

RELATIONSHIP OF INFERTILITY WITH WEIGHT AND POLYCYSTIC OVARIAN SYNDROME (PCOS) IN SPECIFIC FEMALE POPULATION OF KARACHI, PAKISTAN

*AREFA AKHTER, RUBINA MUSHTAQ, AASIA KARIM, SOBIA KHAWAJA
AND AMBREEN AKRAM

Department of Zoology, Federal Urdu University of Arts, Science and Technology, Karachi, Pakistan

**Corresponding author's email: arefaakhter@yahoo.com*

خلاصہ

کراچی کی مخصوص خواتین کی آبادی میں پی سی او اور موٹاپے کا ہانچہ پن کے ساتھ تعلق کے بارے میں ایک مطالعہ کیا گیا تھا۔ ہانچہ پن سے متاثرہ خواتین کی تعداد ۱۰۰ الی گئی ان میں ۴۲ سال تک کی عمر کی خواتین کے پی سی او کے ٹیسٹ کئے گئے۔ ہانچہ پن کے ساتھ منسلک مختلف جسمانی عوامل (سسٹولک اور ڈائسٹولک بلڈ پریشر) کا بھی جائزہ لیا گیا۔ اس مطالعہ سے یہ اخذ کیا جاتا ہے کہ کل ۱۰۰ ہانچہ پن سے متاثرہ خواتین میں سے ۴۳ فیصد خواتین پی سی او کا شکار تھیں۔ اس مطالعہ سے پتہ چلتا ہے کہ ۴۸.۸۳ فیصد خواتین پی سی او کے ساتھ ساتھ موٹاپے کا بھی شکار تھیں۔ شماریاتی تجزیے ($P=0.01$) سے یہ نتیجہ اخذ ہوتا ہے کہ پی سی او اور موٹاپے کا ہانچہ پن کے ساتھ مثبت تعلق ہے۔ یہ تحقیق طبی اور حیاتیاتی علوم کے میدان میں ایک اہم پیش رفت ہے۔ یہ تحقیق مستقبل میں تحقیق دانوں کے لئے تحقیقی نظریات اجاگر کرنے میں معاون ثابت ہوگی۔

Abstract

A study was carried out to evaluate the correlation of infertility with Polycystic Ovarian Syndrome (PCOs) and weight in specific female population of Karachi. One hundred infertile women under the age of 42, were tested for polycystic ovarian syndrome (PCOs). Different physiological factors (systolic and diastolic blood pressure) associated with infertility were also assessed. It is attributed by the study that 43% of the subjects had PCOs among 100 infertile females. The study revealed that in PCOs positive subjects 48.83% of the cases were obese. Obesity and Polycystic ovarian syndrome were significantly correlated with infertility ($P = 0.01$) by statistical analysis of the data. The study shows many perspectives for future research.

Introduction

Failure of a couple to conceive with an average period of one year is referred to as infertility, despite of regular unprotected sexual intercourse (Cooper et al., 2010). Mechanisms of both ovarian and extra ovarian origin involve in the processes of fertility. Many neuro-endocrine and ovarian functions hamper in the presence of obesity, resulting in reduce fertility rate and ovulatory process in comparison with healthy women. In comparison for women with a BMI >27 and 20-25, obese women are at relative risk of an ovulatory infertility with oligo-ovulation and sub-fertility. Furthermore polycystic ovary syndrome (PCOS) causes intricacy by hyper-androgenism and menstrual disturbances (Norman et al., 2002). Excessive weight gain with BMI > 27 Kg/m² and weight loss results in ovarian dysfunction (Imani et al., 1998). Primary sex organs and fat cells produced estrogen (Nelson et al., 2001) and the condition of having an excess of body fat and obesity results in increase production of estrogen which limits the chances of conceiving. Small amount of body fat produces inadequate estrogen level which results in irregular menstrual cycle with anovulatory cycle (Pritts, et al. 2009).

Polycystic ovarian syndrome is associated with obesity, infertility, hirsutism, oligo-amenorrhea and elevated testosterone concentrations (Holte et al., 1994ab). Polycystic ovarian syndrome in women is also demonstrated by a fat mass distribution around the upper body. Consequently, abdominal area heftiness, characterized as a waist:hip proportion (WHR) 0.80, is discovered all the more regularly in ladies with PCOS, and in addition other endocrinological and metabolic changes; expanded convergences of free and aggregate testosterone, androstenedione, oestradiol, insulin, LDL-cholesterol, triglyceride and blood glucose, yet diminished centralizations of serum hormone-restricting globulin (SHBG) (Kirschner, et al., 1990; Pedersen, et al., 1995; Bernasconi, et al., 1996).

