

Original Article

Prevalence of Polycystic Ovary Syndrome Awareness Among Female Medical Students

Hamyel Tahir^{#,1,*}, Amna Hassan^{#,1}, Qudsia Umaira Khan^{#,1,*}, Farida Hafeez¹

CMH Lahore Medical College & Institute of Dentistry, Lahore, Pakistan

These authors contributed equally to this work.

* Corresponding authors: Dr. Qudsia Umaira Khan and Hamyel Tahir, CMH Lahore Medical College, Lahore, Pakistan; Emails: drqudsia@yahoo.com and hamyeltahir@hotmail.com respectively.

Submitted: August 1, 2020; Revised: August 27, 2020; Accepted: August 29, 2020; Published: Sept. 28, 2020;

Citation: Tahir H, Hassan A, Khan QU, Hafeez F. Prevalence of Polycystic Ovary Syndrome Awareness Among Female Medical Students. *Discoveries Reports* 2020, 3: e10. DOI: 10.15190/drep.2020.4

ABSTRACT

Background: Polycystic ovary syndrome is one of the most common causes of infertility in woman, affecting 4-18% of reproductive aged women worldwide. It is characterized by hormonal imbalance leading to reproductive, metabolic and psychological dysfunction. It is a multi-organ syndrome affecting both female gonads and the pituitary gland. Polycystic ovary syndrome is idiopathic in occurrence. However, recent studies suggest that it can be caused by inherent abnormalities of ovarian steroidogenesis, follicular development, excessive gonadotropin-releasing hormone (GnRH) and luteinizing hormone (LH), and reduced follicle stimulating hormone (FSH) secretion.

Objectives: To evaluate the knowledge and level of awareness of female students about polycystic ovary syndrome. To determine the prevalence of the symptoms of polycystic ovary syndrome.

Methods: A cross sectional type of quantitative study was conducted following the approval from the Ethical Review Committee. The study was carried out on a sample of medical students, with a calculated sample size of 278 individuals according to the World Health Organization (WHO) formula. A questionnaire-based survey was implemented.

Results: The most important question was regarding the awareness of polycystic ovary syndrome and to our interest 74.5% of the

participants were aware of the disease. 42.2% of the participants gained knowledge of the disease from social media and the internet. The diagnosed cases of polycystic ovary syndrome in the sample was 11.2%, among which 41.9 % are receiving the treatment.

Conclusion: The majority of the female medical students (74.5%) were aware of polycystic ovary syndrome in female medical students. 33.8% of the participants had a normal menstrual cycle of 28 days. A noticeable percentage of students had polycystic ovary syndrome and were under treatment. Our study can be further used to determine relations between polycystic ovary syndrome and a variety of factors, such as the duration of menstrual cycle, body mass index (BMI) or symptoms of this syndrome, such as the weight gain and acne.

Abbreviations: polycystic ovary syndrome (PCOS); follicle stimulating hormone (FSH); luteinizing hormone (LH); gonadotropin-releasing hormone (GnRH); World Health Organisation (WHO); body mass index (BMI); growth hormone (GH); adrenocorticotrophic hormone (ACTH); Combined Military Hospital Lahore Medical and Dental College (CMH LMDC); Bachelor of Medicine, Bachelor of Surgery (MBBS); Bachelor of Dental Surgery (BDS); Doctor of Medicine (MD).

Keywords: polycystic ovarian syndrome, female medical students, awareness.

INTRODUCTION

The female gonads, ovaries, have many important functions, including, but not limited to, the release of mature oocytes and secretion of hormones that are steroids in nature. The release of these hormones is further controlled by pituitary hormones, namely follicle stimulating hormone (FSH) and luteinizing hormone (LH)¹.

Polycystic ovary syndrome is a condition that affects the natural balance of these hormones in the body and is growing very common these days, affecting a large number of women, especially girls, each year. Not only does it affect the pituitary hormones, but it also casts a major impression on the levels of adrenal and sex hormones, including gonadotropins, growth hormone (GH) and adrenocorticotrophic hormone (ACTH). It can be described as multi-organ syndrome².

