

Symptomatological Prevalence of Polycystic ovary Syndrome in Adolescent Girls of India: A Review

SRISHTI*¹ AND NAVITA PAREEK²

¹Research Scholar and ²Associate Professor

Department of Food Science and Nutrition, Banasthali Vidyapith, Tonk (Rajasthan) India

ABSTRACT

Polycystic ovarian syndrome (PCOS) is an endocrinal disease of females of reproductive age. The disease progresses with fertility related complications and increased risks of chronic diseases and metabolic disorders in women. More emphasis is given to address young females of child bearing age for screening PCOS but the onset of disease has been observed since early teens where the symptoms are often ignored in the confusion of early pubertal changes. The purpose of the current review is to explore different published literature conducted in India regarding the escalating prevalence of PCOS among adolescent girls belonging to the age group of 10-21 years of age on the basis of Rotterdam criteria. This review also investigated symptomatology of polycystic ovary syndrome (PCOS) in adolescent girls which is often confused as pubertal changes and can lead to delay in diagnosis hence increase the risk of associated complications. For pertinent database Pubmed, Scopus, and Google scholar were thoroughly searched. The published Indian studies adopting Rotterdam criteria for diagnosis and reported symptoms of overweight/obesity, acne, hirsutism and menstrual irregularity on adolescent girls with PCOS were included for the present review paper. Different studies reported a prevalence between 11.9% - 23.8% among adolescent girls in different parts of India and observed the symptoms present in highest population with PCOD was hirsutism and menstrual irregularity. Timely action on detection of PCOS can only be possible with appropriate measures for its awareness among the girls and the care takers.

Key Words : PCOS, Adolescents, Rotterdam criteria, Hirsutism, Anovulation, Overweight/obesity, Acne, Menstrual irregularity

INTRODUCTION

According to World Health Organisation (WHO), adolescent is a period of 10 to 19 years of age and includes a series of critical physical growth, emotional development and onset of puberty. Polycystic Ovary syndrome (PCOS) is a very commonly reported endocrine related disease of females of reproductive age. PCOS can be diagnosed as early as in stage of 8-9 years till post- menopausal age. If develops in early stage it can worsen with time and leads to sub- fertility or infertility due to unawareness and avoidance of signs and symptoms of the diseases. The beginning of PCOS is observed as abnormal levels of hormones in early teenage but mostly diagnosed and

affects young females in child- bearing age (Desai *et al.*, 2018).

PCOS may first present in adolescence, but the incidence of the diseases in this very young age is unknown as in this age group the diagnostic criteria is still not defined. In the age of adolescence, the diagnosis of PCOS is very challenging with the diagnostic criteria of adults due to the reason of overlapping characteristics related to normal pubertal changes like irregular menstruation, seborrhoea, acne etc. (Teede *et al.*, 2011, Legro *et al.*, 2013). Lack of awareness among adolescents further add up the risk of under- diagnosis or over diagnosis, delayed or poor diagnosis which can lead to complications of the overall health of young girls. Onset of an endocrinal

disorder at such an early stage prolong the disease time till adulthood and increases the chances of developing chronic diseases, metabolic syndrome and endometrial cancer (Pramodh, 2020, Hart *et al.*, 2011). Timely action on the disease can save the girls from further complications and associated disorders of chronic diseases like type II diabetes, hypertension, thyroid, infertility and other long term psychological disorders of anxiety, depression, and inferiority complex among girls. So, the purpose of the study is to find out the prevalence and assess the symptomatology of PCOS among adolescent girls of India.

