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EXPLORING CULTURAL IMPACTS ON PATIENT COMFORT IN OPPOSITE-GENDER ULTRASOUND EXAMINATIONS: A CROSS-SECTIONAL ANALYSIS AMONG RADIOLOGY RESIDENTS AND PRACTITIONERS

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Abstract

Objectives: *To study how cultural beliefs and gender norms affect patient comfort in opposite-gender ultrasound examinations, this research sought to determine the most common cultural or religious issues that result in discomfort or refusal of examination, and finally, this study aimed at determining the availability and efficacy of institutional support mechanism (policies, training, and chaperone protocols) and the readiness of radiologists to address cultural sensitivities in opposite-gender ultrasound examinations.*

Methods: *A cross-sectional study was done between December 2024 and April 2025 in six government hospitals in Rawalpindi and Islamabad, Pakistan. Eighty radiology residents and practitioners got a convenience sample and a validated questionnaire based on cross-cultural competence continuum, measuring cultural impacts, patient discomfort, and institutional support. IBM SPSS Statistics 25 was utilized in the analysis of data through descriptive statistics, chi-square tests ($p < 0.05$).*

Results: *Most of the participants encountered cultural effects on patient encounters, and the relationship between the perceived influence of either cultural/ gender norm on patient comfort level was significant ($p = 0.017$). Interestingly, 21.3 percent of the respondents who felt the cultural impact felt a little uncomfortable as opposed to 5 percent who felt not uncomfortable at all, 20 percent and 16.3 percent felt moderately and very uncomfortable respectively. The patient discomfort or refusal was mainly concerned with personal modesty (30.0%) and religious reasons (28.7%). The availability of institutional policy was substantially related to the preparedness of radiologists ($p=0.002$), in comparison with cultural sensitivity training ($p=0.955$) or chaperone protocols ($p=0.378$).*

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Conclusion: *The cultural beliefs and gender norms play a significant role in affecting the opposite-gender ultrasound examinations patient comfort because of modesty and religious issues. Culturally sensitive care in Pakistan radiology environments can progress through mandatory chaperones, improved training, and institutionalized policies that are consistent with the existing inconsistent support.*

INTRODUCTION

The subjective feeling of ease, security, and psychological well-being in medical procedures, referred to as patient comfort, is highly influenced by interpersonal interactions and cultural conditions in ultrasound tests where physical closeness and uncovering of intimate body parts are typically involved. The perception of modesty and privacy can be defined by cultural beliefs and social gender norms which may affect the acceptance of patients to undergo such processes. The research is carried out in governmental hospitals in the Rawalpindi and Islamabad, Pakistan and defines how these cultural considerations influence the comfort of patients as radiology residents and practitioners see it in order to improve patient-centered care in the varied clinical environments. (2)

The issue of patient discomfort during opposite-gender ultrasound examinations is a significant issue in the field of radiology, as 2040 percent of patients feel uncomfortably during such examination, particularly in those procedures that require pelvic or obstetric ultrasounds. (3) The roots of this uneasiness are usually cultural and religious values that may express themselves as a preoccupation with physical contact with an opposite-gender practitioner which may be exacerbated by poor communication or absence of chaperoning possibilities. This is also compounded by the difference in cultural competence levels of radiology professionals which could be different between residents and those with experience because of the difference in training and exposure as seen in recent South Asian literature on cultural dynamics in healthcare. (4)

The existing literature offers some information about the patient-provider interaction in medical imaging, but the particular discussion of the cultural factors in opposite-gender ultrasound scans is lacking. Other literature, including the effects of communication barriers in a multicultural radiography practice or patient knowledge of ultrasound processes, note the need to impact cultural competence and effective communication but do not specifically mention the opposite-gender dynamic of ultrasound exams as a particular area of concern, presenting an important topic of investigation.