Rotterdam criteria is currently being used for the diagnosis of polycystic ovary syndrome³. These criteria suggest the diagnosis of polycystic ovary syndrome should be made following any of the following symptoms: anovulation, oligo-ovulation hyperandrogenemia and appearance of polycysts on ultrasound.

Polycystic ovary syndrome is said to be the most common female syndrome worldwide⁴. It affects 4-18% of reproductive aged women around the globe⁵. Women with polycystic ovary syndrome are at a greater risk for infertility, endometrial cancer, endometrial hyperplasia, depression, anxiety, altered glucose metabolism and much more⁶.

The etiology of polycystic ovary syndrome is not known. However, hormonal imbalances, as already mentioned, play a significant role. These imbalances may occur due to inherent abnormalities of ovarian steroidogenesis and follicular development. It also results from rapid gonadotropin-releasing hormone impulses, excess LH and insufficient FSH. Collectively, these result in excessive ovarian androgen production, which leads to ovarian dysfunction. The World Health Organization classifies polycystic ovary syndrome as a group II ovulation disorder, which are dysfunctions of the hypothalamic-pituitary-ovarian axis⁷.

The most widely observed symptoms in women with polycystic ovary syndrome include: irregular or no menstrual periods, heavy periods,

weight gain, fatigue and lack of energy. Other symptoms include hirsutism, hair loss, difficulty in conception, acne and related skin problems, frequent and chronic headaches, voice changes, sleep problems etc⁸.

Early term complications of polycystic ovary syndrome include infertility and obstetric complications. Long term complications include cardiovascular risks, among these the most common being hypertension, diabetes, dyslipidaemia and obesity⁹. Oncology risks include increased risk of developing cancer, such as endometrial, ovarian and breast cancers. Women suffering from polycystic ovary syndrome have psychological complications and reduced quality of life, as compared to healthy women. The prevalence of depression in polycystic ovary syndrome is estimated to be around 14% to 67%.

The objectives of this research study were: (1) to evaluate the knowledge and level of awareness of female students in medical colleges about polycystic ovary syndrome; (2) to determine the prevalence of the symptoms of polycystic ovarian syndrome; (3) to educate the students about the polycystic ovarian syndrome and the importance of early detection and treatment.

The study benefit of our research is that it can create the awareness of polycystic ovary syndrome among medical students. This study will help us acknowledge the dangers and importance of prevention, as well as the treatment of this syndrome, and educate people that are unaware of it. It will also help us destigmatise polycystic ovarian syndrome. Moreover, medical students and professionals can use this study for their future research work on polycystic ovary syndrome, by determining relations between this syndrome and other factors, such as the weight gain and the duration of menstrual cycle.

MATERIAL AND METHODS

A cross sectional type of quantitative study was conducted following the approval of CMH Lahore Medical and Dental College Ethical Review Committee. The study was carried out on medical students from CMH-LMC, with the sample size of 278 individuals, according to the WHO formula. A questionnaire-based survey was held. The questionnaire used was obtained from Dr. Sara Ali, Dr. Syed Raziur Rehman and Nora Mohammad

Albassan, and had previously been used in other similar researches. The data collected was analysed via the SPSS software.

The sample size was calculated to be 278, with 95% confidence interval and 5% absolute precision, using the formula: $n = Z^2 \times p(1-p) / d^2$

Inclusion criteria were (1) female medical students; (2) willingness to participate, while the exclusion criteria were (1) male students; (2) unwilling to participate.

RESULTS

The study was carried out on a sample of medical students of CMH LMC, with a calculated sample size of 278 individuals, according to the WHO formula. The results showed that the majority of the participants, i.e. 94.2 % were female medical students and the remaining of them were female

dental students of CMH LMDC. MBBS stands for Bachelor of Medicine, Bachelor of Surgery, an international medical degree equivalent to Doctor of Medicine (MD) in the United States' system. BDS stands for Bachelor of Dental Surgery (Figure 1).

