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ANALYSIS OF ANXIETY, DEPRESSION AND PERCEIVED STRESS IN WOMEN WITH POLYCYSTIC OVARY SYNDROME (PCOS)

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Abstract
This research study is designed to investigate the impact of Polycystic Ovarian Syndrome (PCOS) on the psychological well-being of women in the Kambar Shahdadkot district. Polycystic Ovarian Syndrome (PCOS), a prevalent endocrine illness marked by hormonal imbalances and reproductive irregularities, has been linked to an increased occurrence of mental health Challenges.
The study collects and analyses data using a qualitative research approach. The sample consists of women between 20 to 40 years old. The sampling technique is the Snowball sampling type. The data was collected using semi-structured interviews. The study used a phenomenological approach to get the live experiences of the participants. The study results revealed an elevated rate of anxiety and depression among women with PCOS, suggesting a bidirectional relationship between the physiological aspects of the Syndrome and mental well-being. It is recommended that integrating mental health considerations into the clinical management of PCOS is crucial, necessitating collaborative efforts among gynecologists, endocrinologists, and mental health professionals to provide holistic care that addresses both the physical and psychological dimensions of this complex Syndrome.

Keywords: Polycystic Ovarian Syndrome, Stress, Anxiety, Depression, Disease

Introduction

Polycystic ovarian Syndrome (PCOS) is a frequent endocrinopathy that mostly affects women of reproductive age, exerting its influence throughout several stages of life, ranging from adolescence to post-menopause (Teede et al., 2023). The prevalence of polycystic ovary syndrome (PCOS) has been determined to range from 10% to 13% based on findings from the guideline process (Teede & Moran, 2010; Azziz et al., 2016). A growing number of women are being diagnosed with polycystic ovary syndrome, which has multiple causes, including genetic and environmental factors. The pathogenesis of polycystic ovary syndrome (PCOS) is diverse, and its clinical presentation exhibits a wide range

of reproductive, metabolic, and psychological characteristics (Teede & Moran, 2010; Azziz et al., 2016). This prevalent medical condition significantly affects 10% of women in their reproductive years. The negative impact of polycystic ovary syndrome (PCOS) on individuals' overall well-being is a contributing factor to the development of depression in those affected (Malik & Hussain, 2020; Buriro et al, 2023). The identification of polycystic ovary syndrome (PCOS) was initially accomplished by Stein and Leventhal (Naqvi, Bhattarai, & Wang, 2019). The prevalence of polycystic ovary syndrome (PCOS) among women globally is estimated to range from 6% to 26%. The medical condition encompasses anovulation, infertility, and mental health issues.

Research Questions

- What are the effects of PCOS diagnosed on anxiety?
- What is the effect of PCOS on mood swings or depression in patients?
- How is stress related to PCOS-diagnosed patients?

Literature Review

Hormonal Imbalance

Beyond reproductive abnormalities, PCOS hormones impair mood regulation. High androgen levels, insulin resistance, and altered gonadotropin production create a complicated endocrine milieu that may affect mood-regulating neurotransmitter activity and pathways (Podfigurna-Stopa et al., 2015). New evidence reveals that PCOS-related hormonal abnormalities may raise the risk of developing mood disorders like depression and anxiety (Buriro et al., 2023). Neurotransmitters involved in mood regulation, such as serotonin and dopamine, may be affected by androgens like testosterone (Weiner et al., 2004). Insulin resistance, a prominent characteristic of polycystic ovary syndrome (PCOS), has the potential to intensify these effects (Buriro, et al., 2023) resulting in a hormonal environment that overlaps with brain circuits implicated in emotional welfare (Diamanti & Dunaif, 2012). Developing tailored therapies that address the endocrine and psychological elements of PCOS requires a deeper understanding of the intricate link between hormone fluctuations and mood regulation in PCOS patients (Papadakis et al., 2021). This study's findings have promising implications for the development of patient-centered methods of mental health care for women with PCOS (Buriro et al, 2023), underscoring the importance of holistic models that consider the complex role that hormone dysregulation plays in determining psychological health.

