PERINATAL JOURNAL

Original Article

Perinatal Journal 2025; 33(1):197-209

https://doi.org/10.57239/prn.25.03310027

Socio-demographic and clinical profiles of male and female infertile patients at Teba center, Babylon, Iraq

Saleh E. Meghil[1], Adnan A. H. Al-Bdairi[2], Hayder Abdul-Amir Makki Al-Hindy[3]*, Salama Hamid Alkhudair[4], Batool Abdulwahid Alkhalidi[5], Hadeel Kadhim Kareem[6], Hadeel A. Karbel[7]

[1]University of Ajdabia, Obstetrics and Gynecology, Faculty of Medicine, Libya
[2]Teba IVF, and Genetic Center, Babylon, Iraq
[3]Dept. of Pharmacology and Toxicology, College of Pharmacy, University of Babylon, Iraq
[4]Alzaitoon Specialized Fertility Center, Baghdad, Iraq.
[5]Shiraz University for Medical Science, Iran. University of Kufa, Najaf, Iraq.
[6]Babil Maternity and Childhood Teaching Hospital, Babylon Health Directorate, Babylon, Iraq
[7]Department of Pathology and Forensic Medicine, Hammurabi College of Medicine, University of Babylon, Babylon, Iraq

Abstract

Infertility affects around 15% of couples worldwide, leading to emotional, social, and economic challenges. This study explores the socio-demographic and clinical profiles, as well as treatment outcomes of infertile patients at the Teba Center in Babylon, Iraq, from 2016 to 2022. By analyzing differences between genders, the research aims to improve understanding of infertility management and treatment effectiveness. A retrospective, cross-sectional analysis was conducted involving 32,000 patients (17,656 males, 14,344 females) aged 18-45. Data were gathered through structured interviews with fertility specialists and a comprehensive review of medical records. Variables examined included socio-demographic factors (age, marital status, education, occupation), clinical histories (chronic diseases, previous infertility treatments, genetic conditions), and lifestyle behaviors (smoking, alcohol, physical activity, diet). Quantitative analysis used chi-square tests to compare profiles and outcomes by gender, while qualitative data from open-ended questions were thematically analyzed. Most patients were aged 20-40. Males had higher educational attainment (56.2%) than females (36.1%), and many females were housewives (70.6%). Females showed a higher obesity rate (47.9%) compared to males (29.9%). Chronic diseases affected both genders similarly (10.8% males; 10.6% females). More females (34.1%) had prior treatments than males (32%). Smoking was more common in males (12.1%) compared to females (0.3%). Treatment outcomes showed high pregnancy rates (93.8% males; 92.4% females) and higher live birth rates for females (81.9% vs. 77.2% for males). Males had more identified infertility causes (14% vs. 7.3% for females). This study underscores gender-specific differences in infertility profiles and highlights the need for tailored treatment strategies in Iraq, especially considering the impact of lifestyle factors on infertility.

Keywords: Infertility, Demographic, Social, Lifestyle, Sex differences

Introduction

Infertility is a health problem for one-third of couples across the world who suffer from subfertility [1]. It represents a significant health challenge for couples in their reproductive years and has a dramatic psychosocial impact, and the current infertility rate is still around 13–17% despite the clinics and programs developed to solve this high socioeconomic issue [2, 3]. Among women, it is mostly related to advanced maternal age, hypogonadotropic anovulation, ovarian failure, poor ovarian reserve, severe endometriosis, tubal factor infertility, and sequelae of pelvic inflammatory disease [4, 5]. In men, moderate to severe oligozoospermia, severe teratozoospermia, and severe asthenozoospermia are the major causes of infertility [6].

A diagnosis of infertility is often multifaceted, and infertility is likely to cause severe emotional pain in both men and women who experience it [5]. There are few studies on infertility representing an urgent health issue in many Middle Eastern countries that should be fully investigated from different points of view. In the marital and infertility clinic, extensive research in this area is ongoing, but even here, a comparison between male and female infertility is essential. As male and female fertility may differ, little is known about the possible relations between fertility levels and characteristics of couples in our local community, where infertility issues are many and manifested in various forms [7].

Previous studies in several countries have reported on the sociodemographic factors for infertility. The observed female risk factors included increasing age, early age at marriage, lower education level, residence, and occupation. The male risk factor

Correspondence: Hayder Abdul-Amir Makki Al-Hindy, *Dept. of Pharmacology and Toxicology, College of Pharmacy, University of Babylon, Iraq. **e-mail:** phar.hayder.abdul@uobabylon.edu.iq., **Received:** June 22, 2025 **Accepted:** August 2, 2025

included the working environment. Differences in the socio-demographic profiles of patients with infertility may account for the risk of infertility [8]. In Iraq, infertility has garnered increased attention due to its growing incidence and the cultural significance surrounding childbearing. Likewise, limited research exists on socio-demographic profiles, such as age, education, and socio-economic status, hindering a comprehensive understanding of infertility's socio-demographic determinants [9]. Addressing this gap is crucial for developing effective interventions and support systems for affected individuals.

The Teba Center in Babylon, Iraq, is a key institution for infertility diagnosis and treatment. This center serves a diverse group of patients, including both men and women facing infertility challenges. This study was conducted in a clinical context in Babylon, and Teba Center – one of the tertiary healthcare centers – and the aims were to find out and report sociodemographic and clinical differences between infertile male and female patients attending the center in Babylon.

Methods

Study design

This retrospective, cross-sectional study utilized both quantitative and qualitative methods to examine the profiles of infertile patients at Teba Center located in Babylon, Iraq. The primary objective was to gain a comprehensive understanding of the socio-demographic characteristics and clinical profiles of male and female patients diagnosed with infertility, specifically those aged between 18 and 45 years.

