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Infertility knowledge and awareness in men presenting for infertility evaluation: a cross-sectional study from a urology outpatient clinic

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Abstract

Background: Public awareness of infertility remains suboptimal, and most existing studies focus predominantly on women. This study evaluated men's knowledge and awareness of infertility at a tertiary urology outpatient clinic. **Methods**: This cross-sectional study enrolled 327 married men of reproductive age who sought evaluation for infertility. Participants completed a 16-item binary (yes/no) questionnaire assessing basic concepts of reproduction, infertility definitions, and lifestyle-related risk factors. Participants were grouped based on educational level (below *vs.* university level and above) and history of assisted reproductive techniques (ART). All responses were analyzed both at the overall cohort level and separately within each subgroup. **Results**: Only 55% of the participants correctly identified the World Health Organization (WHO) definition of infertility. Patients who sought evaluation before completing 12 months of unprotected intercourse demonstrated lower awareness of both the definition of infertility and the expected 12-month pregnancy rate ($p = 0.027$, $p = 0.003$, respectively). Knowledge that the probability of pregnancy increases to approximately 80% after 12 months of unprotected intercourse was significantly higher among participants with a history of ART (71.0% *vs.* 53.8%, $p = 0.005$). Men with a university-level education demonstrated significantly better knowledge regarding ovulation timing, fertilisation, and male contribution to infertility. The majority of respondents (80.7%) relied on Google as their primary source of infertility-related information, with men of lower educational attainment demonstrating greater reliance on online sources compared with their more highly educated counterparts. **Conclusions**: Men presenting for infertility evaluation exhibited limited knowledge of infertility, particularly regarding its formal definition and key aspects of reproductive physiology. Higher education and prior ART experience were associated with improved knowledge, although this did not consistently translate into healthier lifestyle behaviours. These findings underscore the importance of targeted infertility education for men, particularly through accurate, evidence-based, and accessible digital resources.

Keywords

Infertility; Male reproductive health; Fertility awareness; Assisted reproductive techniques; Health literacy

Conocimientos y concientización sobre la infertilidad en hombres que acuden a una evaluación de infertilidad: un estudio transversal de una consulta externa de urología

Resumen

Antecedentes: La concienciación pública sobre la infertilidad sigue siendo subóptima, y la mayoría de los estudios existentes se centran predominantemente en las mujeres. Este estudio evaluó el nivel de conocimiento y concienciación sobre la infertilidad en hombres que acudieron a una consulta ambulatoria de urología de tercer nivel. **Métodos**: Este estudio transversal incluyó a 327 hombres casados en edad reproductiva que acudieron para evaluación por infertilidad. Los participantes completaron un cuestionario de 16 ítems con respuestas binarias (sí/no), que evaluaba conceptos básicos sobre reproducción, definiciones de infertilidad y factores de riesgo relacionados con el estilo de vida. Los participantes fueron clasificados según su nivel educativo (inferior a universitario *vs*. universitario o superior) y antecedentes de técnicas de reproducción asistida. Todas las respuestas fueron analizadas tanto a nivel global como dentro de cada subgrupo. **Resultados**: Solo el 55% de los participantes identificó correctamente la definición de infertilidad según la Organización Mundial de la Salud (OMS). Los pacientes que buscaron evaluación antes de completar 12 meses de relaciones sexuales sin protección mostraron menor conocimiento tanto sobre la definición de infertilidad como sobre la tasa de embarazo esperada a los 12 meses (p = 0.027 y p = 0.003, respectivamente). El conocimiento de que la probabilidad de embarazo aumenta aproximadamente al 80% después de 12 meses sin protección fue significativamente mayor entre los participantes con antecedentes de técnicas de reproducción asistida (TRA) (71.0% *vs*. 53.8%, p = 0.005). Los hombres con nivel educativo universitario demostraron un conocimiento significativamente mejor sobre el momento de la ovulación, la fecundación y la contribución masculina a la infertilidad. La mayoría de los encuestados (80.7%) utilizó Google como su principal fuente de información sobre infertilidad, siendo los hombres con menor nivel educativo quienes mostraron una mayor dependencia de fuentes en línea en comparación con aquellos con mayor nivel de estudios. **Conclusiones**: Los hombres que acudieron a evaluación por infertilidad presentaron conocimientos limitados sobre esta condición, especialmente en lo relacionado con su definición formal y aspectos clave de la fisiología reproductiva. Un mayor nivel educativo y antecedentes de tratamiento con técnicas de reproducción asistida (TRA) se asociaron con un mejor conocimiento, aunque esto no se tradujo de manera consistente en comportamientos de estilo de vida más saludables. Estos hallazgos subrayan la importancia de implementar estrategias educativas dirigidas a los hombres sobre infertilidad, especialmente a través de recursos digitales precisos, basados en evidencia y de fácil acceso.

Palabras Clave

Infertilidad; Salud reproductiva masculina; Conocimiento sobre fertilidad; Técnicas de reproducción asistida; Alfabetización en salud

1. Introduction

Infertility is a prevalent health issue affecting approximately 10–15% of married couples worldwide [1]. Today, it imposes a significant psychological and economic burden on the affected couples and adversely affects their quality of life [2–4]. According to the World Health Organization (WHO), infertility is defined as the inability of a couple to achieve pregnancy after at least 12 months of regular, unprotected sexual intercourse [5].

Couples may occasionally present prematurely to healthcare institutions, without any underlying organic pathology, primarily due to anxiety and insufficient knowledge regarding fertility timelines [6, 7]. Such premature presentations may result in inefficient use of healthcare resources and unnecessary emotional, temporal, and financial costs for couples. The level of knowledge regarding infertility can directly influence both the timing of medical consultation and perceived need for assisted reproductive techniques (ART) [8, 9].

In particular, in many societies, infertility continues to be predominantly perceived as a female-related condition, which negatively affects men's awareness and understanding of infertility [8, 10]. Male awareness of infertility is often lower compared with females, even though a male factor contributes solely or partially to approximately half of infertility cases [11]. Therefore, assessing men's knowledge of infertility and the basic reproductive physiology is critically important. However, studies specifically assessing male knowledge and awareness of infertility remain limited in the existing literature [12]. Accordingly, the present study aimed to assess the level of knowledge and awareness regarding infertility among men presenting for infertility evaluation.

