



## Increasing Incidence of PCOS in Adolescence and its Relation with Mental Stress

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### Abstract

*Polycystic ovary syndrome (PCOS) is one of the most common endocrine/metabolic disorders found in women. It is seen that the incidence of PCOS is increasing in adolescent age group. The stress level of this age group is also heightened due to high competition, need for recognition and self esteem both from society and in person. Early diagnosis and treatment of PCOS in adolescents are essential in ensuring adulthood health and restoring self-esteem. This paper is based on a 10 year long clinical experience regarding the role of mental stress on PCOS. As teenagers are the future of a nation PCOS should be dealt at an early stage and corrected. A sample of 50 cases of PCOS are selected and tried to establish the relation of mental stress in those cases with the help of SSS-AZ English version booklet of National Psychological Corporation. An attempt is made to explain the role of mental stress in PCOS with the help of General Adaptation Syndrome. The diagnosis of PCOS is done as per Rotterdam 2003 criteria which says that any of the two out of three of the following is needed for the diagnosis of PCOS: oligo- and/or anovulation, clinical and/or biochemical signs of hyperandrogenism and polycystic ovaries [by ultrasound]. This study is done to highlight the relevance of reducing mental stress in adolescent age group to avoid or reduce the incidence of systemic diseases with a sample study on PCOS.*

**Keywords:** Poly cystic ovarian syndrome (PCOS), General Adaptation Syndrome (GAS), mental stress.

### Introduction

Polycystic ovary syndrome (PCOS) is one of the most common endocrine/metabolic disorders occurring women. It is seen that the incidence of PCOS is increasing in adolescent age group. The level of mental stress is also increasing, may be due to high competition, need for recognition and esteem brings in stress both from society and in person. Early diagnosis and treatment of PCOS in adolescents are essential in ensuring adulthood health and restoring self-esteem. As teenagers are the future of a nation PCOS should be dealt at an early stage and corrected.

PCOS often manifests during adolescence. Menstrual irregularities, acne, and hirsute are some symptoms of this common clinical condition. However since these symptoms occur in otherwise perfectly healthy teenagers too, recognizing PCOS poses a challenge. Hence the diagnosis of PCOS is done as per Rotterdam 2003 criteria. Here I have included the samples of students with PCOS of age group from 15 yrs to 21 years of age. Only those cases of PCOS diagnosed as per Rotterdam criteria are included in study.

Various studies support the increasing incidence of PCOS in Adolescent age group.

This paper is based on a 10 year long clinical experience regarding the role of mental stress on PCOS. 50 cases of PCOS diagnosed as per Rotterdam 2003 criteria is assessed for mental

stress with the help of SSS-AZ English version booklet of National Psychological Corporation.

Various studies show adolescents with PCOS suffer from various levels of psychiatric disturbances including anxiety and depression<sup>2</sup>. An attempt is made to explain the role of mental stress in PCOS with the help of General Adaptation Syndrome.

### Material and Methods

Although the adolescent age in many countries are limited to 18-19 of age some countries like Germany, UAE, Egypt etc adolescence age group included upto 21years. Here I have included the samples of PCOS cases of age group 15 yrs to 21 years of age.

The diagnosis of PCOS is done as per Rotterdam 2003 criteria<sup>3</sup>. As per this criterion in order to diagnose PCOS, two of the three among the following are required. The conditions required include: i. Poly cystic ovaries (12 or more peripheral follicles or increased ovarian volume (greater than 10 cm<sup>3</sup>), ii. Oligo- or anovulation, iii. Clinical signs of hyperandrogenism or biochemical signs of hyperandrogenism.