Participants

The study comprised a total of 32000 patients, with 17656 males and 14344 females. The average age of male participants was approximately 36.3 ± 9.0 years, while female participants had a mean age of 32.1 ± 7.1 years. The male-to-female ratio was approximately 1.23:1, indicating a predominance of male patients.

Data collection process

To ensure thorough and accurate gathering of information from infertile couples at Teba Center, a structured approach was adopted for data collection. Trained staff members, including fertility specialists and clinical personnel, possessed the requisite skills and tools necessary to conduct effective interviews.

Study variables

The study concentrated on two principal categories of variables:

1. Demographic and Clinical Variables: These variables included age, marital status, medical history, family history of infertility, and lifestyle choices like smoking and alcohol consumption.
2. Gender-Specific Infertility Factors: Infertility was classified based on male or female factors as per clinical diagnosis.

Furthermore, lifestyle choices (such as alcohol consumption and smoking) and infertility diagnoses were categorized according to gender.

Data analysis

Statistical analyses were performed using chi-square tests to assess differences between male and female patients concerning socio-demographic and clinical characteristics. Descriptive statistics were employed to summarize participant traits, while inferential statistics were used to explore relationships among the variables. Qualitative data collected from open-ended questions were analyzed to identify prevalent themes related to the challenges associated with infertility.

Interviewing process

The data collection process initiated with structured interviews, where trained staff interacted directly with couples seeking treatment for infertility. Interviewers implemented a standardized questionnaire aimed at gathering comprehensive details regarding participants' socio-demographic backgrounds, medical histories, lifestyle choices, and experiences with infertility.

During the interviews, staff fostered a supportive environment that encouraged candid communication. They were trained to pose questions in a non-judgmental manner, ensuring that participants felt at ease sharing sensitive information about their reproductive health. The incorporation of open-ended questions enabled deeper insights into

the personal challenges faced by couples dealing with infertility. For example, participants were prompted to describe their experiences with prior treatments, the emotional repercussions of infertility, and any lifestyle adjustments made in response to their diagnosis.

Data categorization and statistical analysis

Once the data collection was completed, the information underwent systematic categorization for analysis. The quantitative data related to demographic and clinical variables were organized into structured databases for subsequent statistical evaluation. Descriptive statistics were utilized to summarize key characteristics, such as age, marital status, education level, and medical history.

Qualitative responses from open-ended questions underwent thematic analysis, wherein common themes and patterns were identified within the participants' narratives regarding their infertility journeys. This qualitative examination aimed to reveal underlying issues that may not have been captured through quantitative measures alone.

Statistical analyses, including chi-square tests, were executed to explore relationships between variables and to examine differences between male and female patients. This comprehensive methodology ensured that both quantitative metrics and qualitative insights contributed to a nuanced understanding of the factors influencing infertility at the Teba Center.

Ethical considerations

Ethical approval was obtained from the relevant institutional review boards. Informed consent was secured from all participants, ensuring confidentiality and the right to withdraw from the study at any point without facing any negative consequences.

Results

In this cohort, the primary infertility represents less than two-thirds of male patients (N=11471, 65.0%) and secondary infertility represents (N=6185, 35.0%).

Figure 1 highlights key socio-demographic characteristics of male and female infertile patients. Both groups are predominantly in the 20-40 age range, married, and have varying educational levels, with males showing a higher proportion of higher education (56.2%) compared to females (36.1%). Occupationally, most males are in official work (54.3%), while the majority of females are housewives (70.6%). BMI data reveals that obesity is more prevalent among females (47.9%) than males (29.9%). These findings suggest that infertility is influenced by age, marital status, education, occupation, and BMI, with notable gender-specific differences.

Table 1 delves into the comprehensive analysis of infertility concerning male and female patients, shedding light on their clinical histories and lifestyle behaviors. The comparative table highlights key similarities and differences between the two groups. Both male and female infertile patients exhibit a nearly equal prevalence of chronic diseases, indicating a similar long-term health burden. Notably, prior infertility treatments are more common among women, which may suggest a higher propensity for females to seek or receive medical assistance. While genetic disorders are infrequent overall, they appear to occur slightly more often in males. Lifestyle factors reveal a stark contrast: smoking rates are significantly higher among men, whereas women demonstrate greater dietary adherence, suggesting divergent health behaviors that could impact reproductive success. Both groups generally engage in low levels of physical activity, although women show slightly higher activity rates, and alcohol consumption is minimal across both categories. This data underscores the necessity for gender-specific approaches in the management of infertility, tailoring interventions that acknowledge and address these distinct needs and behaviors (Table 1).

The analysis of female infertile patients highlights several important reproductive health characteristics. The average pregnancy duration is 5.93 weeks, with a range of 1 to 25 weeks, indicating a high rate of early pregnancy loss or complications. The majority of women (62.6%) have no previous pregnancy, while 24.5% have carried a term pregnancy, and 11.4% have experienced an abortion, emphasizing the challenges these women face in achieving successful pregnancies.

Regarding infertility type, 61.9% of cases are primary

infertility, meaning these women have never conceived, while 38.1% have secondary infertility, indicating difficulty in conceiving after a previous pregnancy. Menstrual cycle irregularities are present in 27.2% of patients, which could be a factor contributing to infertility.

Most women (84.8%) have never undergone a previous medical investigation for infertility, and 87.7% have not attempted a previous infertility trial, suggesting a need for more proactive fertility assessments and interventions. These findings emphasize the importance of early diagnosis, reproductive health monitoring, and fertility treatments for women struggling with infertility (Table 2).

