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## REVIEW ARTICLE

### Is the Risk of Polycystic Ovary Syndrome among Working Women Higher and Vice Versa?

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#### Abstract:

#### Introduction:

Polycystic ovary syndrome (PCOS), an endocrine glands disorder, caused by hormonal imbalance, is featured by diverse potential effects for women; while individuals perpend to those that are affecting appearance and menstruation disorder. Our aim was to assess PCOS risk factors in working women.

#### Materials and Methods:

The study was carried out as a literature review work through searching databases including Scopus, PubMed, and ScienceDirect for papers published before December 2019. The databases were searched for the terms such as PCO, job stress, and risk factors of PCO. Risk factors for polycystic ovarian syndrome and occupational risk factors for working women were investigated.

#### Results and Discussion:

There are several reasons known for PCOS like obesity and insulin resistance along with the stressors that increase its risk. Working women tend to be exposed to several stressors and being in charge of home affairs creates a higher workload and intensified stresses. The risk of PCOS is higher in women with higher stressors at work.

#### Conclusions:

Working women experience many stressors and taking into account that stress is a precursor or intensifier of PCOS risk factors, working women are at a higher risk of PCOS compared with housewives.

**Keywords:** Polycystic ovary syndrome, Working women, Stress, Glucose, Risk, Polycystic.

#### Article History

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## 1. INTRODUCTION

Polycystic ovary syndrome (PCOS), a disorder of endocrine glands, is caused by hormonal imbalance in women [1]. This syndrome is a silent and non-contagious disease [2] and appears as a sort of insulin resistance in women along with probable changes in cortisol and melatonin secretion; which are the key indicators of the hypothalamus, hypophyses, and adrenal function [2, 3]. According to the National Institute of Health (NIH) and Rotterdam Criteria, the prevalence of PCOS is about 6-10% and 15%, respectively [4]. The syndrome

causes a variety of diverse and notable complications such as infertility, hypoenestrogenism, hirsutism, insulin resistance, glucose intolerance, diabetes type II, and cardiovascular disorder; in addition to causing anxiety, depression, and low quality of life [1]. Despite all these problems, there is no public awareness of PCOS [5]. Previous studies showed that women with PCOS suffer from higher social stress and other life stresses as well. One of them is occupational stress, which is the second occupational health related to work [6]. By definition, occupational stress refers to any non-useful psychological or physical response caused by a lack of fitness between the responsibility assigned at work and one's capabilities, which might lead to aggressive behaviors, work

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accidents, psychological and mental disorders, or even death. It affects one's health and quality of life and increases the risk of work accidents. Moreover, stress might cause destructive effects on physical and psychological health including hypertension, heart attack, depression, and anxiety [7].

Chronic depression might cause changes in nutritional habits so that many find overeating a way to fight stress, which leads to obesity and abdominal fat – both as key risk factors for diabetes type II [8, 9]. In addition, unhealthy nutrition results in insulin resistance so there is a significant relationship between insulin resistance and clinical problems like non-alcoholic fatty liver and PCOS. On the other hand, some of the occupational risk factors like the inconsistency of circadian rhythm, overnight sleep disruption, the polluted environment at work (particles, solvents), exposure to heavy metals (arsenic, mercury) or stable organic pollutants increase the risk of insulin resistance [10]. Many jobs are featured with these risk factors. As shown by other studies, anxiety, depression, and lack of physical activity are very common in women with PCOS.<sup>3,9</sup> In general, working women are under heavy stress in addition to their work since they are in charge of home affairs. Therefore, the hypothesis of the present study is that working women are at a higher risk of developing PCOS. Our aim was to assess PCOS risk factors in working women.

## 2. METHODS

The study was carried out as a literature review work through searching databases including Scopus, PubMed, and ScienceDirect for papers published before December 2019.

The databases were searched for the terms such as "Polycystic ovary syndrome", "PCOs", "stress", "job stress", "working women", and "risk factors of PCOs".

The other references were also reviewed to find the papers that might have been overlooked when searching the databases. Moreover, the studies published in English were selected for analysis. Studies, which investigated irrelevant outcomes and lacked sufficient information for analysis, were excluded. Finally, the search results were reviewed by two authors independently after removing duplicates. The information of the studies, which entered the final phase, was extracted and investigated. All procedures carried out in accordance with the ethical committee of Shoushtar Faculty of Medical Sciences (No. IR.SHOUSHTAR.REC.1399.04).