Mental stress is assessed with the help of SSS-AZ (Student Stress Scale) English version booklet of National Psychological Corporation. There are 51 items describing undesirable experiences and events likely to occur in the lives of adolescents

as given in the Student Stress Scale, and each has been provided with five options, which are Always, Often, Sometimes, Rarely and Never. These five options have been scored in order to get a mathematical result from the test. The five point rating scale has been followed and hence starting from Never to Always score is given from 1-5. So that the strength of the indicator i.e. its high occurrence is shown by a large sum and vice versa. There are some negative items which have been scored from Never up to Always which is given 5-1. The maximum score on Student Stress Scale is 51-255.

A very high score above the 75th percentile is found to be very high level of stress. Such conditions may lead to total emotional and physical exhaustion which may further cause burnout. Moderate levels of stress above 50<sup>th</sup> percentile need immediate attention. Low score below, 25th percentile is found to be low level of stress which has cause for some concern.

Study was done selecting 50 diagnosed cases of PCOS of age group 15-21 years. And all these cases were given questionnaire to assess mental stress in general. The mental stress included those from family, interpersonal relationship and from high ambition or need for recognition in the society.

**Inclusion criteria:** i. Mental status/stress level of patients 2-3 months prior to and at the beginning of menstrual irregularity is taken into consideration. They were asked to fill the form taking into consideration their mental status before they noticed the symptoms of PCOS like irregular menses, hair growth etc. ii. Only cases of secondary amenorrhoea are considered. Those with delayed puberty are excluded as it is not unusual to observe delay in the onset of menstrual cycle due to various reasons like, genetics. iii. All the cases are diagnosed on the basis of Rotterdam 2003 criteria. iv. Cases of amenorrhoea with thyroid and other endocrine disorders are excluded.

## Results and Discussion

**Result of Study:** As mentioned in below Figure-1, among the 50 cases, 35 scored percentile above 50, 4 cases between 40 and 50, 2 cases between 40 and 25 and the rest less than 25. Since the result showed more than 70 percent of the selected case with percentile more than 50, an assumption is made that the role of mental stress should also be considered as a causative factor of PCOS. It is always noted that depression or mood changes are often associated with PCOS but never thought that mental stress can also lead to PCOS. With this study I have tried to establish the relationship of mental stress with PCOS using General Adaptation Syndrome of Selye. By this study it should also be noted that not only PCOS but also other life style disorders can be caused by prolonged mental stress.

From this study it is noted that the children of adolescent age group are highly sensitive and are incapable of tolerating least stress. They cannot withstand least pressure and are easily tired with the stressful situations. Nuclear family, high completion,

need for recognition and esteem, strained family relationships etc may be the factors that contribute to the stress of adolescents. They should be identified using standard stress assessment methods, monitored in the institutions regularly for stress and should be addressed at the earliest stage before it deranges the health or before they contribute to the physical illness.

Each institution should identify a group of teachers who are friendly with the students and with whom they can share their emotions. And should be given training for accepting challenges and should be given counseling whenever required. And various relaxation techniques like meditation, yoga, reiki etc should be incorporated in the curriculum.

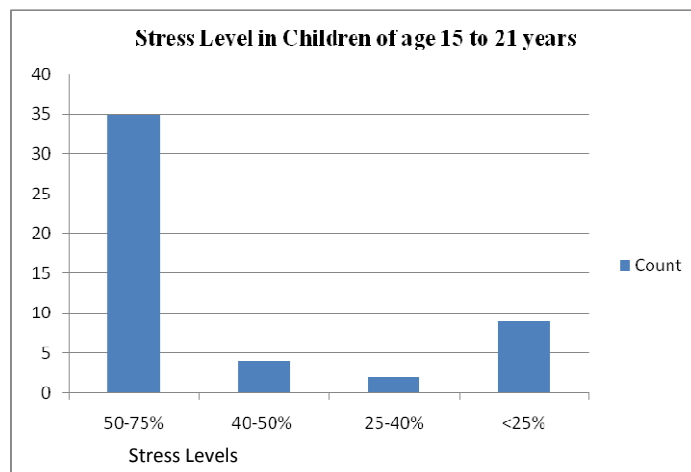


Figure-1

**Discussion:** The pathogenesis of each symptom of PCOS is analyzed and compared with GAS (General Adaptation Syndrome). When our body undergoes stress, the homeostasis mechanism of our body try to respond to the new situation through neurological pathways. These responses are mediated through various hormones and effects are manifested in different target organs. This mechanism is well illustrated by GAS (General Adaptation Syndrome).

