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Prevalence of Polycystic Ovary Syndrome, and relationship with insulin resistance: cross-sectional study in Tripoli Libya

Emhamed Boras[1], Ahmad Ajdidi [2] , Omro A. Aburas[3].
[1]Libyan Academy of postgraduate Studies, Life Science Department, Tripoli/ Janzor.
[2]Higher Institute of Science and Medical Technology, Anesthesia Department, Tripoli/Abusalim.
[3]Higher Institute of Science and Medical Technology, Pharmacy Department ,Tripoli/Abusalim.
Contact Information: E-mail: em.boras@academy.edu.ly.

ABSTRACT
Background: Polycystic ovary syndrome (PCOS) is a syndrome of ovarian dysfunction characterized by multiple (poly) cysts (small sacs filled with fluid) in the ovaries. The clinical manifestations of PCOS include infertility, menstrual irregularity or absence, excess of androgen, and obesity. World Health Organization (WHO) estimates that PCOS has affected 116 million women worldwide. **Objective:** Aim of this study was to evaluate the relationship between PCOS and insulin resistance (IR) and what knowledge women have about this disease and the extent of its prevalence. **Methods**: This research delves into the prevalence and interplay of PCOS and insulin resistance among Libyan women aged 17-45 and was administered to 245 Libyan women. Descriptive statistics were employed to analyze the collected data, providing insights into prevalent trends and percentages. **Results**: The research uncovers a notable PCOS prevalence of 39.1% among the respondents, with 14.5% indicating IR . Intriguingly, a significant correlation emerges between PCOS and mental health concerns, as 71.6% report experiencing nervousness or mood swings. **Conclusion:** This study emphasizes the need for holistic healthcare strategies addressing both reproductive and metabolic aspects of PCOS, with reported positive outcomes from proactive management. The findings provide a foundation for future research, stressing the importance of early detection and ongoing support for women affected by PCOS.

KEYWORDS: Polycystic ovary syndrome (PCOS), Ovarian cysts, insulin resistance, Menstrual cycle, Libya.

1. INTRODUCTION

Polycystic ovary syndrome is a syndrome of ovarian dysfunction characterized by multiple (poly) cysts (small sacs filled with fluid) in the ovaries. These cysts are mostly benign and do not cause ovulation disorders, and therefore do not cause difficulties or problems in pregnancy in most cases, but this depends on the severity and size of the ovarian cysts, although in some cases cause the imbalance of hormone level which results into pregnancy-related issues (Lowenstein E. J., 2006)) and (Palomba, S *et al*., 2015). The clinical manifestations of PCOS include infertility, menstrual irregularity or absence, excess of androgen, and obesity. Although PCOS is the most common endocrine disturbance to affect women of reproductive age, its definition has been controversial, and aspects of its pathophysiology and natural history remain unclear. According to a systematic

screening of women using the National Institutes of Health (NIH) diagnostic standards, 4–10% of reproductive-age women are predicted to have PCOS worldwide (Deeks, A *et al*., 2011) and (El Hayek, S *et al*., 2016). World Health Organization (WHO) estimates that PCOS has affected 116 million women (3.4%) worldwide (González F. (2012) and (Singh, S *et al*., 2023). This high frequency, as well as its link with ovulation and menstruation abnormalities, infertility, hair loss, and metabolic issues, underscores PCOS's significant financial burden (Azziz, R *et al*., 2005) and (Teede, H *et al*., 2010). All Indian Institute of Medical Science (AIIMS) shows that about 20-25 percent of Indian women of childbearing age are suffering from PCOS (Singh, S *et al*., 2023).Recent research reveals that PCOS is a lifelong syndrome that first manifests during pregnancy, although it was traditionally thought to be a disorder that only affected adult women (Eagleson, C *et al*., 2000) and (Wang, R *et al*., 2017). According to the 2010 Rotterdam criteria, the diagnosis of PCOS requires at least two of the three following features: oligo- or an ovulation, clinical and/or biochemical hyperandrogenism, and polycystic ovaries on Ultrasonograpy (Panda, P *et al*., 2016). Polycystic ovary syndrome is frequently associated with the systemic condition of IR, which occurs when the body's cells do not respond properly to insulin, leading to elevated blood sugar levels. Therapy is aimed at amelioration of symptoms and a variety of interventions have been proposed, ranging from lifestyle modifications to medical therapy or ovarian surgery. And is a hormonal disorder common among women of reproductive age (Legro, R *et al*., 2013). Polycystic ovary syndrome symptoms might emerge in early adulthood, although they can also start soon after puberty. Due to an ovulation, women with PCOS usually experience irregular or skipped periods; nevertheless, some may develop ovarian cysts (O'Meara *et al*., 1993) and (Doi, S *et al*., 2005). Definition of IR as a condition in which a certain concentration of insulin leads to a biological response that is less than the normal limit (Legro, R *et al*., 2002) and (Ingudomnukul, E *et al*., 2007). Insulin is produced in the beta cells in the pancreas, and from there it moves into the bloodstream and from there to the various tissues of the body (Panda, P *et al*., 2016). Aim of this study was to evaluate the relationship between PCOS and IR and what knowledge women have about this disease and the extent of its prevalence.