The association between sex and infertility outcomes reveals significant differences in treatment success and results between male and female patients. Live birth rates were slightly higher among females (81.9%) compared to males (77.2%), indicating a marginally better treatment success rate for women. More males (14.0%) had their cause of infertility identified compared to females (7.3%), which suggests that infertility causes may be more detectable in men. The identification of baby sex was relatively similar between the groups, with 10.3% of females and 8.6% of males receiving this information.

Regarding final results, pregnancy rates were high in both sexes (93.8% in males and 92.4% in females), confirming that most patients undergoing infertility treatment were able to conceive. However, live birth rates were slightly higher in females (4.7%) compared to males (3.8%), suggesting possible differences in reproductive health factors or treatment responses. The statistically significant P-value (<0.001) confirms that the differences between male and female infertility outcomes are not due to chance, emphasizing the need for tailored treatment approaches for each gender (Table 3).

The combined analysis of final results among male and female infertile patients shows high pregnancy rates in both groups, with 93.8% in males and 92.4% in females, indicating that most patients undergoing infertility treatment were able to conceive. However, live birth rates were slightly higher in females (4.7%) compared to males (3.8%), suggesting possible differences in treatment response, reproductive health factors, or pregnancy outcomes between the sexes. A small proportion of patients underwent only investigations without achieving pregnancy, with 2.1% of males and 2.3% of females falling into this category. Additionally, other outcomes (including unknown or unsuccessful treatments) were slightly higher among females (0.6%) than males (0.2%), which could indicate differences in treatment complexities or biological factors affecting infertility (Figure 2). These findings highlight the overall success of infertility treatments in leading to pregnancy, but also emphasize the slightly better live birth outcomes in females. This suggests that while conception rates are similar, additional interventions may be required to improve birth outcomes for both genders.

The combined analysis of infertility outcomes in male and female patients reveals notable differences in treatment success and diagnostic findings (Figure 3). Live birth rates were higher in females (81.9%) compared to males (77.2%), suggesting a slightly better treatment success rate for women. This could be attributed to the fact that many fertility treatments, such as assisted reproductive technologies, directly target female reproductive systems. However, males (14.0%) had a significantly higher percentage of cases where the cause of infertility was identified compared to females (7.3%). This discrepancy may indicate that male infertility is more easily diagnosed, whereas female infertility can be influenced by multiple, often complex, factors.

The proportion of patients who underwent procedures to identify the sex of the baby was relatively similar between both groups, with 10.3% of females and 8.6% of males receiving this outcome. The “other” outcomes were minimal, with 0.6% in females and 0.2% in males, suggesting a low rate of unsuccessful or undetermined cases (Figure 4). Overall, these findings highlight higher live birth success rates in females, while male patients had a higher rate of infertility cause identification, emphasizing the need for gender-specific approaches in diagnosis and treatment.

The combined analysis of reasons for choosing an infertility center among male and female patients shows similar patterns in decision-making factors. The most common reason for both groups was an ordinary visit, accounting for 46.7% of males and

45.5% of females, suggesting that many patients independently seek infertility consultation without direct medical referral.

Internal referrals, where patients were likely directed by other specialists or healthcare providers within the same institution, were slightly higher in females (40.8%) compared to males (39.0%). This may indicate that women are more likely to be referred for infertility evaluation due to gynecological consultations or routine reproductive health checkups. Referral from external doctors or specialists was slightly more common in males (12.7%) than in females (11.9%), possibly reflecting a greater reliance on urologists or andrology specialists for male fertility concerns. The least common reason was categorized as "other," which was consistently low at 1.7% for both genders, indicating that most patients followed a structured path to seeking infertility care. These findings suggest that men and women follow similar routes to infertility centers, with a slightly higher proportion of females referred internally, while males had a marginally higher rate of external referrals. This underscores the need for equally accessible diagnostic pathways for both genders to ensure timely and effective fertility treatments (Figure 4).

The chi-square analysis reveals significant associations between various lifestyle and medical factors and infertility treatment outcomes. Chronic diseases exhibit a strong relationship with infertility success rates, emphasizing the potential impact of pre-existing health conditions on reproductive health. Similarly, smoking, alcohol use, and dietary habits show a statistically significant influence, suggesting that lifestyle modifications could play a crucial role in improving infertility treatment success.

Notably, the highest chi-square value was observed for alcohol use, though its extremely low prevalence in the dataset limits broader conclusions. Engagement in sports also appears to have a significant association, reinforcing the potential benefits of physical activity in reproductive health. Lastly, the sex of the patient significantly correlates with live birth rates, highlighting the biological differences that may affect treatment outcomes. These findings collectively underscore the importance of considering both medical and lifestyle factors in infertility management and treatment planning (Table 4).

This table presents the odds ratios (OR) and 95% confidence intervals (CI**)** for various medical and lifestyle factors influencing infertility treatment success. An OR greater than 1 indicates an increased likelihood of adverse infertility outcomes, while an OR less than 1 suggests a protective effect. The p-value determines statistical significance, with values ≤ 0.05 indicating a meaningful association (Table 5).

Discussion

The findings of this comprehensive and insightful study underscore the substantial and significant differences in the sociodemographic and clinical profiles that have been meticulously observed between male and female infertility patients at Teba Center in Babylon, Iraq. These enlightening insights highlight an urgent and pressing need for carefully tailored, specifically designed approaches in the management and treatment of the diverse infertility issues faced by patients at the facility.

The basis of this study is to compare findings and characteristics between male and female infertility in terms of many related aspects like age, duration, education, residence, occupation, and successive ethnic and socioeconomic distributions by suitable statistical and demographic methods. To our knowledge, this is the first study in our locality to determine the distribution and prevalence of a vast number of causes of male and female infertility at Teba Center. The very low frequency found in the follow-up periods may be due to the conservativeness of our communities in discussing matters related to their sexual and reproductive health, particularly infertility problems, in addition to participants in the discussion based on feelings of shyness and shame from reference to the limited, unutilized services due to the unwillingness to disclose their health problems or inability to do so.

