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Research Article

Polycystic ovarian syndrome

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Assessment of Risk Factors of Polycystic Ovarian Syndrome Among Women: An Online Based Survey

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Abstract: Polycystic ovary disorder is a fluctuated and regularly intricate cluster of metabolic and endocrine anomalies. This study aims to assess the risk of PCOS among women aged 15-45 years. This is an online-based cross-sectional survey conducted among women of childbearing age in South India. The data was collected online by providing google links to fill out questionnaire forms by various social media platforms. The questionnaire consists of demographic details and assessment questions. Microsoft Excel was used to interpret data. Statistical analysis done by using chi-square test. A total of 466 women responded, among which the women of 15-25 years and 25-36 years, h 32.46% have hirsutism,22.7% have infertility and overweight problems, 24.7% have mood swings, 49.2% have sleep disturbances, 55.5% have tiredness, 41.9% people have good awareness regarding exercise and lifestyle modifications. This study reveals that there is no proper knowledge about PCOS in the population, especially among girls and women, therefore there is a need to educate the public regarding PCOS at a younger age for better health outcomes.

Keywords: PCOS, Overweight, Hirsutism, Anxiety, Lifestyle

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1. INTRODUCTION

Polycysticovarydisorderisafluctuatedandregularlyanintricatecl usterofmetabolicand endocrine anomalies. The polycystic ovarian condition was first portrayed by Dr Irving Stein and Michael Leventhal in Chicago in 1935alluding to a condition endured by women with feminine brokenness, weight, hirsutism and two-sided polycystic ovaries. At that point, it was known as a Stein-Leventhal disorder.[1]According to NIH measures and Rotterdam models, PCOS is characterized as a hormonal issue recognized by the presence of, in any event, one polycystic ovary joined by ovulatory brokenness and unnecessary emission of androgens.[2]It is the most widely recognized complex endocrine issue, which is regularly found in the regenerative time of women. The determinants of the polycystic ovarian disorder are connected to hereditary and natural variables. The early period of menarche Premature foetal advancement Family history of PCOS among first-degree relatives.[3]The primary underlying defect in PCOS remains unknown, but critical features include insulin resistance, impaired gonadotropin and androgen excess. Anovulation is defined as menstrual cycles of more than 35 or <21days while ovarian morphology is considered significant in the presence of follicles greater than equal to12 with a diameter of 2-9mm or an ovarian volume of 10cm^3.[4] These diagnostic criteria cannot be applied to adolescents because changes that occur physiologically are associated with puberty overlap with pathological changes observed in PCOS.

1.1. Prevalence of PCOS

The polycystic ovarian syndrome is seen among 1 in 10 women of reproductive-aged women. Not only in women but it is also seen in the girls who enter the reproductive age nowadays. The prevalence of PCOS ranges from 2.2% to 26% in India among childbearing-aged women and affects 116 million women worldwide, according to WHO estimation.[5,6] The yearly mean cost for the initial evaluation of PCOS was 2.1% of total costs, and further treatment was 31%. The factors like complications, expenses and the age in which it occurs make to study more about Polycystic ovarian syndrome. There are four sorts of PCOS: Insulin-safe PCOS, Inflammatory PCOS, Hidden-cause PCOS and Pill-incited PCOS.[7,8]Infertility was one of the most originally characteristic symptoms of PCOS[9.] The evidence shows that PCOS is the most common cause of the ovulatory disorder and oligo anovulation is related to the increased risk of infertility.[10]Obesity and insulin resistance were autonomously identified with an expanded danger of early termination and diminished pregnancy and live rates of birth. [11]Endometrial anomalies are additionally announced in PCOS ladies.[12] Gestational Diabetes Mellitus (GDM) is the most commonly described pregnancy complication in women with PCOS. In addition, women with PCOS have a high prevalence of classic risk factors for cardiovascular disease(CVD).[14]Causes of PCOS include resistance to insulin, hormonal imbalance and genetics. The effects of yoga alone and its accessibility to individuals of all ages and fitness levels provide unique benefits and make it a powerful therapeutic option for women with PCOS. This study aims to assess the risk of PCOS among women aged 15-45 years. Need of the study is to find the risk of developing PCOS among women and associate the disorder's manifestation with lifestyle variations. It also aims to analyze the influence of lifestyle factors like Diet, Physical Activity, Stress and Family History with PCOS manifestation.