There is also a research gap on the effect of cultural issues that influence patient comfort in opposite-gender ultrasound examination, as perceived by radiology residents and practitioners. (7) Although there have been investigations into the concepts of patient-provider interactions in general or gender preference in primary care, the specifics of ultrasound procedures, where close physical contact is involved, have not been studied enough. This disparity is more evident especially in culturally diversified environments such as Pakistan whereby religious and societal principles have rigid dominance over patient preferences. Insufficient studies on policies and training in institutions concerning such cultural sensitivities inhibit the expansion of practices that improve trust and comfort levels of patients in radiology environments. (8)

The objective of the study will be to explore how cultural beliefs and gender norms affect patient comfort in opposite-gender ultrasound tests through the assessment of perceptions of radiology residents and practitioners in government hospitals in Rawalpindi and Islamabad, Pakistan, between December 2024 and April 2025. Its aim is to discover the main cultural or religious issues causing patient discomfort or rejection and the efficiency of institutional policies, training, and chaperoning procedures. This study is important because it can be used to formulate specific interventions that can boost patient trust and satisfaction, which constitutes a key gap in culturally sensitive radiology procedures. The study will facilitate fair healthcare provision and

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radiate to the training systems across the world by offering information on cultural obstacles and institutional solutions.

- To examine the perceived effect of cultural beliefs and gender norms on patient comfort during opposite-gender ultrasound examination
- To determine the predominantly cited cultural or religious issues that result in patient discomfort or refusal opposite-gender ultrasound examinations
- To assess the accessibility and efficacy of institutional support variables (policies, training, and chaperone protocols) in overcoming the radiologists readiness to encounter cultural sensitivities when performing opposite-gender ultrasound examinations

METHODOLOGY

The study was a cross-sectional study carried out between December 2024 and April 2025 in six Government hospitals including Pakistan Institute of Medical Sciences, Federal Government Services Hospital, Capital Hospital, Holy Family Hospital, Rawalpindi General Hospital and Fauji Foundation Hospital Pakistan. These tertiary care centers were chosen because they have to deal with diverse patients, and high footfall of patients undergoing ultrasound examination made it an apt backdrop to investigate cultural factors that impact patient comfort levels during opposite-gender ultrasound examination. Radiology departments were aimed at capturing both the radiology residents and practitioners to get a wide scope of cultural dynamism in clinical practice in a culturally diverse region with thick religious and gender societal norms.

Radiology departments of the chosen government hospitals were used to recruit a convenience sample of 80 radiology residents and practitioners. Both males and females were represented in the sample in order to introduce different views on interaction with opposite-gender patients. The residents were at different levels of their training, whereas practitioners had more than two years of post-residency experience, which made it possible to compare cultural competence and patient care approaches in residents and practitioners of different levels of expertise. The use of a power calculation in the previous radiology and cultural competence studies helped to determine the sample size of 80 participants. With an expected prevalence of 30% of reported cultural effects on patient comfort (based on early data), a 95% confidence level, and a 10% margin of error, the minimum sample size was 73. To contribute to possible non-response and to assure adequate power (80 %) to find important differences in perceptions and practices between residents and practitioners we recruited 80 participants.

The study instrument was a validated questionnaire based on the cross-cultural competence continuum, modified to specific patient comfort in opposite-gender ultrasound examinations. The most relevant items in the questionnaire were: (1) a 5-point Likert scale concerning the perceived effect of cultural beliefs on patient interactions (1 = no impact, 5 = severe impact), (2) multiple-choice questions determining particular reasons why patients feel uncomfortable or refuse (e.g. personal modesty, religious reasons, family influence), and (3) categorical questions related to the availability of chaperone protocols (e.g. always provided, encouraged but not mandatory) and cultural sensitivity training (e.g. comprehensive, minimal, none. The questionnaire was filled anonymously in paper-based or electronic forms at the departmental meetings scheduled to ensure high response rates. Data collection process maintained confidentiality and adherence to ethical standards, and the institutional review boards of involved hospitals gave approval.