2. Materials and Methods

The Period of Study

The data collection for this study was carried out from April 6, 2024, to July 24, 2024.

Study Population

Data on self-reported PCOS was collected from 245 Libyan volunteer women from the Tripoli area. Of the total number who answered the questionnaire 242 women aged 20-17years old and aged 21-25 years old, aged 26-35 years old and aged 36-45 years old.

Study Setting

The questionnaire were published with many different questions that will help us draw conclusions and percentages of those with polycystic ovary disease and its relationship to IR. In this study case, received a great cooperation was shown to collect the largest number of cases and answers to our questionnaire. The questionnaire involved a maximum of 19 questions which will determine the graduation project according to the result of the research.

Data Collection Period and Distribution Sites

In this study targeted age groups ranging from 17-45 years, during this study received 245 responses and the questions were as follows: Do you suffer from chronic diseases?, Do you suffer from insulin resistance or diabetes?, Is her menstrual cycle regular?, How long does her menstrual cycle last?, Is her menstrual period late?, How late is her menstrual period?, After how many days does she get her period?.

Data management and statistical analysis

The questionnaire were surveyed and entered the data for statistical analysis which was then analyzed using statistical software (Microsoft excel). Descriptive statistics (frequencies, percentages) were used to describe the categorical study variables.

3. Results

Age distribution of Polycystic ovary syndrome

Data on self-reported PCOS was collected from 245 Libyan volunteer women from the Tripoli area. Of the total number who answere

the questionnaire 242 women aged 17-20 years old (15.7%) , and aged 21-25 years old (50.6%), and aged 26-35 years (26%) , and aged 36-45 years (7.7%) as shown in figure 1.

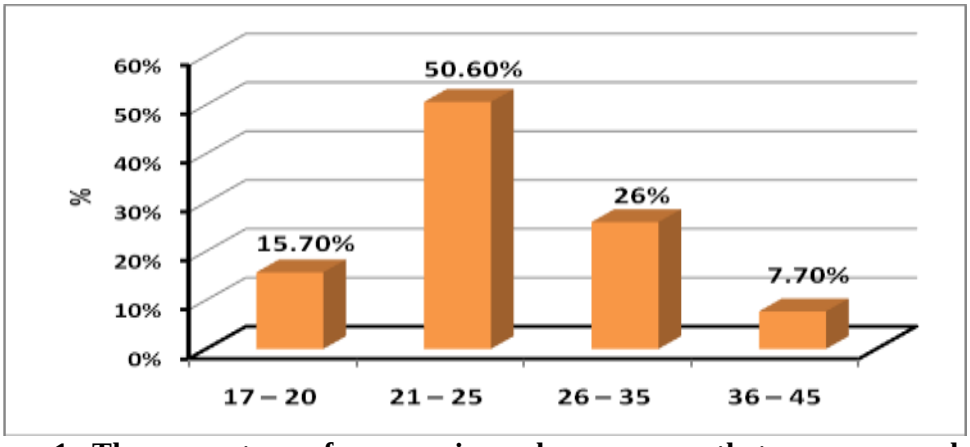


Figure 1. The percentage of women in each age group that are answered the questionnaire.