2. MATERIALS AND METHODS

2.1. Study site

In and around South India

2.2. Selection of Study

Cross-sectional Study: As the study has to be conducted in a certain period, the cross-sectional study was used. In cross-sectional studies, data can be collected from as many participants only for a certain period.

2.3. Study criteria

The age group of women ranging from 15-45 years were included.

2.3.1. Inclusion criteria

The age group of women ranging from 15-45 years are included.

2.3.2. Exclusion criteria

Women of menopause were excluded.Other complications that mimic the conditions of PCOS were excluded.Women diagnosed with PCOS were excluded.Responses without appropriate information were excluded.

2.4. Study duration

The study was conducted for six months.

2.5. Ethical considerations

The study was conducted after getting ethical clearance from Institutional Review Board (RIPER/IRB/2021/035). As we conducted this study online, consent forms were obtained among the participants online. The confidentiality of the participants was maintained during and after the trial completion.

2.6. Sampling technique and Sample size

Non Probability sampling technique was used. The sample size was calculated using Epi-info software 7 with a confidence interval of 95%, a margin of error of 5% and design effect 1. The obtained sample size is 356.

2.7. Search strategy

Authors conducted a literature review in databases like Cochrane library, PubMed, and Google Scholar and collected suitable journals for the questionnaire preparation from September to November 2021. The search strategy is as follows, (PCOS OR Risk factors OR Cross-sectional studies OR Women's health OR Online study OR Questionnaire-based study OR polycystic ovarian syndrome). After conducting a literature review, a questionnaire was prepared for conducting the study. The prepared questionnaire was sent for face validation to the experienced professionals related to the healthcare sectors, the suggestions were

considered, and the final questionnaire was submitted to IRB. The IRB panellists approved the questionnaire for the study.
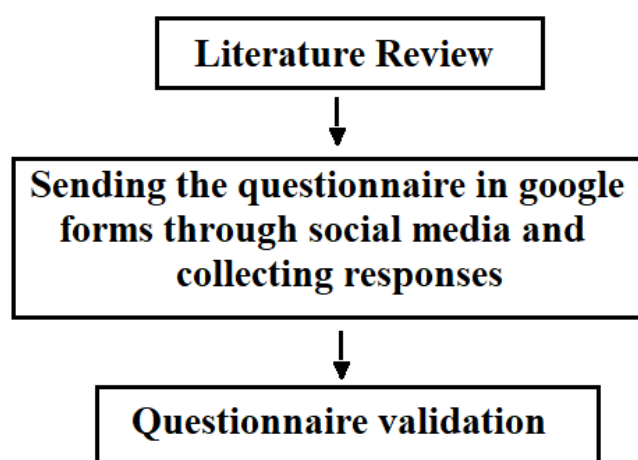
2.8. Study design and procedure

Authors planned to conduct a cross-sectional study in the female population of South India. The entire duration of the study is six months. The prepared questionnaire was presented in Google form and circulated among the female population through WhatsApp, Facebook, Telegram, and Gmail. Electronic consent was taken from participants before filling out the questionnaire, and responses were recorded. A total of 477 responses were collected, of which 466 were selected for final analysis because 11 did not meet the inclusion criteria.

2.9. Risk of bias

Out of 477 responses collected, we removed 11 study

participants, as they did not meet our study criteria, so that we could get accurate results with the available data.

2.10. Statistical Analysis

Descriptive statistics were used for socio-demographic details; data was retrieved from google forms and interpreted in Microsoft excel. The chi-square test was used to determine the association between the categorical variables, i.e., the age of the participants and other variables like weight, age of menarche, and regularity history of PCOS correlated. The Correlation between the clinical features and physiological characteristics was determined by the Pearson correlation test using IBM SPSS statistics 26 version 26.0.0.0. We used the two-tailed Pearson correlation test to determine the Correlation between the clinical features and the psychological symptoms.