## 3. RESULTS

### 3.1. Risk Factors of PCOS

A variety of risk factors such as obesity, insulin resistance, and hormonal disorders play a role in the development of PCOS [7, 9]. According to the results of studies, stress can be influential as an intermediate factor in the development or intensification of these risk factors. These relationships are further discussed in the following sections:

### 3.2. Stress and Obesity

Chronic stress increases the risk of changes in nutritional habits and consequential obesity is a risk factor for diseases like diabetes, cardiovascular disease, and PCOs. Overeating is a strategy to fight stress, which results in obesity and abdominal fat – *i.e.* two main risk factors of diabetes type II

[9]. Social stresses like aggression, domination, and work pressure all may lead to diseases like diabetes type II. The prevalence of PCOS in underweight, normal, overweight, and obese women were 8.2, 9.8, 9.9, 9.0% respectively. Therefore, the risk of PCOs increases with obesity [4 - 6]. Studies have also shown that anxiety, depression, and lack of physical activity are common in women with PCOS.

### 3.3. Stress and Insulin Resistance

PCOS is a type of insulin resistance that is only developed by women. Some of the occupational risk factors like the inconsistency of circadian rhythm and overnight sleep disorders caused by overnight work shifts, exposure to pollution (particles, solvents), heavy metals (arsenic, mercury) or, organic pollutants increase the risk of developing insulin resistance. In turn, insulin resistance leads to cardiovascular diseases and diabetes. There is a significant relationship between insulin resistance and clinical problems like non-alcoholic fatty liver and PCOS [9]. Studies have shown that occupational stress creates unhealthy habits like unhealthy nutrition that results in insulin resistance. Tianwei Xu *et al.* showed that social stresses like aggression, domination, and work pressure may lead to diabetes type II [8], which is an outcome of insulin resistance.

### 3.4. Stress and Hormonal Disorders

In terms of pathology, PCOS includes hyperandrogenic and probable changes in cortisol and melatonin secretion that reflect the function of the hypophyses and adrenal hypothalamus. Each of the elements of stress paths can halt reproduction function. Severe stress and ovulation failure disrupt steroidogenesis and angiogenesis. Chronic stress intensifies general catabolic conditions; therefore, constant hyperactivity (HPA) might gradually lead to a reduction of lean body mass (muscle and bone) and an increase in visceral fat and insulin resistance, which in turn affects the HPO axis. In the case of PCOS, chronic stress is one of the hemostatic disorders that leads to an endocrine disorder. Functional hypothalamic amenorrhea (FHA) is a chronic annulation that is not diagnosable due to organic reasons. It is mostly associated with stress, weight loss, hyperactivity, or a combination of them. A decrease in GnRH outcome at LH and FSH levels is not enough to preserve folliculogenesis and ovary function [7]. Moreover, psychological stress intensifies hypothalamus amenorrhea through decreasing the HPS activity [7].

### 3.5. Work and PCOS

There is a relationship between the expansion of stress symptoms and demanding work, low decision-making skills, and low social support [11]. Studies have shown that female managers feel more stress than male ones and the source of this stress is the social roles and expectations of women. This explains the fact that female managers are still a minority [12].

Studies in the USA have shown that women in stressful jobs are twice at the risk of short menstruation in comparison to the ones in non-stressful jobs. The risk of breast cancer is higher in women with shorter menstruation cycles [13]; in addition, the rate of ovary and womb cancers is higher in these women [14].

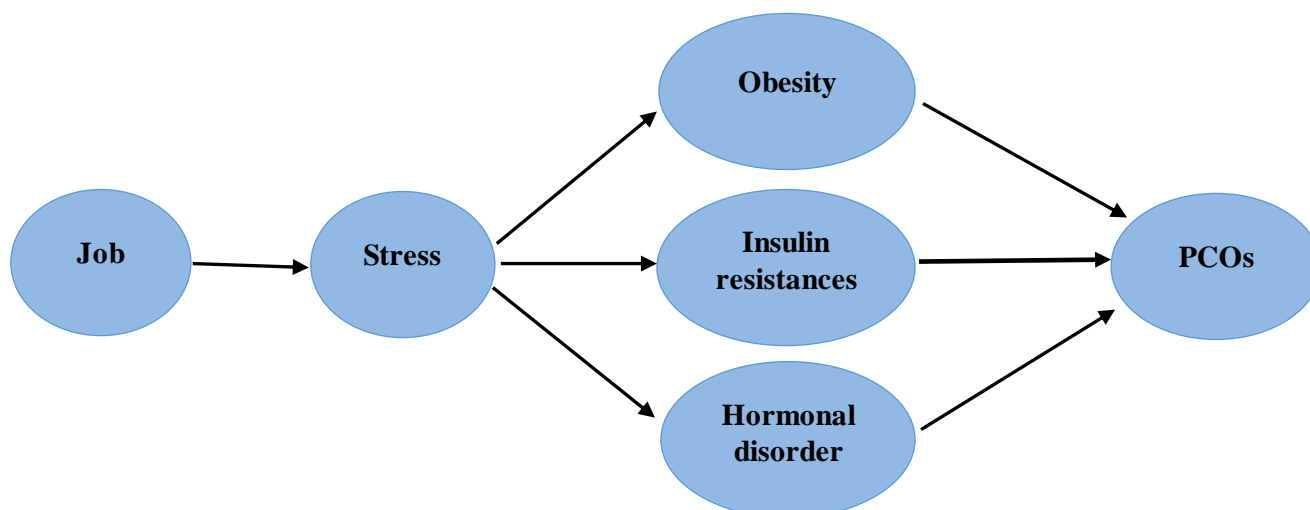


Fig (1). Relationship between job stress and PCO.

