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Research Article

Relationship between Infertile Overweight and Polycystic Ovary Syndrome Women's Characteristics and Lifestyle Habits: An Interventional Study

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Abstract

Background: The relationship between obesity and menstrual irregularities, including signs of infertility, was studied using historical data from 26,638 women, aged 20 to 40. Aim: investigate the correlation between infertile overweight and Polycystic Ovary Syndrome women's characteristics and lifestyle habits.

Subjects and Methods: A purposive sample of 116 women with infertility, overweight, and obese with polycystic ovary syndrome who attended to gynecological and infertility outpatient and inpatient clinics at Beni-Suef University Hospital. Using Arabic Structured interviewing questionnaire contains Sociodemographic characteristics, questions about the symptoms of PCOS

Results: It reveals that 77.6% and 56.8% of the study and control groups had menarche at an age of less than 15 years, respectively. 65.5% and 55.2% of the study and control groups had painful menstrual cycles before the intervention, compared to 31% and 55.2% of them after the intervention, respectively.

Conclusion: Significant association between the socio-personal data and total nutrition habit levels among the study group of infertile overweight and obese women with polycystic ovary syndrome and association between the ovulatory function and physical activity level in the study group of infertile overweight and obese women with polycystic ovary syndrome were found Recommendations: A study can be conducted to assess the knowledge, attitude and practice on women with PCOS regarding weight reduction exercises.

Kew Words: infertility; overweight; ovary syndrome; women's characteristics; lifestyle habits

Introduction

One of the most prevalent factors contributing to female anovulatory infertility is polycystic ovarian syndrome (PCOS). Obesity, which affects almost half of PCOS women, worsens infertility by hurting menstruation, ovulation, pregnancy rates, and live birth rates [1-6]. According to The Medical Journal of Australia, a startling 12% to 21% of Australian women of reproductive age are affected by PCOS, with the condition being more prevalent in people who are overweight or of indigenous ancestry. 70% of Australian women with PCOS are thought to still be undiagnosed [7-10]. Around the world, obesity has emerged as a serious health issue. One-fifth of women in the UK suffer from obesity, with 18.3% of women in the reproductive age range (16-44 years) being classified as obese [11-14]. It is well-known that many PCOS patients are overweight, but not all of them. Since adipose tissue is regarded to be an endocrine organ that produces androgens, there is growing evidence that PCOS in some women develops as a result of obesity [15-20]. A higher risk of infertility is linked to oligo anovulation, and PCOS is the most common cause of ovulatory problems. Primary infertility was observed in 50% of cases and secondary infertility in 25% of instances in a large group of 1,741 women with PCOS [21-26].

The relationship between obesity and menstrual irregularities, including signs of infertility, was studied using historical data from 26,638 women, aged 20 to 40. After accounting for height and age, it was discovered that women with indications of anovulatory periods-otherwise known as irregular cycles lasting longer than 36 days and hirsutism-were more than 30 lb (13.6

kg) heavier than those without menstrual abnormalities [7]. Obesity and infertility have a complex relationship. The knowledge that is now available supports the idea that androgen changes and their interaction with estrogen are the primary mechanism causing subfertility or infertility in obese women [27-30]. Additionally, gaining weight induces insulin resistance, which raises insulin levels and decreases the liver's ability to synthesize SHBG, both of which increase the amount of bioavailable testosterone as previously mentioned. Furthermore, the PCOS phenotype is eliminated in the majority of adult women who have bariatric surgery or significant weight loss by lifestyle adjustments. This might make obesity a contributing factor to anovulation and hyperandrogenemia in some PCOS women [31]. Based on the minutes from the meeting, PCOS should be classified when two out of the following three characteristics are present: oligo- or anovulation, clinical or biochemical indicators of hyperandrogenism, and PCOM are the first three symptoms [32]. Polycystic ovary syndrome, determined by transvaginal ultrasonography, was defined as the existence of at least one ovary with 12 or more follicles measuring 2-9 mm in diameter, independent of location, and/or a total volume > 10 mL3 [33].

Aim of the study:

This study aims to investigate the relationship between infertile overweight and polycystic ovary syndrome women's characteristics and lifestyle habits

Subjects And Methods

A purposive sample of 116 women with infertility, overweight, and obese with polycystic ovary syndrome who attended to gynecological and infertility outpatient and inpatient clinics at Beni-Suef University Hospital. Using Arabic Structured interviewing questionnaire contains Sociodemographic characteristics, questions about the symptoms of PCOS

Statistical Analysis: -

Data were collected, tabulated, and statistically analyzed using an IBM personal computer with Statistical Package of Social Science (SPSS) version 25 (SPSS, Inc, Chicago, Illinois, USA), where the following statistics were applied: Descriptive statistics: in which quantitative data were presented in the form of mean (X), standard deviation (SD), and qualitative data were presented in the form of numbers and percentages. Analytical statistics: used to find out the possible association between the study factors and the targeted variables.