Inclusion criteria were radiology residents and practitioners who were directly engaged in the process of conducting ultrasound examination in the chosen hospitals, and who could give an informed consent. The exclusion criteria were non-radiology medical personnel and medical staff not involved in direct patient care, as well as those who did not want to take part. The SPSS version 25 was utilized to analyze data. Demographic characteristics and questionnaire responses were summarized using descriptive statistics, frequencies and percent. The results were obtained using chi-square to determine cultural beliefs and gender norms on patient with a significant level of $p < 0.05$. The purpose of the analysis was to have sound information on the

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cultural barriers and the performance of institutional measures in dealing with these barriers.

RESULTS:

Responses of 80 radiology residents and practitioners in government hospitals in Rawalpindi and Islamabad, Pakistan, between December 2024, and April 2025 were analyzed in this cross-sectional study using IBM SPSS Statistics 25. A validated questionnaire based on the cross-cultural competence continuum was utilized in data collection, and descriptive statistics, chi-square tests, t-tests, logistic regression, and frequency distribution were used in the data analysis. Other significant results were the 76.3% (n=61) of the participants stating that their culture had an influence on patient interactions, and female radiologists were 68.4% less likely to report cultural impact than male radiologists (OR = 0.316, p=0.032). Also, the significant correlation was identified between the experience and the training effectiveness (p=0.042).

Table 1

Demographic Characteristics of Radiology Residents and Practitioners (n=80)

Characteristic	Category	F (%)
Age Group	**20-25 years**	**7(8.8%)**
	26-30 years	**41(51.2%)**
	31-35 years	**28(35.0%)**
	36-40 years	**4(5.0%)**
Gender	**Male**	**27(33.8%)**
	Female	**53(66.3%)**
Marital Status	**Single**	**18(22.5%)**
	Married	**61(76.3%)**
	Separated	**1(1.3%)**
Experience Level	**1-3 years**	**28(35.0%)**
	4-7 years	**38(47.5%)**
	8-10 years	**14(17.5%)**

Table 1 shows the demographic characteristic of the 80 radiology practitioners who took part in the research. They mostly were aged 26 to 30 years (51.2%), followed by those aged 3135 years (35.0%), lesser percentages were in the 2025 years (8.8%) and 3640 years (5.0) age brackets. Regarding the gender proportion, females comprised 66.3% (n = 53) and males 33.8% (n = 27). In the aspect of marital status, the majority of the respondents were married (76.3%), 22.5 percent were single and only 1.3 percent said they were separated. Regarding the professional experience, the largest percentage of the respondents had work experience of 4 7 years (47.5%), 1 3 years (35.0%), and 8 10 years (17.5%). What these demographics tell us is that the sample was mostly composed of young to mid-career professionals, with majority of them being female and having significant amount of experience (in years) in clinical radiology practice.

Table 2

Perceived Impact of Cultural/Gender Norms on Patient's Comfort Level in Opposite-Gender Ultrasound Examinations(n=80)

Comfort Level	Cultural Impact (Yes)	Cultural Impact (No)	$\chi^2(4)$	p-value
Not at all	8(10%)	8(10%)	12.025	0.017

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Slightly	17(21.3%)	4(5%)
Moderately	16(20%)	3(3.8%)
To a great extent	13(16.3%)	0(0%)
To a very great extent	7(8.8%)	4(5%)

As shown in the table 2, there is a strong relationship between the perceived cultural influence on the comfort level of patients as assigned by a chi-square test 2 4 = 12.025, p = 0.017). Of those who did not report cultural impact, 8(10%) were not at all comfortable compared to 8(10%) who did have a cultural impact in the same bracket, however, 17(21.3%) who did have a cultural impact were slightly uncomfortable as opposed to 4(5%) who did not have an impact. The pattern is repeated with 16(20%) and 13(16.3%) of those who perceive cultural impact as moderate and great discomfort respectively with no patients in the to a great extent category having no impact, and only 4(5%) of those in the to a very great extent category having no impact. These findings imply that the presence of an assumed cultural or gender norm effect bears a significant connection to the increased level of discomfort in opposite-gender ultrasound scans.

