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Outcomes of Infertile Women with Poly Cystic Ovary Syndrome Seeking Pregnancy in Sudan

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ABSTRACT

Background: *Polycystic ovary syndrome (PCOS) is the most common endocrine condition in women of reproductive age. As a result, the purpose of this study was to assess the outcomes for infertile women with PCOS who wish to conceive in Sudan.*

Methodology: *This was a prospective descriptive study done in El-Obeid, North Kordofan state, Sudan, between November 2023 and June 2024. The sample consisted of all women with PCOS who visited the High-Care clinic in search of a pregnancy. Women with other causes of infertility were excluded.*

Results: *This study included 109 women, the majority of whom were between the ages of 26 and 35 (49.5%), followed by those aged 15 to 25 (47.7%). Of the 109 patients, 57% suffered primary infertility, whereas 43% experienced secondary infertility. Of the 109 women, 70% were nulliparous, and the remaining 30% were multiparous. The majority of participants (68%) had irregular menarche, and a large portion, 65%, suffered from primary infertility.*

Conclusion: *Ovarian drilling is the most effective treatment for polycystic ovary syndrome. Patients should be counselled about lifestyle changes before undergoing ovarian drilling, followed by medical therapy, and then ovarian drilling.*

Keywords
Polycystic ovarian syndrome, Infertility, Ovarian drilling, Pregnancy, Sudan.

Introduction
Infertility constitutes a major global concern, impacting roughly 15-17% of couples globally, with around 50% of instances attributable to female infertility problems [1]. Approximately 50% of infertility cases are attributed to genetic causes [2]. Infertility is a medical disorder that can result in psychological, physical, emotional, spiritual, and medical harm to the patient. This medical problem uniquely impacts both the patient and their partner as a couple [3]. The most extensive study found that 85% of women would conceive after 12 months. According to this study's findings, fecundity is 25% in the first three months of unprotected intercourse and subsequently decreases to 15% for the following nine months [4].

PCOS is a polygenic endocrine condition resulting from genetic, hormonal, and epigenetic influences. It's important to address PCOS because it affects about 10 to 13% of women and can lead to serious health problems that negatively impact their lives,

such as difficulty getting pregnant, skin issues like excessive hair growth and acne, heart diseases, metabolic problems, and mental health challenges [5]. Several causes can contribute to PCOS. Women often experience insulin resistance, hyperandrogenism, irregular menstruation, and infertility. A multitude of researchers have investigated gut microbiome (GMB) dysbiosis in women with PCOS. Porphyromonas spp., Bacteroides coprophilus, and Faecalibacterium prausnitzii are more prevalent in the gastrointestinal tracts of individuals with PCOS. Short-chain fatty acids (SCFAs), generated by intestinal microbiota via fermentation, modulate metabolic processes and diminish insulin resistance and symptoms of PCOS. Research indicates that these women possessed a lower abundance of gut bacteria responsible for generating short-chain fatty acids compared to healthy women. Probiotic supplements have demonstrated efficacy in assisting women with PCOS. Consistent probiotic consumption enhances gut microbial dysbiosis and short-chain fatty acid synthesis [6]. There are many different ways to treat PCOS, its particular symptoms, and the health issues that go along with it. Some of these include medication, lifestyle modifications, and strategies to manage acne and increased hair growth. [7]. Consequently, the current investigation sought to evaluate the outcomes for infertile women diagnosed with polycystic ovary syndrome who are pursuing pregnancy in Sudan.

Materials and Methods

This study was conducted in El-Obeid, North Kordofan State, Sudan, as a prospective descriptive investigation from November 2023 to June 2024. The sample comprised all women with PCOS who visited the High-Care clinic in pursuit of pregnancy. Women with additional infertility conditions were not included. The identification of PCOS was determined by the presence of irregular or infrequent menstrual cycles, indicators of elevated androgen levels, and the detection of polycystic ovaries via ultrasound imaging.

Data analysis

The analysis was conducted using SPSS, which produced frequencies, cross-tabulations, and statistically significant findings. We provided a 95% confidence interval for the chi-square test results. To be deemed statistically significant, the P-value must be less than 0.05.