Chronic Nature of PCOS

Its chronic nature distinguishes Polycystic Ovary Syndrome (PCOS) since it entails a persistent and frequently lifelong interaction of hormonal, metabolic, and reproductive problems in affected women (Regidor et al., 2022). Unlike some medical disorders with acute phases, PCOS often continues beyond the reproductive lifespan, providing complications throughout several life stages (Wekker *et al*., 2020). The long-term effects of PCOS on fertility, menstrual regularity, and metabolic health are indicative of the disease's chronicity (Morgante et al., 2018; Buriro et al, 2023). Insulin resistance, type 2 diabetes, cardiovascular disease, and endometrial cancer are all potential long-term problems for women with PCOS (Condorelli *et al*., 2017). In addition to the physical difficulties associated with PCOS, there are also psychological issues to deal with, such as negative body image, anxiety, depression, and pressures from society (Ee *et al*., 2021). The chronic nature of PCOS highlights the significance of comprehensive, long-term management techniques that address both the physiological and psychosocial elements of this complicated illness (Farkas, Rigó, & Demetrovics, 2014). To improve the quality of life for those living with PCOS, healthcare providers must use an adaptable approach that considers the changing requirements of patients at various phases of their lives (Behboodi *et al*., 2018).

Infertility-Related Stress

Fertility-related stress is a multidimensional and pervasive phenomenon that profoundly impacts individuals and couples encountering difficulty in achieving parenthood (Li et al., 2022). Infertility

has been shown time and time again to have a devastating effect on a person's mental health, elevating their stress, anxiety, and despair levels (Zehravi, Maqbool & Ara, 2021). The emotional strain is contributed to by the uncertainties surrounding fertility treatments, the financial constraints associated with them, and the societal expectation of parenthood. Additionally, the recurring pattern of optimism and disillusionment linked to assisted reproductive technology serves to intensify levels of stress (Papalou & Diamanti, 2017). Due to the emotional toll of infertility, couples with fertility challenges often report strained relationships and lower quality of life. Social demands to conform to traditional family norms and infertility stigma increase psychological stress (Yokota et al., 2022). Infertility treatments are physically and financially exhausting, causing stress that affects general well-being. For infertile individuals and couples, fertility-related stress must be addressed with psychological support, therapy, and education, developing therapies that reduce fertility-related stress and improve mental health and resilience in prospective parents (Öztürk et al., 2021).

Screening and Diagnosis

Screening and diagnosis are essential components of healthcare, particularly in the identification and management of medical conditions such as PCOS. Polycystic ovary syndrome (PCOS) exhibits a diverse range of clinical manifestations and can potentially have significant implications for an individual's overall well-being (Kyrou, Weickert & Randeva, 2015). Consequently, the timely and precise implementation of screening measures assumes paramount significance. The importance of combining clinical and laboratory findings as part of diagnostic criteria has been emphasized in recent research (Boivin et al., 2020). Menstrual abnormalities, clinical signs of hyperandrogenism, and ovarian morphology (evaluable via imaging techniques like ultrasonography) are frequently employed as diagnostic criteria (van Hooff et al., 2000). Since PCOS can be present in several ways, there is consensus on basic diagnostic criteria, but scientists are continually striving to refine and personalize screening procedures for each group (Livadas & Diamanti, 2013). The creation and confirmation of biomarkers and genetic markers may improve PCOS diagnosis. Standardized screening techniques and diagnostic criteria are essential for early PCOS detection, focused therapies, and minimizing consequences. PCOS screening and diagnostic technologies must be refined through research to improve precision and efficacy (Abdalla et al., 2020).