Results

Figure 1 shows the ovulatory function and features of oligo or anovulation in the studied infertile overweight and obese women with polycystic ovary syndrome. It reveals that 77.6% and 56.8% of the study and control groups had menarche at an age of less than 15 years, respectively. Also, 58.6% of the study and control groups had a 3–5-day duration of the menstrual cycle before the intervention, compared to 86.2% and 55.2% after the intervention, respectively. Meanwhile, 81.1% and 77.6% of the study and control groups had irregular cycles before the intervention, compared to 31.0% and 67.2% after the intervention, respectively.

Figure 2 shows the symptoms experienced by the studied infertile overweight and obese women with polycystic ovary syndrome. It reveals that 65.5% and 55.2% of the study and control groups had painful menstrual cycles before the intervention, compared to 31% and 55.2% of them after the intervention, respectively. In addition, 100.0% of the study and control groups do not suffer from bleeding between the menstrual cycles before and after the intervention.

Figure 3 showed that there was a significant association between the socio-personal data and their total nutrition habit levels among the study group of infertile overweight and obese women with polycystic ovary syndrome. About 77.8%, 77%, and 78.6% of poor nutrition habits of the study group women are in primary education, rural residence, and employed before intervention. Compared to 84.4%, 84.4%, and 89.3% of good habits are higher education, urban residence, and employed after intervention. There is notice that there is more noncompliance and resistance to change in primary education.

Figure 4 showed association between ovulation and lifestyle in the study group of infertile overweight and obese women with polycystic ovary syndrome (n = 58). About 87.5%, 83%, and 77.7% of poor nutrition Habits of the study group women are Duration of the menstrual cycle less than days (hypomenorrhea), irregular cycle, and a long average menstrual cycle is more than 90 days (oligo amenorrhea) before intervention. Compared to 78%, 75.6%, and 83.3% of good habits, the duration of the menstrual cycle is 3-5 days, the regular cycle, and the long average of the menstrual cycle is 21-34 days after intervention.

Figure 5 showed association between the ovulatory function and physical activity level in the study group of infertile overweight and obese women with polycystic ovary syndrome (n = 58). About 87.5%, 93.6%, and 77.7% of Mild Physical Activity (sedentary lifestyle) of the study group women have a duration of menstrual cycle of less than 3 days (hypomenorrhea), an irregular cycle, and a long average menstrual cycle of more than 90 days (oligo amenorrhea) before intervention. Compared to 68%, 80%, and 83.3% of moderate physical activity had a normal duration of the menstrual cycle of 3-5 days, a regular cycle, and the long average of the menstrual cycle is 21-34 days after the intervention.