2.11. Flow chart of data extraction

The data extraction process's outcome is 477 responses, of which only 466 were considered, as the remaining needed to meet the criteria.

3. RESULTS

A total of 477 responses were collected using an online questionnaire form. Eleven were excluded as they needed to meet the inclusion criteria. Therefore 466 were the final sample used for the analysis of the data.

Table 1: Weight of the study population (n=466)			
Variable	**15-25yrs**	**26-35yrs**	**36-45yrs**	**p-value**
Weight				
30-50kgs	232(57.5%)	149(36.9%)	22(5.4%)	
51-70kgs	10(40%)	10(40%)	5(20%)	0.000
71-90kgs	7(18.42%)	28(73.68%)	3(7.89%)	

Study participants were categorized according to different age groups (15-25 years, 26-35years and 36- 45 years), and the weight was categorized, which is represented in the above (Table .01) and the obtained p–value was 0.000, which is statistically significant.

Table 2: Menarche started to age (n=466)			
Variable	**11-15yrs**	**16-20yrs**	**p-value**
At what age did menarche has been started?			
15-25yrs	380(94.2%)	23(5.8%)	
26-35yrs	25(100%)	0(0)	0.39
36-45yrs	35(92.1%)	3(7.9%)	

Table2 menarche age of women who underwent the study was represented above (Table.02) according to the age groups (15-25 years, 26-35years and 36- 45 years) for the majority of the respondent's menarche started between the age of 11- 15 years

(92.2%, n=430) and remaining were in between the age of 16-20years (7.8%, n=26). Therefore, the obtained p-value was 0.39, which is not statistically insignificant.

Table 3: Regularity of menstrual cycle (n=466)			
Variable	Yes	No	p-value
Is your menstrual cycle regular?			
15-25yrs	329(81.6%)	74(18.4%)	
26-35yrs	20(80%)	5(20%)	0.71 *
36-45yrs	29(76.3%)	9(2.34%)	

the regularity of the menstrual cycle of study participants. Was represented in the above (Table.03) which Majority of the respondents have a regular menstrual cycle (81.1%, n=378), while the remaining have irregular menstrual cycles (18.9%, n=88), and the obtained p-value was 0.71, which was not statistically significant

Table 4: History of PCOS (n=466)				
Variable	Yes	No	Maybe	p-value
Is there a family history of PCOS?				
15-25yrs	21(5.21%)	338(83.8%)	44(10.9%)	
26-35yrs	1(4%)	19(76%)	5(20%)	0.23*
36-45yrs	3(7.89%)	27(71.05%)	8(21.05%)	