Patient-Centered Approaches

The study revealed that the approaches should be used based on patient-centered care because to understand the nature of chronic disease, one should understand the nature. The patient's views, interests, and needs are considered, and the patient is encouraged to take an active role in their healthcare (Holton, Hammarberg & Johnson, 2018). The idea behind this method is that patients know best when it comes to their health and well-being (Barnard et al., 2007). Patient-centered care has been shown to improve health outcomes, patient happiness, and the quality of healthcare delivery in recent years (Tay et al., 2018). An integral part of patient-centered care is encouraging two-way dialogue, joint decision-making, and teamwork between doctors and their patients. This approach recognizes the value of individualized care plans that consider not just the physiological but also the psychological and social components of a patient's condition (Maizes, Rakel & Niemiec, 2009). It stresses the need to listen to patients, involve them in treatment decisions, and give them a voice while doing so. Polycystic ovary syndrome (PCOS) is a chronic disorder that requires individualized and comprehensive methods of treatment due to its complexity and wide-ranging effects on patients' lives. Improvements in patient participation, satisfaction, and health outcomes can be achieved using patient-centered approaches to PCOS management (Stefanaki et al., 2015). The efficacy of patient-centered care models, as well as strategies for incorporating them into a variety of healthcare settings, remain the subject of ongoing research (Thompson et al., 2023).

Pharmacological Interventions for PCOS

Pharmacological therapies have been crucial in the investigation and management of PCOS, enabling focused techniques to address hormonal imbalances and related symptoms (Kriedt, Alchami &

Davies, 2019). Many women with PCOS find great comfort in taking oral contraceptives and other medications that help regulate menstrual periods and reduce hyperandrogenism (Woodward et al., 2019). Metformin and other insulin-sensitizing medications can control insulin resistance and reduce glucose tolerance, two metabolic features of the Syndrome (Hashim, 2016). The effect of these pharmaceutical therapies on reproductive results, metabolic health, and possible adverse effects have been the subject of many studies (Kamenov & Gateva, 2020). To enhance treatment options for the various manifestations of PCOS, researchers are always looking for new pharmacological agents and combinations (Badawy & Elnashar, 2011). Research-driven improvements in pharmaceutical interventions have highlighted their significance in the all-encompassing care of people with polycystic ovary syndrome (PCOS), giving doctors more tools to treat the illness's endocrine and metabolic components (Zaikova, 2021).

Impact of PCOS on Depression and Anxiety

Women with Polycystic Ovarian Syndrome (PCOS) commonly battle with elevated levels of anxiety and depression, creating a significant area of concern within the broader landscape of mental health (Kerchner et al., 2009). Recent studies highlight the high occurrence of psychological difficulties in women who have been diagnosed with PCOS (Himelein & Thatcher, 2006).

PCOS is characterized by hormonal imbalance, including raised androgen levels and insulin resistance, both of which have been related to an increased risk of mood disorders (Khmil, Khmil S.& Marushchak, 2020). Studies show that these women are more likely to have symptoms of depression and anxiety than women who do not have PCOS. The visual symptoms of the Syndrome, such as hirsutism and acne, contribute to body image worries and reduced self-esteem, thus worsening the risk of depressive and anxious symptoms (Çoban et al., 2019). These visible aspects of the condition include acne, hair fall and facial hair.

Furthermore, the correlation between polycystic ovary syndrome (PCOS) and challenges related to fertility, in conjunction with societal constraints and stigmatization, exacerbates the psychosocial load experienced by women suffering from this condition (Hart, 2008). Understanding the intricate correlation between Polycystic Ovary Syndrome (PCOS) and mental health is crucial to developing holistic approaches to healthcare (Lau et al., 2022). The investigation of tailored therapies, including cognitive-behavioral therapy and mindfulness-based methods, is currently underway to effectively target the distinct mental health requirements of women diagnosed with PCOS (Salajegheh et al., 2023). For optimal health, reproductive health specialists and mental health doctors must work together to incorporate mental health considerations into the clinical management of PCOS (Barry & Barry, 2019).

Methods and Procedure

The study used a phenomenological approach to collect robust data. The study used a snowball sampling technique to reach the participants. The study sample is from Kambar and Shahdadkot district females who are between 20 and 40 years old. While collecting the data, ethical measures were taken, and anonymity of the actual record of the persons was ensured. The study followed the willingness of the participants, and they were given the freedom to quit at any time if they wished to. The study used semi-structured interviews with the participants. The interviews were recorded and transcribed. The codes were generated, and themes were developed. The study used thematic analysis by following Braun and Clark (2012) thematic analysis procedure. Themes were drawn objectively to explain phenomena. The researcher has ensured objective positionality in data collection and analysis.