2. Materials and methods

2.1 Study design and population

This cross-sectional descriptive study was conducted on 327 male patients who presented to the urology outpatient clinics of Izmir City Hospital (Izmir, Türkiye) and Inegol State Hospital (Bursa, Türkiye) with complaints of infertility. The study was approved by the Ethics Committee of Izmir City Hospital (Izmir, Türkiye) (18 June 2025, 2025/295). Data collection took place between 18 June 2025, and 18 September 2025. Men aged 18 years and older, who were married, of reproductive age, and engaged in regular sexual activity were included. Individuals with a previously diagnosed severe psychiatric

disorder, those who had difficulty communicating, or those who submitted incomplete questionnaire forms were excluded from the study.

2.2 Questionnaire design and data collection

Participants were administered a binary questionnaire (yes/no, Table 1) designed to assess knowledge of fundamental concepts related to the reproductive process, the definition of infertility, and its infertility-related physiology. The questionnaire consisted of 16 items evaluating knowledge level and lifestyle-related factors. Additionally, participants' educational status, sources of information consulted regarding infertility, and history of ART were also recorded.

The questionnaire was deliberately designed to be concise, clear, and easily understandable across different educational levels. As the study population consisted of men attending a urology outpatient clinic for infertility evaluation, a yes/no format was used to minimize ambiguity, reduce respondent fatigue, and improve response accuracy and consistency. This approach has been widely used in clinical surveys where straightforward and unambiguous answers are essential [13].

2.3 Rationale for yes/no questionnaire format

Evidence from survey methodology research indicates that multi-point rating scales require greater cognitive processing and subjective judgment, which may reduce response consistency, whereas two-option (yes/no) questions demand substantially less mental effort from respondents [14]. Moreover, dichotomous survey formats have been shown to facilitate participant concentration during questionnaire completion and to enhance overall response rates [15].

TABLE 1. Survey questions used in the study.

Question No.	Survey Question
Q1	Do you know that the probability of pregnancy in the first month of unprotected intercourse for a couple trying to conceive is only about 20%?
Q2	Do you know that the probability of achieving pregnancy after 12 months of unprotected intercourse reaches approximately 90%?
Q3	Do you know that, according to the World Health Organization, infertility is defined as the inability to conceive despite one year of regular, unprotected intercourse?
Q4	Do you know that pregnancy begins when a sperm from the male reaches the uterus and meets the egg in the fallopian tube?
Q5	Do you know that infertility is not only caused by women, but male factors are also commonly responsible?
Q6	Do you know that a woman's egg remains viable for only about one day after ovulation?
Q7	Do you know that sperm can survive in the female reproductive tract for approximately 3–5 days?
Q8	Do you know that, considering the lifespan of sperm and the egg, intercourse should occur a few days before or shortly after ovulation for fertilization to take place?
Q9	Do you know that in women with regular menstruation, ovulation typically occurs once per cycle, usually in the middle of the menstrual cycle?
Q10	Do you know that some methods (*e.g.*, basal body temperature monitoring, ovulation kits, cervical mucus observation) can be used to track ovulation?
Q11	Do you know that smoking negatively affects sperm quality?
Q12	Do you know that advancing maternal age reduces both the quality and quantity of eggs, thus decreasing the chances of conception?
Q13	Do you know that being overweight or obese negatively impacts reproductive health in both men and women?
Q14	Do you know that regular exercise and a healthy diet have a positive effect on reproductive health?
Q15	Do you currently smoke?
Q16	What is your primary source of information when you want to learn more about infertility? (a) Google (b) Online forums (c) Instagram (d) Facebook (e) Twitter (X) (f) Newspapers and magazines (g) Acquaintances/Friends

2.4 Validity assessment and expert review

The questionnaire underwent expert review to ensure content validity and face validity. The questionnaire was reviewed by board-certified urologists and gynecologists working in our hospital's infertility and assisted reproductive technologies clinic. These experts independently assessed the draft items to ensure content and face validity, evaluating each question for clarity, clinical relevance, and appropriateness. Their feedback was incorporated into the final version of the survey to enhance its precision and applicability.

2.5 Use of language-support tools

As a language-support tool, ChatGPT-4.0 was utilized solely to enhance the linguistic clarity and readability of the questionnaire items, without contributing to scientific content, conceptual framework, or formulation of the questions.

2.6 Study group classification

Participants were divided into two groups based on their educational status: below-university education (Group 1) and university-level education and higher (Group 2). A secondary grouping was also performed based on ART history: categorizing participants with a history of ART (Group B) and those without (Group A).

A flow diagram summarizing the study design and participant grouping is presented in Fig. 1.

2.7 Statistical analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS), version 23.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were expressed as mean ± standard deviation. The chi-square test and, where appropriate, Fisher's exact test were used to compare categorical variables between groups. Binary logistic regression analysis was conducted to identify factors independently associated with knowledge and awareness levels. Results of regression analyses were reported as odds ratios (ORs) with 95% confidence intervals (CIs). For continuous dependent variables, linear regression analysis was applied, and results were expressed as Beta coefficients with standard errors (SE). A p-value < 0.05 was considered statistically significant.

3. Results

3.1 Participant characteristics and general knowledge outcomes

The mean age of the male participants was calculated as 33.13 ± 6.24 years. The mean duration of unprotected intercourse prior to the first medical consultation for infertility was 17.94 ± 12.87 months. Regarding educational status, 23.9% (n = 78) of the participants had completed primary school, 33.0% (n = 108) secondary school, 41.3% (n = 135) university, and 1.8% (n = 6) held a postgraduate (master's or doctoral) degree. Additionally, 28.4% (n = 93) of participants reported a history of ART use. The overall distribution of responses is presented in Fig. 2.

Regarding the knowledge-based questions, 62.4% of participants correctly identified that the probability of conception during the first month of unprotected intercourse is approximately 20%. Additionally, 58.7% correctly stated that the cumulative pregnancy rate increases to approximately 80% after 12 months of unprotected intercourse.

Overall, 55% of participants correctly identified the WHO definition of infertility. Among the 81 participants who sought medical evaluation before completing the 12 months of unprotected intercourse, 66.7% (54 of 81) correctly identified the low probability of conception during the first month, which was comparable to the general study population (p = 0.359). However, only 44.4% (n = 36) of these early presenters were aware that the probability of conception increases to 80% after 12 months, representing a statistically significant difference compared with the general population (Odds ratio (OR) = 0.46, 95% Confidence interval (CI) 0.28–0.77, p = 0.003). Likewise, only 44.4% (n = 36) of this group were familiar with the WHO definition of infertility, also significantly lower than those who presented after 12 months (OR = 0.57, 95% CI: 0.34–0.94, p = 0.028).