Occupational stress or other occupational risk factors have an indirect impact on PCOS in working women by creating insulin resistance, obesity, and hormonal distress (Fig. 1).

## CONCLUSION

Working women experience many stressors depending on their job and being in charge of home affairs at the same time increases their stress and workload. Taking into account that stress is a precursor or intensifier of PCOS risk factors (e.g. obesity, insulin resistance, and hormonal disorder), working women are at a higher risk of PCOS compared with housewives.

## LIST OF ABBREVIATION

PCOS = Polycystic Ovary Syndrome

## CONSENT FOR PUBLICATION

Not applicable.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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## REFERENCES

- Zangeneh FZ, Jafarabadi M, Naghizadeh MM, Abedinia N, Haghollahi F. Psychological distress in women with polycystic ovary syndrome from imam khomeini hospital, tehran. *J Reprod Infertil* 2012; 13(2): 111-5. [PMID: 23926533]
- Kirthika SV, Paul J, Sudhakar S, Selvam PS. Polycystic ovarian syndrome-Interventions for the emerging public health challenge: A scoping review. *Drug Invention Today* 2019; 12(3)
- Fernandez R, Moore V, Van Ryswyk E, *et al.* Sleep disturbances in women with polycystic ovary syndrome: Prevalence, pathophysiology, impact and management strategies. *Nat Sci Sleep* 2018; 10: 45-64. [http://dx.doi.org/10.2147/NSS.S127475] [PMID: 29440941]
- Nasiri-Amiri F, Ramezani Tehrani F, Simbar M, Montazeri A, Mohammadpour RA. Health-related quality of life questionnaire for polycystic ovary syndrome (PCOSQ-50): Development and psychometric properties. *Qual Life Res* 2016; 25(7): 1791-801. [http://dx.doi.org/10.1007/s11136-016-1232-7] [PMID: 26814480]
- McKellar L. Stories of the cystorhood: Exploring women's experiences with polycystic ovarian syndrome: Implications for education, self-perception, and medicalization Master of Education. Thunder Bay, Canada: Lakehead University 2016.
- Deswal R, Nanda S, Ghalaut VS, Roy PS, Dang AS. Cross-sectional study of the prevalence of polycystic ovary syndrome in rural and urban populations. *Int J Gynecol Obst* 2019; 146(13): 370-79. [http://dx.doi.org/10.1002/ijgo.12893]
- Hashemi Nejad N, Rahimi Moghadam S, Mohammadian M, Amiri F. Survey of relationship between mental health and job stress among midwives who were working in hospitals of Kerman, Iran, 2011. *Majallah-i Zanan, Mamai va Nazai-i Iran* 2013; 16(64): 1-9.
- Xu T, Magnusson Hanson LL, Lange T, *et al.* Workplace bullying and violence as risk factors for type 2 diabetes: A multicohort study and meta-analysis. *Diabetologia* 2018; 61(1): 75-83. [http://dx.doi.org/10.1007/s00125-017-4480-3] [PMID: 29130114]
- Tay CT, Teede HJ, Hill B, Loxton D, Joham AE. Increased prevalence of eating disorders, low self-esteem, and psychological distress in women with polycystic ovary syndrome: A community-based cohort study. *Fertil Steril* 2019; 112(2): 353-61. [http://dx.doi.org/10.1016/j.fertnstert.2019.03.027] [PMID: 31056307]
- Otelea M. Is insulin resistance work related? *Occup Health (Lond)* 2017; 103-40.
- Tsai YC, Liu CH. Factors and symptoms associated with work stress and health-promoting lifestyles among hospital staff: A pilot study in Taiwan. *BMC Health Serv Res* 2012; 12(1): 199. [http://dx.doi.org/10.1186/1472-6963-12-199] [PMID: 22799278]
- Velayutham K, Gomathinayagam R, Ramanathan B, Murugan A, Selvan SA. Endocrine health in school teachers from primary, high, and higher secondary schools of south tamilnadu, India. *European J Biomed* 2019; 6(1): 382-92.
- Fenster L, Waller K, Chen J, *et al.* Psychological stress in the workplace and menstrual function. *Am J Epidemiol* 1999; 149(2): 127-34. [http://dx.doi.org/10.1093/oxfordjournals.aje.a009777] [PMID: 9921957]
- Nelson DL, Burke RJ. Women executives: Health, stress, and success. *Acad Manage Perspect* 2000; 14(2): 107-21. [http://dx.doi.org/10.5465/ame.2000.3819310]