Generally a great number of obese females are coupled with adverse health effects. Obesity is associated with stroke, atherosclerosis, myocardial infarction, gall-bladder and diabetes mellitus (Noppa and Bengtsson, 1980).

A dominant relationship be present between female fertility and adiposity proposed by scientific examination. For both initiation and continuation of ovulatory cycles in young women a little amount of body fat was necessary by Frisch and McArthur (1974). Without a doubt, the normal time of menarche in the United

States has dropped by about 3 months in just the most recent 30 years, a move to a great extent ascribed to expanding body weights (Anderson et al., 2003).

Corpulence convolutes around half of all instances of polycystic ovarian disorder and most likely affects or compounds the natural ovulatory brokenness by enlarging both the insulin protection and the hyperandrogenemia show in this issue (Rittmaster et al., 1993). An affiliation free of polycystic ovarian disorder, be that as it may, has likewise been shown between truncal heftiness and unpredictable menses, proposing that corpulence itself may adversely affect fertility (Douchi et al., 2002).

Obesity and overweight are endemic worldwide. About 1 billion people are overweight of which 300 million are obese according to a WHO report, world widely (Warraich et al., 2009).

Obesity adversely influences reproductive function. It not only creates complications in conception and pregnancy but also increases the risk of miscarriage (Balen, et al., 2007; Pasquali, 2006).

Materials and Methods

To investigate the relationship of infertility with weight and PCOs, 100 infertile female subjects were examined from May 2012 to June 2014. A comprehensive questionnaire was designed which contain almost all related information about infertility including background of reproductive physiology and chemical pathology. Questionnaire was filled in the presence of doctor or along with some personale. Levels of FSH, LH and prolactin hormone were also investigated along with PCOs test, in subjects. The data was divided into 3 groups i.e., Group I, II and III on the basis of age. Infertile women aged 19-42 years, having irregular or regular menstrual cycle were included, while women, who had conceived once or women had secondary infertility, aged less than 19 and more than 42 years were excluded.

Statistical Analysis

Data examination was analyzed through the Statistical Package for the Social Sciences adaptation 11 (SPSS Inc., Chicago, IL, USA) for mean \pm standard error (SE). LSD test was applied, for finding differences among mean values. Statistical significance was assessed by Pearson's correlation test for Independence. The overall significance of differences between three groups (cases with PCOs, weight, systolic and diastolic blood pressure) was analyzed. A probability values (p value) less than 0.05 was considered significant. For categorical variables, the results were expressed as percentages.

Results

GROUP I: In this group the mean age (yrs) was 23.42 ± 0.40 , weight (Kg) 50.02 ± 0.96 , while mean values of systolic and diastolic blood pressure (mm Hg) were 108.75 ± 2.27 and 73.75 ± 1.88 respectively. PCOs had been found in 25% subjects of this group (Table. 1).

GROUP II: The mean age (yrs) in this group was 30.18 ± 0.33 , weight (Kg) 66.29 ± 0.62 , systolic blood pressure (mm Hg) 115.64 ± 1.71 , diastolic blood pressure (mm Hg) 77.82 ± 1.12 . Subjects of this group had 45.45% of PCOs.

GROUP III: This group had the mean age (yrs) 39.40 ± 0.87 , weight (Kg) 86.76 ± 1.43 , systolic blood pressure (mm Hg) 110.48 ± 3.04 , diastolic blood pressure (mm Hg) 74.76 ± 2.24 . 57.14% of the subjects had found to have PCOs.

A significant correlation was observed between weight and PCOs ($P = 0.01$) by statistical analysis of the data (Table. 2), while the relationship was found to be non-significant between weight and systolic ($P = 0.23$) and weight and diastolic blood pressure ($P = 0.17$).

Discussion

Hippocrates 2500 years ago noted a pessimistic consequence of obesity on fertility, and in modern times obesity is associated with PCOS, chronic anovulation, infertility and menstrual irregularities (Wallach et al., 1987; Grodstein et al., 1994; Zaidi et al., 2009).