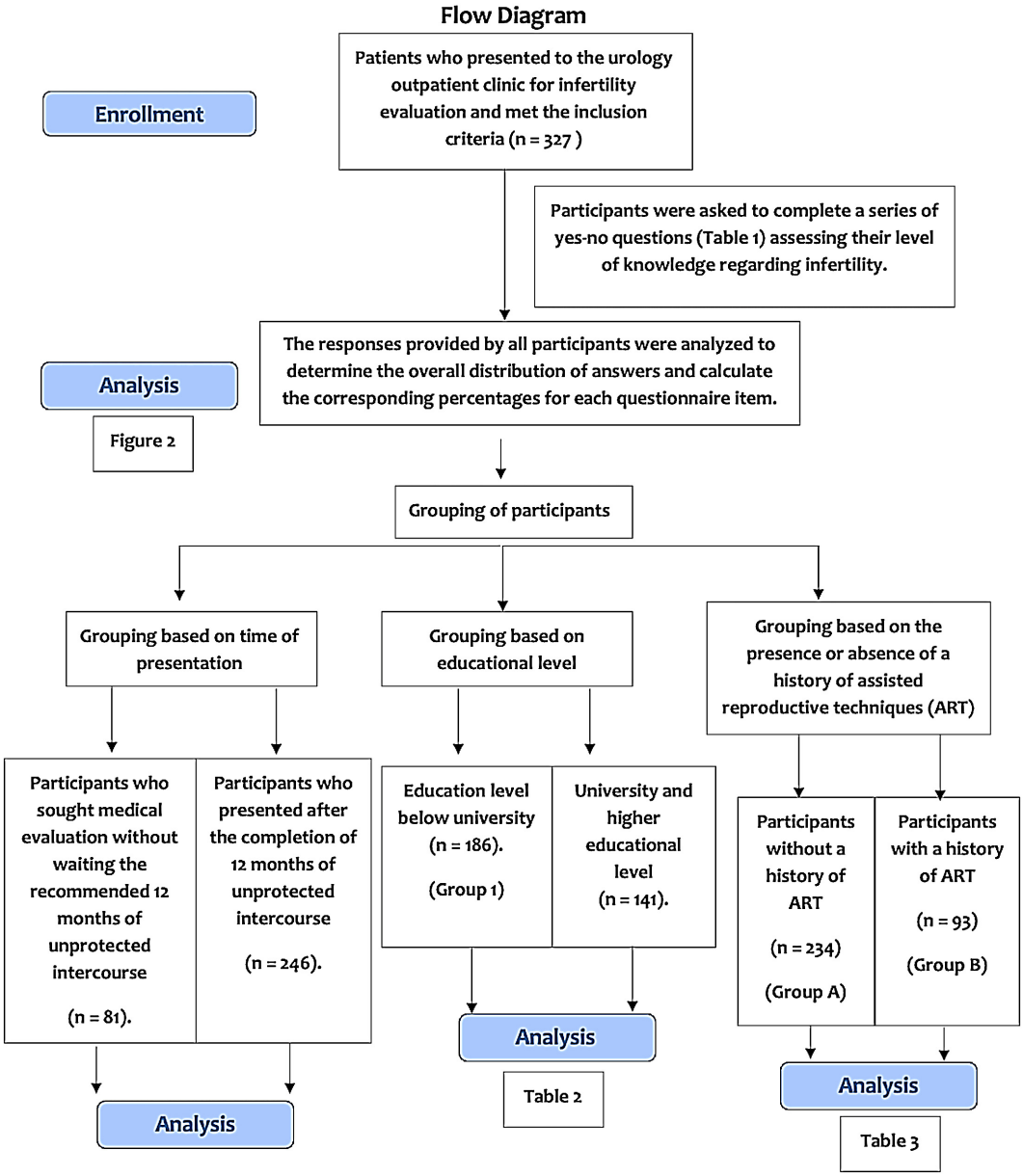
Knowledge regarding reproductive physiology varied across domains. Only 43.1% of participants knew that a woman's oocyte remains viable for approximately one day after ovulation, whereas 67.9% were aware that male sperm can survive in the female reproductive tract for 3–5 days. 84.4% correctly stated that intercourse should occur around ovulation for optimal fertilization. The knowledge that ovulation typically occurs mid-cycle in women with regular menstruation was correctly stated by 85.3%. Additionally, 98.2% were aware that fertilization occurs when the sperm passes through the uterus and meets the egg in the fallopian tubes. Knowledge of methods for tracking ovulation days was reported by 43.1% of participants.

Regarding infertility etiology and lifestyle factors, 80.7% of participants recognized that infertility can also result from male factors and is not exclusively female-related. Awareness of the harmful effects of smoking on sperm quality was high (96.3%), and 95.4% correctly identified that advanced maternal age negatively affects oocyte quality and quantity. Furthermore, 89.9% acknowledged the adverse impact of excess body weight or obesity on reproductive health, while 96.3% recognized the benefits of regular exercise and a healthy diet. Despite this high level of awareness, 51.4% of participants reported being current smokers.

When examining sources of infertility-related information, 80.7% of the participants reported Google as their primary source. This was followed by forums (5.5%), friends or acquaintances (5.5%), Instagram (4.6%), newspapers or magazines (1.8%), Facebook (0.9%), and X (formerly Twitter) (0.9%).

3.2 Impact of educational level on infertility knowledge

When responses were compared by educational level, knowledge of the WHO definition of infertility was significantly higher in Group 2 (university-level education and higher) compared with Group 1 (below-university education) (OR = 0.531,



F I G U R E 1. Flow diagram summarizing the study design and participant grouping. ART: assisted reproductive techniques.

95% CI: 0.339–0.832, $p = 0.006$). Awareness that infertility may also be caused by male factors was likewise significantly higher in Group 2 compared with Group 1 (OR = 0.459, 95% CI: 0.252–0.834, $p = 0.011$).

