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Acne appearance and life style effects in women with polycystic ovary syndrome

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Abstract
One of the common signs of polycystic ovary syndrome in young adults is acne appearing, irregular menstruation, weight increase and hirsutism. Data were collected from 120 young women in their twenties years old; 90 of them with polycystic ovary disease and 30 control, during the winter season of 2023. Different lifestyle factors studied as diets, sports, body mass index estimation and psychological and emotional effects as well as excessive acne and facial hair. The results revealed that a high p-value significance between the inflamed acne appearance and irregular menstruation in women with polycystic ovary disease than control one, and most of patients with overweight and obesity that may affected by endocrine hormone or unhealthy lifestyle factors or as a result for microbial infections.

Keywords: Polycystic ovary disease, acne & microbial infections, lifestyle

Introduction
Polycystic ovary syndrome (PCOS) is a most heterogeneous endocrine disorder of unknown etiology that causes hyperandrogenism in women. Acne vulgaris is a common manifestation of cutaneous hyperandrogenism (Sekhon, A. K., *et al*., 2020) [1]. (PCOS) is the leading cause of infertility in women of reproductive age, presenting wide range clinical manifestation features as irregular menstruation, obesity, acne appearance, hirsutism, hair thinning and loss difficulty getting pregnant or irregular ovulation and many others (Deswal, R, *et al*., 2020) [10]. PCOS disease defined by the presence of several follicles growing on the external edges of the ovary. Factors that affect ovarian function; a pituitary gland disorders causing deficiency of follicle-stimulating hormone FSH which stimulates the release of the egg from the follicle. It affects about 5-10% of women, in some severe and chronic cases, this disorder can lead to infertility and other serious complications such as heart disease, type 2 diabetes (Alina Bradford, 2022).
What causes acne?
Acne is an inflammatory disease of the epidermal sebaceous ducts of the skin, affected by Sleep problems, alterations to mental health parameters, as well as stress and inflammation-related causes of death. These disorders often lead to the development of serious diseases such as diabetes, loss of visceral fat, infertility, atherosclerosis, cardiovascular disease, dysbiosis and cancer. Acne is caused by four main pathophysiological processes, as explained by (Dawson, A. L., & Dellavalle, R. P. (2013): First: abnormal loss of keratinocytes and their proliferation, leading to duct obstruction. Second: androgen-related increase in sebum production. Third: inflammation. And finally: bacterial infection caused by the proliferation of Propionibacterium acnes. (.McLaughlin, J., 2019) [2]. *P. acnes* known as Bacillus acnes) was isolated from acne lesions, it was involved in acne pathology (Bojar, R. A., & Holland, K. T. 2004) [32]. *P. acnes* is a Gram-positive, rod-shaped, facultative anaerobic bacterium that inhabits human skin and accounts for 87% of other Staphylococcus, Streptococcus, Corynebacterium, and Pseudomonas clones.] *P. acnes* also triggers the release of pro-inflammatory cytokines, interleukin-1b (IL-1b), IL-8, tumor necrosis factor alpha (TNF-α), granulocyte macrophage colony-stimulating factor (GM-CSF), and complement deposition in follicular keratinocytes, leading to keratinocyte proliferation and replacement and the formation of preclinical microcomedones (Qidwai, A. *et al*. (2017) [33]. To reduce the prevalence of PCOS, patients need to modify their lifestyle and dietary habits, choose the right nutrients, pharmaceutical supplements, and physical activity. The duration and results of PCOS are primarily dependent on the patient's treatment and genetic predispositions. (Victorin, E., 2022) [27], (McCartney, C. R., & Marshall, J. C., 2016) [17]. A previous study showed a correlation between the prevalence of acne and lifestyle in adolescents/young adults in 7 European countries. (Wolkenstein P.*et al*., 2018) [31].

Methods

Data collection

The reports of women with polycystic ovary syndrome (POC) were 120. Ninety of them with POC while thirty without (as control). These reports were collected from different private endocrinology labs of specialist in Basrah, during four months period between November, 2023 to February, 2024.

Questionnaire designing

This study was designed depending on a questioner collected from PCOS patients' women and controls. The questioners explained in table 2.

Table 2: A questionnaire of some life style effects on women with polycystic ovary syndrome.

Questions
Do you have polycystic syndrome?
Age
Is your menstrual cycle regular?
Is menstruation accompanied by pain
Does POC cause psychological effects?
Marital status: Are you married?
Do you have a child?
POC before or after marriage?
Cultural status: Are you educated?
Do you eat fast food or canned food?
Do you drink soft gases drinks?
Is your sleep regular? (Do you stay up at night?)
Do you exercise regularly?
Do your facial skin look clear?
Do you have acne?

