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Epidemiological profile of infertile couples in Western Iraq

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ABSTRACT

Infertility affecting approximately one in seven couples globally is a poorly documented issue in Iraq. This study examines the epidemiology of infertility among 82 Iraqi couples undergoing assisted conception at Al-Razzi Hospital in Ramadi. Retrospective analysis of medical records provided insights into sociodemographic profiles, infertility types (primary or secondary), and causes. The age range for males and females was 17-59 years, with means of 34.5 (±7.4) and 31.4 (±7.3) years, respectively. Infertility duration spanned a mean of 4.9 (±3.9) years. Primary infertility affected 74% of couples, while 25.6% experienced secondary infertility. Among the couples, the biochemical pregnancy rate was 45%, the clinical pregnancy rate was 38%, and the rate of live births was 24%. The average embryo transfer was 3.4, with a 21% miscarriage rate. This study emphasizes high rates of primary infertility dominated by female factors. Future research should consider larger population and detailed data on outcomes of in vitro fertilization (IVF) cycles to enhance understanding on the current (in)fertility status in Iraq.

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1. INTRODUCTION

Globally, there are around 50 million infertile couples [1], [2], making infertility a worldwide health problem. Based on the WHO data, infertility results from the lack of a clinical gestation following twelve months of regular sexual contact without protection [3]. According to another Definition by the WHO, infertility is detected when women of reproductive age have been trying to conceive for more than two years and have not succeeded [4], [5]. Generally, Iraq and the Middle East suffer from low representation in the infertility data [6], [7]. Various types and causes of infertility have been reported in Middle Eastern countries [8]. Identifying the causes and types of infertility is extremely important for generating data that can provide insight into infertility patterns across regions. It is important to note that there is a limited amount of quality data on infertility in Iraq compared to low-income and high-income countries. Iraqi population is around 42 million [9], making it one of the most populated Middle Eastern countries. The fertility rate was reported at 5.5% in 18 Iraqi states [10], [11]. This study has been conducted to inspect the causes and types of infertility in Ramadi, western Iraq.

Multiple studies conducted in different locations provide insights into the etiology and outcomes of infertility. A study conducted in Helsinki, female endocrine disturbances (33%) and male causes (26%) were identified as the most common factors contributing to infertility, with 29% of couples having multiple causes [12]. Another study found that male factors accounted for 45% of infertility cases, while oligo-ovulation

disorders and tubal damage were responsible for 37% and 18% of cases, respectively. Unexplained infertility, including non-tubal endometriosis, was observed in 20.7% of cases [13].

Therfore, a study in Thammasat Hospital, Thailand, reported primary infertility in 61.8% of cases and secondary infertility in 35.6% of cases [14]. The causes of female infertility included endometriosis, tubal issues, ovulatory disorders, uterine problems, endocrinological factors, and pelvic factors. Male infertility causes varied, including teratozoospermia, oligoasthenoteratozoospermia, asthenoteratozoospermia, azoospermia, and unexplained factors. Pregnancy rates varied depending on the assisted reproductive techniques used, with intra uterine insemination (IUI) having a 14.8% success rate, in vitro fertilization (IVF) a 32.3% success rate, and intracytoplasmic sperm injection (ICSI) and ICSI combined with percutaneous epididymal sperm aspiration (PESA) both showing success rates around 28-35%. These findings highlight the complex and multifactorial nature of infertility, emphasizing the importance of comprehensive evaluation and tailored treatment approaches. The aim of this study is to provide a comprehensive analysis of the epidemiology of infertility among Iraqi couples undergoing assisted conception at Al-Razzi Hospital in Ramadi, Western Iraq. By examining sociodemographic profiles, infertility types, causes, and treatment outcomes, this research aims to contribute essential insights into the prevalence and factors associated with infertility in this specific region, thereby guiding future strategies for improved diagnosis, intervention, and counseling for affected couples

2. METHOD

The World Health Organization's definition of infertility as the “inability to achieve a clinical pregnancy after twelve months or more of regular unprotected sexual intercourse” [2] was employed as the basis for identifying the study participants. Medical records of 82 infertile patients undergoing assisted conception at Al-Razzi Hospital in Ramadi, Western Iraq, were retrospectively reviewed to gather comprehensive data spanning from December 2019 to January 2021. The sample size of 82 patients was determined based on the availability of complete datasets meeting the inclusion criteria during the specified period. The collected information encompassed crucial aspects, including the age of the couples, types, and duration of infertility, as well as factors recognized to contribute to infertility. Patients with complete datasets meeting the inclusion criteria were included in this study, ensuring a robust and thorough analysis of the personal and clinical aspects associated with infertility. Ethical approval for this study was obtained from Al-Razzi Hospital with the registered number P-07898.