Results

This study investigated 109 ladies, most of them aged 26-35 years (54/109, 49.5%), followed by 15-25 years (52/109, 47.7%). Out of the 109 participants, 62/109 (57%) were with primary infertility and 47 (43%) with secondary infertility. Of the 109 ladies, 76/109 (70%) were nulliparous, and the remaining 33 (30%) were multiparous. Most participants were with irregular menarche, representing 74/109 (68%), and most of them were with primary infertility, 48/74 (65%). Most ladies feel depressed while seeking treatment, 61/109 (56%), as indicated in Table 1, Figure 1.

A history of polycystic ovary syndrome (PCOS) was identified in 67/109 (61.5%), of whom 44/62 (71%) were with primary infertility and 23/47 (49%) with secondary infertility. Information regarding POCS from the doctors was received by 85/109 (78%) participants. On asking the participants about the fact that the first step in the management is lifestyle, 54/109 (49.5%) replied yes, as shown in Table 2.

Table 1: Distribution of the study subjects by infertility type and clinical characteristics.

Variable	Primary n=62	Secondary n=47	Total n=109
Gravida			
Nulliparous	62	14	76
Multiparous	0	33	33
Menarche			
Regular	14	21	35
Irregular	48	26	74
Did you feel with depression			
Yes	41	20	61
No	21	27	48

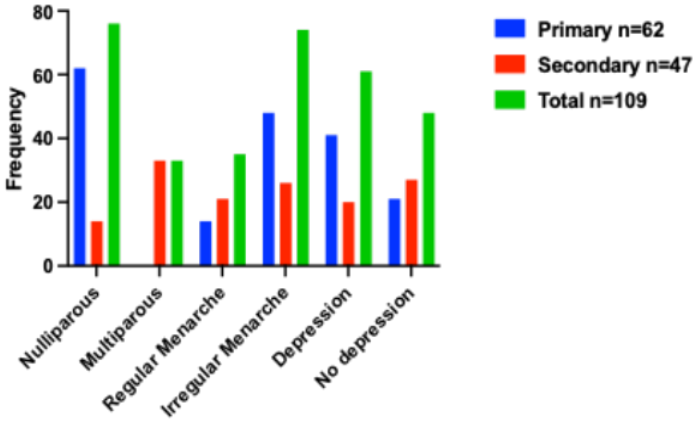

Figure 1: Description of the study subjects by infertility type and clinical characteristics.

Table 2: Distribution of the study subjects by infertility type and PCOS.

Variable	Primary n=62	Secondary n=47	Total n=109
History of PCOS			
Yes	44	23	67
No	18	24	42
Did you receive information from the doctor in PCOS			
Yes	50	35	85
No	12	12	24
The first step in management is lifestyle			
Yes	32	22	54
No	30	25	55

Table 3, Figure 2, summarizes the distribution of the study subjects by infertility type and outcome.

The most common clinical feature associated with this group of patients was acne, 99/109 (91%). Following the clinical features amendment, about 55/109 (50.4%) have conceived immediately, of whom 30/62 (48.4%) were with primary and 25/47 (53.2%) were with secondary. About 54/109 (%) didn't conceive within

more than one year.

The most common medication taken by the patients was Clomiphene citrate, 92/109 (84.4%), followed by aromatase inhibitors (Letrozole), 9/109 (8.3%). Following medications, 24/109 (22%) conceived immediately, 31/109 (28.4%) after 6 months to one year, 8/109 (%) after more than one year, and 46/109 (42.2%) didn't conceive.

Ovarian drilling was done for 55/109 (50.5%) patients. Of the 55 patients, 48/55 (87.3%) have conceived. Out of the 48 conceived patients, 32/48 (66.6%) cases conceived immediately, 10/48 (20.8%) within 6 months to one year, and 6/48 (12.5%) within more than one year (see Figure 4).

Table 3: Distribution of the study subjects by infertility type and outcome.