Fig 1. Braun & Clark 2013, Thematic Analysis picture.

The six-step approach to data analysis, proposed by Braun and Clarke in 2013, offers a thorough framework for doing qualitative research. The initial stage entails the process of data familiarization, wherein researchers engage in a comprehensive examination of the raw data to develop a profound comprehension of its substance. Subsequently, the second phase involves the production of codes, wherein essential concepts and patterns are discerned and assigned labels. Subsequently, the codes are systematically categorized into overarching themes during the third phase, when related codes are merged to construct a cohesive narrative. The fourth step in the research process involves the critical evaluation of themes, highlighting the importance for researchers to evaluate the precision and pertinence of the identified topics carefully. After the establishment of themes, the subsequent phase entails the determination of their significance, as well as the exploration of the broader meanings and linkages within the collected data. The final part of the research process involves the dissemination of findings, during which researchers effectively explain their conclusions in a manner that is both understandable and persuasive, guaranteeing the study's significance and applicability. The utilization of a systematic approach in qualitative data analysis serves to uphold rigor and transparency, hence enhancing the credibility and reliability of the research.

RESULTS

The results of the study are very important regarding the PCOS effects on the diagnosed patients.
The civil hospital Shahdadkot authorities were approached for permission to collect data. All ethical measures were taken to ensure the ethics in research. Permission was sought from the head of the department and the relevant respondents.

PCOS leads to anxiety.

The results of the study are interesting. One of the respondents has shared very important information. The respondents shared their life experiences regarding their feelings after being diagnosed with PCOS.

R1: *"I have been a PCOS patient for so many years. Overthinking anxiety were the symptoms I was facing when I consulted the doctor; he found that I have high levels of serotonin and testosterone and that are the main causes of PCOS".*
The interview transcription of the respondent expresses that PCOS caused anxiety and overthinking, which has affected mental and physical health.

R2: "*I have felt very depressed fighting PCOS since I was 20 years old. My symptoms of PCOS are Feeling irritable, easily frustrated, or restless; sometimes I cannot handle my emotions/ myself".*
The transcription shows that she was facing irritation and frustration after the PCOS diagnosis. She has shared that she has lost her emotions and feelings. She is unable to come out of the mental depression situation.

R3: *"Being a PCOS patient, my anxiety levels are high. Most of the time, I cannot make mature decisions. I feel weaker than other individuals, Facing pain, headaches, or stomach issues.*
The findings of research examining the correlation between Polycystic Ovary Syndrome (PCOS) and anxiety in women shed light on a multifaceted interaction between physiological and psychological

well-being. The analysis of the transcription suggests the intricate mechanisms via which Polycystic Ovary Syndrome (PCOS) may contribute to elevated levels of emotional imbalance, anxiety, and mood swings. The transcription has highlighted the psychosocial pressures associated with concerns about mental health. Moreover, the impact of societal stigmas and the perceived social ramifications of Polycystic Ovary Syndrome (PCOS) might intensify feelings of anxiety. As part of an effort to thoroughly examine the outcomes-oriented discourse, it is imperative to acknowledge the intricate and varied relationship between polycystic ovary syndrome (PCOS) and anxiety. Furthermore, it is crucial to underscore the significance of adopting a holistic healthcare framework that incorporates therapies targeting both the physical and emotional well-being of women impacted by PCOS. Engaging in such discussions enhances comprehension of the wider ramifications of Polycystic Ovary Syndrome (PCOS) beyond its physiological dimensions, hence facilitating the development of comprehensive and compassionate healthcare approaches.

PCOS Leads to Moods Swings

The respondents' responses are very interesting regarding the effects of PCOS on patients' mental health. One of the respondents shared that.

R1: *I faced so many things regarding my mood swings. Little things/ ignorable things are very hard to forget. I have a problem not letting go of things. I keep everything in my mind, which affects my mind very badly. I have continuous headaches, overthinking, being emotional, crying all the time, and sadness in my behavior.*

The results show that PCOS has impacts on mood swings, which impact relationships and family bondage. The behavior of the patient is unstable and unbearable.