The research determined that the special age distribution of men, minor, and academic opportunities, indicating earlier adulthood prevalence in the selected community compared to females, was also delineated. Our results contradict the longstanding belief in the simplicity of treating males with females.

Sociodemographic characteristics

The finding that infertility predominantly impacts individuals aged 20-40 aligns with research by Nina E. (2024) [10], which identified this age group as being at heightened risk for infertility. Moreover, this study noted that 56.2% of males possessed a higher education level, contrasting with the 70.6% of females who were predominantly housewives. While higher education has been linked to longer postponement of childbirth [11], the higher percentage of housewives could reflect traditional gender roles prevalent in the region, echoing findings from similar cultural contexts [12]. The prevalence of obesity in females (47.9%) compared to males (29.9%) mirrors trends found in various studies, indicating that obesity significantly impacts women's reproductive health [13]. These findings suggest that obesity may indeed be a critical factor contributing to female infertility and could warrant further investigation.

The odds ratio analysis (Table 4) further elucidated the impact of medical and lifestyle factors on infertility treatment outcomes. Chronic diseases (OR = 2.5, 95% CI: 2.3-2.7, $p < 0.001$), smoking (OR = 2.1, 95% CI: 1.9-2.3, $p < 0.001$), and alcohol use (OR = 3.8, 95% CI: 3.2-4.5, $p < 0.001$) significantly increased the odds of unsuccessful infertility treatment. These findings emphasize the importance of managing chronic conditions and promoting healthier lifestyle choices for individuals undergoing infertility treatment [14]. The odds ratio for alcohol use was particularly high, suggesting a substantial negative impact on treatment success. While physical activity and diet also showed a positive impact with $p<0.002$, their odds ratio effect was smaller than smoking, alcohol, and chronic diseases; a focus on patients with these previous conditions would have the greatest impact on fertility treatments. Although being male was associated with a slightly higher risk of unsuccessful treatment compared to being female (OR = 1.3, 95% CI: 1.1-1.5, $p < 0.005$), the lifestyle factors are more prominent and may be a better focus for initial intervention. These findings supported the previously published data [15].

Clinical and medical history

When examining clinical and medical histories, this study indicates that chronic diseases were present at comparable rates in both genders (10.8% males vs. 10.6% females). This finding is consistent with previous studies that have suggested chronic illness is not a predominant factor in infertility [16]. Additionally, the higher percentage of identified infertility causes in males (14.0%) compared to females (7.3%) may reinforce findings from earlier research suggesting that male infertility is often more easily diagnosed [17]. Interestingly, the higher incidence of prior infertility treatments in females (34.1%) compared to males (32.0%) can be potentially linked to the societal pressures on women regarding childbearing, as documented in various cultural studies [18].

Lifestyle factors

The lifestyle factors studied reveal significant contrasts, particularly in smoking rates, which were markedly higher in males (12.1%) than females (0.3%). This finding is consistent with existing literature that has documented a strong association between smoking and male infertility [19]. Conversely, dietary adherence was better among females (9.5%) than males (0.9%), indicating a heightened awareness of nutritional influences on fertility among women, a result supported by prior studies showing women are often more engaged in health-promoting behaviors [20]. The low levels of physical activity in both groups, though slightly higher in females (1.8% compared to 0.9% in males), are concerning. Previous research has linked low physical activity levels to infertility [21], emphasizing the need for interventions aimed at improving lifestyle factors among infertile populations.

The chi-square analysis revealed significant associations between several lifestyle factors and infertility outcomes (Table 3). Smoking, alcohol use, physical activity, and dietary habits were all significantly associated with infertility ($p < 0.01$), underlining the importance of addressing these modifiable factors. These findings align with previous research demonstrating the detrimental effects of smoking on sperm quality [22] and the negative impact of obesity on female fertility [13]. The significantly higher prevalence of smoking among males in our study (12.1% vs. 0.3% in females) may partially explain the higher proportion of identified causes of infertility in males.

Infertility outcomes

In this study, the high pregnancy rates of 93.8% for males and 92.4% for females confirm or even exceed the findings from studies showing that infertility treatments typically yield positive outcomes [23, 24]. The marginal disparity in live birth rates, with females experiencing slightly higher rates (4.7% vs. 3.8% for males), aligns with previous research suggesting female physiological factors play a role in reproductive outcomes [25]. A minority of patients (2.1% males and 2.3% females) undergoing investigations without achieving pregnancy underscores the complexity of infertility and highlights the necessity for comprehensive diagnostic approaches.

Reasons for seeking infertility treatment

The principal reason for seeking infertility treatment identified in this study—an ordinary visit (46.7% for males and 45.5% for females)—corresponds with findings from similar research indicating that many individuals first consult healthcare providers for routine health checks [26]. The slight preference for internal referrals among females (40.8% vs. 39.0% in males) can be attributed to traditional practices where gynecological care is more commonly sought, aligning with regional health-seeking behavior models [27]. Conversely, the greater occurrence of referrals from external doctors for males (12.7%) compared to females (11.9%) suggests differing pathways in accessing treatment, a phenomenon noted in other demographic studies [28]. In summary, the findings of this study contribute valuable insights to the discourse on infertility, highlighting significant socio-demographic, clinical, and lifestyle factors that differ between male and female patients. These results not only reinforce prior findings but also underscore the need for targeted interventions and deeper understanding of infertility within cultural contexts.