METHODOLOGY

This review had explored a wide range of published literature of studies conducted all across India to access the prevalence trend and the observatory four major symptoms of overweight/obesity, hirsutism, acne, and menstrual irregularity. The collective knowledge can be helpful to provide awareness about the actual prevalence in the age group of 10–21-year-old young girls from schools/ colleges. Together with it, the review also studied the most common and highly presented signs and symptoms in adolescent girls with PCOS. This information can be helpful in understanding the seriousness of persistence of major symptoms which can otherwise be ignored considering it as a normal adolescent pubertal change. A wide search had been done on Google scholar, PubMed, Scopus and various studies were selected. Criteria for selection of the studies were based on the adoption of Rotterdam criteria for reporting on the prevalence among study population. This criterion constitutes broader spectrum than others and diagnosis is made when individual has two of the following three criteria: oligo and/or anovulation, hyperandrogenism (clinical and/or biochemical) and poly- cystic ovaries identified sonographically (Nanjaiah and roopadevi, 2018). For exploring the symptomatology, the studies with an observation of four similar symptoms of Overweight/obesity (Body mass index (BMI) above normal), acne (red or tender bumps on face or body), hirsutism (excessive body and facial hair) and menstrual irregularity among the adolescent girls with PCOS were considered.

Prevalence among Adolescent Girls:

Globally, prevalence of PCOS is observed around 8 to 13% of all females (Bozdog *et al.*, 2016) and among adolescent girls about 6-18% (Christensen *et al.*, 2013).

Majority of cases of PCOS usually has been identified in young age or child bearing age when the symptoms are so prominent to ignore but the onset of the disease has actually started from the teenage. At this stage the condition remains undiagnosed due to lack of awareness or the confusion of considering the signs as the early pubertal change (Laddad *et al.*, 2019).

In India, a considerable number of studies has been conducted to assess PCOS from different parts of the nation on adolescents who have attained menarche from schools, colleges, residential institutes and hostels. In a cross- sectional study conducted in rural areas of Andhra Pradesh on 253 adolescent girls of 10-19 years of age the prevalence was observed as 15.4% (Bhuvanashree *et al.*, 2014). In Ahmedabad urban region a study was performed on 881 adolescent girls of 13-18 years of age for exploring the prevalence and associated risk factors of PCOS reported 13.54 % subjects were suffering from the disease (Desai *et al.*, 2018). In a similar study from urban area of Hyderabad including 117 adolescent girls of age 15-19 years done to assess the prevalence of PCOS observed 11.96 % subjects were suffering from it (Singh *et al.*, 2015). A cross- sectional study on adolescent subjects of 14–18-year-old girls conducted for the purpose of assessing the effect of structured awareness programme in urban areas of Chennai about PCOS concluded the prevalence of 12.3% (Veena *et al.*, 2019). Another study of rural areas of Maharashtra involving 150 adolescent girls of 10-19 years of age to assess the prevalence of PCOS reported the presence of the disease in 17.33% subjects (Laddad *et al.*, 2019). In study on adolescent girls of 10- 21 years visiting in a tertiary care hospital of Bangalore observed the prevalence of PCOS in 23.8% of them (Kalavathi *et al.*, 2015). Mumbai based study on adolescent girls of 15 -19 years revealed a clear positive diagnosis of PCOS in 16.4% subjects (Joshi *et al.*, 2014).

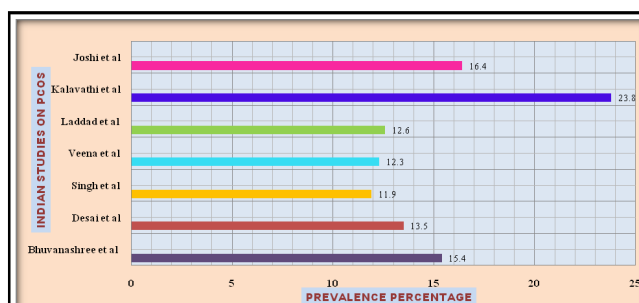


Fig. 1 : Prevalence of PCOS among adolescent girls of India as reported by different studies

Symptomology Assessment:

Polycystic ovary syndrome has some characteristic signs of oligo/ anovulation leading to amenorrhoea or menstrual irregularities as primary cause of concern and the main reason to seek medical advice in many cases. It is often accompanied with some other secondary observatory symptoms as hirsutism, acne, obesity etc. (Upadhyaya *et al.*, 2020). In an observational cross-sectional study conducted in a medical college hospital of Nashik, Maharashtra performed on adolescent girls of 12-19 years with PCOS reported all patients were presented with menstrual irregularity. The other symptom observed was hirsutism as chief complaint (85.03%), acne was 52.75%, while a total of 37.79% subjects were overweight/obese (22.83% overweight, 9.45% obese and 5.51% morbidly obese) (Nagansure *et al.*, 2019). In a study of medical institute of Karad, Maharashtra which included adolescent girls of 10-19 years evaluated the symptoms present on PCOS subjects documented that total of 57.68% were above normal weight. Out of these 26.92% cases were overweight and 30.76% were under the category of obese, menstrual irregularity was found in 84.61%, acne in 61.53% and hirsutism in 19.23% (Laddad *et al.*, 2019). In a community based cross sectional study conducted at Ahmedabad, Gujarat region on PCOS included 13–18-year-old school going adolescents from five different schools concluded that menstrual irregularities were present in 29.41%, severe hirsutism in 47.05% and moderate hirsutism in 25.21% (total of 72.2% population with hirsutism). The subjects with PCOS were observed to have moderate acne (31.93%) and severe acne (5.88%), with a total of 37.81% acne prevalence. Overweight and Obesity was found in 60% girls with PCOS (Desai *et al.*, 2018). In a study on PCOS diagnosed adolescents of 12- 17 years in Chennai, South India found the prevalence of acne (45.2%), acanthosis (20%) and overweight/ obesity (69%) in patients. It also reported that symptoms highly present in PCOS patient were menstrual irregularity (74.2 %) and hirsutism (51%) (Mehreen *et al.*, 2021). In another study conducted in Bhopal city on girls of 15 -21 years of age from 3 schools and 3 colleges using technique of purposive sampling concluded menstrual irregularity in 80.2%, overweight/obese were 43.2% girls, acne was present in 32.9% and hirsutism in 24.5% among girls with PCOS (Gupta *et al.*, 2017). Another study on adolescent girls of 15-17 years of Thiruvananthapuram observed 136 PCOS patients. It reported the prevalence of irregular

menstruation in 59.9%, hirsutism in 56.3%, acne in 17.8 % and obesity in 17.3% population with PCOS (Nair *et al.*, 2012) A similar study was conducted at Hyderabad, Government medical college on adolescent girls of 15-19 years old. Among the diagnosed subjects with PCOS, 43% were overweight and 7% were obese (total of 50% above normal BMI). The most common symptom noticed was menstrual irregularity observed in 71% cases, acne was in 64%, hirsutism in 21% (Singh *et al.*, 2018).

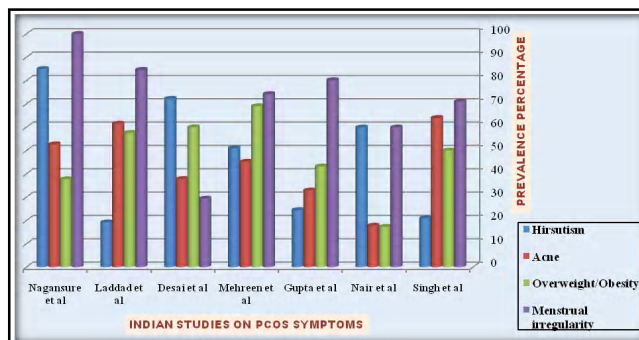


Fig. 2 : Percentage of four symptoms (hirsutism, acne, overweight/obesity, menstrual irregularities) present in adolescent girls with PCOS at a glance by different Indian studies

Finding from the Studies:

