

ROLE OF ULTRASOUND FOR THE DIAGNOSIS OF POLYCYSTIC OVARIAN SYNDROME, PESHAWAR

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Abstract

Background: Polycystic Ovarian Syndrome (PCOS) is one of the most common endocrine disorders in women of reproductive age characterized by irregular menstrual cycles, high level of androgen (male hormone) and presence of multiple cysts on ovaries. Diagnosing Polycystic Ovarian Syndrome can be challenging due to its wide range of symptoms which necessitates the need of reliable diagnostic method such as Transvaginal ultrasound.

Aim & Objectives: The main aim of this study was to determine the role of ultrasound for diagnosis of polycystic ovarian syndrome Peshawar.

Methodology: This research study used a cross-sectional descriptive design to determine the utility of ultrasonography for detecting Polycystic Ovary Syndrome (PCOS) among female participants at Fauji Foundation Hospital Peshawar (FFH), Khyber Teaching Hospital (KTH), Mian Rashid Hussain Shaheed Memorial Hospital (Pabbi), Dr. Mubarak Khan ultrasound clinic (Pabbi) and Dr. Tabish Ahmad ultrasound clinic (Pabbi). A total of 124 participants were recruited in this study using non probability sampling technique

Result: The results confirm that while Trans abdominal ultrasound may miss or overlook polycystic ovaries, but Transvaginal ultrasound accurately detects them and does not miss any case based on our findings. This proves Transvaginal ultrasound is an essential tool for a clear and definite polycystic ovarian syndrome diagnosis.

Conclusion: These findings confirm that while Trans abdominal ultrasound can miss polycystic ovaries, Transvaginal ultrasound reliably detects them. In this study, Transvaginal imaging identified every case, establishing it essential tool for a clear and definite PCOS diagnosis.

INTRODUCTION

Polycystic Ovary Syndrome (PCOS) is one of the most prevalent endocrine and metabolic disorders among women of reproductive age with an estimated global prevalence of 8% to 13% (Yasmin, 2022). It extends beyond merely being an ovarian issue rather represents a complex condition that affects multiple aspects of health and is characterized by a wide range of symptoms including reproductive dysfunction (e.g. oligo-ovulation or anovulation, leading to irregular menstrual cycles and infertility), hyper androgenic features (hirsutism, alopecia, acne), and polycystic ovarian morphology (PCOM) observed on ultrasound (Karkera, 2023). This hormonal imbalance leads to serious metabolic risks like being overweight (obesity), insulin resistance, developing type 2 diabetes, and cardiovascular diseases. (Lentscher, 2021). Together they all highlight PCOS as a major public health concern. The earliest description we know of PCOS goes back to 1721, when Italian doctor Antonio Vallisneri described a young married woman having oily skin, increased body weight, and irregular menstrual cycle who, upon examination had ovaries which were abnormally smooth and as large as the size of pigeon eggs. In 1935, American physicians Irving Stein and Michael Leventhal first formally medically characterized what we now recognize as PCOS. Their research study documented seven female patients who showed a specific set of unique symptoms which included missed menstrual cycle for a month, inability to conceive, and enlarged swollen ovaries having numerous cysts. This specific mix of symptoms was later recognized and named as Stein-Leventhal Syndrome in medicine. (Witchel, 2022). This variety of symptoms makes it difficult to determine whether the individual has PCOS or not making diagnosis difficult, as the symptoms resemble those of other endocrine or medical disorders. To achieve a standardized diagnosis, the Rotterdam Criteria is recognized worldwide, which states that the patient must display at least two of the three primary characteristics: irregular or absent menstrual cycle, clinical indication of elevated androgen