Conclusion

The conclusions drawn from this extensive investigation illustrate the complex dynamics surrounding infertility, highlighting essential socio-demographic and clinical characteristics that influence treatment efficacy. Our analysis reveals that most male and female patients are concentrated within the 20-40 age bracket, mirroring findings from previous studies. Educational attainment and occupational status exhibit notable discrepancies across genders, suggesting that these factors may significantly impact individuals' access to and decisions regarding fertility treatments. The prevalence of obesity among women in this study, with nearly half classified as obese, underlines the importance of lifestyle choices in fertility issues, indicating a need for targeted health interventions aimed at promoting healthier lifestyle behaviors.

Furthermore, the data indicates that chronic illnesses and genetic factors are not significant contributors to infertility in this demographic, as indicated by low reported rates. Nonetheless, the increased proportion of women having undergone previous fertility treatments raises critical questions about the accessibility and effectiveness of reproductive healthcare services for females.

Lifestyle factors, including smoking, alcohol use, physical inactivity, and poor dietary habits, were significantly associated with infertility outcomes. Furthermore, chronic diseases, smoking, and alcohol use significantly increased the odds of adverse infertility treatment outcomes. Specifically, interventions should focus on reducing smoking and alcohol consumption, promoting physical activity, and improving dietary habits. Given the high odds ratio associated with alcohol use, targeted interventions may be particularly beneficial for individuals with a history of alcohol consumption. Furthermore, healthcare providers should emphasize the importance of managing chronic diseases to improve infertility treatment success. Future research should investigate the effectiveness of these targeted interventions in improving reproductive outcomes.

The observed differences in live birth rates between genders call for tailored fertility treatment strategies that directly address the specific reproductive health challenges faced by men and women. By examining the socio-demographic factors and clinical profiles revealed in this study, healthcare providers can improve fertility management practices, enhancing treatment outcomes for both genders.

Looking forward, further research is essential, particularly longitudinal studies that explore the

long-term effects of lifestyle modifications and medical interventions on the success of infertility treatments. Such efforts will contribute to a deeper understanding of the multifaceted nature of infertility, particularly in under-researched regions like Iraq, ultimately informing better healthcare practices and policies.

Declaration of interest

Nothing to declare

Funding

Self-funded

References

1. Adnan A. H. Al-Bdairi HA-AMA-H, Mohend A.N. Al-Shalah Preoperative measures of serum Inhibin B, and FSH levels predict sperms retrieval outcome in non-obstructive azoospermic males. Clinical Schizophrenia Related Psychoses. 2021;15:1-5. doi: 10.3371/CSRP.AA.280721.
2. Adnan A. H. Al-Bdairi HA-AMA-H, Sallama Hamid Alkhudair ,Khudhair Hussein Alkadhim. Serum and Seminal Plasma concentrations of Inhibin B and FSH: A Case-Control Comparison Study between Fertile and Infertile Males History of Medicine. 2023;8:22–8. doi: 10.17720/2409-5834.
3.Sakali AK, Bargiota A, Bjekic-Macut J, Macut D, Mastorakos G, Papagianni M. Environmental factors affecting female fertility. Endocrine. 2024;86:58-69. doi: 10.1007/s12020-024-03940-y. PubMed PMID: 38954374.
4. Al-Bdairi AAH, Makki Al-Hindy HA-A, Rahmatullah WS, Alshukri WSM. Impact of Congenital Uterine Anomalies on Ectopic Pregnancy: A Cross-Sectional Observational Study of 510 Cases. Med J Babylon. 2024;21:S52-S7. doi: 10.4103/mjbl.mjbl_352_23. PubMed PMID: 01216716-202406001-00010.
5. AAS Adnan A. Al-Bdairi HAM, Osama Shawki , Sallama H ... The Multi-faceted Effects of COVID-19 on Female Reproductive Health: An Updated Narrative Review. Cureus. 2024;16:e57944.
6. Hayder Abdul-Amir Makki Al-Hindy TAJA-KAAA. Innovative Mutation of ATPase-8 Gene (8378 A > G) of Sperm Mitochondrial DNA of Infertile Males with Asthenozoospermia. Journal of Bioscience and Applied Research. 2024;10:111-9. doi: 10.21608/jbaar.2024.396026.
7. Bayoumi RR, Hurt L, Zhang N, Law YJ, Venetis C, Fatem HM, et al.Boivin J. A critical systematic review and meta-analyses of risk factors for fertility problems in a globalized world. Reproductive BioMedicine Online. 2024;48:103217. doi: https://doi.org/10.1016/j.rbmo.2023.04.008.
8. Kasilikika AG, Hussein HI, Joseph HS, Ng'weshemi SK, Chandika AB. Patterns of Infertility and Sociodemographic Characteristics Among Patients with Infertility Attending Benjamin Mkapa Hospital in Tanzania: Analytical Cross-Sectional Study. Reprod Med. 2024;5:243-51. doi: 10.3390/reprodmed5040021. PubMed PMID: doi:10.3390/reprodmed5040021.
9. Murshid R, aany R, Ammar O. Epidemiological profile of infertile couples in Western Iraq. International Journal of Public Health Science (IJPHS). 2024;13:1. doi: 10.11591/ijphs.v13i1.23054.
10. Rusanova NE. Infertility and fertility: demographic problems of assisted reproduction. Population and Economics. 2024;8:156-67.
11. Li H, Nawsherwan, Fan C, Mubarik S, Nabi G, Ping YX. The trend in delayed childbearing and its potential consequences on pregnancy outcomes: a single center 9-years retrospective cohort study in Hubei, China. BMC Pregnancy and Childbirth. 2022;22:514. doi: 10.1186/s12884-022-04807-8.
12. Eqbal Dohan Chillab DS, Nabaa Salah, Dhurgam A. Rahman. Fertility and sterility in some Iraqi families. Int J Res Pharm Sc. 2019;10:2318-22. doi: 10.26452/ijrps.v10i3.1471.
13. Zheng L, Yang L, Guo Z, Yao N, Zhang S, Pu P. Obesity and its impact on female reproductive health: unraveling the connections. Front Endocrinol (Lausanne). 2023;14:1326546. doi: 10.3389/fendo.2023.1326546. PubMed PMID: 38264286; PubMed Central PMCID: PMCPMC10803652.
14. Carson SA, Kallen AN. Diagnosis and Management of Infertility: A Review. Jama. 2021;326:65-