Percentage of women that are suffering from a chronic diseases.

There are 240 women responded to the questionnaire: Do they suffer from chronic diseases? 25 women (10.50%) answered yes, 215 women (89.50%) answered no. As shown in figure 2.

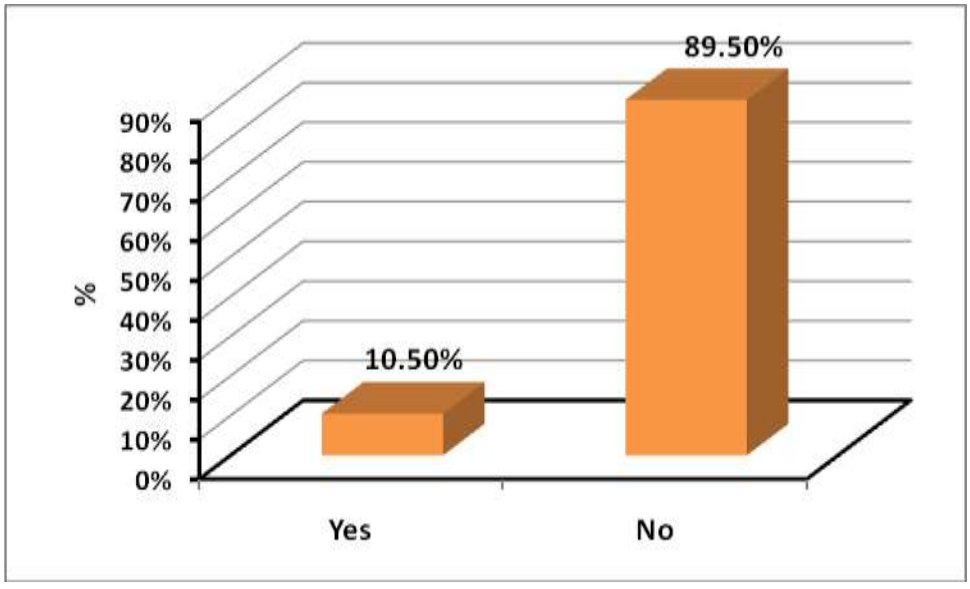


Figure 2. The percentage of women that are answered yes or no.

The women that are suffering or not from insulin resistance or diabetes.

Of the total number of women who responded, 242women responded to the question: Do you suffer from insulin resistance or diabetes? 37 women (14.5%) answered yes, 172 women (72.3%) answered no, and 33 women (13.2%) answered maybe, as shown in figure 3.