34% of the participants were of 19 years of age, 27.3% of the participants were 20 years of age, 13 % were 18 years of age, and 0.7% were 24 years of age. Among the total participants, 99.6% were unmarried (Figure 2).

In response to the duration of the monthly cycle, more than 33.8% (n=94) of the participants had a menstrual cycle of 28 days, which is the average normal duration. 24.8% (n=69) of the participants had a cycle of 26 days with 7.9% (n=22) sample subjects having duration of menstrual cycle of 25 days or less. Similar to this, 1.4% (n=4) sample subjects had monthly menstrual cycle spanning to more than 30 days (Figure 3).

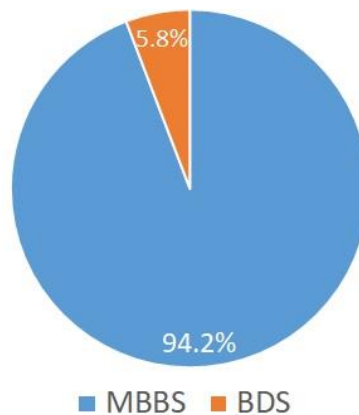


Figure 1. Distribution of subjects from CMH LMC investigated in this study: 94.2 % were female medical students (MBBS) and the remaining of them were female dental students (BDS) in CMH LMDC.

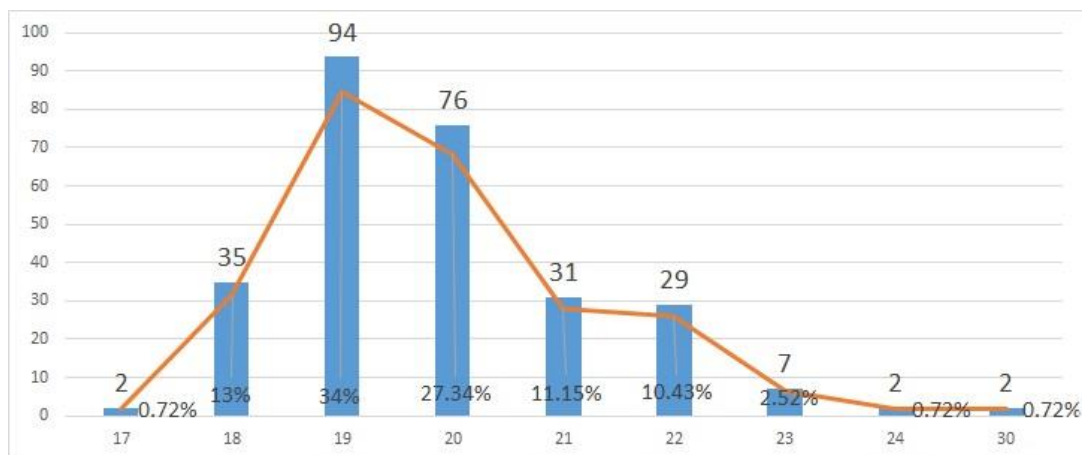


Figure 2. Subjects' age (X-axis; years old) versus the number of the subjects in each age category (Y-axis).