Table 3

Cultural and Religious Concerns Leading to Patient Discomfort or Refusal (n=80)

Reason	F%
Cultural Beliefs	6(7.5%)
Religious reasons	23(28.7%)
Personal modesty	24(30.0%)
Family influence	17(21.3%)
No clear reason provided	10(12.5%)

Table-3 presents most frequently reported culture-religious issues causing patient discomfort or refusal to accept opposite-gender ultrasound examination, the participants were requested to spell out observed reasons as cited by patients. Personal modesty was the most commonly given reason with 24 respondents (30.0%) followed by religious reasons with 23 respondents (28.7%). The family influence was cited by 17 respondents (21.3%), another factor which was less common was the cultural beliefs, with only 6 respondents (7.5%) citing it as a cause. Also, 10 respondents (12.5%) indicated that patients did not give any clear reason. These results lead to the consideration that personal values, especially, modesty and religious concerns are the major causes of patient discomfort or refusal in opposite-gender imaging cases.

Table 4

Availability and Effectiveness of Institutional Support Factors and Radiologist Preparedness(n=80)

Institutional Support Factors		Radiologists Preparedness		χ^2 (1)	p-value
		Yes	No		
Institutional Policy	Available	39	10	10.067	0.002
	Not Available	14	17		
Cultural Sensitivity Training	Present	35	18	0.003	0.955
	Absent	18	9		
Chaperone Protocol	Present	42	19	0.778	0.378
	Absent	11	8		

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Table 4 indicates that Chi-square test was used to analyze the association between institutional support mechanisms and radiologists perceived preparedness to deal with cultural sensitivities when performing opposite-gender ultrasound examinations. The presence of institutional policies were also statistically significantly related to preparedness, 2 (1) = 10.067, p = 0.002, preparedness among radiologists working at institutions with formal policies. Conversely, neither the presence of cultural sensitivity training (p=.955) nor chaperone protocol (p=0.378) are statistically significant. These results imply that the institutional rules could be a more decisive factor contributing to practitioner preparation than training or chaperone policies separatedly.

Discussion:

This study result highlights how cultural beliefs and gender norms affect patient comfort level during opposite-gender ultrasound examination, addressing the first research objective.(11) Table 2 results show that there is a significant relationship between the perceived, cultural or gender norms influence and patient comfort level during opposite-gender ultrasound examination with the chi-square test showing significance (2 (4) = 12.025, p = 0.017). Interestingly, 21.3% (n=17) of the patients who felt the cultural influence faired slightly uncomfortable as opposed to 5% (n=4) of those who did not, whereas 20% (n=16) and 16.3% (n=13) of those who felt the cultural influence moderately and greatly uncomfortable, respectively with no patient in the to a great extent category feeling no cultural influence.(26) That indicates that cultural and gender expectations significantly increase the level of discomfort, which is in line with the results that show that cultural beliefs define interactions with patients in radiology practices. (12) It indicates such trends can be caused by the heightened awareness of practitioners with regard to various patient responses since experience tends to heighten responsiveness to cultural norms. (13) moreover, this distress is also similar to what has been noted in Southeast Asian settings, wherein gender congruence affects patient preferences, highlighting the importance of using specialized strategies to reduce disparities in care. (14)

To deal with the second goal, Table 3 reveals personal modesty (30.0%, n=24) and religious (28.7%, n=23) factors as influencers of patient discomfort or refusal in opposite-gender ultrasound examinations, preceding family influence (21.3%, n=17). It demonstrates the cultural aspect of Pakistan, segregation, and modesty between genders, which is based on Islamic principles. (15) The same tendencies are observed in other areas that have similar cultural standards. (16) Family influence indicates social influences on the choices. This is similar to what is found in the rural communities. Radiology therefore needs culturally sensitive practices to make the patient comfortable. (18)

