Binge eating disorder**					
	Binge Eating* (≥17)		57	19	17.8(1.29-24.63)	0.03
	Non Binge Eating**(<17)		83	121	1	
ǂAdjusted odd ratio, °confidence interval, ^ polycystic ovarian syndrome [b]smokeless addiction (niswar, pan, others)						
*binge eating scale scores (≥17), **non-binge eating scale scores (<17),"non-polycystic ovarian syndrome						

After adjusting other variables the odds of polycystic ovarian syndrome among obese (BMI ≥30) were reported ten times more (AOR=10.4, 95 % CI=4.11-26.4,pvalue=<0.001) as compared to control (normal BMI 18.5-24.9) women kilogram per meter square. The odds of having polycystic ovarian syndrome among monthly household income less than ten thousand was foundseven times more (AOR=7.3, 95 % CI=1.35-39.9,pvalue=0.02) as compared to control women who had monthly house hold income more than ten thousand Pakistani rupees. The odds of having polycystic ovarian syndrome among smokeless addictive (niswar, pan, gutka, others) was reported nine times more (AOR=9.2, 95 % CI=1.13-75.4, pvalue=0.03) as compared to control (smoke addiction) women. The odd of having polycystic ovarian syndrome among binge eating disorder score (≥17) was found seventeen times more (AOR=17.8, 95 % CI=1.29-24.63, pvalue=0.03) as compared tocontrol non-binge eating score (<17) women

Discussion:-

The socio demographic variables including age, education and family history of polycystic ovarian syndrome in our study was not statistical significant in women having polycystic ovarian syndrome. The house hold income and smokeless addiction (niswar, pan, others)in our study was reported statistically significant in women having polycystic ovarian syndrome. In contrast to another study conducted in Germany where socio demographic variables in fifty women having polycystic ovarian syndrome and fifty healthy controls were not statistical significant [30].Given this study finding showed that some socio demographic variables increasing the risk of developing polycystic ovarian syndrome

In accordance with our result reported obesity and polycystic ovarian syndrome was statistically significant. Another study conducted in United States of America among the polycystic ovarian syndrome patients in tertiary care center reported obesity increased the risk of developing polycystic ovarian syndrome[31] .Many same other studies were conducted in Greece and Spain had similar results[32,33]. A study in Pakistan showed that high percentages of affected polycystic ovarian syndrome women were found to be obese[34].Our result thus indicated that obesity is increases risk of developing of polycystic ovarian syndrome.

In our study was reported that binge eating disorder was associated with polycystic ovarian syndrome. A study conducted in United Kingdom among the 230 women reported that binge eating disorder in women having polycystic ovarian syndrome was not significant because of poor selection criteria [28].Another study conducted in Stavanger university hospital showed that among 25 polycystic ovarian syndrome women and 24 control (healthy) women with polycystic ovarian syndrome16% reported moderate and 4% severe binge eating disorder but the result from this study could not be found association of polycystic ovarian syndrome and binge eating syndrome[27]. This study finding will help to reduce the risk of developing of polycystic ovarian syndrome and may help through life style modification prevent from binge eating disorder and its developing complications.

Limitations:-

Limitations of the present study was included,

- The study was conducted in one hospital so the result could not be generalized to whole population
- It is a case control study and recall bias is inherent in case control designed. This study may encountered recall bias

Strength And Weakness Of The Study:-

Strength:-

- This study determined multiple factors associated with polycystic ovarian syndrome
- This study validated scale for binge eating disorder and questionnaire for socio demographic data was used
- The study protocol was approved by Institutional Review Board (IRB) of Dow university of health sciences
- Adjustment of sample size from previous study though reliable software of open EPI version 3
- Used Urdu translation of questionnaire for understanding and got appropriate answers

Weakness:-

- In this study was used consecutive technique for selection of participants

Conclusion:-

Our study concluded that binge eating disorder is significantly associated with polycystic ovarian syndrome. Results will help health care provider making good health choices for preventing and managing not only binge eating disorder but also women having polycystic ovarian syndrome with binge eating disorder

Recommendations:-

This study recommended that,

- Early evaluation and management of binge eating disorder in young girls to reduce the risk of developing polycystic ovarian syndrome
- It will prevent by followed long term consequences e.g. diabetes and cardiovascular disease and non-communicable diseases are also a big burden in our part of world
- Advice life style modification among women with similar problem and will improve her social functioning and quality of life

- This study will also help in public health programs, making strategy for binge eating prevention in health policy f Pakistan and can be reduce social burden of binge eating disorder