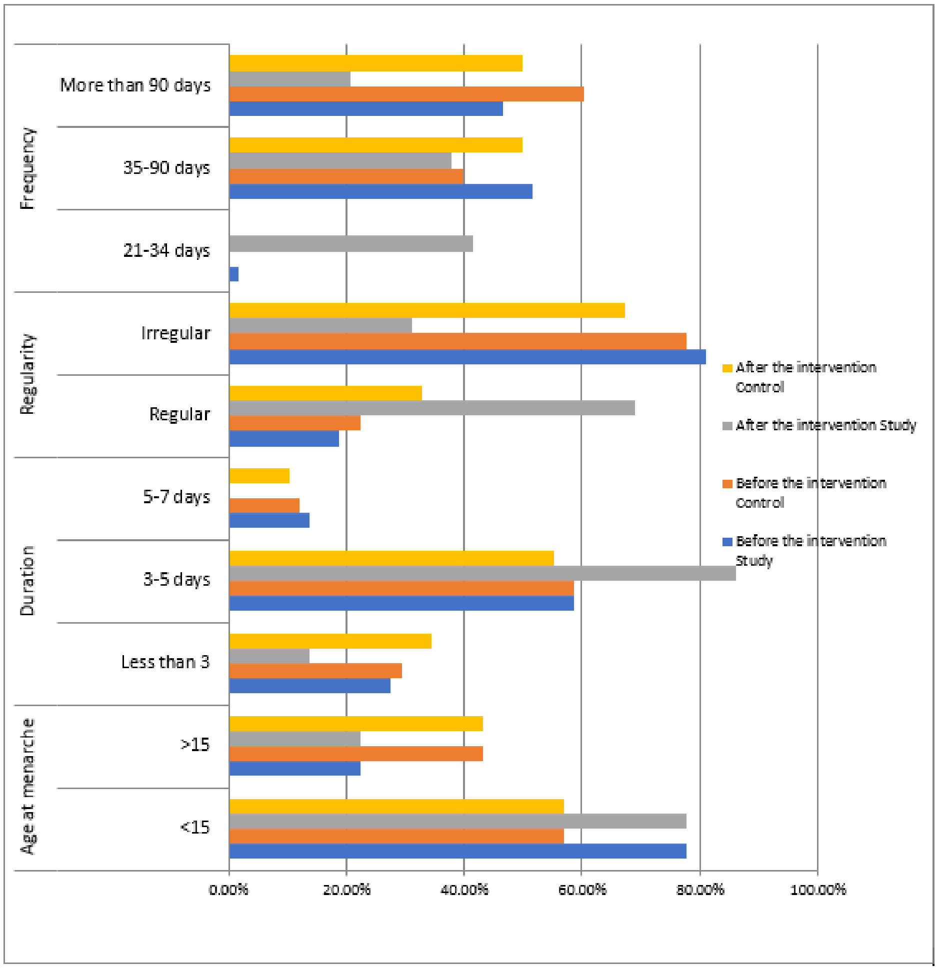

Figure 1: Ovulatory Function and Features of the Studied Infertile Overweight and Obese Women with Polycystic Ovary Syndrome (n = 116)

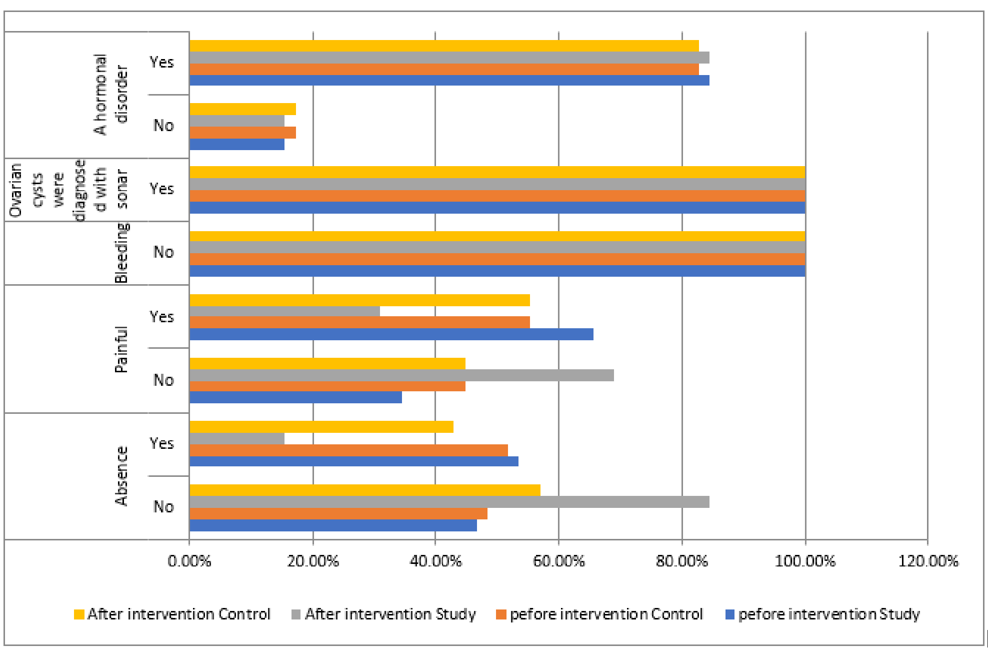

Figure 2: Symptoms experienced among the studied infertile overweight and obese women with polycystic ovary syndrome (n = 116)