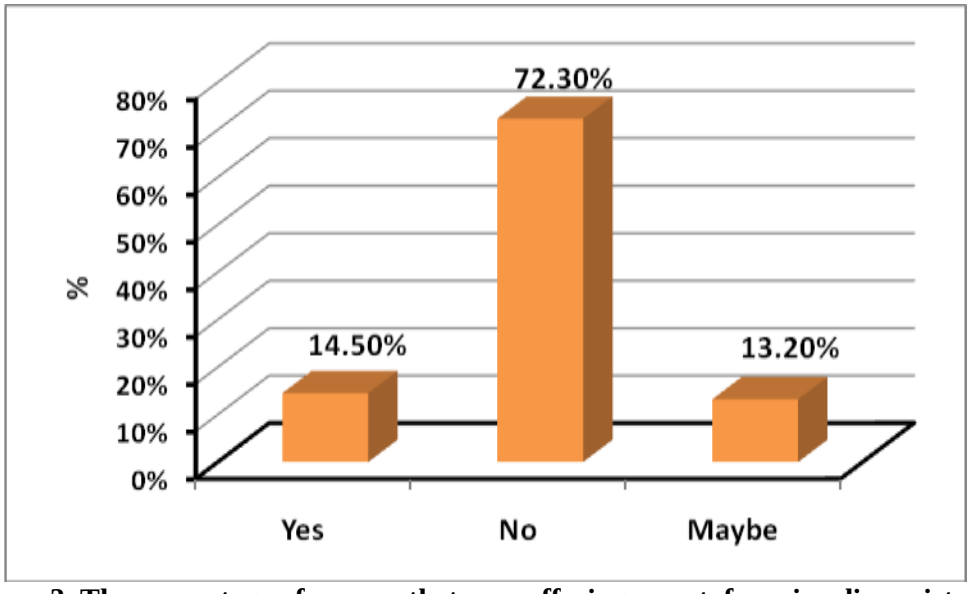


Figure 3. The percentage of women that are suffering or not, from insulin resistance or diabetes.

The women that have a regular menstrual cycle.

A total of 241 women responded to the question: Is your menstrual cycle regular? 136 women (57.3%) answered yes, 63 women (25.2%) answered no, and 42 women (17.5%) answered sometimes. As shown in figure 4.

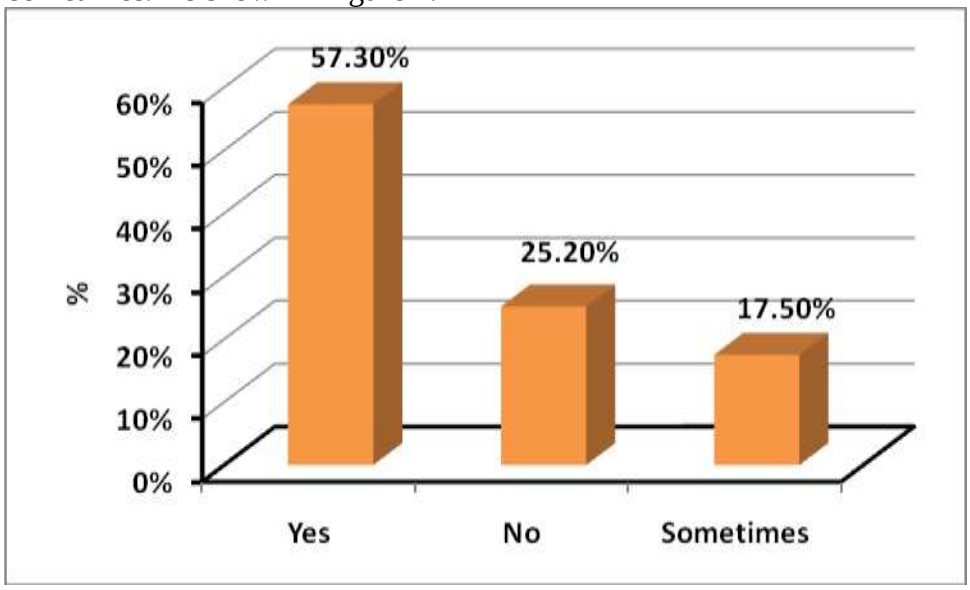


Figure 4. The percentage of women that have a regular menstrual cycle or not.

The number of the menstrual cycle days of the participating women.

The data showed 231 women answered a questionnaire: How long does her last menstrual cycle? 85 women (36.3%) answered from 3-5 days, 145 women (59.4%) answered from 5-7 days, and one woman (4.3%) answered from 7-10 days, As shown in figure 5.