References:-

1. Sheehan MT. Poly cystic ovarian syndrome: diagnosis and management. Clin Med Res. 2004; 2(1):13–27
2. TeedeH etal.Polycystic ovary syndrome: a complex condition with psychological, reproductive and metabolic manifestations that impacts on health across the lifespan.BioMed Central Ltd2010; 8:41
3. Marrinan G, Stein M. Polycystic Ovarian Disease (Stein-Leventhal Syndrome) .MD.htm2002:10
4. Yildiz BO, Yarali H, Oguz H, Bayraktar M. Glucose intolerance, insulin resistance, and hyperandrogenemia in first degree relatives of women with polycystic ovary syndrome. J ClinEndocrinolMetab2003; 88:2031-6
5. Azziz R, et al. The androgen excess and pcos society criteria for the polycystic ovarian syndrome: the complete task force .FertilSteril 2009;91: 456-488
6. Michelmore KF, Balen AH, Dunger DB. Polycystic ovaries and eating disorders: Are they related? Hum. Reprod.2001; 16(4): 765–769.
7. Walsh JM, Wheat ME and Freund K. Detection, Evaluation and Treatment of Eating Disorders: The Role of primary Care Physician .J Gen Intern Med 2000; 15: 577-90
8. Resch M, Szendei G, Haasz P. Bulimia from a gynecological view: Hormonal changes. J ObstetGynaecol. 2004; 24(8):907-910.
9. Ulman TF, VonHolle A, TorgersenL,StoltenbergC,Reichborn-Kjennerud T, Bulik CM.Sleep disturbance and binge eating disorder symptoms during and after pregnancy. SLEEP 2012; 35(10):1403-1411.
10. Fichter MM, Quadflieg N, Hedlund S.Long term course of binge eating disorder and bulimia nervosa: Relevance for nosology and diagnostic criteria. Int J Eat Disorder 2008 ;41:577-586
11. McCluskey S, Evans C, Lacey JH et al. Polycystic ovary syndrome and bulimia. FertilSteril 1991; 55: 287–291
12. Hirschberg AL, Naessen S, Stridsberg M, Bystrom B, Holtet J. Impaired cholecystokinin secretion and disturbed appetite regulation in women with polycystic ovary syndrome.GynecolEndocrinol 2004; 19:79-87.
13. McCluskey S, Lacey JH, Pearce JM. Binge eating and polycystic ovaries. Lancet 1992; 340(8821):723
14. Hudson JI, Hiripi E, Pope HG Jr.Kessler RC. The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. Biol Psychiatry 2007; 61:348-58
15. Kirchengast S, Huber J: Body composition characteristics and fat distribution patterns in young infertile women. FertilSteril2004, 81:539-544
16. Holte, J. et al.Restored insulin sensitivity but persistently increased early insulin secretion after weight loss in obese women with polycystic ovary syndrome. J. Clin. Endocrinol. Metab.1995 ; 80,2586–2593
17. Despres, J.P. et al. Treatment of obesity: need to focus on high risk abdominally obese patients. BMJ 2001; 322, 716–720
18. Zaadstra, B.M. et al. Fat and female fecundity: prospective study of effect of body fat distribution on conception rates. BMJ 1998; 306, 484–487
19. Ehrmann, D.A. et al. Prevalence of impaired glucose tolerance and diabetes in women with polycystic ovary syndrome.Diabetes Care 1999; 22, 141–146
20. Legro, R.S. et al. Prevalence and predictors of risk for type 2 diabetes mellitus and impaired glucose tolerance in polycystic ovary syndrome: a prospective, controlled study in 254 affected women. J. Clin. Endocrinol. Metab. 1999; 84, 165–169
21. Farrell K, Antoni MH. Insulin resistance, obesity, inflammation, and depression in polycystic ovary syndrome: biobehavioral mechanisms and interventions. FertilSteril. 2010; 94(5):1565-1574
22. Moatasim A, Haque AU. Polycystic Ovarian Disease. IJP2006; 4(1):1
23. Goldzieher JW, Axelrod LR. Clinical and biochemical features of polycystic ovarian disease. FertilSteril. 1963; 14:631–653
24. Richard et al. Diagnosis and Treatment of Polycystic Ovary Syndrome: An Endocrine Society Clinical Practice Guideline. J. Clin. Endocrinol. Metab.2013;98:4565-4592
25. Patel SM, Nestler JE. Fertility in polycystic ovary syndrome. EndocrinolMetabClin North Am. 2006;35(1):137-155
26. BalenAH et al. Polycystic ovary syndrome: 22 Legro et al Guidelines on PCOS J ClinEndocrinolMetab the spectrum of the disorder in 1741 patients. Hum Reprod. 1995; 10:2107–2111
27. Covrig M. Polycystic ovary syndrome: Diet, micronutrient status and eating behavior. University of Oslo, Thesis 2008
28. Elsenbruch S et al.Quality of life, psychosocial well-being and sexual satisfaction in women with polycystic ovarian syndrome. J. Clin. Endocrinol. Metab.2003;88(12):5801-5807

29. Kerchner A.M, Lester W, Styart SP, DorkrasA.Risk of depression and others mental health disorders in women with polycystic ovary syndrome: A longitudinalstudy.Int J FertilSteril2008; 91:207-12.
30. Kreputa K, Bidzinska-speichert B, LenarcikA, Tworowska-Bardzinska U. psychiatric disorders related to polycystic ovary syndrome.Endokrynol Pol 2012; 62(6):488-491.
31. Yildiz BO, Eric S, Azziz K and R. Impact of obesity on the risk for polycystic ovary syndrome. J ClinEndocrinolMetab.2008; 93(1): 162-168
32. Kandarakis ED et al. A survey of the polycystic ovary syndrome in the Greek Island of Lesbos: Hormonal and Metabolic Profile. J. Clin. Endocrinol. Metab.,1999;84(11):4006-4011
33. Asuncion M et al. A prospective study of the prevalence of the polycystic ovarian syndrome in unselected Caucasian women from Spain. J. Clin. Endocrinol. Metab. 2000;85(7):2434-2438
34. Nazir F, Tasleem H, Tasleem S, Sher Z, Waheed K. Polycystic ovaries in adolescent girls from Rawalpindi. J Pak Med Assoc 2011; 61(10):960-3