76. doi: 10.1001/jama.2021.4788. PubMed PMID: 34228062; PubMed Central PMCID: PMCPMC9302705.
15. de Angelis C, Nardone A, Garifalos F, Pivonello C, Sansone A, Conforti A, et al.Pivonello R. Smoke, alcohol and drug addiction and female fertility. Reproductive Biology and Endocrinology. 2020;18:21. doi: 10.1186/s12958-020-0567-7.
16. Holton S, Thananjeyan A, Rowe H, Kirkman M, Jordan L, McNamee K, et al.Fisher J. The Fertility Management Experiences of Australian Women with a Non-communicable Chronic Disease: Findings from the Understanding Fertility Management in Contemporary Australia Survey. Matern Child Health J. 2018;22:830-40. doi: 10.1007/s10995-018-2454-9. PubMed PMID: 29411252.
17. Barratt CLR, Björndahl L, De Jonge CJ, Lamb DJ, Osorio Martini F, McLachlan R, et al.Tournaye H. The diagnosis of male infertility: an analysis of the evidence to support the development of global WHO guidance-challenges and future research opportunities. Hum Reprod Update. 2017;23:660-80. doi: 10.1093/humupd/dmx021. PubMed PMID: 28981651; PubMed Central PMCID: PMCPMC5850791.
18. Rodgers RF, Campagna J, Hayes G, Sharma A, Runquist E, Fiuza A, et al.Piran N. Sociocultural pressures and body related experiences during pregnancy and the postpartum period: A qualitative study. Body Image. 2024;48:101643. doi: https://doi.org/10.1016/j.bodyim.2023.101643.
19. Amor H, Alkhaled Y, Bibi R, Hammadeh ME, Jankowski PM. The Impact of Heavy Smoking on Male Infertility and Its Correlation with the Expression Levels of the PTPRN2 and PGAM5 Genes. Genes. 2023;14:1617. PubMed PMID: doi:10.3390/genes14081617.
20. Fashafsheh I, Al-Ghabeesh S, Ayed A, Salameh B, Batran A, Bawadi H. Health-Promoting Behaviors among Nursing Students: Palestinian Perspective. INQUIRY The Journal of Health Care Organization Provision and Financing. 2021;58:1-5. doi: 10.1177/00469580211018790.
21. Brinson AK, da Silva SG, Hesketh KR, Evenson KR. Impact of Physical Activity and Sedentary Behavior on Spontaneous Female and Male Fertility: A Systematic Review. J Phys Act Health. 2023;20:600-15. doi: 10.1123/jpah.2022-0487. PubMed PMID: 37146984; PubMed Central PMCID: PMCPMC7614776.
22. Osadchuk L, Kleshchev M, Osadchuk A. Effects of cigarette smoking on semen quality, reproductive hormone levels, metabolic profile, zinc and sperm DNA fragmentation in men: results from a population-based study. Front Endocrinol (Lausanne). 2023;14:1255304. doi: 10.3389/fendo.2023.1255304. PubMed PMID: 37920251; PubMed Central PMCID: PMCPMC10619690.
23. Vidal A, Bora C, Jarisch A, Pape J, Weidlinger S, Karrer T, Von Wolff M. Impact on fertility outcomes in survivors after hematopoietic stem cell transplantation for benign and malignant hematologic disorders: a systematic review and meta-analysis. Human Reproduction. 2024;39. doi: 10.1093/humrep/deae108.721.
24. Volgsten H, Schmidt L. Live birth outcome, spontaneous pregnancy and adoption up to five years after undergoing assisted reproductive technology treatment. Acta Obstet Gynecol Scand. 2017;96:954-9. doi: 10.1111/aogs.13139. PubMed PMID: 28374421; PubMed Central PMCID: PMCPMC5574008.
25. Mohamed HM. Physical and Psychological Factors and the Reproductive Outcomes of Women Undergoing In-Vitro Fertilization Treatment. Assiut Scientific Nursing Journal. 2018;6: 49-62. doi: 10.21608/asnj.2018.58781.
26. Pansky M, Feingold M, Sagi R, Herman A, Schneider D, Halperin R. Diagnostic hysteroscopy as a primary tool in a basic infertility workup. Jsls. 2006;10:231-5. PubMed PMID: 16882426; PubMed Central PMCID: PMCPMC3016139.
27. Hu W, Li L, Su M. Modeling Health Seeking Behavior Based on Location-Based Service Data: A Case Study of Shenzhen, China. 2022;11:295. PubMed PMID: doi:10.3390/ijgi11050295.
28. Wang S, Wang M, Liu Y, systems u. Access to urban parks: Comparing spatial accessibility

measures using three GIS-based approaches. Computers, environment. 2021;90:101713.
29. Behfrouz, Armin, and Maryam Tahmasebpoor. "Modification of clinoptilolite zeolite adsorbent from Miyaneh mines to remove ammonia from the water environment." Environment and Water Engineering 11, no. 3 (2025): e219829.
30. ZOHAIR, H., & AIT NASSER, M. (2024). Communication in the digital age: Challenges and trans-formation. Journal of Advances in Humanities and Social Sciences 2024, 10(2): 33-39
31. Jam, F. A., Akhtar, S., Haq, I. U., Ahmad-U-Rehman, M., & Hijazi, S. T. (2010). Impact of leader behavior on employee job stress: evidence from Pakistan. European Journal of Economics, Finance and Administrative Sciences, (21), 172-179.
32. Jam, F. A., Mehmood, S., & Ahmad, Z. (2013). Time series model to forecast area of mangoes from Pakistan: An application of univariate ARIMA model. Acad. Contemp. Res, 2, 10-15.
33. Jam, F. A., Rauf, A. S., Husnain, I., Bilal, H. Z., Yasir, A., & Mashood, M. (2014). Identify factors affecting the management of political behavior among bank staff. African Journal of Business Management, 5(23), 9896-9904.