Many studies have been conducted in Africa, where the reported prevalence of infertility ranges from 9% in Gambia to 30 % in Nigeria (Gerrits, 2012). In China the prevalence of primary infertility found 9%, 10 – 15% in America, 16% in Siberia and 19% in Australia (Yi, Zeng, and Wu Deqing 2000). In various reports the rate of primary infertility has been reported 8 – 21.9 % (Safarinejad, 2008). By the WHO 8 – 12% infertility in the world is estimated (Dovom, et al., 2014).

Different factors including age, weight, PCOs, systolic and diastolic blood pressure that have been responsible for infertility in females were carefully studied in the present study. The prevalence and common causes of female infertility aged between 15 and 55 years had also been studied by Sule *et al.*, (2008).

Table 1: Mean values of weight, Systolic blood pressure (mmHg), Diastolic blood pressure (mmHg) and PCOs in different age groups of specific female population of Karachi.

Groups	Age of patient				Weight of patient		Systolic blood pressure (mmHg)	Diastolic blood pressure (mmHg)	Percent age of PCOS
	Max-Min	N	Mean \pm SE	Max-Min	N	Mean \pm SE	Mean \pm SE	Mean \pm SE	
I	25-19	24	23.42 \pm 0.403	58-38	24	50.021 \pm 0.969	108.75 \pm 2.277B	73.75 \pm 1.886A	25
II	35-26	71	30.18 \pm 0.330	78-60	55	66.291 \pm 0.624	115.64 \pm 1.717A	77.82 \pm 1.122A	45.45
III	42-27	5	39.40 \pm 0.872	100-80	21	86.762 \pm 1.432	110.48 \pm 3.045A B	74.76 \pm 2.249A	57.14

Means that do not share a letter in column are significantly different.

Table 2: Coefficient of correlation (r) among various parameters of infertility.

	Wt	Sys	Dia
Sys	R=0.121 (<i>p</i> = 0.232)		
Dia	0.138 (<i>p</i> = 0.170)	0.811 (<i>p</i> = 0.000)	
PCO	-0.234 (<i>p</i> = 0.019)	-0.008 (<i>p</i> = 0.934)	0.037 (<i>p</i> = 0.714)

Wt=Weight(Kg), Sys=Systolic blood pressure (mm/Hg),Dia=Diastolic blood pressure (mm/Hg), PCO=Polycystic Ovary.

In the present study minimum age limit were taken 19 years while the maximum age limit was 42 years. The findings of Ogunniyi et al. (1999) taken 15 years as lower limit of age because average female puberty starts at 13 years and around 15 years mostly pregnancy started and the upper limit of age was 47 years because menopause starts at the average age of 46 years. Demographical study noted that at the age of 35 in women birth rates starts to decline (Menken, et al., 1986). The average women at the age of 41 will deliver their last child ranging from 23-51 (Broekmans, et al., 2004).

Globally 1.3 billion people are estimated to be obese and overweight (World Health Organization, 2004). Obesity increased pregnancy complications and had a considerable impact on reproductive outcome (Pasquali, 2006; Balen et al., 2007). In current study 34% cases had body weight above 70 Kg. Conclusively mostly overweight subjects (n = 21) had PCOS, as ANOVA (Table 2) proved a significant relationship between weight and PCOs by statistical analysis of the data. The risk of infertility, conception rates, miscarriage rates, and pregnancy complications are increased in obese women with PCOs (Pettigrew and Hamilton-Fairley, 1997). Ovulatory cycles were regained in 12 out of 13 women and after losing 6.3 \pm 4.8 Kg of weight, 11 subjects had conceived (Clark et al., 1995).

PCOs found to be most significant cause as in recent studies infertility incidence in the Fergana Valley was 16.8%, with polycystic ovaries' disease (PCOD) reported in Uzbekistan (Khaidarova, 2007). Current study also revealed that PCOs had profound effect in infertility, 43% of the cases had PCOs.

Infertility observed in patients having PCOs with higher rates approximately 75% (Hull, 1987; Stadtmauer and Oehninger, 2005). The current findings coincide with the results of Wallach, et al., (1988); Nestler, et al, (1989); Insler, et al., (1993) and Pasquali and Casimirri, (1993). They directly correlate hyper insulinaemia and hyper androgenaemia with obesity and PCOS.

Conclusion

Current study has highlighted the link between obesity, infertility and adverse reproductive health outcome. Infertility is associated with several risk factors, multifactorial in nature. The age has profound effects on fertility along with weight in females. Obesity is increasingly prevalent health burdens upon modern society. All obese women are not infertile; however obesity and its negative impact upon fertility are well documented.

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