levels (manifesting as unwanted facial or body hair growth), or the appearance of polycystic ovaries via ultrasound. (Siddiqui, 2022). Diagnostic thresholds have been updated along with technological progress. For trans abdominal ultrasound (TA) polycystic ovarian morphology is characterized by having a minimum of ≥ 12 follicles each measuring 2-9 mm in diameter per ovary and ovarian volume exceeding 10 cc in comparison modern Transvaginal ultrasound (TVUS) requirement has risen requiring at least ≥ 20 follicles per ovary or an ovarian volume above 10 cc due to its superior resolution (Michele, 2025). These hormonal and metabolic disturbances contribute to PCOS's diverse symptoms such as irregular or absent periods, acne, oily skin, excessive hair growth (hirsutism), dark skin patches (acanthosis nigricans) on their neck, groin, or under the breast, weight gain, depression and pelvic pain which varies from dull ache to sharp pains. Ultrasound reveal this internal dysfunction as 'string of pearls' on the scan (Emanuel, 2022). Exercise is equally important for PCOS individuals. Experts recommend that adults with PCOS get either 2.5 to 5 hours of moderate or 1.25 to 2.5 hours of vigorous physical activity (exercise) every weekly along with two days of muscle-strengthening. Teens need at least 60 minutes of daily activity. (Sabag, 2024). When lifestyle adjustments aren't enough medication may help manage PCOS symptoms effectively. Clomiphene (Clomid) is often the first option for ovulation issues typically taken as 50mg daily dose. Letrozole an alternative, works by temporarily lowering estrogen to stimulate follicle development. Inositol supplements may also improve insulin sensitivity. For those with insulin resistance and weight concerns GLP-1 medications like Ozempic offer triple benefits: better blood sugar control, improved insulin response, and weight management. (Akre, 2022). Hormonal regulation can be achieved with contraceptives (pills, patches, or rings) and Anti androgen medication like spironolactone (most common), flutamide, or cyproterone which regulate periods and reduce acne and excess hair by lowering testosterone.

Taking Vitamin D supplements may improve insulin sensitivity and aid in weight management. (Afzal, 2024)

AIM: This study aim to determine the role of ultrasound for diagnosis of the polycystic ovarian syndrome.

OBJECTIVES

To determine the accuracy of ultrasound for polycystic ovarian syndrome which has been confirmed by lab investigation?

To identify which ovary is typically more affected by PCOS (left/right/both) using ultrasound?

To measure the size (small, medium, large) of ovarian cysts in women with pcos.

METHODOLOGY

This research study used a cross-sectional descriptive design to determine the utility of ultrasonography for detecting Polycystic Ovary Syndrome (PCOS) among female participants at Fauji Foundation Hospital Peshawar (FFH), Khyber Teaching Hospital (KTH), Mian Rashid Hussain Shaheed Memorial Hospital (Pabbi), Dr. Mubarak Khan ultrasound clinic (Pabbi) and Dr. Tabish Ahmad ultrasound clinic (Pabbi). A total of 124 participants were recruited in this study using non probability sampling technique.

Inclusion Criteria

Participants aged between 15-45 years

Underwent Transvaginal ultrasound (preferred for diagnostic accuracy)

Had polycystic ovarian syndrome diagnosis confirmed by clinical symptoms and ultrasound findings

Voluntarily participated

Reported a history of irregular menstrual cycle

Exclusion Criteria

Refused to participate or share ultrasound data

Had chronic conditions such as cardiovascular disease, autoimmune disease, diabetes or thyroid disease

Had ovarian surgery

Data Collection Procedures

Participants filled questionnaires intended to gather detailed information regarding their medical history, current symptoms, and relevant lifestyle factors such as dietary habits, physical activity, and family history of Polycystic Ovary Syndrome (PCOS). Each participant underwent clinical examination by a physician, focusing on important indicatives of PCOS, which included assessment of hirsutism (facial hair growth), evaluation of menstrual patterns, and presence of acne. Transvaginal ultrasonography was used to evaluate ovarian morphology for more thorough examination. The process involved measuring number of follicles per ovary, the ovarian volume, and examining cyst size and composition. All the procedures were carried out strictly in compliance with confidentiality guidelines. Data was analyzed Through SPSS version 25..

PCOS Status

Table 4.1 PCOS Status

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	124	100.0	100.0	100.0

Table 4.2 Type of Cyst Status

Type of Cyst Status	Frequency	Percent
Fluid	124	100.0

Figure 4.12 shows that out of the 124 study participants 31 (25.0%) had PCOS affecting just the left ovary, 19 (15.3%) had it only in right ovary, while 74 (59.7%) had polycystic changes in

both right and left ovaries. This shows that the most of women with PCOS in this study had bilateral polycystic ovaries.