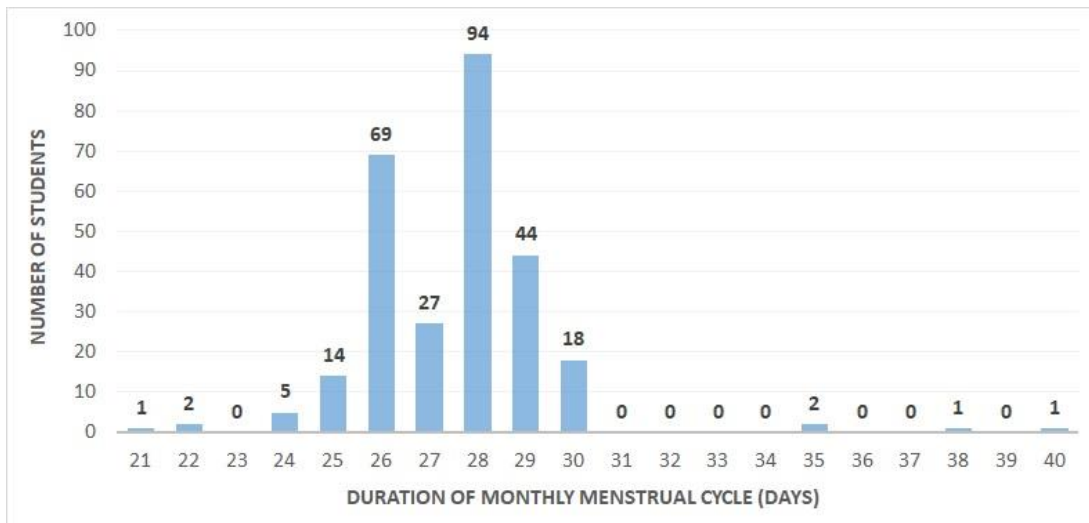


Figure 3. Menstrual cycle duration distribution

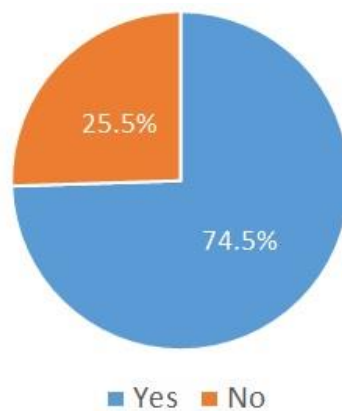


Figure 4. Did you hear about polycystic ovary syndrome?

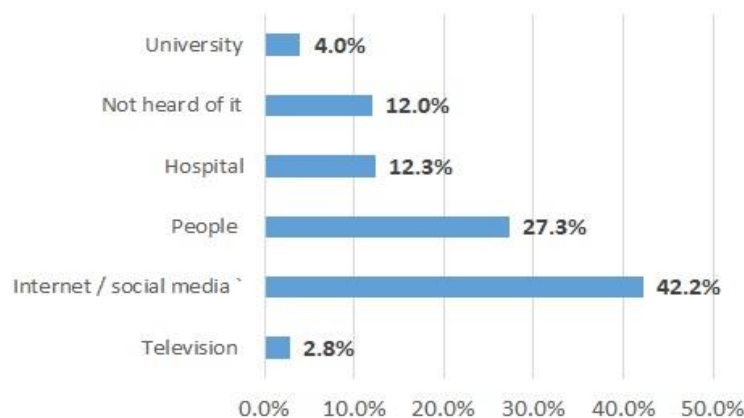


Figure 5. How did you hear about polycystic ovary syndrome?

One of the most imperative and significant question was regarding the awareness of polycystic ovary syndrome. It is interesting to note that 74.5% of the participants were aware of the disease, while 25.5% were unacquainted with it (Figure 4).

It was noteworthy to find out that 42.2% of the participants gained the knowledge of the disease from social media and internet. As we have observed that huge population hear or read about the disease from internet and then they discuss with

each other and spread the knowledge, whereas 27.3% of the participants came to know about the disease from each other and only 2.8% from television. There was only 4% of the population who gained knowledge from reading books and class lectures and universities (Figure 5).

The frequency of different polycystic ovary syndrome symptoms in all the 278 students that we surveyed regardless of them being diagnosed or not with polycystic ovary syndrome was as follows: 37.1% students suffered from metrorrhagia or

amenorrhea, 55.4% had oily skin and acne, 50.7% had hirsutism, 36.3% encountered weight gain and 42.8% subjects had alopecia. Other observed symptoms of polycystic ovary syndrome and their studied frequency in our research sample are shown in the graph below (Table 1).