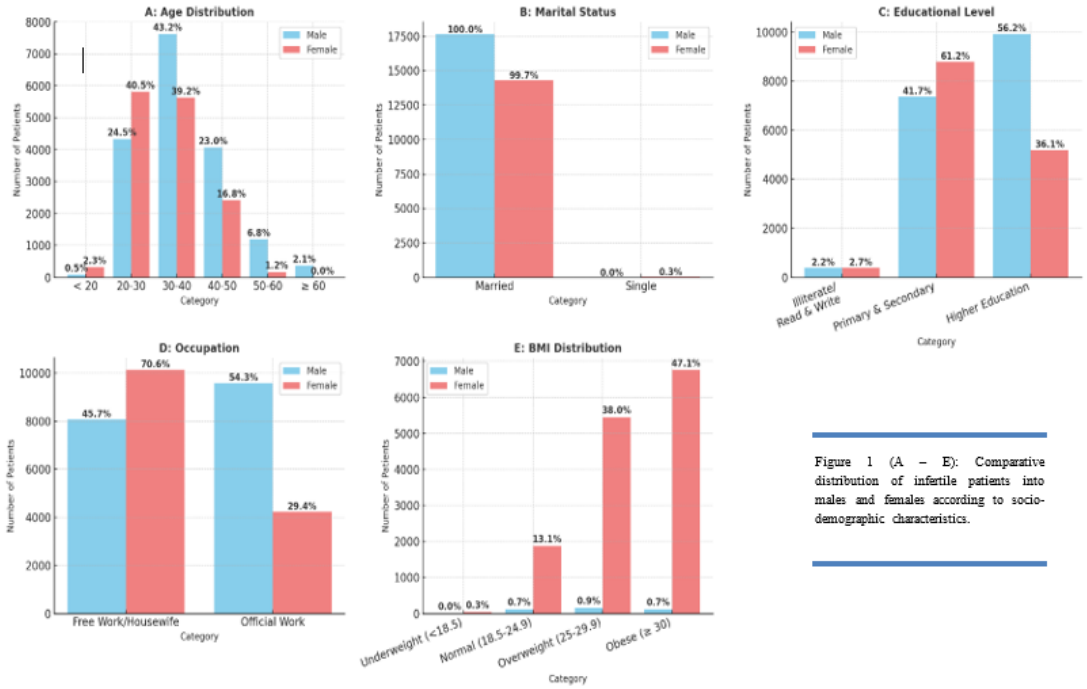

Figure 1 (A – E): Comparative distribution of infertile patients into males and females according to socio-demographic characteristics.

Fig 1. Comparitive distribution of infertile patients into males and females

Table 1. Comparison of clinical and lifestyle characteristics between male and female infertile patients

Variable	Males (%)	Females (%)
Clinical Factors		
Chronic Diseases	10.8	10.6
Previous Infertility Treatment	32.0	34.1
Genetic Diseases	2.0	1.5
Lifestyle Characteristics		
Smoking	12.1	0.3
Alcohol Consumption	Negligible	Negligible
Physical Activity	0.9	1.8
Adherence to Diet	0.9	9.5

Table 2: Distribution of female infertile patients according to study variables (N=14344)

Study variables	**Descriptives**	
Duration of pregnancy (weeks)	Mean ± SD (5.93 ± 4.46)	Average (1-25)
Previous pregnancy		
Term	3518	24.5%
Preterm	217	1.5%
Abortion	1632	11.4%
Ectopic	2.0	0.0%
No previous pregnancy	8975	62.6%
Total	14344	100.0%
Type of infertility*		
Primary	8855	61.9%
Secondary	5448	38.1%
Total	14303	100.0%
Menstrual cycle regularity*		
Regular	10407	72.8%
Irregular	3894	27.2%
Total	14301	100.0%
Previous investigation		
Yes	2174	15.2%
No	12170	84.8%
Total	14344	100.0%
Previous trial		
Yes	1758	12.3%
No	12586	87.7%
Total	14344	100.0%

*There was missing data on the type of infertility and Menstrual cycle regularity.

Table 3. Association between sex of patients and outcome or final results (N=32000)

Study variables	**Sex of patients**		**Total (N=32000)**	**P-value**
	Male (N=17656)	**Female (N=14344)**		
Outcome				
Live birth	13625 (77.2)	11743 (81.9)	25368 (79.3)	<0.001*
Identify the sex of the baby	1513 (8.6)	1473 (10.3)	2986 (9.3)	
Identify the cause of infertility	2474 (14.0)	1046 (7.3)	3520 (11.0)	
Other	44 (0.2)	82 (0.6)	126 (0.4)	
Total	17656 (100.0)	14344 (100.0)	32000 (100.0)	
Final results				
Only investigation	378 (2.1)	337 (2.3)	715 (2.2)	<0.001*
Pregnancy	16564 (93.8)	13257 (92.4)	29821 (93.2)	
Live birth	670 (3.8)	668 (4.7)	1338 (4.2)	
Other	44 (0.2)	82 (0.6)	126 (0.4)	
Total	17656 (100.0)	14344 (100.0)	32000 (100.0)	

*Pvalue ≤ 0.05 was significant.