The observation from different studies is indicative of the pooled prevalence of PCOS using Rotterdam's criteria for diagnosis among adolescents from different parts of the country ranged from 11.9% to 23.8%. The current review also took an account of distribution of four observatory self-reported symptoms (overweight/obesity, acne, hirsutism and irregular menses) found in PCOS through different studies. It has been observed that most present symptom was irregular menstruation (maximum reported as 100% and minimum as 29.4%) followed by hirsutism (maximum reported as 85% and minimum as 19.2%) among the adolescents with PCOS. Other symptoms of Overweight/obesity range from 69-17.3% and acne from 64- 17.8% showing almost similar presence. Though PCOS usually occurs with multiple characteristics, the high presentation of menstrual irregularity and hirsutism mandates a need to increase awareness regarding the signs and symptoms among the teenage girls for preventing future morbidities and developing health related complexities.

Discussion:

Many physiological, psychological and anatomy

related changes are brought by reproductive phase in women's life. Most of the women usually do not get right advice and guidance for menstrual related problems in their lives due to familial, cultural, societal restrictions and taboos related to it.

PCOS is an endocrine disorder among females of reproductive ages, complex in nature and can be considered as a chronic disease. If it starts at early stages of life and persist for an extended period of time, increases the chances of many critical health problems as diabetes, cardiovascular disorders, infertility, metabolic disorder, endometrial cancer and other psychological conditions as anxiety, depression and inferiority complex. Many researches held to identify the trend of diseases status among young female tends to create a better picture of our community health. Different studies drew the attention on the increasing prevalence among adolescent girls creates an urgent need to address the problem.

Though the rate of prevalence drawn by different studies exclusively depends on the criteria used for its definition and screening methods (Witchel *et al.*, 2015, Ibanez *et al.*, 2017, Teede *et al.*, 2018), it is clear that PCOS among adolescents is an emerging reproductive problem. The health risks related to physical and psychological co- morbidities needs intensive careful assessment and intervention accompanied with appropriate treatment in younger population for controlling the condition on time. The overlapping signs and symptoms of puberty make the PCOS diagnosis among adolescents, a real challenge. The modern lifestyle has increased the incidence of PCOS. Right diagnosis can instil effective measures related to lifestyle in adolescents can prevent them for facing metabolic and reproductive complications.

Even though PCOS has proved to have a wide range of symptoms that affects a women's life from early teens to later stages of life, it is still have not given appropriate importance and addressal as other lifestyle chronic diseases like hypertension, diabetes and thyroid. The spectrum of PCOS is a serious burden to health care system of nation as well as on individual basis and needs to be taken into account to give paramount importance to health of youth. In addition, some of the students do not have the knowledge and awareness regarding the symptoms (Malini and Surekha, 2023) and most of the girls do not visit doctors even after suffering from PCOS sign and symptoms (Alshdaifat *et al.*, 2021).

Awareness through health education and correct screening for PCOS is essential in schools and colleges.

Community based health related programs and activities needs to be incorporated for adolescents on regular basis. Early intervention can only be possible by facilitating appropriate early detection of PCOS in adolescence through regular assessment of target groups by simply extracting menstrual history. Open discussion on menstruation related problems among adolescent girls should be encouraged in schools, colleges, anganwadi centres & other public platforms to impart awareness and information. An updated and strengthened health related information and education in schools can definitely make girls aware about the importance of healthy lifestyle, balance diet for a better health and prevention of lifestyle disorders like PCOS. A well-informed girl and a proactive health care worker can together prove to be an outstanding channel for the prevention of this disease and its future co- morbidities. A healthy environment should be developed between mother and daughter to break the hesitation for discussing period related talk to seek for medical advice on time.

Conclusion:

The opportunity of early intervention completely lies on the successful early detection of the syndrome mainly based on clinical findings (especially oligo- or amenorrhoea) among the susceptible group with disturbed menstrual health or obesity. Thus, more community based multi- centric studies should be conducted to prevent the girls from long term medical complications, metabolic disturbances and related difficulties. Formulation and reinforcement of appropriate guidelines for the management and awareness of poly cystic ovarian syndrome need to be established in India with proper assistance of study-based evidence by policy makers, national Government, healthcare professionals and other related organisations.

