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Original Research Article

Patient perceptions of transvaginal ultrasound in the diagnosis and management of infertility: a cross-sectional study

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ABSTRACT

Background: Infertility is a significant global health concern, affecting a substantial percentage of couples. Transvaginal ultrasound (TVUS) has emerged as a key diagnostic tool in the evaluation along with treatment of infertility, offering improved imaging quality for the assessment of reproductive health conditions. This study aimed to gauge patient perceptions of the effectiveness, comfort, and role of TVUS in infertility diagnosis and treatment planning.
Methods: A cross-sectional study was conducted across 200 women undergoing infertility evaluation at a reproductive health clinic. Data was collected utilising a structured questionnaire that included demographic information, clinical history, and patient perceptions of TVUS. Variables such as effectiveness, comfort during the procedure, and the role of TVUS in treatment planning were analyzed. Descriptive statistics were utilised to encapsulate the data, and results were offered as frequencies along with percentages.
Results: The majority of participants (72.0%) were aged 25-34 years, with 58.4% being married and 64.8% having a college education. Most participants (62.0%) had experienced infertility for 1-5 years, and 46.0% had a previous diagnosis of reproductive health conditions. A large portion of participants (38.5%) strongly agreed that TVUS was effective in providing diagnostic insights, and 45.5% agreed that they felt comfortable during the procedure. Additionally, 48.5% agreed that TVUS played a crucial role in their treatment planning.
Conclusions: Transvaginal ultrasound is perceived as an effective and valuable tool in the diagnosis along with management of infertility. While most patients reported comfort with the procedure, there remains a need to address the experiences of those who expressed discomfort. The conclusions highlight the importance of TVUS in shaping treatment strategies and enhancing patient outcomes in infertility care.

Keywords: Diagnostic imaging, Infertility, Patient perceptions, Reproductive health, Transvaginal ultrasound, Treatment planning

INTRODUCTION

Infertility is a growing global health issue, affecting approx. 10-15% of couples globally. It has significant physical, emotional, and social implications for individuals and families.[1] Timely and accurate diagnosis is crucial for effective infertility treatment, and advances in medical imaging have enhanced the diagnostic process.[2] Among the available diagnostic tools, transvaginal ultrasound has become a key technique in evaluating infertility, providing detailed insights into reproductive health conditions like polycystic ovary syndrome (PCOS), endometriosis, and structural abnormalities of the uterus and ovaries.[3]

Transvaginal ultrasound has some advantages over the transabdominal ultrasound: higher resolution, which allows providing detailed picture of the pelvic organs.[4]

Transvaginal ultrasound (TVS) has become an indispensable tool of current infertility management and studied morphology of the female genital organs in high detail. Its importance is in ability to offer direct visual view of the uterus, ovaries as well as other related structures hence is used in diagnosis of disorders including PCOS, endometriosis and uterine fibroids which are major contributors to infertility. It helps in considering diagnostic information to the clinician, specifically in the diagnosis of the causes of infertility, menstrual cycle, ovarian reserve, and planning and performing of treatments including IVF.[5] Moreover, TVS helps in evaluation of ovarian stores and follow-up of follicular growth during fertility treatments like IVF. Its noninvasive and highly accurate nature makes it an essential weapon in fertility evaluations, which strengthens the strategy and results in proposed therapeutic suggestions and patients. Through early diagnosis of reproductive challenges, the fertility treatment specialist gets the opportunity to devise correct individual treatment procedures, thus improving the likelihood of conception. Nonetheless, through broader social acceptance, the patient's perception of the effectiveness as well as the comfort level they practically experience with this procedure is still limited. This investigation aimed to gauge the attitudes of women being investigated for infertility concerning the transvaginal ultrasound with regard to efficiency, comfort and its function in the investigation and management of the situation.

Therefore, the aim of this study was to analyze patient experiences about this kind of imaging technique and thereby, see its diagnostic usefulness for improving patient care. Further, the findings might reveal potential concerns for future research about patient information provision and patient reassurance throughout the procedure, which would enhance the efficacy of clinical practice in infertility treatment.

This research also explored demographic and clinical factors influencing patient satisfaction and perceptions of transvaginal ultrasound, providing a more comprehensive understanding of how this diagnostic tool is integrated into the broader infertility treatment pathway.

METHODS

Study design

This study utilized a descriptive cross-sectional design to assess the effectiveness, patient comfort, and the role of transvaginal ultrasound in diagnosing and managing infertility. A cross-sectional approach was selected to acquire data from participants at one time, allowing for the examination of perceptions and experiences with transvaginal ultrasound in a broad sample. The design provided an effective method to capture the demographics, clinical histories, and attitudes of individuals undergoing infertility evaluation.

Participants

The study included 200 participants who were undergoing infertility evaluation and treatment at a reproductive health clinic. Participants were recruited over a six-month period through referrals from gynecologists and infertility specialists. Both male and female patients were considered eligible for the study, but the primary focus was on women who had undergone transvaginal ultrasound as part of their diagnostic evaluation.