history of PCOS of study participants was represented in (Table 4). The majority responded that there is no family history of PCOS (82.4%, n=384). Some responded that there might be a history of PCOS (12.2%, n=57), and the remaining respondents had a history of PCOS (5.36%, n=25), and the obtained p-value was 0.23, which was statistically insignificant.
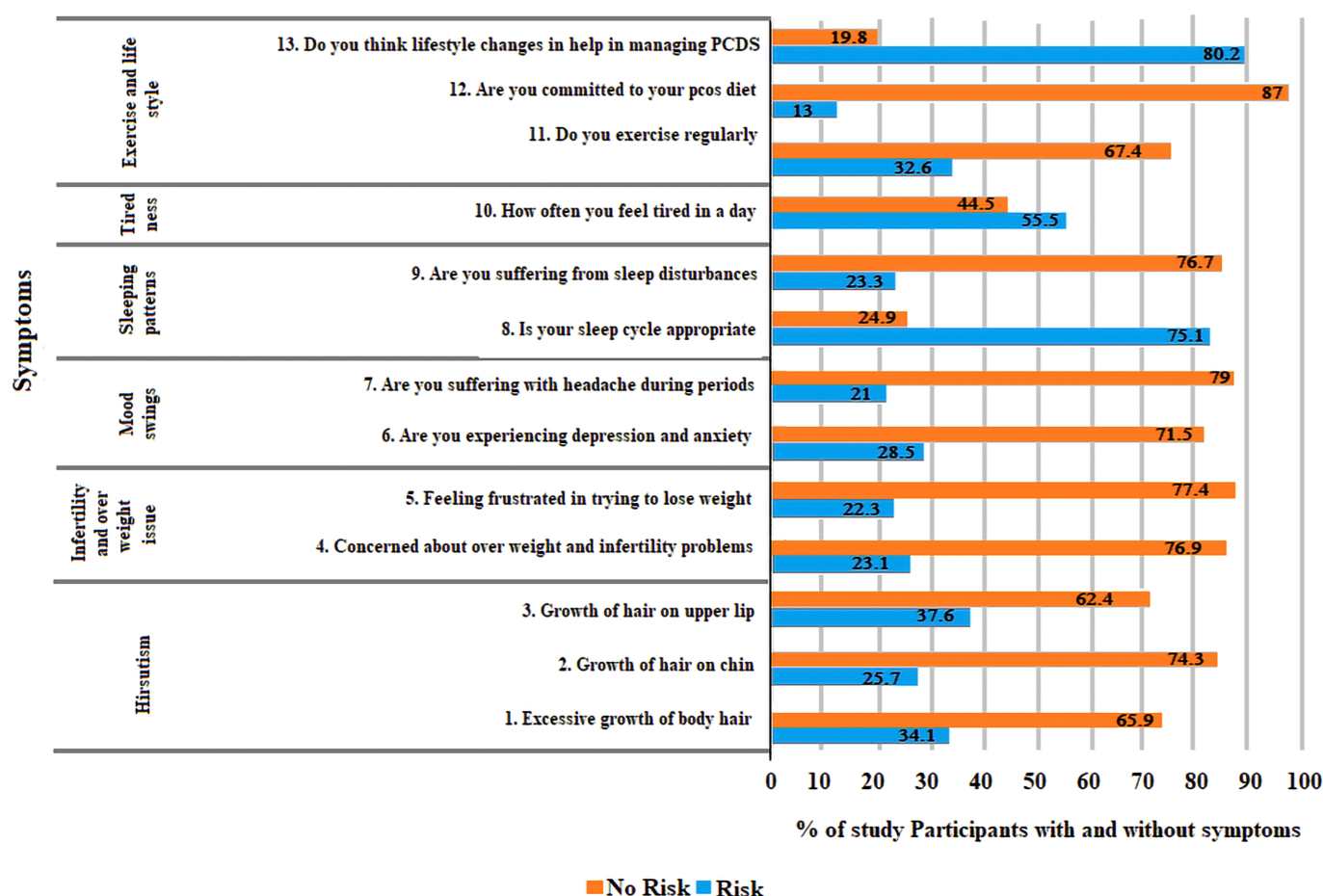

Fig 1: Risk Assessment of PCOS based on symptoms

In the current study, the symptoms related to PCOS are mostly concentrated, which are represented in the above graphical presentation (Figure.01), which include hirsutism: excessive growth of body hair (34.1%), growth of hair on the chin (25.7%), growth of hair on the upper lip (37.6%). Infertility and overweight issues: concerned about being overweight and infertility (23.1%), feeling frustrated in trying to lose weight (22.3%). Mood swings: Are you experiencing depression and anxiety (28.5%), are you suffering from headaches during periods (21%). Sleeping patterns is your sleep cycle appropriate (75.1%), sleep disturbances (23.3%). Tiredness: How often you feel tired in a day (55.5%).

4. DISCUSSION

The current study on polycystic ovarian syndrome was conducted in and around the Anantapuramu region, Andhra Pradesh, in an online population-based survey. The sample size was 477, out of which 11 were deleted due to inappropriate data. The sample size was calculated using Epi-info software with a confidence interval of 95%. In the current study, we assessed PCOS risk by using the associated symptoms [13]. Irregularity of the menstrual cycle was observed as a major problem in the age group of 26-35 years (20%) which is majorly associated with the symptoms of PCOS. Among the three age groups, 15-25 years of the respondent population had severe and moderate problems

with the growth of hair on the body (35.66%) and on the upper lip (39.44%), the respondent population of 26-35 years had severe and moderate problems associated with the hair on the chin (32%). Respondents among 26-35 years were majorly concerned with infertility (28%) and being overweight (24%). Depression and anxiety were observed prominently in the 26-35 age group (32%), and headaches during periods were seen mostly in the age group of 15-25 years (21.5%). Sleep cycle was inappropriate in the age group of 26-35 years (28%), and sleep disturbances were seen mostly in the age group of 26-35 years (24%)[6]. Population among 15-25 years exhibited tiredness most of the day (55.6%), and performing exercises were not included in their daily routine (68.4%)[5, 10.]