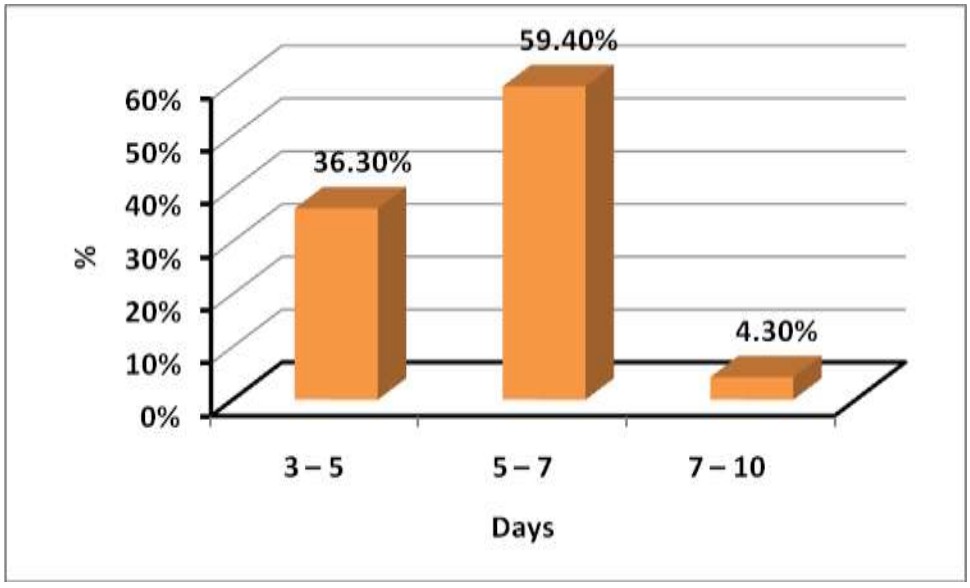
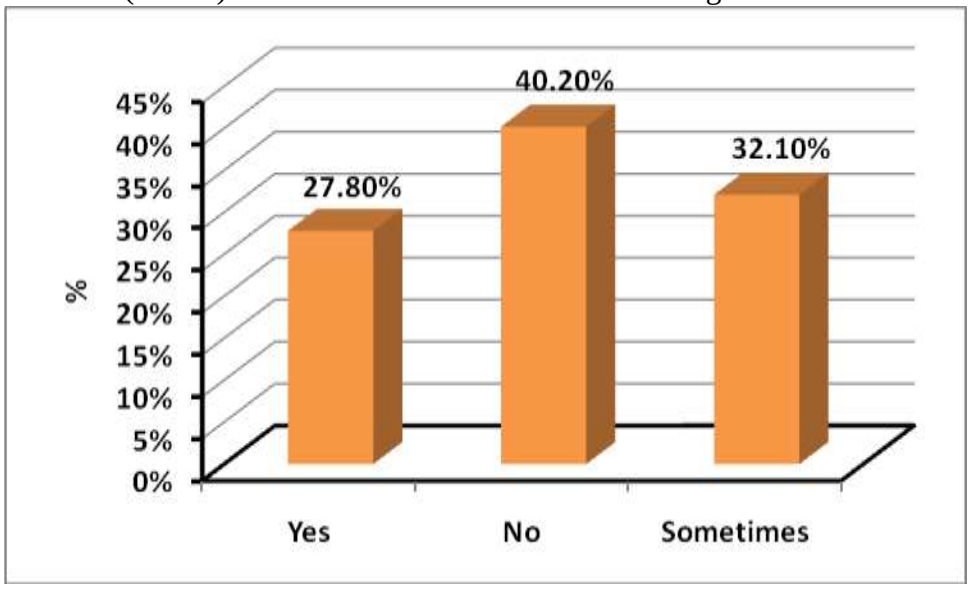


Figure 5. the participating women and the number of the menstrual cycle days.

How many women that have a delayed menstrual periods.

Of the total women who responded, 241 women answered the question: Is your menstrual period late? 69 women (27.8%) answered yes, 95 women (40.2%) answered no, and 77 women (32.1%) answered sometimes. As shown in figure 6.



Fiqure 6. How many women that have delayed their menstrual periods.

The menstrual cycle is delayed for the women who participated in the questionnaire

The total of 192women answered a questionnaire: If she is late for her appointment, how long will she be late for you? 120 women (62.7%) responded from 4 days to a week, 28 women (15.1%) responded from one week to two weeks, and 44 women (22.2%) answered sometimes from a month. As shown in figure 7.