Inclusion criteria

Participants were required to fulfil the following criteria to qualify for participation in the research: females aged 18 to 45 years currently undergoing infertility evaluation. Individuals who had undergone at least one transvaginal ultrasound as part of their diagnostic process. Participants who had experienced infertility for at least six months and were actively seeking treatment. Participants able to provide informed consent and willing to complete the study questionnaire.

Exclusion criteria

The following exclusion criteria were applied to safeguard the validity and relevance of the data: women with contraindications to transvaginal ultrasound. Patients who had not undergone infertility evaluation or were seeking treatment for other unrelated conditions. Individuals with severe cognitive impairment or other conditions preventing them from accurately completing the questionnaire. Participants who had previously received a definitive infertility diagnosis that rendered further diagnostic evaluation unnecessary.

Data collection

Data was acquired utilizing a structured, self-administered questionnaire designed to gather information on participant demographics, clinical history, and their experiences with transvaginal ultrasound. The questionnaire was divided into five sections: 1) demographics: age, and marital status, education level, and occupation; 20 clinical history: duration of infertility, previous reproductive health diagnoses (e.g., PCOS, endometriosis); 3) perceived effectiveness of transvaginal ultrasound: Likert scale questions assessing how useful participants found the ultrasound for diagnosing their condition; 4) patient comfort and satisfaction: Likert scale questions on patient comfort during the ultrasound procedure; 50 role of transvaginal ultrasound in treatment planning: questions exploring how participants felt the ultrasound contributed to their infertility treatment plan.

The questionnaire was pilot tested with 10 participants to guarantee clarity along with reliability. Minor modifications were done per the feedback before the final version was administered.

Data analysis

The data acquired through the questionnaire were entered into a statistical software package (SPSS version 26) for analysis. Descriptive statistics like frequency distributions, and percentages, and means, along with standard deviations were utilized to summarize participant demographics, clinical histories, and responses to the Likert scale questions. Statistical significance was set at $p<0.05$, and the results were delivered in tables and narrative form to provide an understanding of the central role of transvaginal ultrasound in infertility diagnosis and treatment planning.

RESULTS

Demographics of the study participants

Table 1 presents the demographic distribution of the participants based on age, marital status, educational background, and occupation. Most participants (72.0%) were aged between 25 and 34 years, indicating that the study predominantly included individuals within the reproductive age group. The majority were married (58.4%) and had a college education (64.8%). Most of the participants were employed (56.0%), reflecting the occupational diversity within the sample.

Table 1: Demographic characteristics of participants.

Variables	Frequency	%
Age (years)		
18-24 (1)	53	21.2
25-34 (2)	180	72.0
35-44 (3)	16	6.4
45+ (4)	1	0.4
Marital Status		
Single (1)	63	25.2
Married (2)	146	58.4
Divorced (3)	38	15.2
Widowed (4)	3	1.2
Educational background		
No formal education (1)	21	8.4
College educated (2)	162	64.8
Graduate degree (3)	21	8.4
Postgraduate (4)	27	10.8
Other (5)	19	7.6
Occupation		
Employed (1)	140	56.0
Unemployed (2)	73	29.2
Student (3)	11	4.4
Other (4)	26	10.4

Clinical history and treatment experience

Table 2 illustrates the participants' clinical history, including duration of infertility and prior diagnosis of reproductive health conditions. A majority (62.0%) had been experiencing infertility for 1-5 . Nearly half of the participants (46.0%) had a previous diagnosis of reproductive health issues such as PCOS or endometriosis. This indicates that a significant portion of the sample had existing fertility-related diagnoses prior to the study.

Table 2: Clinical history of participants.

Variable	Frequency	%
Duration of infertility		
Less than 1 year (1)	38	15.2
1-5 (2)	155	62.0
6-10 (3)	47	18.8
More than 10 (4)	10	4.0
Previous diagnosis of reproductive health conditions		
Yes (1)	115	46.0
No (2)	135	54.0

Effectiveness of transvaginal ultrasound in diagnosis

The perception of the effectiveness of transvaginal ultrasound in diagnosing infertility was generally positive, as shown in Table 3. Around 38.5% of the participants strongly agreed that the transvaginal ultrasound provided helpful insights into their condition. A significant portion of the participants (30.5%) moderately agreed, indicating overall confidence in the diagnostic utility of the procedure.

Table 3: Perceived helpfulness of transvaginal ultrasound.

Response	Frequency	%
Strongly disagree (1)	32	16.0
Disagree (2)	20	10.0
Neutral (3)	10	5.0
Agree (4)	61	30.5
Strongly agree (5)	77	38.5
Total	200	100.0

Patient comfort and satisfaction with transvaginal ultrasound

Table 4 shows the participants' comfort levels during the transvaginal ultrasound procedure. While 34.5% of the participants strongly agreed that they felt comfortable during the procedure, a smaller portion (8.5%) reported discomfort. These findings suggest that although the majority of participants were at ease, patient comfort remains a consideration in the use of this diagnostic tool.

Role of transvaginal ultrasound in treatment planning

As seen in Table 5, a majority of participants (48.5%) agreed that the transvaginal ultrasound was crucial in shaping their infertility treatment plans, and 26.0% strongly agreed. This emphasizes the perceived

importance of this diagnostic tool in guiding clinical decision-making and improving patient outcomes.