R2: *Sometimes I feel Anger and aggression and cut to feel sadness and loneliness.*

R3: *Before PCOS, I was very ambitious, but now I feel very disheartened. I feel my PCOS has made me too weak to fight the outer world.*

R4: *I feel a chain of mood swings and depression in my behavior. I am polite but sometimes dominant and fight with my family and friends.*

R5*: Depression was my problem for years. I don't know if I got PCOS first or depression or if they are related to each other, but now I am suffering from both.*

The findings of the study demonstrate a constant correlation between Polycystic Ovary Syndrome (PCOS) and mood instability, which in turn contributes to erratic conduct among those affected by this disorder. The findings consistently indicate that hormonal fluctuations, which are a characteristic feature of polycystic ovary syndrome (PCOS), exert a substantial influence on neurotransmitter activity, hence impacting the regulation of mood. Women diagnosed with Polycystic Ovary Syndrome (PCOS) frequently encounter elevated levels of androgens and insulin resistance, leading to the potential worsening of mood swings and mental instability. The presence of hormonal imbalances might potentially lead to the manifestation of symptoms such as irritation, anxiety, and depressive tendencies. Moreover, the psychosocial implications associated with the management of a chronic ailment, in conjunction with the possible difficulties related to reproductive concerns and body image issues, serve to exacerbate unstable behavior. The significance of these findings highlights the necessity of comprehensive healthcare strategies that not only target the physiological components of polycystic ovary syndrome (PCOS) but also consider the emotional and psychological welfare of persons impacted by this condition.

PCOS Affects Physiological Health

The interview results show that PCOS has significant effects on the physiological health of the patients. The interview transcription of the respondents shows that patients diagnosed with PCOS are facing severe physiological health issues.

R1. *Heavy uterine bleeding, abdominal pain, facial hair, so quality of life disturbed.*

R2: *I feel a lack of peaceful sleep; regular cycles and traffic of thoughts in my mind affect my quality of life.*

The interview results show that the PCOS diagnosed face physical health issues with severe bleeding during the menstrual cycle, heavy bleeding and pain in the abdominal area of the patient. Another respondent has shared that irregular sleep and overthinking affect the healthy life of the respondent.

R3: *As a woman, there are so many responsibilities that we must complete in 20 hours of our daily life. Due to painful cycles of 7 days each month, me and my family suffer from PCOS because I can't perform all my duties.*

R4: *Weight gain, cholesterol problems, and blood pressure are related to PCOS, so it is definitely related to quality of life.*

R5: *Diabetes, weight gain and PCOS are directly proportional. PCOS affects quality of life.*

The result part of studies pertaining to Polycystic Ovary Syndrome (PCOS) highlights the extensive ramifications of this ailment on diverse facets of women's health and overall welfare. The results regularly demonstrate a notable correlation between polycystic ovary syndrome (PCOS) and irregular menstrual cycles, which is frequently linked to imbalances in hormones and disturbances in ovulation patterns. The presence of these anomalies not only affects fertility but also plays a role in the broader physical and mental challenges faced by women diagnosed with polycystic ovary syndrome (PCOS).

Conclusion

A qualitative research approach has been adopted in this research study. The target population is the female PCOS patients of Sindh have been selected. The circle of the study was n=6 PCOS patients of District Kamber Shahdadkot. The Snowball sampling technique was used for data collection. Interviews were recorded by following ethical considerations. The existing research has demonstrated a correlation between polycystic ovary syndrome (PCOS) and increased blood pressure, highlighting the comprehensive character of the Syndrome and its possible ramifications for cardiovascular well-being. In addition to its physiological ramifications, the discourse also explores the substantial influence of Polycystic Ovary Syndrome (PCOS) on individuals' overall well-being and satisfaction with life. Women diagnosed with Polycystic Ovary Syndrome (PCOS) commonly experience emotional anguish, poor mental well-being, and difficulties associated with body image, all of which combined lead to a reduced quality of life. This comprehensive study explores how Polycystic Ovarian Syndrome (PCOS) affects blood pressure, menstrual cycle irregularities, and quality of life generally. This Syndrome is quite complicated, and the results shed light on the need for holistic treatments that address the physical and psychological components of polycystic ovary syndrome.