Variable	Primary n=62	Secondary n=47	Total n=109
Clinical features			
Acne	55	44	99
Hirsutism	3	0	3
Obesity	0	1	1
Other	4	2	6
Did you conceive after modifying clinical features			
Immediately	26	18	44
Months to year	4	7	11
Not conceived	32	22	54
Medications			
Clomiphine citrate	55	37	92
Gonadotropin	3	2	5
Aromatase inhibitors (Itrazole)	4	5	9
Other	0	3	3
Did you conceive after medications			
immediately	14	10	24
6months to one year	15	16	31
More than one year	1	7	8
Not conceive	32	14	46
Ovarian drilling			
Yes	39	16	55
No	23	31	54

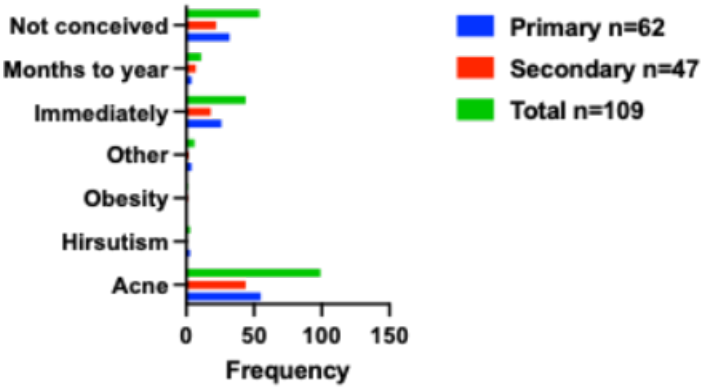

Figure 2: Outcomes of the patients after clinical features modifications.

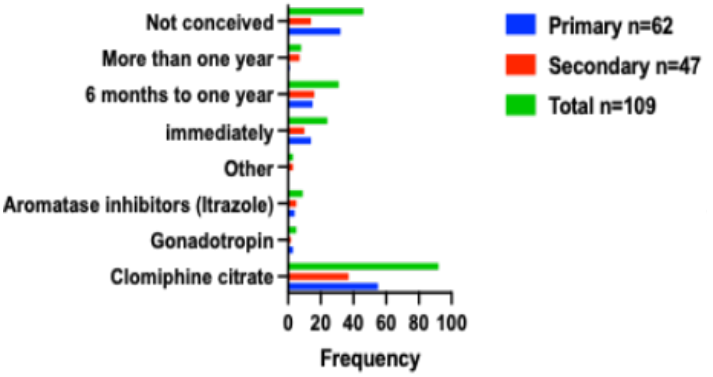

Figure 3: Outcomes of the patients after medications modifications.

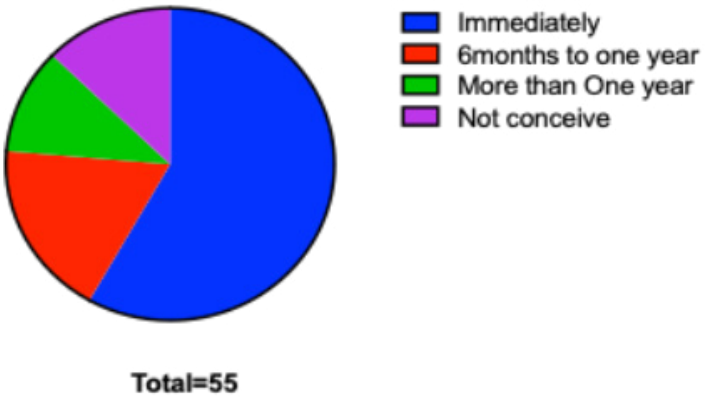

Figure 4: Description of the study subjects by ovarian drilling and conceive rate.

Discussion

The ongoing armed conflict in Sudan has severely disrupted the health system, resulting in limited health facilities. Consequently, individuals facing infertility are experiencing significant challenges in seeking pregnancy, posing difficulties for healthcare providers specializing in infertility care. However, in light of these challenging circumstances, we are consistently seeking solutions for our patients. We would like to share our experience during these uncertain times.