Table 4: Comfort during the transvaginal ultrasound procedure.

Response	Frequency	%
Strongly Disagree (1)	17	8.5
Disagree (2)	8	4.0
Neutral (3)	15	7.5
Agree (4)	91	45.5
Strongly Agree (5)	69	34.5
Total	200	100.0

Table 5: Impact of transvaginal ultrasound on treatment planning.

Response	Frequency	%
Strongly disagree (1)	22	11.0
Disagree (2)	15	7.5
Neutral (3)	14	7.0
Agree (4)	97	48.5
Strongly agree (5)	52	26.0
Total	200	100.0

These results demonstrate the central role that transvaginal ultrasound plays in both the diagnostic and treatment processes for infertility, as perceived by the patients. The data highlights the positive patient experience and its implications for future clinical practices.

DISCUSSION

The present study looked to evaluate the effectiveness, patient comfort, and overall impact of transvaginal ultrasound within the diagnosis and treatment planning of infertility. The findings deliver valuable insights into both the demographic characteristics of the patient population and their perceptions of transvaginal ultrasound as a diagnostic tool. The demographic profile of the study participants revealed that the majority (72.0%) were within the reproductive age group of 25-34, which aligns with the typical age range for individuals seeking infertility evaluation. This is consistent with global fertility trends, where the peak reproductive fall within this age bracket.[6] Additionally, a significant proportion of participants were married (58.4%) and held college-level education (64.8%), suggesting that infertility affects a diverse and educated population.

Clinical history data indicated that most participants (62.0%) had been experiencing infertility for 1-5, and nearly half (46.0%) had pre-existing reproductive health conditions like PCOS or endometriosis. These findings are in line with previous studies that have identified PCOS and endometriosis as common contributors to female infertility.[7] The duration of infertility experienced by participants underscores the chronic nature of the condition and the need for effective diagnostic tools. A substantial majority of participants perceived transvaginal ultrasound as an effective diagnostic tool, with 38.5% strongly agreeing and 30.5% moderately agreeing that it provided helpful insights into their infertility condition. This positive perception is supported by existing literature, which highlights the high diagnostic accuracy of transvaginal ultrasound in identifying anatomical abnormalities, ovarian cysts, and uterine fibroids.[8] The strong agreement among participants reflects confidence in the procedure's ability to elucidate underlying causes of infertility, thereby facilitating targeted treatment strategies. Patient comfort during the transvaginal ultrasound procedure was generally high, with 34.5% strongly agreeing and 45.5% agreeing that they felt comfortable. However, a notable minority (8.5%) reported discomfort, indicating that while the procedure is largely well-tolerated, there remains room for improvement in enhancing patient comfort. Strategies such as improved patient education, gentle handling during the procedure, and the use of lubricants can potentially mitigate discomfort.[9]

The study revealed that transvaginal ultrasound significantly influences treatment planning, with 48.5% agreeing and 26.0% strongly agreeing that it was crucial in shaping their infertility treatment plans. This finding underscores the integral role of accurate diagnostic imaging in informing clinical decisions and tailoring individualized treatment regimens. The ability of transvaginal ultrasound to provide detailed anatomical and functional information enables healthcare providers to devise more effective and personalized infertility treatments, thereby improving patient outcomes.[10] The positive perceptions of transvaginal ultrasound among patients highlight its importance in infertility diagnosis and management. Healthcare providers should continue to utilize this diagnostic tool while also addressing areas of patient discomfort to enhance the overall patient experience. Additionally, integrating patient feedback into clinical protocols can further optimize the use of transvaginal ultrasound, ensuring it meets both diagnostic and patient-centered care objectives.[11] However, it stands to reason that there are some limitations to the work presented in the current study. Generalizations from the sample of respondents where invited participants were in a certain age and educational bracket could therefore be slightly off base. Also, there is existence of response bias since the data have been obtained through self-reporting. Subsequent prospective investigations should seek to involve a broader and more representative sample, in addition to using outcome assessments based on observer reliability and self-reported patient outcome. Subsequent studies should examine the overall prognosis of patients diagnosed and first received treatment depending on the results of transvaginal ultrasound. Moreover, evaluating the role of newer technologies like higher frequency imaging and artificial intelligence based diagnostic for the efficacy and patient acceptability of transvaginal ultrasonography in infertility management may add

superior value of improvement. Further comparative analysis of the diagnostic efficacy of transvaginal ultrasound with other methods would also highly contribute to the definition of the optimal approach to infertility assessment.

CONCLUSION

In conclusion, transvaginal ultrasound is a highly effective diagnostic tool in the evaluation of female infertility, as evidenced by the positive perceptions of patients regarding its diagnostic utility and role in treatment planning. While patient comfort is generally satisfactory, ongoing efforts to minimize discomfort will further enhance the patient experience. The findings advocate for the continued use and optimization of transvaginal ultrasound in clinical practice, reinforcing its pivotal role in the successful management of infertility.

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