Understanding of the correct fertilization process, where the sperm meets the egg in the fallopian tube, was correctly identified by all participants in Group 2 and by the vast majority in Group 1 ($p = 0.031$). Knowledge of the importance of timing intercourse around ovulation was correctly recognized by all participants in Group 2 and by most participants in Group 1 (OR = 0.234, 95% CI: 0.110–0.499, $p < 0.001$). Likewise, the knowledge that ovulation typically occurs mid-cycle in women with regular menstruation was nearly universal in Group 2 and substantially high in Group 1 (OR = 0.152, 95% CI: 0.063–0.370, $p < 0.001$). Awareness of methods to track ovulation was also more prevalent in Group 2 than in Group 1 (OR = 0.565, 95% CI: 0.362–0.881, $p = 0.012$).

Smoking was significantly more common among participants in Group 1 compared with Group 2 (OR = 1.869, 95% CI: 1.200–2.911, $p = 0.006$).

Differences were also observed in preference sources of infertility-related information. Participants with lower education levels tended to rely more heavily on Google, whereas those with higher education levels more frequently assessed alternative sources, such as forums and print media ($p < 0.001$). Patterns of social media use differed between educational groups. Instagram and Facebook were more commonly used by participants with lower education levels. In contrast, the social media platform X was used only by individuals with higher education levels.

The mean duration of unprotected intercourse before consulting a physician was 17.54 ± 11.32 months in Group 1 and 18.46 ± 14.69 months in Group 2, with no statistically significant difference ($p = 0.523$). Detailed comparisons are presented in Table 2.

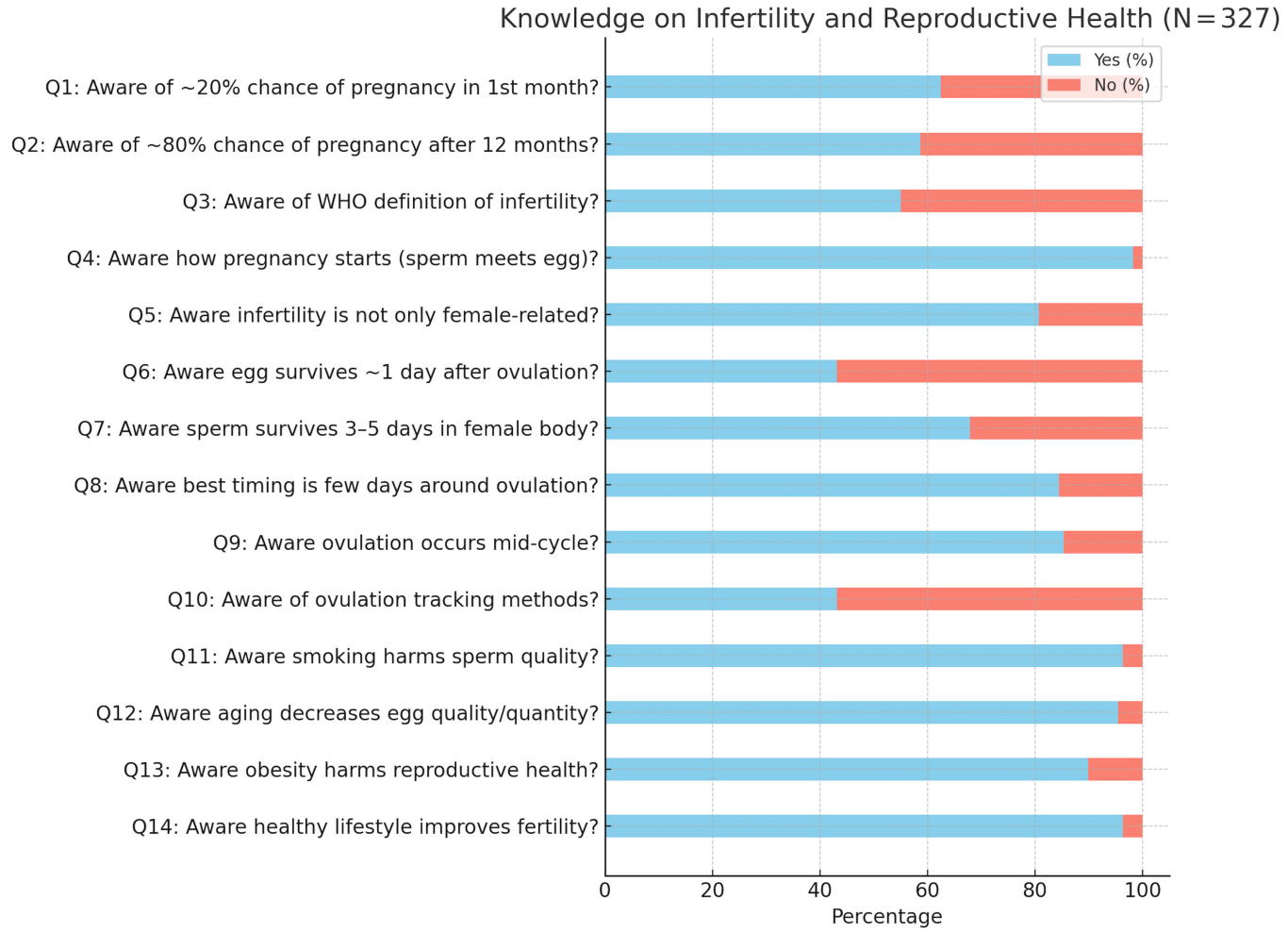


FIGURE 2. The responses of all participants included in the study. WHO: World Health Organization.

3.3 Impact of ART experience on infertility knowledge

When knowledge levels were compared according to ART history, a significantly higher proportion of individuals in Group B (ART history) recognized that the chance of conception increases to 80% after 12 months of unprotected intercourse, compared with Group A (no ART history) (OR = 0.477, 95% CI: 0.285–0.800, $p = 0.005$). Similarly, awareness that sperm can survive for 3–5 days in the female reproductive tract was higher in Group B than in Group A (OR = 0.521, 95% CI: 0.299–0.907, $p = 0.021$).

Awareness that the female oocyte remains viable for approximately one day after ovulation was higher among participants with ART experience than those without, although this difference was not statistically significant ($p = 0.051$). Understanding that intercourse should occur a few days before or shortly after ovulation to optimize fertilization was significantly higher in Group B compared with Group A (OR = 0.290, 95% CI: 0.119–0.705, $p = 0.006$). Knowledge that ovulation typically occurs mid-cycle in women with regular menstruation was higher in Group B compared with Group A (OR = 0.140, 95% CI: 0.042–0.463, $p < 0.001$). Awareness of methods for tracking ovulation was higher in Group B compared with Group A, although this difference did not reach statistical significance ($p = 0.051$).