The most important aspect of this research was the diagnosed cases of polycystic ovary syndrome in female medical students, which were found to be 11.2%. Among these cases, 80.6% are receiving treatment and 19.4% of the diagnosed cases are still

Questions and Symptoms	YES	NO
Do you suffer from irregular menstrual cycle or no menstrual cycles?	103	175
Do you suffer from acne or oily skin?	154	124
Do you experience excessive facial or body hair?	141	137
Do you suffer from hair loss or hair loss in particular area of the hair?	119	159
Do you suffer from weight gain?	101	177
Do you suffer from mood swing?	176	102
Do you feel lonely, loss of interest, or very aggressive frequently?	168	110
Do you experience frequent headache, dizziness?	123	155
Do you suffer from chronic, frequent lower back pain?	90	188
Do you observe any change in voice?	21	257
Do you get tired easily/feel weakness?	174	104

Table 1. The frequency of different polycystic ovary syndrome symptoms in all 278 students and the questions asked.

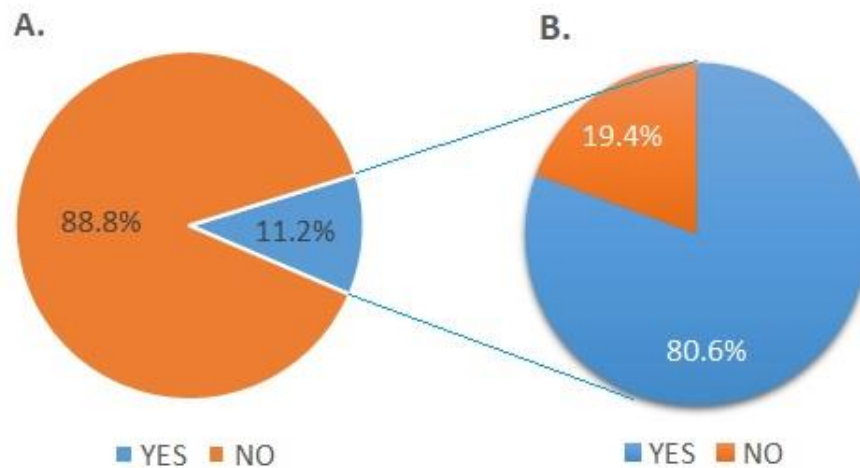


Figure 6. Subjects diagnosed with polycystic ovary syndrome. A. Are you diagnosed with polycystic kidney disease? B. Are you treated for polycystic ovary syndrome?

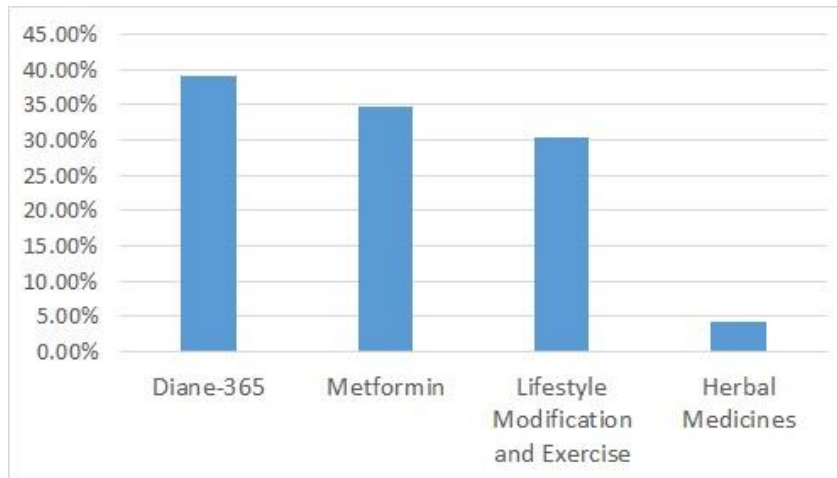


Figure 7. Treatment used by the subjects diagnosed with polycystic ovary syndrome