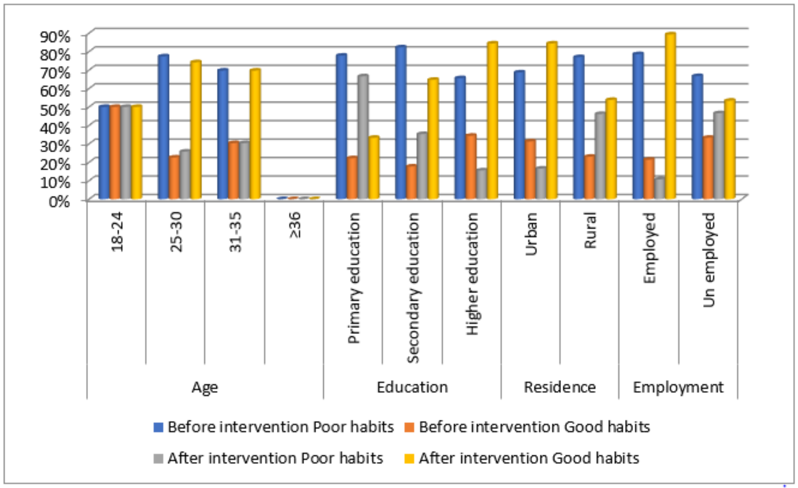

Figure 3: Relationship between the Socio-personal data and Their Total Nutrition Habits levels among the Study group of Infertile Overweight and Obese Women with Polycystic Ovary Syndrome (n=58)

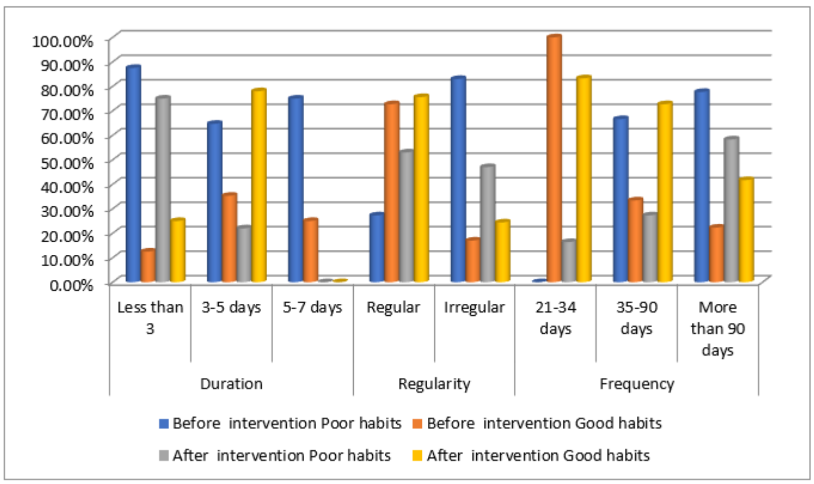

Figure 4: Relationship between Ovulatory function and lifestyle dietary habits in the Study group of Infertile Overweight and Obese Women with Polycystic Ovary Syndrome (n = 58)

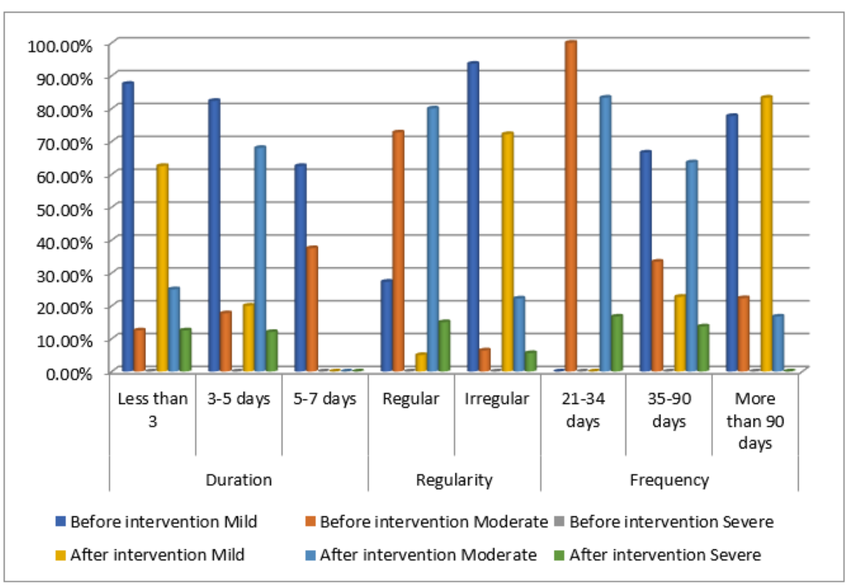

Figure 5: Relationship between Ovulatory function and physical activity level among the Study group of Infertile Overweight and Obese Women with Polycystic Ovary Syndrome (n = 58)