Statistical analysis

The data were analyzed using SPSS version 26, and results are expressed as counts or percentages. The utilization of BMI is based on the assumption that the weight of a population is the square of their height. This supposition and the thresholds for determining overweight (BMI between 25 and <30 kg/m2) or obesity (BMI ≥ 30 kg/m^2) were derived from investigations of Caucasian populations (Table 2, Appendix 2). (Mitra, A. & Dhurandhar, N. V. (2019) [18]. The body mass index is expressed as a percentage of the population's total weight by the following formula by

$$BMI = \frac{\text{Weight in kilogram}}{(\text{Height in meter})^2}$$

(https://www.usz.ch/en/bmi-calculator/.)

Results & discussion

Polycystic ovary syndrome in women

The whole reports were taken from 120 women of different age groups, numbers of polycystic ovary syndrome in women of this study were ninety women, and thirty were collected from normal healthy women as control. Acne appearance and lifestyle aspects were tested, the results showed that:

Life style affects

There were many patterns of lifestyle routines as eating, drinking, doing exercises and sleeping on time. Figure 1 explain the p- value≤ 0.05 was significant in these aspects between PCOS and control women as can see about 64.4% of patients ate unhealthy fast food, 65.5% were drunk fizzy drinks, while 13.3% did exercises and there were 34.4% slept well in time. On the other hand, everything was verse with the control heathy women were applied more regular and healthy routine while 23.3%, 40% had unhealthy food and drinks respectively, while more than half of them did regular exercises and suitable time of sleeping (53.3%, 66.6%) Others have reported that POS is associated with sleep disorders, changes in mental health parameters, and causes of oxidative stress and inflammation. (Victorin, E., 2022) [27].

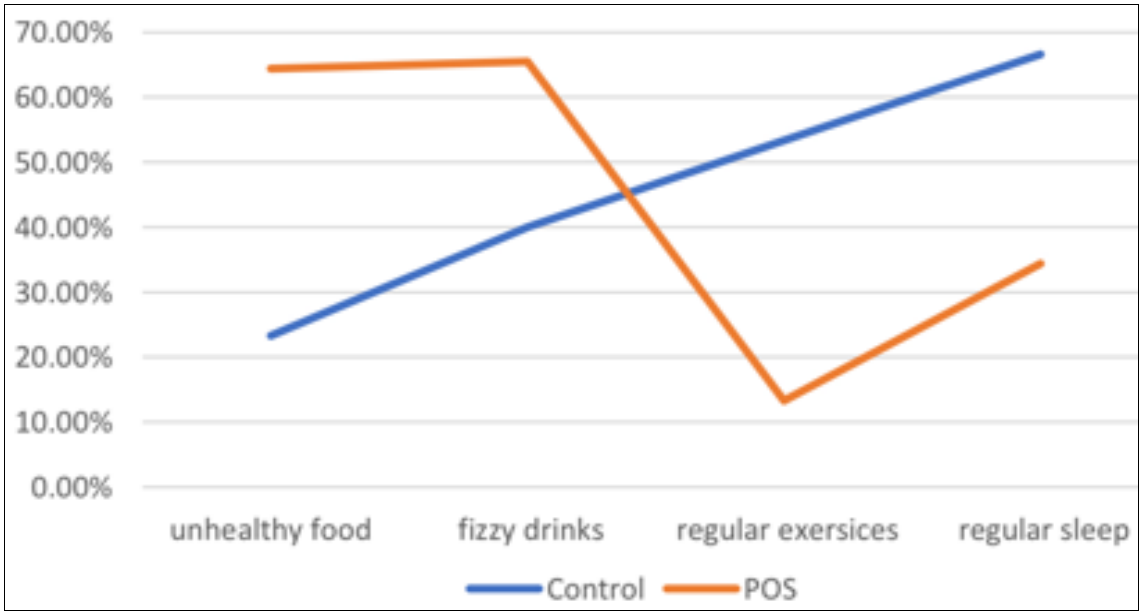

Fig 1: Some life style aspects and POS

The effect of obesity

The relationship between obesity and POS were studied as well by applying

BMI equation to estimate the normal weight and obesity in women, as it can be seen from figure 2, the obesity highly increased in patients in contrast with the normal control women. There were 30% of POS patient had normal body mass index while more than 70% between overweight and obese, but most control heathy women 60% with normal weight. The results accepted with.