All participants in Group B (100%, n = 93) were aware of the negative effects of smoking on sperm quality, compared with 94.9% (n = 222) in Group A ($p = 0.026$). Likewise, 100% (n = 93) of the participants in Group B and 94.9% (n = 222) of Group A correctly stated that regular exercise and healthy nutrition benefit reproductive health ($p = 0.026$).

Regarding information sources, Google was used by 93.6% of participants in Group B, compared with 75.6% in Group A ($p < 0.001$). Alternative or traditional sources, such as forums, friends/acquaintances, and newspapers/magazines, were reported only by participants in Group A. Comparisons between Groups A and B are summarized in Table 3.

Finally, multivariable regression analysis was conducted for Questions 8 and 9, which emphasized the importance of ovulation timing and timed intercourse and showed significant associations with both educational level and ART history in the subgroup analyses. In this model, both educational attainment and a history of ART emerged as independent predictors, whereas age was not found to be a significant determinant. The results of the multivariable regression analysis are presented in Table 4.

TABLE 2. Comparison of responses by educational status (Group 1: below university *vs.* Group 2: university or higher).

Question No.	Question Content	Group 1 (Below University) n (186)	Group 2 (University and Higher) n (141)	*p*-value*	*p*-value$^{\Delta}$
1	Chance of pregnancy after the first month of unprotected intercourse is ~20%	123 (66.1%)	81 (57.4%)	0.108	
2	Pregnancy rate after 12 months of unprotected intercourse is ~80%	114 (61.3%)	78 (55.3%)	0.277	
3	WHO definition of infertility (no pregnancy after 12 months)	90 (48.4%)	90 (63.8%)	0.005	OR = 0.531 95% CI: 0.339–0.832 $p = 0.006$
4	Pregnancy starts when sperm meets an egg in the fallopian tubes	180 (96.8%)	141 (100.0%)	0.031	
5	Infertility can be male-related	141 (75.8%)	123 (87.2%)	0.009	OR = 0.459 95% CI: 0.252–0.834 $p = 0.011$
6	An egg survives ~1 day after ovulation	87 (46.8%)	54 (38.3%)	0.125	
7	Sperm survives 3–5 days in the female body	123 (66.1%)	99 (70.2%)	0.433	
8	The fertilization chance is highest near ovulation	144 (77.4%)	132 (93.6%)	<0.001	OR = 0.234 95% CI: 0.110–0.499 $p < 0.001$
9	Ovulation typically occurs mid-cycle in regular menstruation	144 (77.4%)	135 (95.7%)	<0.001	OR = 0.152 95% CI: 0.063–0.370 $p < 0.001$
10	Ovulation tracking methods	69 (37.1%)	72 (51.1%)	0.012	OR = 0.565 95% CI: 0.362–0.881 $p = 0.012$
11	Smoking negatively affects sperm quality	177 (95.2%)	138 (97.9%)	0.197	
12	Age decreases egg quality and quantity	177 (95.2%)	135 (95.7%)	0.803	
13	Obesity negatively affects reproductive health	165 (88.7%)	129 (91.5%)	0.409	
14	Exercise and a healthy diet improve fertility	180 (96.8%)	135 (95.7%)	0.624	
15	Do you smoke?	108 (58.1%)	60 (42.6%)	0.005	OR = 1.869 95% CI: 1.200–2.911 $p = 0.006$
16					
	Main info source: Google	162 (87.1%)	102 (72.3%)		
	Forum sites	0 (0.0%)	18 (12.8%)		
	Instagram	12 (6.5%)	3 (2.1%)		
	Facebook	3 (1.6%)	0 (0.0%)	<0.001	
	Twitter (X)	0 (0.0%)	3 (2.1%)		
	Newspaper/Magazine	0 (0.0%)	6 (4.3%)		
	Friends/Acquaintances	9 (4.8%)	9 (6.4%)		

p-value: Pearson's chi-square test; p-value$^{\Delta}$: Binary logistic regression.*
WHO: World Health Organization; OR: Odds Ratio; CI: Confidence Interval.

TABLE 3. Comparison of responses by history of assisted reproductive techniques (ART).

Question No.	Question Content	Group A (No ART History) n (234)	Group B (ART History) n (93)	*p*-value*	*p*-value$^{\Delta}$
1	Chance of pregnancy after the first month of unprotected intercourse is ~20%	150 (64.1%)	54 (58.1%)	0.309	
2	Pregnancy rate after 12 months of unprotected intercourse is ~80%	126 (53.8%)	66 (71.0%)	0.005	OR = 0.477 95% CI: 0.285–0.800 $p = 0.005$
3	WHO definition of infertility	129 (55.1%)	51 (54.8%)	0.962	
4	Pregnancy starts when sperm meets an egg in the fallopian tubes	231 (98.7%)	90 (96.8%)	0.237	
5	Infertility can be male-related	189 (80.8%)	75 (80.6%)	0.980	
6	An egg survives ~1 day after ovulation	93 (39.7%)	48 (51.6%)	0.051	
7	Sperm survives 3–5 days in the female body	150 (64.1%)	72 (77.4%)	0.020	OR = 0.521 95% CI: 0.299–0.907 $p = 0.021$
8	The fertilization chance is highest near ovulation	189 (80.8%)	87 (93.5%)	0.004	OR = 0.290 95% CI: 0.119–0.705 $p = 0.006$
9	Ovulation typically occurs mid-cycle in regular menstruation	189 (80.8%)	90 (96.8%)	<0.001	OR = 0.140 95% CI: 0.042–0.463 $p < 0.001$
10	Ovulation tracking methods (BBT, LH test, mucus)	93 (39.7%)	48 (51.6%)	0.051	
11	Smoking negatively affects sperm quality	222 (94.9%)	93 (100.0%)	0.026	
12	Age decreases egg quality and quantity	222 (94.9%)	90 (96.8%)	0.458	
13	Obesity negatively affects reproductive health	210 (89.7%)	84 (90.3%)	0.875	
14	Exercise and a healthy diet improve fertility	222 (94.9%)	93 (100.0%)	0.026	
15	Do you smoke?	117 (50.0%)	51 (54.8%)	0.430	
16					
	Main info source: Google	177 (75.6%)	87 (93.6%)		
	Forum sites	18 (7.7%)	0 (0.0%)		
	Instagram	12 (5.1%)	3 (3.2%)		
	Facebook	0 (0.0%)	3 (3.2%)	<0.001	
	Twitter (X)	3 (1.3%)	0 (0.0%)		
	Newspaper/Magazine	6 (2.6%)	0 (0.0%)		
	Friends/Acquaintances	18 (7.7%)	0 (0.0%)		

p-value: Pearson's chi-square test; p-value$^{\Delta}$: Binary logistic regression.*
ART: assisted reproductive techniques; WHO: World Health Organization; OR: Odds Ratio; CI: Confidence Interval; BBT: Basal Body Temperature; LH: Luteinizing Hormone.