**Pathogenesis of PCOS:** Poly Cystic ovary develop when the ovaries are stimulated and excess amount of male hormones (androgens) are produced, particularly testosterone, either by excessive luteinizing Hormone (LH) production by anterior pituitary gland or by the increased levels of insulin in the blood (hyperinsulinaemia) in persons whose the ovaries are sensitive to this stimulus<sup>4</sup>.

The high insulin level contributes to the abnormalities seen in the hypothalamic-pituitary ovarian axis that lead to PCOS. Specifically, hyper insulinaemia increases GnRH pulse frequency LH over FSH dominance, increased ovarian androgen production, decreased follicular maturation and decreased stimulation.

**Oligo- or Anovulation:** Hypo thalamic dysfunction causes decreased or inhibited GNRH secretion which affects the pulsatile release of LH and FSH causing anovulation<sup>5</sup>. A common cause of amenorrhea is functional hypothalamic amenorrhea which is characterized by abnormal hypothalamic GnRH secretion, decreased gonadotrophin level, low or normal LH concentration, abnormal follicular development and low estradiol. Serum FSH concentrations can be within normal range with high FSH/ LH ratio. Functional hypothalamic amenorrhea can also be seen associated with eating disorder, exercise or high levels of prolonged physical or mental stress<sup>6</sup>. This can also include major psychiatric disorders such as depression<sup>7</sup>.

**Clinical signs of hyperandrogenism or biochemical signs of hyperandrogenism:** Hirsutism- is the distribution of hair in upper lip, chin, chest, lower abdomen, thigh due to hyper secretion of testosterone.

The androgen pre hormones are secreted by ovaries and adrenals, androstenedione and dehydroepiandrosterone. DHEA sulphate is secreted by the adrenals. Testosterone is secreted by the ovaries and the adrenals.

Ovarian androgens act as the precursors of estrogen production and their production is under the control of LH. Thus feed back control of ovarian androgen is mediated by the effects of androgen metabolites (estrogen on hypothalamus and the Pituitary). In the adrenal cortex, the androgen production is

under the control of adrenal androgen and this is mediated by cortisol feedback on the hypothalamic-adrenal axis.

The availability of androgens can be related to the concentration of androgen binding protein produced by the liver known as Sex Hormone Binding Globulin (SHBG). Only free androgens and those bound to circulatory albumin are able to enter tissues and produce biologic effects.

**General Adaptation Syndrome<sup>8</sup>**

Behavioral and Physiological Adaptation during Stress

**Behavioral Adaptation:** Behavioral adaptation during mental stress can be listed as below. There will be: Altered cognition and attention span level, Increased alertness, Altered sensory threshold, Sharpened memory and sensation, Stress-induced analgesia, Suppression of feeding behavior, Suppression of reproductive behavior

**Peripheral Adaptation:** The peripheral adaptations of our body to stress include: Direction of oxygen and to the Central Nervous System and stressed body sites, Detoxification of the body from toxic products, Alteration of cardiovascular tone, Adjustment of the body to the stress-response

This is a mechanism which shows how the stress, strain toxin etc act on our body.  
 Stress+ Strain ->cerebrum->Hypothalamus