In this study, approximately 50% of participants conceived after implementing recommendations to modify specific clinical characteristics related to PCOS. Lifestyle modification improves the lipid profile in individuals with PCOS. Lifestyle modification may be the primary strategy for inducing ovulation in patients with PCOS. Programs aimed at lifestyle modification that emphasize behavioral management, dietary alterations, and exercise interventions have demonstrated effectiveness in improving reproductive and metabolic characteristics in individuals with PCOS. Nonetheless, substantial evidence regarding specific dietary and exercise strategies and guidelines for PCOS management is still lacking. Lifestyle modification is defined as a behavioral change aimed at correcting unhealthy eating habits. Weight loss occurs when energy expenditure exceeds energy intake. Physical activity

is a fundamental component of successful weight management strategies. Dietary energy restriction primarily facilitates initial weight loss; however, ongoing physical activity is important for sustaining weight loss and preventing weight regain. Lifestyle modification is an essential therapeutic strategy for all overweight or obese patients diagnosed with PCOS [8-10].

Approximately 58% of patients achieved conception following medication treatment. The predominant treatment utilized in this study was clomiphene citrate. Clomiphene citrate (CC) is a pharmacotherapeutic agent essential for treating anovulatory or oligo-ovulatory infertility, as it effectively induces ovulation in individuals seeking to conceive [11]. Clomiphene citrate is commonly employed as the primary treatment for anovulatory PCOS. Approximately 15% to 40% of women with PCOS exhibit resistance to standard CC treatment [12]. Clomiphene citrate is an established therapeutic option for PCOS, yet it exhibits limited efficacy and potential adverse effects. Supplementation with coenzyme Q10 enhances mitochondrial function. Letrozole has demonstrated efficacy with a reduced incidence of adverse effects; however, it is not approved for the treatment of PCOS by the USFDA. The CC + Q10 group exhibited a significantly higher conception rate compared to the CC-only group ($P < 0.0001$ for both groups). Letrozole and CC combined with coenzyme Q10 demonstrated comparable effectiveness in facilitating pregnancy among women with PCOS [13].

Following the ovarian drilling procedure, around 87% of patients have successfully conceived. During the procedure, we identified and addressed additional conditions, including tubal adhesions. About 20% of women on combined contraception do not ovulate. This phenomenon is referred to as CC-resistant PCOS. Women with CC-resistant PCOS have various medications available for ovulation induction, including gonadotropins, metformin, and aromatase inhibitors. However, these treatments may not always yield successful outcomes and can lead to adverse events, such as multiple pregnancies and cycle cancellations due to excessive responses. A surgical procedure known as laparoscopic ovarian drilling (LOD) represents an alternative treatment option. This procedure entails the application of heat or laser to the ovaries via a laparoscope, which is introduced through a small incision, typically located just below the umbilicus. This procedure is believed to enhance ovarian hormone production and responsiveness, thereby increasing the likelihood of ovulation. Nonetheless, surgical procedures carry inherent risks, including complications related to anaesthesia, the potential for infection, and the formation of adhesions [14].

The results of this study surpassed those of prior research in this context. The study included 289 women, with a mean follow-up duration of 28.4 months (range: 25.3–31.5 months). A total of 137 women (47.4%) experienced a pregnancy after drilling, with 71 of these pregnancies (51.8%) occurring spontaneously. Of the 48 women (16.6%) who experienced at least two pregnancies, 27 (56.3%) were spontaneous. Normal BMI, infertility duration under three years, an AFC of less than 50, and age below 35 are predictive of effectiveness. Thirty-three women underwent second drillings. Nineteen individuals (57.6%) experienced at least one pregnancy, with ten (52.6%) occurring spontaneously. A second drilling proved effective when the initial drilling was successful (resulting in pregnancy) or unsuccessful in cases of elevated AFC (>55) [15]. Nevertheless, certain studies have indicated a broad spectrum of success. Ovarian drilling leads to a spontaneous ovulation rate ranging from 30% to 90%, with final pregnancy rates between 13% and 88% [16].

In conclusion, ovarian drilling is the most effective treatment option for individuals with polycystic ovarian syndrome. Prior to undergoing ovarian drilling, patients should be counselled on lifestyle modifications, followed by medical therapy, and ultimately, ovarian drilling. Despite the decline in medical services, the outcomes are favourable.

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