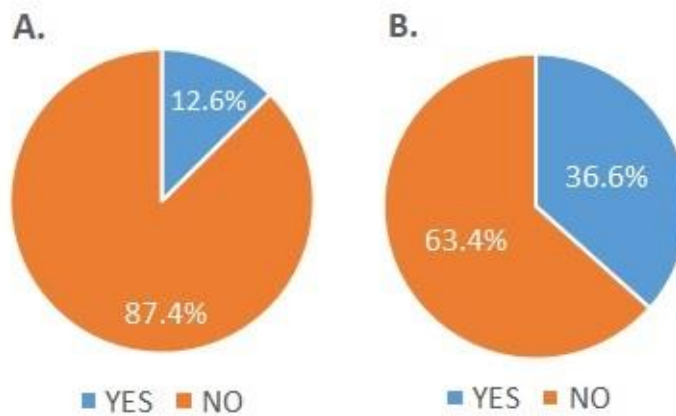


Figure 8. Family history.

- A. Did your mother or at least one of your sisters also have similar symptoms?
B. Do you have a family history of diabetes, hypertension or other endocrine disorders?

untreated (Figure 6).

The participants under treatment were using metformin (34.7%), Diane-35, an oral contraceptive pill (39.1%), and herbal medication (4.3%), while 30.4% used help from lifestyle modification and exercise (Figure 7).

From the participants who were suffering of polycystic ovary syndrome, 12.6% had their mother or at least one of their sisters also having similar symptoms, whereas 87.4% replied negatively (Figure 8A). When asked about family history of diabetes, hypertension or other endocrine disorders, 36.6% had a positive family history (Figure 8B).

DISCUSSION

Total number of female students who participated in this study was 278, with 94.2% (n=262) from MBBS and 5.8% (n=16) from BDS, all studying in CMH Lahore Medical College. The age group that was studied was 17-24 years, although polycystic ovary syndrome has chances of occurring throughout reproductive age¹⁰. According to the questionnaire, 33.8% of the participants had a menstrual cycle of 28 days, which is considered to be the normal average value, while a duration of ≤ 25 days was observed in 7.9% cases and a

duration of >30 days in 1.4% of the participants¹¹. In the present study, out of 278 students, a majority of 74.5% (n=207) had heard of polycystic ovary syndrome, while in a similar study by Patel J. and Rails (2018) only 41% of the women were aware of polycystic ovary syndrome¹².

As for the sources of information of students on polycystic ovary syndrome, 42.2% (n=117) mentioned their information source to be the internet and social media, making it the most potent platform for spreading awareness about polycystic ovary syndrome. This was followed by people, e.g. family members, friends or colleagues, 27.3% (n=76), and hospital 12.3% (n=34), this being the second and third most mentioned sources of information. An analogous study by Ali S. et al.¹³ demonstrated that people, internet and social media, and hospitals to be the first, second and third most mentioned information sources on polycystic ovary syndrome respectively¹³. The change in ranking can be attributed to augmented internet use with time.

As for the frequency of polycystic ovary syndrome, symptoms in all the sample students irrespective of them being diagnosed with polycystic ovary syndrome or not was of 37.1% students which endured menorrhagia or amenorrhea. A study by Ali S. et al.¹³ showed a similar percentage of 37%. In the present study, 55.4% subjects suffered from oily skin and acne, while 50.7% had hirsutism, in comparison to the study by Patel J. et al. that indicated 75.5% having acne and 13% hirsutism. According to the collected data, 36.3% had weight gain similar to study by Sanchez N. et al.¹⁴, that showed 32% were obese¹⁴. Furthermore, 42.8% subjects suffered from alopecia, 63.3% from mood swings and 62.6% got tired easily/felt weak. An analogous study by Ali S. et al.¹³ mentioned 74% subjects having alopecia, 67% having mood swings and 55% having feelings of weakness. Discussed above are all symptoms of polycystic ovary syndrome according to study by Haq NNU et al.¹⁰.