REFERENCES

- Alshdaifat, E., Sindiani, A., Amarin, Z., Absy, N., AlOsta, N., Abuhayyeh, H.A. and Alwani, M. (2012). Awareness of polycystic ovary syndrome: A university students'; perspective. *Annals of Medicine & Surgery*, **72** : 103-123.
- Bhuvanashree, N., Gupta, S., Anitha, M. and Venkatarao, E. (2013). Polycystic ovarian syndrome: prevalence and its correlates among adolescent girls. *Annals of Tropical Medicine Public Health*, **6**(6) : 632-636.

- Bozdag, G., Mumusoglu, S., Zengin, D., Karabulut, E. and Yildiz, B.O. (2016). The prevalence and phenotypic features of polycystic ovary syndrome: a systematic review and meta-analysis. *Human Reproduction*, **31**(12):2841–2855.
- Christensen, S.B., Black, M.H., Smith, N., Martinez, M.M., Jacobsen, S.J., Porter, A.H. and Koebnick, C. (2013). Prevalence of polycystic ovary syndrome in adolescents. *Fertility & Sterility*, **100**(2):470–477.
- Desai, N.A., Tiwari, R.Y. and Patel, S.S. (2018). Prevalence of polycystic ovary syndrome and its associated risk factors among adolescent and young girls in ahmedabad region. *Indian J. Pharmacy Practice*, **11**(3):119.
- Franks, S. (2008). Polycystic ovary syndrome in adolescents. *Internat. J. Obesity*, **32**(7):1035–1041.
- Gibson-Helm, M., Teede, H., Dunaif, A. and Dokras, A. (2017). Delayed diagnosis and a lack of information associated with dissatisfaction in women with polycystic ovary syndrome. *J. Clinical Endocrinology Metabolism*, **102**(2): 604–612.
- Gupta, M., Melwani, V., Priya, A., Toppo, M., Khan, A. and Sethia, S. (2017). A Study to Assess the Prevalence of Polycystic Ovarian Disease among Girls Aged 15-21 Years from Selected Schools and Colleges in Bhopal City. *Indian J. Youth Adolescent Health*, **4**(3).
- Hart, R., Doherty, D. A., Mori, T., Huang, R. C., Norman, R. J., Franks, S., Sloboda, D., Beilin, L. and Hickey, M. (2011). Extent of metabolic risk in adolescent girls with features of polycystic ovary syndrome. *Fertility & Sterility*, **95**(7) :2347–2353.
- Ibanez, L., Oberfield, S.E., Witchel, S., Auchus, R.J., Chang, R.J., Codner, E., Dabadghao, P., Darendeliler, F., Elbarbary, N.S., Gambineri, A. *et al.* (2017). An international consortium update: pathophysiology, diagnosis, and treatment of polycystic ovarian syndrome in adolescence. *Hormone Research Pediatrics*, **88**(6):371–395.
- Joshi, B., Mukherjee, S., Patil, A., Purandare, A., Chauhan, S. and Vaidyam R. (2014). A cross-sectional study of polycystic ovarian syndrome among adolescent and young girls in Mumbai, India. *Indian J. Endocrinology & Metabolism*, **18**(3):317-324.
- Kalavathi, D. Biradar and Amrita N. Shamanewadi (2105). A descriptive study of Polycystic ovarian syndrome in adolescent girls among a tertiary care hospital of Bangalore. *Indian J. Basic & Appl. Med. Rese.*, **4**(2): 453-457.
- Laddad, M.M., Kshirsagar, N.S., Shinde, G. and Shivade, V. (2019). Study of prevalence and determinants of polycystic ovarian syndrome among adolescent girls in rural area: a prospective study. *Internat. J. Reproduction, Contraception, Obstetrics & Gynecology*, **8**(8):3135-3139.