All infertile couples underwent comprehensive evaluations, which included inclusive history-taking, clinical gynecologic examinations, transvaginal ultrasonography, hematological investigations, and hormonal profiling. Hormonal profiles, such as follicle-stimulating hormone (FSH), luteinizing hormone (LH), or anti-mullerian hormone (AMH), were assessed during the early follicular phase in females who were not menstruating. Thyroid-stimulating hormone (TSH) and dehydroepiandrosterone sulfate levels were also measured. In some cases, hysterosalpingography or laparoscopy was performed when deemed necessary. For infertile males, male factor infertility was evaluated through two separate seminal analyses following WHO guidelines [15]. This approach ensured a comprehensive evaluation of the participants, addressing the time aspect by considering the timeframe of data collection and examination.

Infertility factors and related data were determined and recorded, allowing for the analysis of the causes of infertility in the study population. Male factors and spermatozoal parameters were interpreted using reference figures provided by the World Health Organization [16], [17]. The most common Spermatozoal issues observed in infertile males included low concentrations (Oligozoospermia), poor motility (Asthenozoospermia), and abnormal morphology (Teratozoospermia) [18].

Females were diagnosed with polycystic ovarian syndrome (PCOS) based on the Rotterdam criteria, which required the identification of two or more of the following criteria: oligomenorrhea/anovulation, clinical or biochemical hirsutism, and ultrasonographic evidence of polycystic ovaries (≥12 follicles measuring 2 to 9 mm in diameter) [19]. Premature ovarian failure was defined as the absence of menarche (primary amenorrhea), premature depletion of ovarian follicles, or arrested Folliculogenesis (secondary amenorrhea) occurring before the age of 40 [15]. These diagnostic criteria addressed the place aspect by considering the specific location where the study was conducted. Primary infertility refers to couples who have never conceived despite regular unprotected sexual intercourse for at least one year. Secondary infertility pertains to couples who have previously conceived but are currently unable to achieve a clinical pregnancy. These definitions were employed to distinguish between the two groups of infertile couples.

In regard to statistical analysis, data were recorded and transferred into a computer using GraphPad Prism and presented as proportions or Mean±SD. The Chi-square test was applied to match the proportions between the studied groups.

3. RESULTS

According to another Definition by the WHO, infertility is detected when women of reproductive age have been trying to conceive for more than two years and have not succeeded. The distribution of the total included cases of infertile couples into primary and secondary infertility and their distribution to male or female factors and their causes is presented in Table 1. The age range for males and females was 17-59, 34.5 (7.4) years, while the age range for females was 18-46, 31.4 (7.3) yrs. The range and mean/±SD of infertility duration were 1- 20, 4.9/±3.9 yrs. Among the 82 couples, 56 (68%) suffered from primary infertility, and 26 (32%) suffered from secondary infertility. The factors associated with female infertility (59) were anovulation 23 (39%), tubal factor 10 (17%), uterine factor 6 (10%), and other/combined 4 (7%). There were 12 (20%) females with PCO and 4 (7%) women with premature ovarian failure, as shown in Table 2.

Furthermore, male infertility (23) was mainly due to azoospermia 8 cases (35%), oligozoospermia 9 cases (39%), asthenozoospermia 3 cases (13%), and teratozoospermia 3 cases (21%) as presented in Table 3. For the couples (82) included in the Study, the biochemical pregnancy rate was 45%, the clinical pregnancy rate was 38%, and the rate of live births was 24%. There was an average of 3.4 embryos transferred and a miscarriage rate of 21%.

Table 1. Total cases of infertility

Categories	Data
Age range (Males and Females)	17-59
Mean age (Males and Females)	34.5
Standard deviation (Males and Females)	7.4
Age range (Females)	18-46
Mean age (Females)	31.4
Standard deviation (Females)	7.3
Infertility duration range	1-20
Mean infertility duration	4.9
Standard deviation of infertility duration	±3.9
Primary infertility cases	61 of 82
Secondary infertility cases	21 of 82
Couples included in the study	82
Biochemical pregnancy rate	45%
Clinical pregnancy rate	38%
Rate of live births	24%
Average embryos transferred	3.4
Miscarriage rate	21%

Table 2. Causes of female infertility (59)

Variables	Number	Proportion (%)
Anovulation	23	39
Tubal factor	10	17
Uterine factor	6	10
Polycystic ovarian syndrome	12	20
Premature ovarian failure	4	7
Other/combined factors	4	7

Table 3. Causes of male infertility (23)

Variables	Number	Proportion (%)
Azoospermia	8	35
Oligozoospermia	9	39
Asthenozoospermia	3	13
Teratospermia	5	21

4. DISCUSSION

The current study aimed to investigate the prevalence and characteristics of infertility among Iraqi couples seeking assisted reproduction at Al-Razzi Hospital in Ramadi. Our findings revealed a significant prevalence of female factors and primary infertility within the studied population, aligning with similar trends observed in previous studies conducted in Northern Iraq and Jordan [15], [20]. This contrasts with reports from regions like Tanzania and Nigeria, where secondary infertility exhibited higher predominance, highlighting regional disparities in infertility profiles.