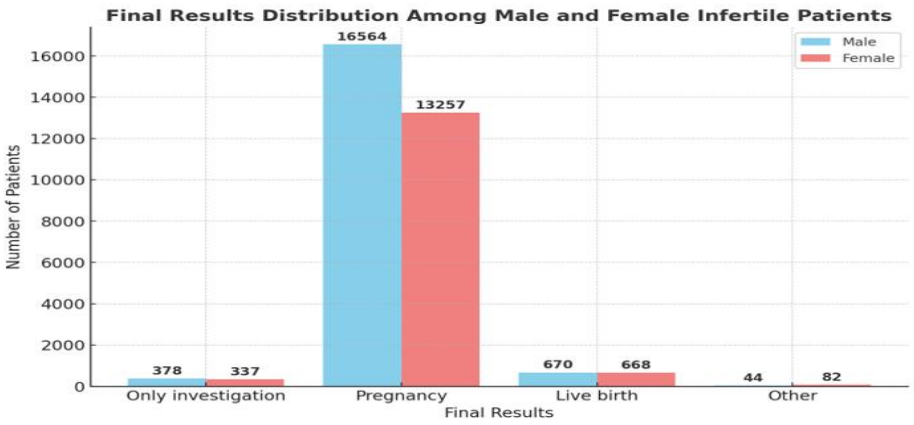

Figure 2: Combined analysis of final results among male and female infertile patients

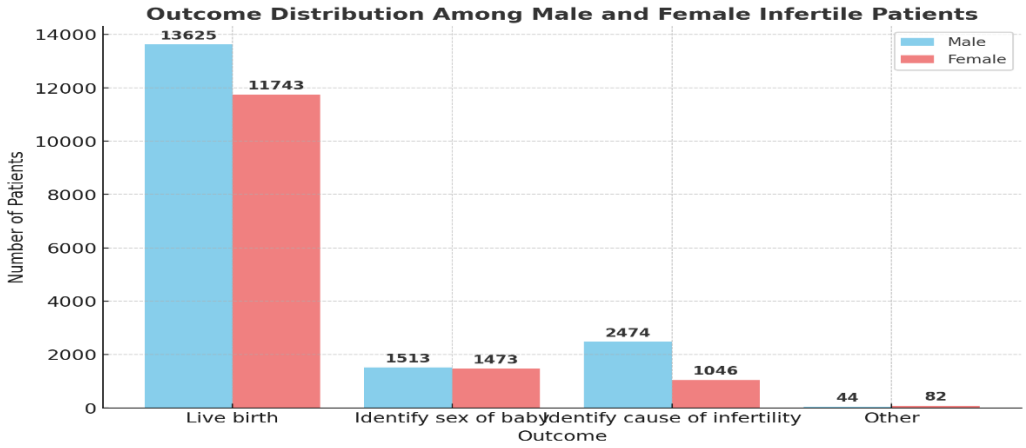

Figure 3: The combined analysis of infertility outcomes in male and female patients

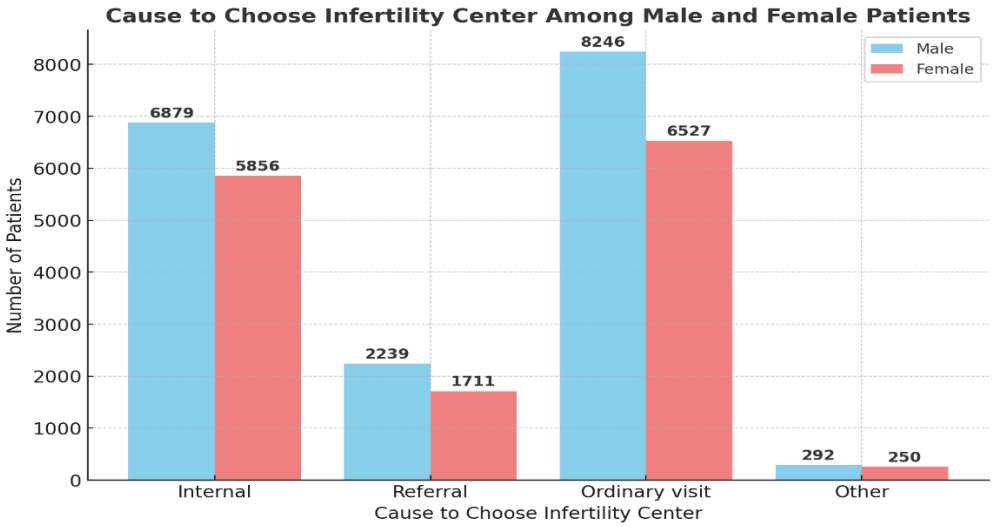

Figure 4: The combined analysis of reasons for choosing an infertility center among male and female patients

Table 4: Association between lifestyle, medical factors, and infertility outcomes using Chi-Square Association analysis

Factors Influencing Infertility Outcomes	Chi-Square (χ^2)	p-Value
Smoking vs. Infertility Outcome	2037.65	0.01
Alcohol Use vs. Infertility Outcome	6724.74	0.01
Sport vs. Infertility Outcome	6220.57	0.01
Diet vs. Infertility Outcome	6217.45	0.01
Sex of Patient vs. Live Birth	106.02	0.01

Table 5. Odds ratio analysis of medical and Lifestyle factors affecting infertility treatment outcomes

Factor	Odds Ratio	95% CI Lower	95% CI Upper	P-Value
Chronic Diseases	2.5	2.3	2.7	0.001
Smoking	2.1	1.9	2.3	0.001
Alcohol Use	3.8	3.2	4.5	0.001
Sport	1.9	1.6	2.3	0.001
Diet	1.8	1.5	2.1	0.002
Sex (Male vs Female)	1.3	1.1	1.5	0.005