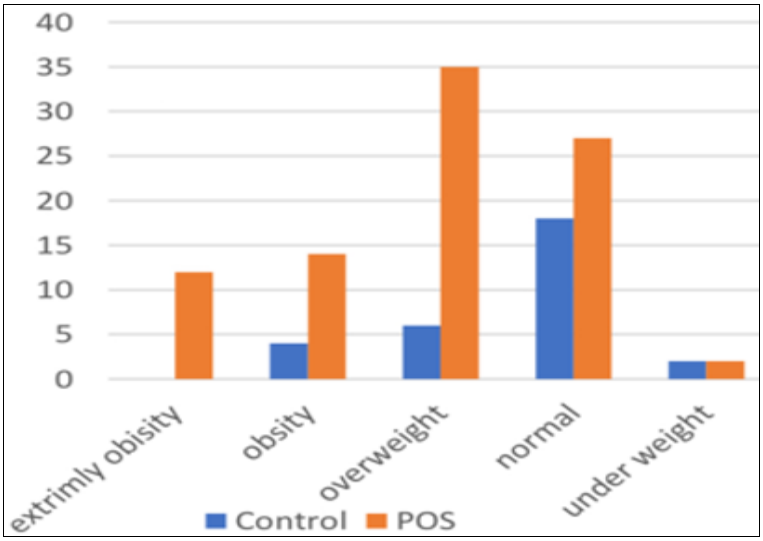

Fig 2: Obesity effect on POS

Age association with POS disease

The age of studied women was grouped into four grouped (-20, 21-30, 31-40, 41-), the age was affected with the appearance of POC, when the disease was more occur in patients of twenties to thirties may because of hormones alterations of pregnancy or after birth as can be shown in figure 3. Although the most control women with the same age. This result accepted with (Begum, S., 2012) [9] Polycystic ovary syndrome (PCOS) is a common endocrine disorder affecting women of childbearing age.

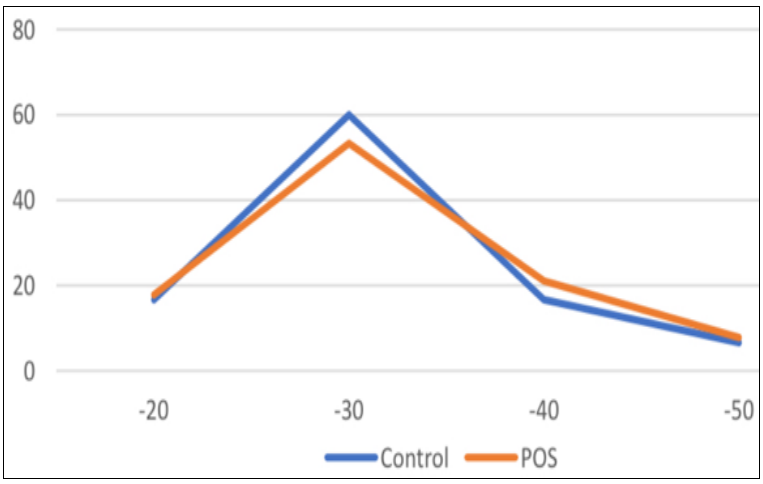

Fig 3: Effect of age

Regularity of menstruation: One of the most important symptoms of polycystic disease was the irregularity of menstrual period and its accompanied by pain. Most of control had regular period (86.6%) while (26.6% of patients had regular period with highly significant effect of p- value ≤ 0.05. This agreed with (Witchel SF, 2015) [30] said in adolescence phases, the PCOS criteria overlap with normal pubertal development So, the diagnosis of PCOS in adolescents is difficult than adults. Also (Deswal, R., et.al. 2020) [10] who mentioned irregular menstrual cycle or oligomenorrhea. Hyperandrogenaemia is associated with menstrual irregularity and polycystic syndrome (West, S., *et al*., 2014) [30]. No significant effect of pain although in control less effect than on patient with (60%, 82.2%) respectively, figure 4.