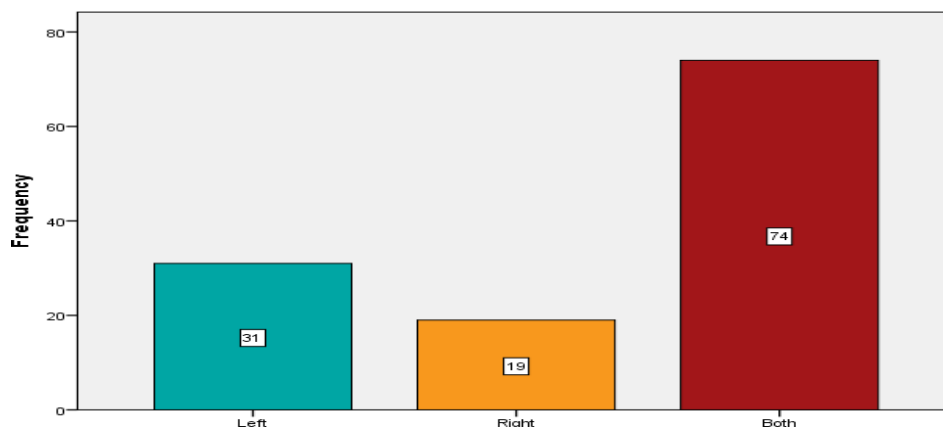


Figure: 4.12 Site of Polycystic Ovarian Syndrome

Figure 4.13 shows that among the 124 study participants 40 (32.3%) had small sized ovarian cysts having ovarian volume 10mL, 48 (38.7%) had medium sized cysts having volume 10-15 mL, 16 (12.9%) presented with large cysts having

volume 15-20 mL, while 20 (16.1%) had very large ovarian cyst having volume >20 mL. This shows that majority of women with PCOS had small to medium sized ovarian cysts.

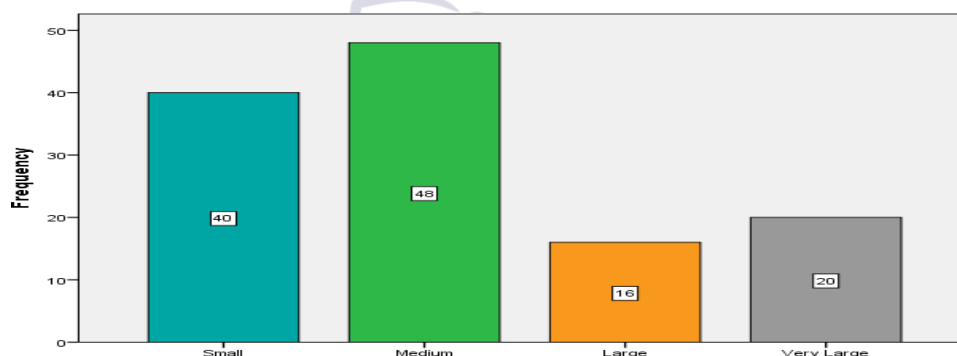


Figure: 4.13 Size of Polycystic Ovarian Syndrome

Discussion

This study investigated how ultrasonography helps in the detecting and describing Polycystic Ovary Syndrome (PCOS) in women visiting outpatient health centers in Peshawar and Pabbi, Pakistan. The findings confirm that role primary imaging tool in diagnosing this condition.

The age of the participants in our study ranged from 15 to 41 years (average age =26) which aligns with the known age distribution of PCOS, it is often found in young women during their prime reproductive years. This observation matches with regional studies by (Sharma, 2025) in Bangladesh, who also observed the highest occurrence of PCOS in females in their early to mid-reproductive ages. the prevalence of PCOS in

young age makes ultrasound an essential first step tool for diagnosis because the structure of ovaries is most noticeable during these reproductive years allowing doctors to see the typical signs of polycystic ovaries.

A key finding of our study is strong correlation of ultrasound findings and clinical manifestations of hyperandrogenism. Among the 124 participants there was high prevalence of hirsutism (88.7%), acne (71%), alopecia (63.4%), and menstrual irregularities (70.2%) were highly prevalent. This result strongly supports the use of ultrasound in connecting structural features of ovaries with the set of symptoms of PCOS, as noted and described by other researchers (Karkera, 2023). This confirms ultrasound's position as an important patient friendly method for diagnosing PCOS. It is particularly helpful when blood tests are unclear, providing doctors with a clear view that links the images on the screen to the symptoms reported by the patient.

Conclusion

This research study highlights the role of ultrasound for diagnosis of polycystic ovarian syndrome (PCOS) by enabling direct visualization of ovarian morphology. An analysis of 124 confirmed polycystic ovarian syndrome cases revealed that bilateral ovarian cysts were the most common finding (n=74). The cysts were typically small (10mL) to medium (10-15mL) in size and were all fluid filled (100%). These findings confirm that while Trans abdominal ultrasound can miss polycystic ovaries, Transvaginal ultrasound reliably detects them. In this study, Transvaginal imaging identified every case, establishing it as an essential tool for a clear and definite PCOS diagnosis.

Recommendations

In light of the results obtained from this study there are a few ideas suggested to make testing procedures for PCOS more enhanced and to raise the quality of care given to the patients.

- Teaching patients that lifestyle changes must be the priority should in managing PCOS.

- Schools and colleges should create specific programs for girls to help them recognize that irregular periods are not normal.
- We suggest for future researches that analytical and experimental researches should be conducted with large sample size.

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