Table 5: Pearson Correlation		Depression and anxiety	Headache during periods	Tiredness	Appropriate sleep cycle	Sleep disturbances
Regularity of menstrual cycle	Pearson correlation	-.193**	.020	-.111*	.229**	-.161**
	Sig. (2-tailed)	.000	.663	.017	.000	.000
Excessive growth of body hair	Pearson correlation	.259**	.041	.140**	-.101*	.145**
	Sig. (2-tailed)	.000	.376	.002	.029	.002
Growth of visible hair on the chin	Pearson correlation	.132**	.081	.161**	-.083	.1428**
	Sig. (2-tailed)	.004	.081	.000	.074	.006
Growth of visible hair on the upper lip	Pearson correlation	.185**	.028	.191**	-.082	.144**
	Sig. (2-tailed)	.000	.547	.000	.076	.002
Infertility concerns	Pearson correlation	.301**	.072	.131**	-.091	.196**
	Sig. (2-tailed)	.000	.120	.005	.050	.000
Overweight	Pearson correlation	.293**	.166**	.054	-.149**	.263**
	Sig. (2-tailed)	.000	.000	.245	.001	.000

*** Correlation is significant at the 0.01 level (2-tailed).*
**Correlation is significant at the 0.05 level (2-tailed).*
Symptoms associated with PCOS and psychological disturbances are correlated as in (Table 05). which is mentioned above.

PCOS is the major cause of psychological morbidity and has a negative impact on women's HRQOL.[17] The different aspects of the QOL in PCOSQ were evaluated, including physical, psychological and social. Therefore, the major factors, which cause a reduction in quality of life in PCOS, were found to be different in a variety of respondents. The physical aspect of quality of life predicted by obesity and hirsutism[20]. in adolescents, excessive body weight is widely reported as an important concern in PCOS women. Obesity is the primary source of poor HRQOL[17] and contributes to negative psychological symptoms in women with PCOS. Changes in body weight and physical beauty, as well as an imbalance of hormones, could reduce QOL.[9] Anxiety symptoms are very common in the general female and occur at an early age,[24] along with other mood disorders such as depression. HRQOL[17] surveys suggest that women with PCOS may be at higher risk of anxiety symptoms related to the clinical signs of hyperandrogenism, weight gain, and health problems, including infertility.[19,21] Coexisting GAD in depressed patients, may worsen the outcome by increasing the risk of suicide, worsening overall symptoms, increasing the number of unexplained clinical symptoms, and high functional disability.[5] Untreated GAD is also associated with increased rates of co-

morbidity and high utilization of medical health care[22]. Studies concerned about the risk of PCOS among women in particular age groups were very less; most of the studies were regarding the co-morbidities associated with the syndrome and the interventions to prevent PCOS.[2] Hirsutism[15], irregular menstrual cycle and infertility problems[18], and Obesity[19] are different aspects of PCOS which showed a negative impact on HRQOL that would not easily be detected by employing only a self-administered questionnaire by using PCOSQ, and it was demonstrated that clinical symptoms of PCOS especially excess body weight and hirsutism, could compromising the women QOL. Zahra BehboodiMoghadam, BitaFereidooni, and Ali Montazeri performed a study on PCOS titled polycystic ovary syndrome and its impact on Iranian women's quality of life: a population-based survey, the findings of the study indicated that hirsutism followed of infertility and menstrual irregularity had a greater impact on the quality of life of menstruating women. The difference between their study and our current study is that they recruited the sample population with PCOS and focused on the impact of the quality of life of women.[14] Some published articles show that women with PCOS may have a greater prevalence of anxiety

symptoms compared with normal women. [23]It is suggested that childbearing-aged women with PCOS should undergo regular screening tests for anxiety and mood disorders using screening tools and for appropriate diagnostic evaluation and appropriate therapy. Most of the studies were regarding the co-morbidities associated with the syndrome and interventions to prevent PCOS, but our study was concerned about the risk of PCOS among women at particular age[14]