In addition, when the students were asked, "If you suffer from 2 or more of these symptoms, are you going to visit a gynaecologist?" 65.8% said "No" and 34.2% said "Yes", with most common reasons being busy schedule and negligence, mild symptoms not affecting their daily routine, social anxiety and treating different symptoms separately. Many females visit a doctor only when symptoms

get extreme¹⁵. These reasons may lead to polycystic ovary syndrome and aggravation of their symptoms¹⁶.

As per the results, 11.2% (n=31) of the students were already diagnosed with polycystic ovary syndrome which is a statistically significant percentage. Prevalence of polycystic ovary syndrome was 26.9% in a study by Saidunnisa B. in the Rak Medical and Health Sciences University in UAE¹⁷. 80.6% (n=25) of these diagnosed students were taking medication for polycystic ovary syndrome; 39.1% mentioned Diane-35, 34.7% specified metformin, 30.4% lifestyle modification and exercise, while 4.3% cited herbal medication as well. Study by Pitchai et al. shows that 62 % of women are aware of exercise benefits in polycystic ovary syndrome¹⁸. According to Pasquali R., metformin and oral contraceptive pills are few of the contemporary approaches to manage polycystic ovary syndrome¹⁹.

From the collected data, 63.7% students had family history of diagnosed diabetes, blood pressure or endocrine disorders. Diabetes plays a central role in pathogenesis of androgen excess in polycystic ovary syndrome. Thus, it may lead to polycystic ovary syndrome²⁰. Chang AY et al. mentions increased prevalence of hypertension in females with polycystic ovary syndrome in his study²¹. This highlights the possibility of genetic predisposition of people with such family history to polycystic ovary syndrome²².

The last open-end question was about the communal thought about polycystic ovary syndrome, and most answers suggested that there were misconceptions about polycystic ovary syndrome and there was a need for public awareness about it. A comparable response was seen in the study by Ali S. et al. too¹³.

CONCLUSION

Majority of the female medical students were aware of the polycystic ovary syndrome in CMH Lahore Medical and Dental College. Noteworthy, 33.8% of the students had a normal 28-day menstrual cycle. Noticeable percentage of students had polycystic ovary syndrome and were under treatment. Unfortunately, many students showed lack of concern and did not take this condition seriously. Hence, we conclude that it is not enough to study the pathophysiology of polycystic ovary syndrome alone, it is also essential to examine how it

influences the trajectories of people's lives. With the world only one click away, we wish to spread awareness about this syndrome, along with its characteristics and etiology, as this condition can lead of other health problem.

Acknowledgements

We express gratitude to CMH Lahore Medical College and Institute of Dentistry, Lahore, Pakistan, for supporting our research endeavors.

Conflict of Interest

The authors declare that there are no conflicts of interest.