TABLE 4. Multiple regression analysis results for predicting.

Question	Variable	Unstandardized Coefficients		Standardized Coefficients		Adjusted *R*-square	*F*-change	*p* value
		β	SE	β	*t*-value			
8								
	Constant	0.443	0.106		4.191			<0.001
	Educational Status	−0.172	0.039	−0.235	−4.410	0.081	10.6	<0.001
	History of ART	−0.146	0.043	−0.181	−3.398			<0.001
	Age	−0.005	0.003	−0.089	−1.673			0.095
9								
	Constant	0.295	0.101		2.908			0.004
	Educational Status	−0.199	0.003	−0.279	−5.306	0.111	14.5	<0.001
	History of ART	−0.181	0.041	−0.231	−4.403			<0.001
	Age	0.000	0.038	−0.006	−0.111			0.912

SE: Standard Error; ART: Assisted Reproductive Techniques.

4. Discussion

4.1 Understanding of infertility definitions and timing

In this study, participants demonstrated limited knowledge regarding fundamental and definition-based aspects of infertility. Although 62.4% of participants correctly stated that the probability of conception in the first month of unprotected intercourse is approximately 20%, only 58.7% were aware that this probability rises to approximately 80% after 12 months. This finding is consistent with a large-scale population-based study reporting a similar rate of 51% [16]. In general, the knowledge level among men regarding monthly conception probabilities during unprotected intercourse appears to be insufficient [17].

Similarly, only 55% of participants correctly identified the WHO definition of infertility, defined as the inability to achieve pregnancy after 12 months of regular, unprotected sexual intercourse. Previous studies have reported even lower awareness levels, often below 50% [18]. These findings suggest that men may have insufficient knowledge regarding the definition of infertility and the process of achieving pregnancy.

One particularly noteworthy finding was that 24.8% of participants sought medical consultation before completing the 12-month waiting period. Among these individuals, only 44.4% were aware that the pregnancy rate increases after 12 months ($p = 0.003$), and the same proportion correctly identified the WHO definition of infertility ($p = 0.027$). These results suggest that insufficient knowledge may directly contribute to premature and unnecessary medical consultations. A previous study examining women's knowledge of infertility also emphasized the role of knowledge in managing the infertility process and seeking assistance [6].

This study also demonstrated that educational level significantly influences infertility-related knowledge. The proportion of participants familiar with the WHO infertility definition was significantly higher in those with university-level education and above (63.8%) compared with those with lower education levels (48.4%) ($p = 0.005$). Multiple studies have confirmed that educational attainment positively affects infertility awareness [8, 19, 20]. However, it is noteworthy that no significant difference was found between educational groups in terms of the timing of medical consultation ($p = 0.618$). This indicates the possibility that factors beyond education, such as sociocultural and economic conditions, could also play a role in influencing healthcare-seeking behaviour.

Given that our study population predominantly included participants from higher socioeconomic backgrounds, the ability to detect differences across a broader socioeconomic spectrum may have been limited, representing a potential study limitation. Moreover, because infertility affects both partners, spousal dynamics may also play a critical role in the decision to seek medical care. The literature remains inconsistent, with some studies reporting no association between socioeconomic status and infertility knowledge [6], while others demonstrated increased awareness with higher socioeconomic status [19]. Importantly, most existing research has focused on women, highlighting the need for additional studies evaluating male infertility knowledge [17].

Additionally, knowledge that the probability of conception reaches approximately 80% after 12 months of unprotected intercourse was significantly higher in individuals with a history of ART use (71.0%, $p = 0.005$). This may reflect greater clinical exposure and knowledge acquisition during the ART process. Previous studies have also shown that undergoing infertility treatment enhances patients' awareness and knowledge [8, 21]. Notably, this increased awareness did not extend to knowledge of the WHO infertility definition, suggesting that clinical experience may enhance practical understanding without necessarily improving theoretical knowledge.

4.2 Awareness of male contribution to infertility

In this study, 80.7% of participants knew that infertility is not solely female-related and that male factors can also contribute.

This finding may indicate a gradual increase in awareness of male infertility compared with earlier reports. Awareness was significantly higher among individuals with higher education levels, which may suggest a possible link between education and both general health literacy and attitudes toward infertility-related stereotypes. However, it should be noted that this finding may have been influenced by social desirability bias inherent to self-reported surveys, particularly given the dichotomous (yes/no) response format. Participants might have been more inclined to choose "yes" responses that are perceived as more socially acceptable, which represents a potential limitation of the study.

However, the lack of a significant difference in this awareness between those with and without ART experience may imply that knowledge of male infertility could be more influenced by educational background or broader public discourse than by direct clinical exposure. Consistent with this interpretation, previous studies report that societal awareness of male infertility remains lower than that of female infertility, highlighting the need for more effective educational strategies [9].

4.3 Knowledge of reproductive physiology

Participants' knowledge of reproductive physiology varied significantly. In a large population-based study, only 23.6% of women correctly identified the ovulation period [22]. While numerous studies have evaluated women's reproductive knowledge, data on male awareness remain limited. Previous research has demonstrated that women's lack of knowledge regarding ovulatory timing contributes to primary infertility, yet men's awareness of this topic remains a subject of interest [7].

In our study, only 43.1% of participants correctly stated that the female egg survives for approximately 24 hours post-ovulation, whereas a greater proportion (67.9%) knew that sperm can survive for 3–5 days in the female reproductive tract. This disparity may reflect a relatively lower level of male knowledge regarding female reproductive physiology.