Comparative analyses across regions and income strata indicate substantial variations, with middle-income countries demonstrating higher prevalence of secondary infertility compared to wealthier nations

[21]. The disparities might stem from regional variations in the prevalence of specific factors, such as tubal issues significantly impacting Sub-Saharan Africa's infertility landscape compared to the global average [22].

Male-factor infertility affected a substantial number of couples in our study, while female-factor infertility was also prevalent, resonating with findings from other Middle Eastern studies [11], [23]. These studies highlighted various factors contributing to infertility, including uterine factors, tubal injury, anovulatory cycles, and male factors.

The mean age of women and men in our study was slightly lower compared to findings from other regions [23], [24]. This discrepancy in age profiles might be influenced by factors such as delayed presentation for infertility treatment due to pursuits like career advancement or further education.

These variations in infertility profiles and age distributions underscore the complex interplay of regional, cultural, and individual factors shaping infertility and treatment-seeking behaviors among Iraqi couples. Understanding these nuances is essential in tailoring interventions and support systems that address the diverse needs of affected populations, advocating for more inclusive and culturally sensitive approaches in infertility care.

Anovulation was found to be more common than tubal factors or ovarian insufficiency in our study, consistent with findings from previous research [11], [25], [26]. Tubal factors, including infections [24], [27], [28] such as Chlamydia trachomatis and Neisseria gonorrhea, have been implicated in the etiology of tubal factor infertility [29], [30]. To provide a more comprehensive analysis of time, place, and person concerning the epidemiological investigation of infertility causes among the study population, we need to consider additional factors and explore their implications. Regarding the aspect of time, a retrospective study like ours offers insights into the characteristics and causes of infertility during a specific period. However, a longitudinal study design would be beneficial to capture temporal trends and evaluate changes in infertility patterns over time. By collecting data at multiple time points, we could assess the impact of various factors, such as changes in lifestyle, advancements in medical technology, and shifts in sociocultural norms, on the prevalence and causes of infertility. Furthermore, long-term follow-up studies would enable us to examine the effectiveness of interventions and identify potential risk factors associated with infertility progression or resolution.

In terms of place, this study was conducted at Al-Razzi Hospital in Ramadi, Iraq. While it provides valuable insights into infertility epidemiology in this specific setting, expanding the research to include multiple centers across different regions of Iraq would enhance our understanding of regional variations in infertility rates, causes, and access to reproductive healthcare services. This would allow for a more comprehensive analysis of the influence of geographic location, sociocultural factors, and healthcare infrastructure on infertility prevalence and outcomes. Additionally, comparing our findings with those from other countries and regions would provide a broader perspective on global infertility trends and help identify similarities or differences in the etiology of infertility.

To further explore the person aspect, it would be valuable to collect additional sociodemographic data, such as educational attainment, socioeconomic status, and occupation. These factors can contribute to variations in fertility behaviors, access to healthcare, and lifestyle choices, which may impact the prevalence and causes of infertility. Understanding the social and economic context in which infertility occurs can help identify potential targets for interventions and support systems. Furthermore, assessing the psychological and emotional aspects of infertility, including the stigma associated with infertility and its impact on individuals and couples, would provide a more comprehensive understanding of the challenges faced by the study population.

In summary, while our study provides valuable insights into the prevalence and causes of infertility in Ramadi, Iraq, a more comprehensive analysis of time, place, and person would involve longitudinal studies, multi-center collaborations, and the inclusion of additional sociodemographic factors. By considering these aspects, we can gain a deeper understanding of the dynamic nature of infertility, identify potential risk factors, and develop targeted interventions to address the specific needs of the population.

This study has some limitations, including its retrospective nature and reliance on hospital-based data. Additionally, certain sociodemographic factors, such as past alcohol consumption, were not available for analysis. The lack of stratification and detailed information about IVF cycles is another limitation. All rates mentioned in this study were obtained directly from the clinic and should be interpreted within this context. add a paragraph to the discussion that provides a more comprehensive analysis of time, place, and person concerning the epidemiological investigation of infertility causes among the study population..

5. CONCLUSION

In summary, this study highlights the significant prevalence of primary infertility among Iraqi couples seeking assisted conception at Al-Razzi Hospital in Ramadi. The dominance of female factors in primary infertility underscores the urgent need for targeted interventions. The study's limitations emphasize

the necessity for broader population studies to comprehensively understand and address infertility in Iraq. Future research endeavors should aim for larger sample sizes and detailed data collection to better support affected couples and develop more effective interventions.

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