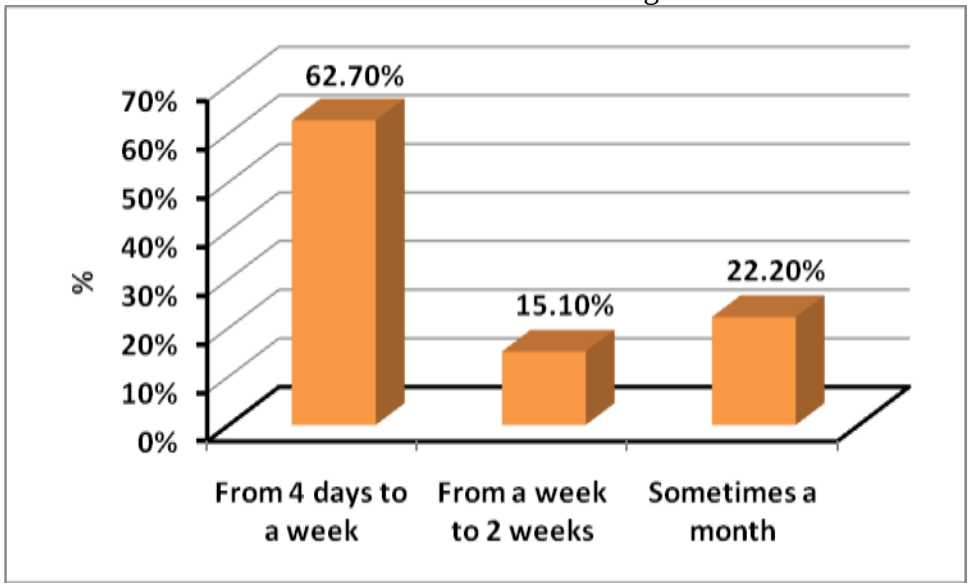


Figure 7. The menstrual cycle is delayed for the women who participated in the questionnaire.

4. DISCUSION

The present study aimed to investigate the relationship between PCOS and IR among a group of Libyan women aged 17-45. The comprehensive questionnaire-based approach provided valuable insights into the prevalence of PCOS, IR, and associated lifestyle factors in the studied population. The findings revealed that a significant percentage of women reported experiencing symptoms consistent with PCOS. Approximately 39.1% of respondents acknowledged suffering from PCOS, indicating a notable prevalence of this syndrome within the studied population. This aligns with global estimates highlighting the widespread impact of PCOS on women of reproductive age. Concerning IR, 14.5% of women reported a positive diagnosis, indicating a notable presence of this metabolic disturbance within the cohort (El Hayek, S *et al.*, 2016). The coexistence of PCOS and insulin resistance is well-documented, emphasizing the importance of understanding the interplay between reproductive health and metabolic function. The study shed light on diagnostic and treatment practices among women with PCOS. A substantial number of respondents reported receiving treatment for PCOS (46.1%). This indicates awareness among affected individuals and their proactive efforts in managing the syndrome. Furthermore, a significant percentage (37.7%) reported regular follow-ups with specialist doctors, showcasing a commitment to ongoing healthcare monitoring. The reported improvements in health conditions (38.2%) among those receiving treatment and making lifestyle changes underscore the potential effectiveness of interventions in managing PCOS (González F. (2012) and (Singh, S *et al*., 2023). This aligns with the multifaceted approach to PCOS management, combining lifestyle modifications with medical interventions. Despite the valuable insights provided by this study, certain limitations should be acknowledged. The reliance on self-reported data introduces the potential for recall bias, and the cross-sectional nature of the study limits the ability to establish causation. Future research could benefit from longitudinal designs and objective measurements to validate findings.

5. CONCLUSION

In conclusion, this study contributes valuable information regarding the prevalence of PCOS, IR, and associated lifestyle factors among Libyan women. The findings underscore the need for comprehensive healthcare strategies addressing both the reproductive and metabolic aspects of PCOS. The reported improvements with treatment and lifestyle changes emphasize the potential for positive outcomes when individuals actively engage in managing their health. This research provides a foundation for further investigations into tailored interventions, emphasizing the importance of early detection, holistic care, and ongoing support for women affected by PCOS.

6. REFERENCES

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