Consistent with prior research, men have generally demonstrated greater knowledge of male fertility factors than female factor [16]. However, knowledge regarding the timing of intercourse relative to ovulation, an area of practical relevance, was relatively high (84.4%), suggesting that applied knowledge may be more commonly known than theoretical information. However, only 43.1% were familiar with ovulation tracking methods, highlighting a gap between theoretical knowledge and practical application. This underscores the importance of including actionable knowledge in fertility education alongside basic physiology.

Although most studies examining infertility knowledge and education focus on women, our findings demonstrate that men with university-level education had significantly higher knowledge of reproductive physiology, suggesting that formal education enhances both general and domain-specific health literacy [8, 22].

Consistent with studies in infertile women [23], men with ART experience exhibited higher knowledge in several subdomains, including sperm and oocyte viability, ovulation timing, and ovulation tracking methods. This likely reflects increased interaction with healthcare professionals and self-directed information seeking during treatment.

A striking finding in this study was that 95.4% of participants were aware that increasing maternal age negatively affects oocyte quality and ovarian reserve. This awareness did not differ by educational level or ART experience, possibly due to widespread media coverage and public discourse on this topic. Previous literature similarly indicates that maternal age is one of the most well-known fertility parameters both clinically and socially [16, 24]. However, this high level of awareness should be interpreted with caution, as the dichotomous (yes/no) response format may have encouraged socially desirable responses, potentially inflating the true level of awareness.

4.4 Lifestyle factors and health behaviors

Our study also found high awareness of the negative effects of smoking, obesity, and unhealthy lifestyle factors on fertility, consistent with the literature [16, 24]. Despite this, more than half of the participants (51.4%) reported being current smokers, highlighting a disconnect between knowledge and behaviour. This gap suggests that awareness alone may be insufficient to drive behavioural change, emphasizing the need for multidisciplinary and behaviour-focused interventions.

Although knowledge levels did not differ significantly between educational groups, smoking prevalence was inversely associated with education level. This suggests that behavioural change is influenced by complex factors, such as socioeconomic status and lifestyle, rather than knowledge alone.

Participants with ART experience demonstrated higher awareness of lifestyle-related fertility factors, further supporting the role of clinical engagement in patient education. However, the lack of a significant difference in smoking rates between ART and non-ART groups suggests that addictive behaviours and psychosocial determinants may limit behavioural change despite increased awareness.

4.5 Digital information-seeking behavior

With increasing digitalisation, infertility-related information-seeking behaviour has shifted predominantly toward online sources [25]. In this study, 80.7% of participants reported using Google as their primary source of information, indicating that the internet has become the initial reference point. However, studies have shown that this behaviour is closely associated with education level [26]. In our study, 87.1% of participants with less than a university education relied on Google, compared with 72.3% of those with higher education. Conversely, individuals with higher education were more frequently to use forums, print media, and alternative digital sources. This suggests that more educated individuals approach information more critically and prefer to cross-check multiple sources.

Although social media platforms were used less frequently for infertility-related information, they still showed interesting trends. Facebook was used only by lower-educated individuals, while X was used only by those with higher education. These differences may reflect variability in content quality across platforms and highlight the importance of selecting

appropriate platforms when disseminating educational materials. The results suggest that content creators should carefully consider their target audience and select platforms accordingly.

It should also be noted that due to the demographic composition of our sample, these findings may not fully represent the information-seeking behaviors of individuals with limited socioeconomic resources. In lower-income populations, limited access to devices such as smartphones and computers may restrict the use of social media and online platforms, potentially leading to different patterns of information sourcing. Future studies are warranted to explore these dynamics in more socioeconomically diverse populations.

Overall, information-seeking behaviours appear to be shaped by both educational background and clinical history, with a strong preference for digital resources. However, this digital shift also presents risks related to information accuracy and reliability. Therefore, healthcare professionals and institutions must provide evidence-based content, particularly online and on social media platforms. Given the increasing use of artificial intelligence tools, further research is needed to examine how individuals use artificial intelligence tools for accessing medical information, particularly in the context of infertility.

4.6 Limitations

This study has several limitations to consider. First, most participants were drawn from socioeconomically advantaged urban regions, limiting generalisability to rural or lower-income populations. Although participants were stratified by education level, no stratification by income level was performed. The questionnaire was developed by the researchers, its clarity refined using ChatGPT, and the content evaluated by domain experts; however, it was not a formally validated instrument. While a dichotomous yes/no format enhances comprehension and response rate, it may limit depth of assessment and influence response patterns [15, 27]. Additionally, the study focused exclusively on men, precluding evaluation of couple-based knowledge dynamics. Finally, self-reported responses may be subject to social desirability bias.

5. Conclusions

This study revealed that male individuals have insufficient foundational knowledge regarding infertility, particularly concerning its definition and reproductive physiology. Such knowledge gaps contribute to premature and unnecessary healthcare utilization, increasing the burden on healthcare systems. Although educational attainment and ART experience were associated with improved knowledge across specific domains, these differences did not consistently translate into healthier behavioural outcomes. These findings suggest that health behaviours are shaped by complex social and individual factors beyond knowledge alone, highlighting the need for structured and comprehensive informational efforts during clinical processes.

6. Implications and recommendations

Enhanced men's knowledge of infertility is essential for improving individual healthcare-seeking behaviours, optimising healthcare resource use, and reducing the psychosocial burden on couples. Infertility education should be incorporated into routine clinical care and introduced through age-appropriate sexual and reproductive health education from adolescence, tailored to individuals' educational stages. Healthcare professionals should play a proactive role in disseminating accurate, evidence-based information across both digital and printed platforms and in supporting individuals' ability to critically evaluate health information.

Such strategies may promote more effective knowledge acquisition and healthier behavioural outcomes. Future research should employ validated assessment tools, explore couple-based educational interventions, and assess long-term knowledge retention and behavioural change.

AVAILABILITY OF DATA AND MATERIALS

The datasets generated and analyzed during the current study are not publicly available due to concerns regarding participant privacy but are available from the corresponding author on reasonable request.