Reference

1. Abdalla, M., Deshmukh, H., Atkin, S. L., & Sathyapalan, T. (2020). miRNAs as a novel clinical biomarker and therapeutic targets in polycystic ovary syndrome (PCOS): a review. *Life Sciences*, *259*, 118174.
2. Azziz, R., Carmina, E., Chen, Z., Dunaif, A., Laven, J. S., Legro, R. S., ... & Yildiz, B. O. (2016). Polycystic ovary syndrome. Nature reviews Disease primers, 2(1), 1-18.
3. Badawy, A., & Elnashar, A. (2011). Treatment options for polycystic ovary syndrome. *International journal of women's health*, 25-35.
4. Barnard, L., Ferriday, D., Guenther, N., Strauss, B., Balen, A. H., & Dye, L. (2007). Quality of life and psychological well being in polycystic ovary syndrome. *Human reproduction*, *22*(8), 2279-2286.
5. Barry, J. A., & Barry, J. A. (2019). Treatments for Improving Psychological Health in PCOS. *Psychological Aspects of Polycystic Ovary Syndrome*, 191-224.
6. Behboodi Moghadam, Z., Fereidooni, B., Saffari, M., & Montazeri, A. (2018). Measures of health-related quality of life in PCOS women: a systematic review. *International journal of women's health*, 397-408.
7. Boivin, M. J., Fatehi, F., Phillips-Chan, A. E., Richardson, J. R., Summers, A. N., & Foley, S. A. (2020). Exploratory study of a screening measure for polycystic ovarian Syndrome, quality of life assessment, and neuropsychological evaluation. *BMC Women's Health*, *20*, 1-12.