- Legro, R.S., Arslanian, S.A., Ehrmann, D.A., Hoeger, K.M., Murad, M.H., Pasquali, R., Welt, C.K. and Endocrine, S. (2013). Diagnosis and treatment of polycystic ovary syndrome: an Endocrine Society clinical practice guideline. *J. Clinical Endocrinology Metabolism*, **98**(12) :4565–4692.
- Malini, M.V. and Surekha, T. (2022). A study to assess the knowledge of female medical students on polycystic ovary syndrome in NRI Institute of Medical Sciences. *Internat. J. Res. Medical Sci.*, **11**(1) : 243–247.
- Mehreen, Taharullah Shah, Ranjani, Harish, Kamalesh, Rajan, Ram, Uma, Anjana, Ranjit Mohan and Mohan, Viswanathan (2021). Prevalence of Polycystic Ovarian Syndrome Among Adolescents and Young Women in India. *J. Diabetology*, **12**(3):319-325.
- Nagansure, P.P., Patole, K.P. and Patil, A.M. (2020). Clinical Study of Prevalence of Polycystic Ovarian Syndrome in Adolescent Girls with Irregular Menstruation. *MVP J. Med. Sci.*, **8**(1):46-53.
- Nair, M.K.C., Pappachan, P., Balakrishnan, S. *et al.* (2012). Menstrual Irregularity and Poly Cystic Ovarian Syndrome among Adolescent Girls—A 2 Year Follow-up Study. *Indian J. Paediatrics* **79** (Suppl 1) : 69–73.
- Nanjaiah, R. and Roopadevi, V. (2018). Prevalence of Polycystic Ovarian Syndrome Among Female Students: A CrossSectional Study. *National Journal of Community Medicine*, **9**(3):187-191.
- Pramodh, S. (2020). Exploration of Lifestyle Choices, Reproductive Health Knowledge, and Polycystic Ovary Syndrome (PCOS) Awareness among female emirati university students. *Internat. J. Women's Health*, **12** : 927-938.
- Sharma, M., Khapre, M., Saxena, V. and Kaushal, P. (2021). Polycystic ovary syndrome among Indian adolescent girls – A systematic review and metanalysis. *Nepal J. Epidemiology*, **11**(3):1063-1075.
- Singh, A., Vijaya, K. and Laxmi, K.S. (2018). Prevalence of polycystic ovarian syndrome among adolescent girls: a prospective study. *Internat. J. Reproduction, Contraception, Obstetrics & Gynecology*, **7** : 4375-8.
- Teede, H.J., Misso, M.L., Costello, M.F., Dokras, A., Laven, J., Moran, L., Piltonen, T. and Norman, R.J., (2018). International PCOS Network. Recommendations from the international evidence-based guideline for the

assessment and management of polycystic ovary syndrome. *Human Reproduction*, **33**(9): 1602–1618.

Upadhya, J.P., Rai, Supriya and Acharya Shrikrishna V. (2020). Study of clinical characteristics of women with polycystic ovarian syndrome. *Internat. J. Reproduction, Contraception, Obstetrics & Gynecology*, **9**(6):2424-2428.

Veena, K.S., Daggumati, H., Padmanabhan, K., Paul, J., Sudhakar,

S. and Senthil, S.P. (2019). Effect of Structured Awareness Programme on Polycystic Ovarian Syndrome (PCOS) among Adolescent Girls. *Research J. Pharmacy & Technol.*, **12**(12): 6097-6100.

Witchel, S.F., Oberfield, S., Rosenfield, R.L., Codner, E., Bonny, A., Ibanez, L., Pena, A., Horikawa, R., Gomez-Lobo, V., Joel, D. *et al.* (2015). The diagnosis of polycystic ovary syndrome during adolescence. *Hormone Res. Paediatrics*, **83**: 376–389.