Regarding the third goal, as shown in Table 4, there was a strong connection between the presence of institutional policies and the radiologists feeling prepared to deal with cultural sensitivities when performing opposite-gender ultrasound examinations 2 (1) = 10.067, p = 0.002). This implies that formal policies improve levels of preparedness to deal with cultural uneasiness. By comparison, cultural sensitivity training χ 2 (1) = 0.003, p = 0.955) and chaperone protocols χ 2 (1) = 0.778, p = 0.378) did not yield a significant association.(27) This outlines a possible loophole in training performance. Guidelines on chaperones do not seem to be enough to increase preparedness either. Therefore, uniform institutional policies appears to be important in facilitating culturally sensitive care.(28)

Although the discomfort of female patients because of cultural expectation is eminent, male patients also complain of discomfort during opposite gender ultrasound, especially in intimate pelvic or genitourinary investigations. This discomfort is probably caused by privacy concerns. Nevertheless, cultural barriers might be reduced as some patients, in life-threatening situations, prefer an expert to a person of a particular gender.(29) The desire to receive the care of the samegender is high in the conservative environment of Pakistan, and both masculine and feminine issues should be considered to practice radiology in a holistic manner.

Institutional reinforcement and cultural belief are decisive factors influencing the radiology practice in various countries such as Pakistan.(30) Limits of training are underlined by the absence of relation between cultural sensitivity training and

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preparedness .Poor policies also highlight the necessity of uniform guidelines, like required chaperons, in order to overcome the cultural obstacles successfully.

Instead, modesty (30.0%) and religious concerns (28.7%) are the most critical problems, and they require uniform guidelines such as the presence of chaperones and specific communication training. Also, table 4 demonstrates the disparities in the institutional support, where the policy availability is correlated with the preparedness ($p = 0.002$), implying that the cultural competence should be included in the training. (25) Qualitative methodology that seeks to gain the perceptions of the patients needs to be utilized in future research to enhance the knowledge concerning the cultural impacts on ultrasound examination.

Conclusion:

In this research conducted in government hospitals of Rawalpindi and Islamabad, Pakistan, it is important to note that cultural beliefs as well as gender norms play an important role in defining patient comfort in opposite-gender ultrasound examination. The investigation revealed that cultural and religious issues, especially the ones related to modesty and social norms, frequently result in patient discomfort or denial. Also, the analysis of the institutional support mechanisms revealed the importance of formal policies in training radiologists to be prepared to deal with cultural sensitivities and pointed to the deficiencies in training and chaperone policies. These lessons highlight the importance of uniform policies, cultural competence education, and the presence of uniform chaperons to promote patient-centered and culture-sensitive care in radiology practices.

Limitation and recommendation:

This research had a few limiting factors that can impact on the external validity of its results. The convenience sample of government hospitals in Rawalpindi and Islamabad, Pakistan, restricts the representation of the private facilities or rural environments, where the cultural norms and resources may vary. The cross-sectional design further limits the possibility to determine the changes over time or determine causality of the cultural factors the comfort levels. Moreover, the practitioner-centered approach does not include the direct patient voice, which might introduce more insights regarding the personal and cultural factors affecting discomfort in opposite-gender ultrasound exams.

In order to overcome the described cultural factors and institutional voids, radiology departments would be advised to develop uniform policiesrequiring the presence of a chaperone during opposite-gender ultrasound examinations to promote patient comfort and confidence. It is suggested that more extensive cultural competence training programs be implemented to accommodate the different societal or religious norms in Pakistan so that radiologists would be more adequately prepared in handling patient sensitivities. It is also high time that hospitals focus on improving the female workforce in the radiology department to match the patient preference of same-gender care especially in conservative environments. The next stage of research must include qualitative methodology, including interviewing patients, to fix their first-hand experience and supplement the experience of practitioners. Also, future research should be extended to cover the private and rural facilities to gain more insight into cultural dynamics and shape radiology practice equitable and patient-centered.

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