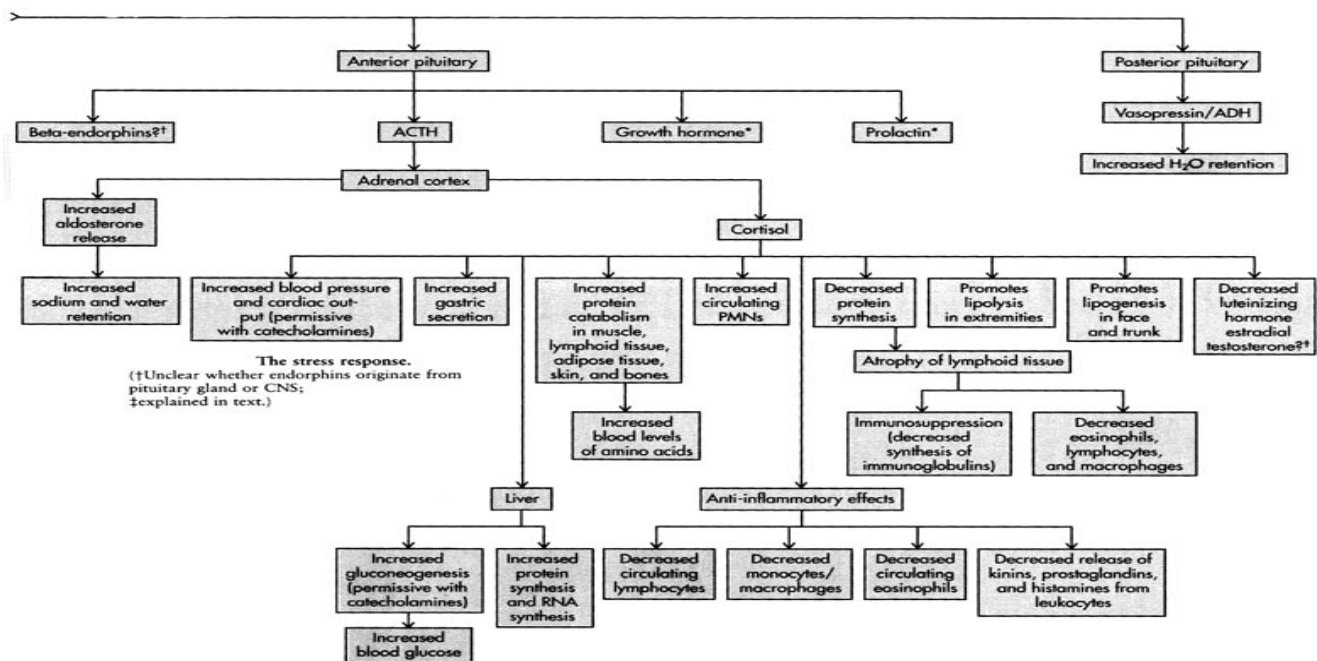


Figure-2

We can say that pathogenesis of PCOS is linked with General Adaptation Syndrome and how stress can cause PCOS  
 General adaptation syndrome Stress

**From Hypothalamus-3 possible ways:** i. Hypothalamus-Anterior Pituitary- Other glands and organs especially ACTH-Adrenal Cortex. ii. Hypothalamus-Sympathetic-Adrenal medulla to other tissues, organs and glands especially to Anterior Pituitary-increased ACTH to Adrenal Cortex. iii. Hypothalamus-Parasympathetic-Insulin-peripheral action of Corticosteroid hormones Whole process is called HansSelye's General Adaptation Syndrome.

## Conclusion

It is seen that the incidence of PCOS is increasing in adolescent age group. The mental stress level in adolescents also increasing due to increasing competition, need for recognition and self esteem. . Early diagnosis and treatment of PCOS in adolescents are essential in ensuring adulthood health and restoring self-esteem. As teenagers are the future of a nation they should be dealt at an early stage and corrected.

Stress is a major factor in almost all diseases today. Not only PCOS but other life style disorders are also increasing. This can be connected with the level of increasing stress in the community. In earlier times interpersonal relations were good may be due to the joint family system prevalent then and the big size of families. If we are able to understand and reduce the stress in adolescents by not giving them undue pressure, and teach them how to manage or cope up with these types of stress by relaxation techniques like yoga, we can prevent not only PCOS but also many of the lifestyle disorders.

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