8. Buriro, S. A., Mirjat, M. A., Pathan, R. L., Chandio, I., Lashari, A. A., & Gul, H. (2023). Eco-Friendly Pedagogies for STEM Education: A Review. *Journal of Namibian Studies: History Politics Culture*, *34*, 3018-3044.
9. Buriro, S. A., Muhammad, S., Rtd, M. M. P., Channar, H. B., Memon, S. A., & Chandio, I. (2023). Analysis of infectious communicable and non-communicable diseases in Pakistan: A systematic review. *Journal of Population Therapeutics and Clinical Pharmacology*, *30*(18), 2207-2217.
10. Bossuyt, P. M. (2023). Patient-centred outcomes of imaging tests: recommendations for patients, clinicians and researchers. *BMJ quality & safety*, *32*(9), 536-545.
11. Çoban, Ö. G., Tulacı, Ö. D., Adanır, A. S., & Önder, A. (2019). Psychiatric disorders, self-esteem, and quality of life in adolescents with polycystic ovary syndrome. *Journal of pediatric and adolescent gynecology*, *32*(6), 600-604.
12. Condorelli, R. A., Calogero, A. E., Di Mauro, M., & La Vignera, S. (2017). PCOS and diabetes mellitus: from insulin resistance to altered beta pancreatic function, a link in evolution. *Gynecological Endocrinology*, *33*(9), 665-667.
13. Diamanti-Kandarakis, E., & Dunaif, A. (2012). Insulin resistance and the polycystic ovary syndrome revisited: an update on mechanisms and implications. *Endocrine reviews*, *33*(6), 981-1030.
14. Ee, C., Pirotta, S., Mousa, A., Moran, L., & Lim, S. (2021). Providing lifestyle advice to women with PCOS: an overview of practical issues affecting success. *BMC endocrine disorders*.
15. Farkas, J., Rigó, A., & Demetrovics, Z. (2014). Psychological aspects of the polycystic ovary syndrome. *Gynecological Endocrinology*, *30*(2), 95-99.
16. Hashim, H. A. (2016). Twenty years of ovulation induction with metformin for PCOS; what is the best available evidence?. *Reproductive biomedicine online*, *32*(1), 44-53.
17. Hart, R. (2008). PCOS and infertility. *Panminerva medica*, *50*(4), 305-314.
18. Holton, S., Hammarberg, K., & Johnson, L. (2018). Fertility concerns and related information needs and preferences of women with PCOS. *Human reproduction open*, *2018*(4), hoy019.
19. Himelein, M. J., & Thatcher, S. S. (2006). Polycystic ovary syndrome and mental health: a review. *Obstetrical & gynecological survey*, *61*(11), 723-732.
20. Kamenov, Z., & Gateva, A. (2020). Inositols in PCOS. *Molecules*, *25*(23), 5566.
21. Kriedt, K. J., Alchami, A., & Davies, M. C. (2019). PCOS: diagnosis and management of related infertility. *Obstetrics, Gynaecology & Reproductive Medicine*, *29*(1), 1-5.
22. Kyrou, I., Weickert, M. O., & Randeva, H. S. (2015). Diagnosis and management of polycystic ovary syndrome (PCOS). *Endocrinology and diabetes: Case studies, questions and commentaries*, 99-113.
23. Lau, G. M., Elghobashy, M., Thanki, M., Ibegbulam, S., Latthe, P., Gillett, C. D., ... & PCOS SEva Working Group. (2022). A systematic review of lived experiences of people with polycystic ovary syndrome highlights the need for holistic care and co-creation of educational resources. *Frontiers in Endocrinology*, *13*, 1064937.
24. Livadas, S., & Diamanti-Kandarakis, E. (2013). Polycystic ovary syndrome: definitions, phenotypes and diagnostic approach. *Polycystic Ovary Syndrome*, *40*, 1-21.
25. Kerchner, A., Lester, W., Stuart, S. P., & Dokras, A. (2009). Risk of depression and other mental health disorders in women with polycystic ovary syndrome: a longitudinal study. *Fertility and sterility*, *91*(1), 207-212.
26. Khmil, M., Khmil, S., & Marushchak, M. (2020). Hormone imbalance in women with infertility caused by polycystic ovary syndrome: is there a connection with body mass index?. *Open Access Macedonian Journal of Medical Sciences*, *8*(B), 731-737.
27. Maizes, V., Rakel, D., & Niemiec, C. (2009). Integrative medicine and patient-centered care. *Explore*, *5*(5), 277-289.
28. Malik, M., Latif, F., & Hussain, A. (2020). Health related quality of life and depression among women with poly cystic ovary syndrome (PCOS) in Pakistan. *British Journal of Medical and Health Research*, *7*(12), 28-43.

