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RESEARCH ARTICLE

Prevalence of language barriers, impacts, and coping strategies among medical students during their clinical rotation in Peshawar

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ABSTRACT

Background: This study examines the Prevalence of Language Barriers, Impacts, and Coping Strategies among Medical Students during their Clinical Rotation in Peshawar, an area with a wide range of language diversity.

Methods: A cross-sectional survey was conducted among 663 medical students from six medical colleges in Peshawar to assess the prevalence, frequency, and severity of language barriers, their impact on patient interactions, and the coping mechanisms employed by students.

Results: The findings indicated that 39.1% of the students faced language barriers during clinical rotations; most of them were female and non-Pashto speakers. A vast proportion (69.1%) felt that these barriers negatively affected patient care due to difficulties in obtaining proper patient history and increased miscommunication. Moreover, students with language barriers reported anxiety and frustration during patient interaction. The primary coping strategy used by students was seeking support from colleagues at 80.7%. Figures showed that only 11.9% of students received formal training to overcome language barriers. Of course, students who received language barrier training were significantly more confident in clinical interactions.

Conclusion: These results suggest extreme reforms in medical curricula, such as including many languages and cultural training programs to overcome language barriers; this would better prepare the students to work in a multilingual setting, dramatically reducing communication errors, improving patient care, and enriching the education experience in diverse areas.

Introduction

Effective communication is critical in medical practice, especially during clinical rotations, where proper doctor-patient interaction directly affects the quality of care (1). However, language barriers remain

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a major hurdle, causing most misunderstandings, decreasing care quality, and adding more stress to medical students during patient interactions (2).

Many studies show a need to overcome the language barriers in health care. For instance, research in Pakistan reported that medical graduates face problems communicating with patients because of a language barrier, which causes frustration, poor rapport, and poor patient care (3). The same results have been recorded worldwide. Language differences between the health care providers and patients have been associated with miscommunication, patient dissatisfaction, and sometimes adverse health outcomes (4). Another study has shown that language barriers are the most significant determinant of diagnostic errors, risks to patient safety, and poor clinical outcomes (5-6).

Clinical rotations pose a high risk, as medical students are likely to experience the challenges of language differences. The students are expected to pool all theoretical knowledge into practical situations during this training period. However, when the patients they attend speak other languages, this application of knowledge will be incomplete due to the language barrier. It may even impact their confidence levels, clinical decisions, and the quality of care offered (7). For instance, foreign medical students who pursue studies in the United States and Australia apparently claim that they are unable to understand the local accent and have an uncomfortable feeling when communicating with patients (8-9). Similarly, a study of Malaysian medical students in Egypt highlighted the difficulties students face when taking part fully in their clinical learning experiences due to linguistic barriers (10).

Apart from communication problems, this study also shows that the language barrier has deeply affected the emotional and psychological well-being of medical students, such as feelings of guilt, anxiety, and actual dissatisfaction with their performance (11). These stresses can create a vicious cycle of the sub-optimal application of clinical skills and subsequent communication, in which further anxiety normally produces poor patient care (12). In addition, a workload increase with stress among healthcare providers has been linked to language barriers that further complicate the educational environment of medical students (13).

To overcome this, researchers identify several coping mechanisms that may be useful. These include language training, use of interpreters, cultural sensitivity training, and non-verbal communication skills development (14). For example, medical students in multilingual countries like Saudi Arabia and Malaysia receive the necessary language support and cultural orientation to work across the linguistic barrier and communicate with patients more effectively (15-16). Thus, studies have promoted more policies and frameworks that should be developed by healthcare organizations to ensure language capability and cultural competence make medical students and professionals better equipped to deal with the diverse languages they find themselves interacting with during clinical practice (17). There is a high demand for language comprehension skills related to patient satisfaction with care in healthcare institutions (18).

Further, the relationship between patient-physician language concordance and quality care is an important consideration that must be explored if such outcomes are achieved in diverse linguistic environments (19-20). Despite the global recognition of language barriers in healthcare, a significant research gap remains regarding the challenges faced by medical students in Peshawar during clinical interaction. Linguistic diversity is peculiar in this region because of the influence from both Khyber Pakhtunkhwa and Tribal areas and Afghanistan's proximity, so the challenges in this regard are still underexplored in the existing literature. This study examines the Prevalence of Language Barriers, Impacts, and Coping Strategies among Medical Students during their Clinical Rotation in Peshawar, an area with a wide range of language diversity.

This study aims to:

1. Determine the frequency and severity of language barriers encountered by medical students during clinical practice in Peshawar.
2. Assess the impact of language barriers on patient interactions among medical students in Peshawar, including emotional responses, observed effects on patient care, and perceptions of communication quality.

3. Identify coping mechanisms utilized by medical students to overcome language barriers during patient interactions, and evaluate their perceived effectiveness.
4. Evaluate the impact of training programs on addressing language barriers, determine the need for additional training or education, and explore topics for inclusion in training programs to enhance communication skills in clinical settings.