5.   STRENGTHS AND LIMITATIONS

The online-based survey is more convenient and gets better responses, is significantly less cost and can be accessed from any device like a computer, laptop or mobile. As the study is an online based survey, illiterates were not able to participate in the study. Furthermore, the sampling technique used is a snowball technique; therefore, the sample recruitment may be biased, as there are no Ultra sonographic (USG) and blood tests concerned with PCOS the risk assessment is not profound.

6.   CONCLUSION

The study results showed that females between 15-25 years and 26-35 years are at higher risk of developing PCOS. The study revealed that there is no proper knowledge about PCOS in the population, which is the need of the hour;

therefore, there is a need to educate the public regarding PCOS at an age for better health outcomes. Most importantly, adolescent girls and women of childbearing age should be aware of PCOS. How to identify the root cause, how to understand the symptoms, the treatment that should be followed, the lifestyle that should be made, and physical activity should be made aware by conducting campaigns about PCOS in schools, colleges and hospitals. As 1 in 5 women is suffering from PCOS nowadays, the government should actively take the initiative to increase awareness about PCOS.

7.   ACKNOWLEDGEMENT

8.   AUTHORS CONTRIBUTION STATEMENT

Dr SMG. Ishrar conceptualized and designed the study. Next, Goruntla Narayana reviewed the data. R.Swetha, C.Priya, AsmaAneesa.K.S discussed the introduction, methodology, and result and prepared the original draft. All the authors reviewed and approved the final version.

9.   CONFLICT OF INTEREST

Conflict of interest declared none.

10.   REFERENCES

1.   Szydlarska D, Machaj M, Jakimiuk A. History of discovery of polycystic ovary syndrome. AdvClinExp Med. 2017;26(3):555-8. doi: 10.17219/acem/61987, PMID 28791833.

2.   Balaji S, Amadi C, Prasad S, BalaKasav J, Upadhyay V, Singh AK et al. Urban rural comparisons of polycystic ovary syndrome burden among adolescent girls in a hospital setting in India. BioMed Res Int. 2015;2015:158951. doi: 10.1155/2015/158951, PMID 25629036.

3.   Gupta M, Melwani V, Priya A, Toppo M, Khan A, Sethia S. A study to assess the prevalence of polycystic ovarian disease among girls aged 15-21 years from selected SchoolsandCollegesinBhopalCity [internet]; 2021. Medical. Available from: adrpublications.in [cited Mar 23 2021]. Available from: https://medical.adrpublications.in/index.php/IndianJ-YouthandAdolescentHealth/article/view/1287.

4.   Franik G, Krysta K, Madej P, Gimlewicz-Pięta B, Oślizło B, Trukawka J et al. Sleep disturbances in women with polycystic ovary syndrome. GynecolEndocrinol. 2016;32(12):1014-7. doi: 10.1080/09513590.2016.1196177. Madusudhanan RR, Nambisan B, Brahmanandan M, Radha S. Study on the prevalence and characteristics of metabolic syndrome in women of reproductive age group with polycystic ovarian syndrome. Journal of South Asian Federation of Obstetrics and Gynaecology. 2017;9(4):341-7. doi: 10.5005/jp-journals-10006-1526. Journal of South Asian Federation of Obstetrics and Gynaecology.2017;9(4):341-347.

5.   VidyaBharathi R, Swetha S, Neerajaa J, VarshaMadhavica J, Janani DM, Rekha SN et al. An epidemiological survey: effect of predisposing factors for PCOS in Indian urban and rural population. Middle East FertilSoc J. 2017;22(4):313-6. doi: 10.1016/j.mefs.2017.05.007.

6.   Francis R. A prospective study on the usage of metformin and awarness of lifestyle modification in polycystic ovary syndrome at various hospitals, Palakkad. World J Pharm Pharm Sci. 2017:1326-35.