References

1. Carton J, Daly R, Ramani P. Clinical pathology, 1st edition, 2007, Oxford University Press, UK; SBN-10: 0198569467; ISBN-13: 978-0198569466.
2. Glinborg D, Andersen M. An update on the pathogenesis, inflammation, and metabolism in hirsutism and polycystic ovary syndrome. *Gynecol Endocrinol.* 2010; 26(4):281-296.
3. Shroff R, Syrop C, Davies W, Voorhis BJV, Dokras A. Risk of metabolic complications in the new PCOS phenotypes based on the Rotterdam criteria. *Fertility and Sterility* 2007; 88(5): 1389-1395; [http://www.fertstert.org/article/S0015-0282\(07\)00163-X/pdf](http://www.fertstert.org/article/S0015-0282(07)00163-X/pdf)
4. Gul S, Zahid SA, Ansari A. PCOS: Symptoms and Awareness in Urban Pakistani Women. *IJPRHS.* 2014;2, 356-360.
5. Moran LJ, Hutchison SK, Norman RJ, Teede HJ. Lifestyle changes in women with polycystic ovary syndrome. *Cochrane Database Syst Rev.* 2011;(2):CD007506.
6. Solomon C G; McCartney C R; Marshall J C, Polycystic ovary syndrome. *NEJM.* 2016; 375(1): 54-64.
7. ESHRE Capri Workshop Group, Health and fertility in World Health Organization group 2 anovulatory women, *Human Reproduction Update.* 2012; 18(5):586-599.
8. Kasper DL, Fauci AS, Hauser SL, Longo DL, Jameson JL, Loscalzo J. *Harrison's Principles of Internal Medicine*, 19th ed., New York: McGraw-Hill Education Medical. 2015; 2 v. xxxviii; NLM ID: 101643730.
9. Palomba S, Santagni S, Falbo A, La Sala GB. Complications and challenges associated with polycystic ovary syndrome: current perspectives. *Int J Womens Health.* 2015;7:745-763.
10. Haq NU, Khan Z, Riaz S et al. Prevalence and Knowledge of Polycystic Ovary Syndrome (PCOS) Among Female Science Students of Different Public Universities of Quetta, Pakistan *Imperial journal of interdisciplinary research.* 2017; 3. Corpus ID: 79891162.
11. Grieger JA, Norman RJ Menstrual Cycle Length and Patterns in a Global Cohort of Women Using a Mobile Phone App: Retrospective Cohort Study *J Med Internet Res.* 2020;22(6):e17109
12. Patel J, Rai S. Polycystic ovarian Syndrome (PCOS) awareness among young women of central India. *Int J Reprod Contracept Obstet Gynecol,* 2018; 7:3960-4.
13. Ali S, Al Bassam NM, Rahman SR; Polycystic Ovarian Syndrome (PCOS), Awareness Among Female Students, Qassim University, Qassim Region, Saudi Arabia; *International Journal of Research – Granthaalayah* 2018;6:395-406.
14. Sanchez N. A life course perspective on Polycystic Ovary Syndrome. *Int J Women's Health.* 2014; 6: 115–122.
15. Rizvi N, Khan KS, Shaikh BT. Gender: shaping personality, lives and health of women in Pakistan. *BMC Women's Health.* 2014; 14:53.
16. Nanjaiah R, Roopadevi V. Prevalence of Polycystic Ovarian Syndrome among Female Students: A Cross Sectional Study. *Natl J Community Med.* 2018; 9(3):187-19.
17. Saidunnisa B, Atiqulla S, Ayman G; et al, Prevalence of polycystic ovarian syndrome among Students of Rak Medical and Health Sciences University, UAE; *International Journal of Medicine and Pharmaceutical Science (IJMPS).* 2016; 6(1):109-118. ISSN(P): 2250-0049; ISSN(E): 2321-0095.
18. Pitchai P, Sreeraj SR, Anil PR. Awareness of lifestyle modification in females diagnosed with polycystic ovary syndrome in India: explorative study. *Int J Reprod Contracept Obstet Gynecol.* 2016;5(2):470-6.
19. Pasquali R. Contemporary approaches to the management of polycystic ovary syndrome. *Ther Adv Endocrinol Metab.* 2018; 9(4):123-134.
20. Pani A, Gironi I, Di Vieste G, Mion E, Bertuzzi F, Pintaudi B. Prediabetes to Type 2 Diabetes Mellitus in Women with Polycystic Ovary Syndrome: Lifestyle and Pharmacological Management. *Int J Endocrinol.* 2020; Article ID 6276187.

21. Chang AY, Oshiro J, Ayers C, Auchus RJ. Influence of race/ethnicity on cardiovascular risk factors in polycystic ovary syndrome, the Dallas heart study. *Clin Endocrinol (Oxf)*. 2016; Jul;85(1):92-9.
22. Panda P, Rane R, Ravichandran R, Singh S, Panchal H. Genetics of PCOS: A systematic bioinformatics approach to unveil the proteins responsible for PCOS, *Genomics Data*. 2016; 8:52-60.

This article is an Open Access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited and it is not used for commercial purposes; 2020, Tahir H. et al. and Applied Systems;