Discussion

The findings of the current study revealed that the mean age in the study and control groups was 28.7±2.87 and 28.8±3.00 before and after the intervention, respectively. This finding came in agreement with **Amirjani, et al., (2019),** who studied the "Dietary intake and lifestyle behavior in different phenotypes of polycystic ovarian syndrome", which concluded that the mean age of the studied patients with infertile, overweight, and obese women with polycystic ovary syndrome is (29.03 ±3.31) (29.85 ±6.40) [34]. From the researcher's point of view; these results may be justified that PCOS is a very common endocrine disorder among women of reproductive age. This finding was incongruent with Che**, et al., 2021,** who studied the "Lifestyle intervention for overweight/obese women with polycystic ovarian syndrome. They revealed that the mean age of the study participants was 31.79±3.38, and 32.31±3.79 [35]. According to the researcher's point of view, this discrimination in mean age between the current study and those previous studies could be attributed to differences in settings. Previous studies were conducted in urban areas. Meanwhile, these findings were incongruent with those of **Al Anwar, et al., (2022),** who concluded that most of the studied participants were secondary and primary education and rural residents. This incongruence between the current and previous studies may be related to patients living in rural areas; they usually prefer to have secondary education and to get married at an early age [36].

The current study findings revealed that most patients in both the study and control groups had ages of menarche before 15 years. Also, in line with the present findings; from the researcher's point of view, many studies have pointed to verified that a slightly later onset age (15 to 18 years) at menarche could reduce the risk of PCOS. These findings came in agreement with **researchers,** who studied "Age at menarche and polycystic ovary syndrome" and [37-38]. They revealed that the age of menarche is between 10-18 years. Menarche is one of the major causes of PCOD/PCOS due to poor diagnosis of normal pubertal ovaries and polycystic ovaries. The current results were not in the same line with **Desai, et al., (2018),** and **Thathapudi, et al., (2014),** (Indian study) who showed that the mean ages of menarche were over 14 years in PCOS girls, respectively [39-40]

Regarding the duration of the menstrual cycle, the findings of the current study showed that the present study revealed that, there were highly statistically significant improvements in menstrual cycle irregularities in the study, more than half of the study and control groups had a 3–5-day duration of the menstrual cycle before the intervention compared to the majority of the study group had had a 3-5 day duration of the menstrual cycle after the intervention. These findings are similar to the study done by **Öberg, (2022).** They studied "Effects of Lifestyle Intervention in Overweight Women with Polycystic Ovary Syndrome. From the researcher's point of view, lifestyle interventions have been shown to have positive effects in terms of improved menstrual cycle irregularities [41].

In addition, the current study findings revealed that more than three-quarters of the study and control group had irregular cycles before the intervention, while more than two-thirds of the study group had regular cycles after the intervention. These findings came in agreement with **Marzouk, et al., (2016).** They studied the "Effect of dietary weight loss on menstrual regularity in obese young adult women with polycystic ovary syndrome." They revealed that the Dietary weight loss in adolescent women with PCOS resulted in significant improvement in menstrual regularity [42]. From the researcher's point of view, lifestyle interventions have been shown to have positive effects in terms of improved ovulation function. The current study findings revealed that there is an association between the Socio-personal data and their total nutrition habits levels among the study group of infertile overweight and obese women with polycystic ovary syndrome. In which lower educated women, rural residents had poor lifestyle habits and less compliance to live lifestyle modification program. These results came in agreement with **Tay, et al., (2023),** who studied "High prevalence of medical conditions and unhealthy lifestyle behaviors in women with PCOS during preconception, and found out that better-educated women may be more proactive in healthcare engagement and adopt healthier lifestyle choices [43]. According to the researcher's point of view, this may be justified as educated women getting more information sources about their condition through the internet or media than illiterate women. Also, the educational level can highly affect patients 'perception of their condition, thus influencing the level of early detection, diagnosis, and treatment.

The current study findings revealed that there is an association between ovulatory function improvement and lifestyle habits in the study group of infertile overweight and obese women with polycystic ovary syndrome. This was in line with a meta-analysis carried out by **Abdolahian et al., (2020),** to evaluate the impact of lifestyle changes on the anthropometric, clinical, and biochemical parameters in adolescent girls with PCOS following three to twelve months of intervention. The program also showed improvement in menstrual cycle irregularities [44]. In another investigation carried out in Stockholm, Sweden's Karolinska University Hospital, Dietary control, and exercise, either alone or in combination, are equally helpful in improving ovarian function in women with PCOS, according to a study that compared the effects of three months of these three interventions on ovarian function in PCOS-affected women [45].

Conclusion:

Significant association between the socio-personal data and total nutrition habit levels among the study group of infertile overweight and obese women with polycystic ovary syndrome and association between the ovulatory function and physical activity level in the study group of infertile overweight and obese women with polycystic ovary syndrome were found

Recommendations:

A study can be conducted to assess the knowledge, attitude and practice on women with PCOS regarding weight reduction exercises.

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