29. Morgante, G., Massaro, M. G., Di Sabatino, A., Cappelli, V., & De Leo, V. (2018). Therapeutic approach for metabolic disorders and infertility in women with PCOS. *Gynecological Endocrinology*, *34*(1), 4-9.
30. Naqvi, S. M. A. S., Bhattarai, J. B., Li, H., & Wang, X. W. (2019). Polycystic ovarian Syndrome and female infertility. *Yangtze Medicine*, *4*(1), 11-27.
31. Öztürk, R., Herbell, K., Morton, J., & Bloom, T. (2021). "The worst time of my life": Treatment-related stress and unmet needs of women living with infertility. *Journal of community psychology*, *49*(5), 1121-1133.
32. Papadakis, G., Kandaraki, E. A., Garidou, A., Koutsaki, M., Papalou, O., Diamanti-Kandarakis, E., & Peppa, M. (2021). Tailoring treatment for PCOS phenotypes. *Expert Review of Endocrinology & Metabolism*, *16*(1), 9-18.
33. Papalou, O., & Diamanti-Kandarakis, E. (2017). The role of stress in PCOS. *Expert review of endocrinology & metabolism*, *12*(1), 87-95.
34. Podfigurna-Stopa, A., Luisi, S., Regini, C., Katulski, K., Centini, G., Meczekalski, B., & Petraglia, F. (2015). Mood disorders and quality of life in polycystic ovary syndrome. *Gynecological endocrinology*, *31*(6), 431-434.
35. Regidor, P. A., de la Rosa, X., Müller, A., Mayr, M., Gonzalez Santos, F., Gracia Banzo, R., & Rizo, J. M. (2022). PCOS: A chronic disease that fails to produce adequately specialized pro-resolving lipid mediators (SPMs). *Biomedicines*, *10*(2), 456.
36. Salajegheh, Z., Ahmadi, A., Shahrahmani, H., Jahani, Y., Alidousti, K., Nasiri Amiri, F., & Salari, Z. (2023). Mindfulness-based stress reduction (MBSR) effects on the worries of women with poly cystic ovary syndrome (PCOS). *BMC psychiatry*, *23*(1), 1-8.
37. Stefanaki, C., Bacopoulou, F., Livadas, S., Kandaraki, A., Karachalios, A., Chrousos, G. P., & Diamanti-Kandarakis, E. (2015). Impact of a mindfulness stress management program on stress, anxiety, depression and quality of life in women with polycystic ovary syndrome: a randomized controlled trial. *Stress*, *18*(1), 57-66.
38. Tay, C. T., Moran, L. J., Wijeyaratne, C. N., Redman, L. M., Norman, R. J., Teede, H. J., & Joham, A. E. (2018, January). Integrated model of care for polycystic ovary syndrome. In *Seminars in Reproductive Medicine* (Vol. 36, No. 01, pp. 086-094). Thieme Medical Publishers.
39. Teede, H., Deeks, A., & Moran, L. (2010). Polycystic ovary syndrome: a complex condition with psychological, reproductive, and metabolic manifestations that impacts health across the lifespan. *BMC medicine*, *8*(1), 1-10.
40. Thompson, M. J., Suchsland, M. Z., Hardy, V., Lavallee, D. C., Lord, S., Devine, E. B., ... &
41. Teede, H. J., Tay, C. T., Laven, J. J., Dokras, A., Moran, L. J., Piltonen, T. T., ... & Joham, A. E. (2023). Recommendations from the 2023 international evidence-based guideline for the assessment and management of polycystic ovary syndrome. *European journal of endocrinology*, *189*(2), G43-G64.
42. van Hooff, M. H., Voorhorst, F. J., Kaptein, M. B., Hirasing, R. A., Koppenaal, C., & Schoemaker, J. (2000). Polycystic ovaries in adolescents and the relationship with menstrual cycle patterns, luteinizing hormone, androgens, and insulin. *Fertility and sterility*, *74*(1), 49-58.
43. Weiner, C. L., Primeau, M., & Ehrmann, D. A. (2004). Androgens and mood dysfunction in women: comparison of women with polycystic ovarian Syndrome to healthy controls. *Psychosomatic medicine*, *66*(3), 356-362.
44. Wekker, V., Van Dammen, L., Koning, A., Heida, K. Y., Painter, R. C., Limpens, J., ... & Hoek, A. (2020). Long-term cardiometabolic disease risk in women with PCOS: a systematic review and meta-analysis. *Human reproduction update*, *26*(6), 942-960.
45. Woodward, A., Broom, D., Harrop, D., Lahart, I., Carter, A., Dalton, C., ... & Klonizakis, M. (2019). The effects of physical exercise on cardiometabolic outcomes in women with polycystic ovary syndrome not taking the oral contraceptive pill: a systematic review and meta-analysis. *Journal of Diabetes & Metabolic Disorders*, *18*, 597-612.

46. Yokota, R., Okuhara, T., Okada, H., Goto, E., Sakakibara, K., & Kiuchi, T. (2022, July). Association between stigma and anxiety, depression, and psychological distress among Japanese women undergoing infertility treatment. In *Healthcare* (Vol. 10, No. 7, p. 1300). MDPI.
47. Zaikova, A. V. (2021). *" Betrayed by My Body": The Views of Women with Polycystic Ovarian Syndrome on Their Experiences in Their Intimate Partner Relationships* (Doctoral dissertation, Adler University).
48. Zehravi, M., Maqbool, M., & Ara, I. (2021). Depression and anxiety in women with polycystic ovarian Syndrome: a literature survey. *International Journal of Adolescent Medicine and Health*, *33*(6), 367-373.