AUTHOR CONTRIBUTIONS

AE, MD, BK—administrative support. AE, GC, MBN, TD—provision of study materials or patients. SC, YC—collection and assembly of data. MD, EY, YC—data analysis and interpretation. AE, GC, MBN—manuscript writing. All authors contributed to the conception and design of the study and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Ethics Committee of İzmir City Hospital (18 June 2025, 2025/295), and was conducted in accordance with the Declaration of Helsinki. Informed consent was obtained from all participants.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

REFERENCES

[1] Nik Hazlina NH, Norhayati MN, Shaiful Bahari I, Nik Muhammad Arif NA. Worldwide prevalence, risk factors and psychological impact of infertility among women: a systematic review and meta-analysis. BMJ Open. 2022; 12: e057132.

[2] Azize Diallo A, Anku PJ, Darkoa Oduro RA. Exploring the psycho-social burden of infertility: perspectives of infertile couples in Cape Coast, Ghana. PLOS ONE. 2024; 19: e0297428.

[3] Simionescu G, Doroftei B, Maftei R, Obreja BE, Anton E, Grab D, *et al.* The complex relationship between infertility and psychological distress (Review). Experimental and Therapeutic Medicine. 2021; 21: 306.

[4] Kiani Z, Simbar M, Rashidi F, Zayeri F, Banaderakhsh H. The quality of life of men experiencing infertility: a systematic review. BMC Public Health. 2024; 24: 1236.

[5] World Health Organisation Guideline Development Group for Infertility; Mburu G, Santesso N, Brignardello-Petersen R, Kennedy R, Farquhar C, Boivin J, *et al.* Recommendations from the WHO guideline for the prevention, diagnosis, and treatment of infertility. Human Reproduction. 2026; 41: 25–38.

[6] Mahey R, Gupta M, Kandpal S, Malhotra N, Vanamail P, Singh N, *et al*. Fertility awareness and knowledge among Indian women attending an infertility clinic: a cross-sectional study. BMC Women's Health. 2018; 18: 177.

[7] Ojah P, Pradhan MR. Can a lack of knowledge of the ovulatory cycle result in primary infertility? Evidence from selected South Asian countries. Human Fertility. 2025; 28: 2441832.

[8] Pedro J, Brandão T, Schmidt L, Costa ME, Martins MV. What do people know about fertility? A systematic review on fertility awareness and its associated factors. Upsala Journal of Medical Sciences. 2018; 123: 71–81.

[9] Kusuma B, Harzif AK, Maidarti M, Saroyo YB, Winarto H, Meutia AP. Infertility misperception and improper health-seeking behavior between urban and rural areas. PLOS ONE. 2025; 20: e0312456.

[10] Singh V, Rajpal G, Majumdar S, Mandal S, Sahu R. Awareness, knowledge, and psychoemotional aspect of infertility among women seeking fertility assistance at a tertiary care hospital in Chhattisgarh, a cross-sectional study. Journal of Education and Health Promotion. 2023; 12: 3.

[11] Agarwal A, Baskaran S, Parekh N, Cho C, Henkel R, Vij S, *et al*. Male infertility. The Lancet. 2021; 397: 319–333.

[12] Daumler D, Chan P, Lo KC, Takefman J, Zelkowitz P. Men's knowledge of their own fertility: a population-based survey examining the awareness of factors that are associated with male infertility. Human Reproduction. 2016; 31: 2781–2790.

[13] Koo M, Yang SW. Questionnaire use and development in health research. Encyclopedia. 2025; 5: 65.

[14] DeCastellarnau A. A classification of response scale characteristics that affect data quality: a literature review. Quality & Quantity. 2018; 52: 1523–1559.

[15] Rivera-Garrido N, Ramos-Sosa MP, Accerenzi M, Brañas-Garza P. Continuous and binary sets of responses differ in the field. Scientific Reports. 2022; 12: 14376.

[16] Barron ML, Lithgow D, Wade GH, Mueller Luckey G. Fertility health knowledge in U.S. adults: men narrowing the knowledge gap. American Journal of Men's Health. 2022; 16: 15579883221117915.

[17] Hammarberg K, Collins V, Holden C, Young K, McLachlan R. Men's knowledge, attitudes and behaviours relating to fertility. Human Reproduction Update. 2017; 23: 458–480.

[18] Gaye O, Ba K, Diallo M, Niasse A, Counta A, Ndiaye M, *et al.* Knowledge of male infertility and acceptance of medical assistance reproductive technology among fertile and infertile Senegalese men. Research and Reports in Urology. 2024; 16: 343–355.

[19] Hoffman JR, Delaney MA, Valdes CT, Herrera D, Washington SL, Aghajanova L, *et al*. Disparities in fertility knowledge among women from low and high resource settings presenting for fertility care in two United States metropolitan centers. Fertility Research and Practice. 2020; 6: 15.

[20] Domar A, Vassena R, Dixon M, Costa M, Vegni E, Collura B, *et al*. Barriers and factors associated with significant delays to initial consultation and treatment for infertile patients and partners of infertile patients. Reproductive BioMedicine Online. 2021; 43: 1126–1136.

[21] Deatsman S, Vasilopoulos T, Rhoton-Vlasak A. Age and fertility: a study on patient awareness. JBRA Assisted Reproduction. 2016; 20: 99–106.

[22] Getahun MB, Nigatu AG. Knowledge of the ovulatory period and associated factors among reproductive women in Ethiopia: a population-based study using the 2016 Ethiopian demographic health survey. International Journal of Women's Health. 2020; 12: 701–707.

[23] Sharma A, Kamboj N, Saraswathy KN, Puri M, Babu N, Mahajan C. Knowledge, attitude, and practice of infertility: a comparative study in infertile and fertile Indian women. Journal of Biosocial Science. 2023; 55: 947–959.

[24] Daniluk JC, Koert E. The other side of the fertility coin: a comparison of childless men's and women's knowledge of fertility and assisted reproductive technology. Fertility and Sterility. 2013; 99: 839–846.

[25] Brochu F, Robins S, Miner SA, Grunberg PH, Chan P, Lo K, *et al.* Searching the internet for infertility information: a survey of patient needs and preferences. Journal of Medical Internet Research. 2019; 21: e15132.

[26] Satir DG, Kavlak O. Use of the internet related to infertility by infertile women and men in Turkey. Pakistan Journal of Medical Sciences. 2017; 33: 265–269.

[27] OECD. OECD guidelines on measuring trust. 2017. Available at: https://www.oecd.org/content/dam/oecd/en/publications/reports/2017/11/oecd-guidelines-on-measuring-trust_g1g7ca1c/9789264278219-en.pdf (Accessed: 11 January 2026).

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