7.   9. Stein IF, Leventhal ML. Amenorrhea associated with bilateral polycystic ovaries. American Journal of Obstetrics and Gynecology. 1935;29(2):181-91. doi: 10.1016/S0002-9378(15)30642-6.

8.   Hull MG. Epidemiology of infertility and polycystic ovarian disease: endocrinological and demographic studies. GynecolEndocrinol. 1987;1(3):235-45. doi: 10.3109/09513598709023610, PMID 3140583.

9.   Jungheim ES, Lanzendorf SE, Odem RR, Moley KH, Chang AS, Ratts VS. Morbid obesity is associated with lower clinical pregnancy rates after in vitro fertilization in women with polycystic ovary syndrome. FertilSteril. 2009;92(1):256-61. doi: 10.1016/j.fertnstert.2008.04.063, PMID 18692801.

10.   Palomba S, Russo T, Orio F, Falbo A, Manguso F, Sammartino A et al. Uterine effects of clomiphene citrate in women with polycystic ovary syndrome: a prospective controlled study. Hum Reprod. 2006;21(11):2823-9. doi: 10.1093/humrep/del267, PMID 16835214.

11.   ZehraBehboodiMoghadam et al. conducted a study named Polycystic ovary syndrome and its impact on Iranian women's quality of life: a population-based study (in bmc women's health 2018 Oct 11). Which concluded that that decrease in the quality of life was associated with PCOS related conditions such as hirsutism, infertility and menstrual problems.

12.   Hirsutism – Symptoms and causes [internet]. Mayo Clinic Publications; 2021 [cited Mar 3 2021]. Available

from: https://www.mayoclinic.org/diseases-conditions/hirsutism/symptoms-causes/syc-20354935.

13. Desai NA D. S.S. Patel P. Prevalence of polycystic ovary syndrome and its associated risk factors among adolescent and young girls in Ahmedabad region. Indian Journal of Pharmacy Practice. R Tiwari T. 2018;11(3):119-25.

14. Chaudhari AP, Mazumdar K, Mehta PD. Anxiety, depression, and quality of life in women with polycystic ovarian syndrome. Indian J Psychol Med. 2018;40(3):239-46. doi: 10.4103/IJPSYM.IJPSYM_561_17, PMID 29875531.

15. PCOS and infertility – what it is, symptoms & treatment | CCRM fertility [internet]; 2021. CCRM Fertility [cited Mar 3 2021]. Available from: https://www.ccrmivf.com/pcos-infertility/.

16. Largo R. Obesity and PCOS: implications for diagnosis and treatment. SeminReprod Med. 2021;2012;30(06):4Fertility.

17. Health line: medical information and health advice you can trust [internet]; 2021. Healthline.com [cited Mar 3 2021]. Available from: https://www.healthline.com/.

18. Drosdzol A, Skrzypulec V, Plinta R. Quality of life, mental health and self-esteem in hirsute adolescent females. J PsychosomObstetGynaecol. 2010;31(3):168-75. doi: 10.3109/0167482X.2010.501398, PMID 20626242.

19. Katon W, Von Korff M, Lin E, Lipscomb P, Russo J, Wagner E et al. Distressed high utilizers of medical care. DSM-III-R diagnoses and treatment needs. Gen Hosp Psychiatry. 1990;12(6):355-62. doi: 10.1016/0163-8343(90)90002-t, PMID 2245919.

20. Benson S, Hahn S, Tan S, Mann K, Janssen OE, Schedlowski M et al. Prevalence and implications of anxiety in polycystic ovary syndrome: results of an internet-based survey in Germany. Hum Reprod. 2009;24(6):1446-51. doi: 10.1093/humrep/dep031, PMID 19223290.

21. Laggari V, Diareme S, Christogiorgos S, Deligeoroglou E, Christopoulos P, Tsiantis J, et al. Anxiety and depression in adolescents with polycystic ovary syndrome and Mayer-Rokitansky-Kuster-Hauser syndrome. J PsychosomObstetGynaecol € ObstetGynaecol2009;30. 2009;30(2):83-8. doi: 10.1080/01674820802546204, PMID 19533486.