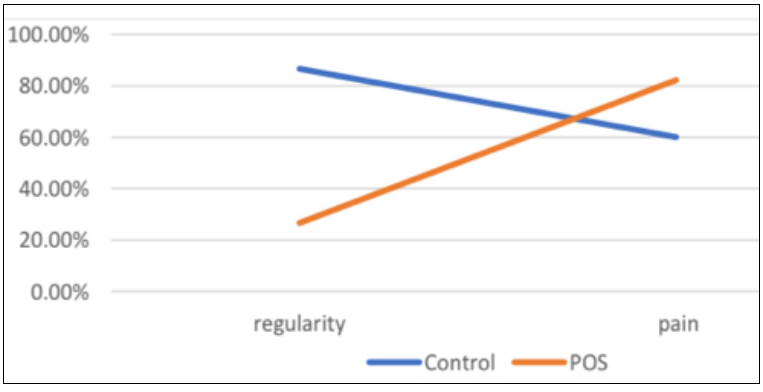

Fig 4: Regularity of menstruation accompanied with pain

Psychological, martial, cultural effects Other aspects were studied in this questioner dealing with POS women feeling that affects psychological state, it can be noticed from (Figure 5) the psychological state was highly affected on patients (74.4%) with no that effect on control (3.3%). Researchers mentioned psychosocial stressors and emotional states of depression increased in adolescents with PCOS (Saei Ghare Naz, M., *et al*., 2020) [22] and are crucial in long-term therapy of PCOS (Norman, R. J., *et al*. 2002) [21], so any medical conditions can stop the ovaries from working properly (Alina Bradford, 2022). There were no significant differences shown in Material state although a little vary between control and POS women (16.6%.41.1%) respectively. Polycystic disease was not affected with Cultural state, as noticed in figure 5 when.

Both control women and patients were educated with more than 90% for both.

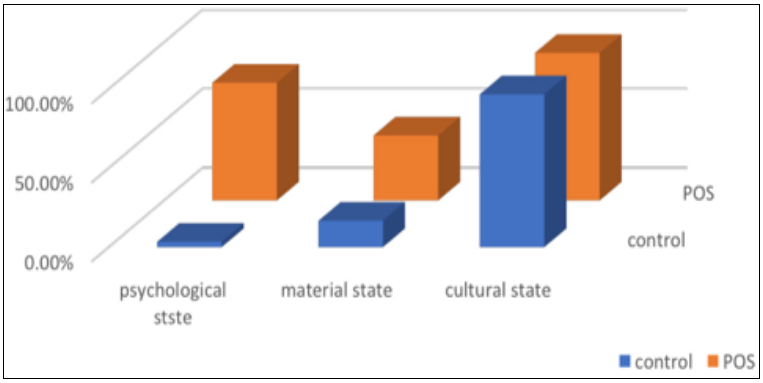

Fig 5: Psychological, material and cultural states of women

Skin purity and Acne

Polycystic ovary syndrome may directly effect on the facial skin purity from freckles, melasma, any pigmentation and the appearance of acne or indirectly as mentioned before due to psychological state of patients. The results in figure1 showed that healthy women had more clear facial skin with less acne (66.6%,33.3%), which were significant differences with PCOS women, when their facial clearness were 31.1% and acne 46.6% As was seen by (Deswal, R., *et al*. 2020) [10] who reported the increased skin sebum secretion or acne with polycystic ovary women. Also agreed with (Begum, S., 2012; Hacivelioglu, S., *et al*. 2013) [9, 13] He wrote that acne is a common manifestation of hyperandrogenism and androgen excess in patients with (PCOS). This is consistent with (Wolkenstein P. *et al*., 2018) [31], who also observed that menstrual cycle disorders and androgen excess are associated with acne, hirsutism, and high levels of LH and testosterone. Alsadi, Y. L., & Mohamad, B. J. (2019) [5].

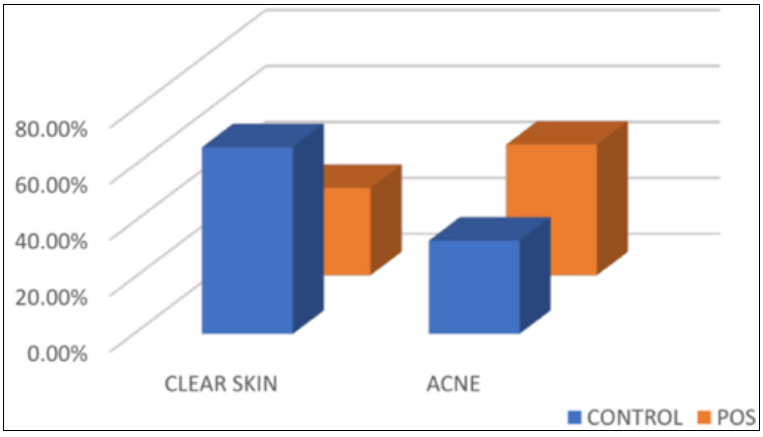

Fig 6: Skin purity and acne appearance of POA and control women

To conclude most women with polycystic ovary syndrome in the reproductive age suffer from irregular menstruation, obesity, acne appearance in face, psychological state highly affected. Lifestyle routines affected polycystic ovary syndrome among women in special unhealthy food, fizzy drinks, sleeping irregularly with staying wake up till dawn and not doing regular exercises.

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