Materials and Methods

This cross-sectional survey was conducted to investigate the prevalence, impacts, and coping strategies related to language barriers among medical students during their clinical rotations in Peshawar, Pakistan. The study was conducted at six major medical colleges: Khyber Medical College, Khyber College of Dentistry, Khyber Girls Medical College, Rehman Medical College, Rehman College of Dentistry, and Pak International Medical College. A total of 665 medical students from these colleges participated, providing a diverse and representative sample of medical students from both private and public institutions.

A stratified sampling technique was used to ensure balanced representation from both private and public colleges. The colleges were divided into two strata: private colleges (Rehman Medical College, Rehman College of Dentistry, and Pak International Medical College) and public colleges (Khyber Medical College, Khyber College of Dentistry, and Khyber Girls Medical College). Systematic sampling was conducted by selecting every third student from the entire population of 2,203 medical students, based on their roll numbers, to achieve a final required sample size of 722 students. This sampling method ensured a representative sample across different years and colleges. Eligible participants included medical students in their 3rd, 4th, or final year of study. Students who were absent during the data collection period or did not consent to participate were excluded from the study.

Data was collected using a structured questionnaire designed specifically for this study. The questionnaire consisted of two sections: a screening section to identify participants encountering language barriers and a comprehensive section covering communication difficulties, frequency, severity rating, and various aspects related to language barriers in healthcare settings. Prior to the main data collection, a pilot test was conducted to evaluate the validity, reliability, and feasibility of the instrument. A small sample of participants, demographically similar to the target population, provided feedback that led to refinements in the questionnaire. The final questionnaire demonstrated a Cronbach's alpha reliability coefficient between 0.7 and 0.8, indicating good internal consistency.

Data collection was carried out over a five-month period (March to July). Research assistants visited the selected colleges to explain the study's purpose and obtain informed consent from eligible participants. The participants completed the comprehensive section of the questionnaire, and the completed questionnaires were collected in sealed envelopes to maintain confidentiality and data integrity.

Quantitative data from the questionnaires were entered into SPSS version 23 for analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the data. Inferential statistics, such as chi-square tests, were employed to examine associations between categorical variables, while Spearman's Rank Correlation tests were used to explore relationships between key continuous variables. Significant associations and correlations were determined at a 95% confidence level ($p < 0.05$).

Results

The study included 663 medical students, with a mean age of 22.20 years (SD = 1.115). Of these, 66.5% (n = 441) were female. The majority were single (96.4%, n = 639. The largest group of students were in their third year (44.9%, n = 298). Most participants were from KMC (43.6%, n = 289), A total of 39.1% (n = 259) reported experiencing language barriers.

Table 1. Characteristics distribution of the study sample

Characteristic	Categories	Number (N)	Percentage (%)
Age	Mean (ST Deviation)	22.20±1.115	
Gender	Male	222	33.5
	Female	441	66.5
Marital Status	Single	639	96.4
	Married	18	2
	Divorced	1	0.1
	Widowed	1	0.1
	Other	4	0.6
Year of Study	Third Year	298	44.9
	Fourth Year	207	31.2
	Final Year	158	23.8
College	KGMC	155	23.4
	KMC	289	43.6
	KCD	58	8.7
	PIMC	70	10.6
	RMC	69	10.4
	RCD	22	3.3
Mother Tongue	Pashto	521	78.6
	Urdu	58	8.7
	Punjabi	6	0.9
	Hindko	33	5.0
	Other	37	5.6
Primary Language Since Childhood	Pashto	504	76.0
	Urdu	93	14.0
	Punjabi	7	1.1
	Hindko	16	2.4
	English	11	1.7
	Other	32	4.8
Language-Proficiency	Pashto	476	71.8
	Urdu	590	89.0
	Punjabi	61	9.2
	Hindko	90	13.6
	English	401	61.4
	Other	23	3.5
Language Intermediate	Pashto	59	8.9
	Urdu	109	16.4
	Punjabi	139	21.0
	Hindko	95	14.3
	English	171	25.8
	Other	16	2.4
Language Basic	Pashto	70	10.6
	Urdu	90	13.6
	Punjabi	99	14.9
	Hindko	54	8.1
	English	69	10.4
	Other	25	3.8
Language Barrier	Yes	259	39.1
	No	404	60.9

Gender was significantly associated with the experience of language barriers, with more females (42.6%, n = 188) than males (32%, n = 71) reporting barriers (p = 0.008). Marital status did not significantly affect the likelihood of experiencing language barriers (p = 0.422). The year of study also did not have a significant impact (p = 0.344), although final-year students reported a slightly higher incidence (43.7%, n = 69) (Table 2). Mother tongue significantly influenced language barrier experiences, with Urdu speakers reporting the highest rate (87.9%, n = 51), compared to Pashto speakers who reported the lowest rate (27.3%, n = 142) (p = 0.001) (Table 2).

Table 2. Chi-Square Analysis of Language Barriers across Demographic Characteristics

Characteristic	Categories	Language Barrier		*P*-value
		Yes	No	
Gender	Male	71 (32.0%)	151(68.0%)	0.008
	Female	188 (42.6%	253(57.4%)	
Marital Status	Single	252 (39.4%)	387 (60.6%)	0.422
	Married	7 (38.9%)	11 (61.1%)	
	Divorced	0 (0%)	1 (100%)	
	Widowed	0 (0%)	1 (100%)	
	Other	0 (0%)	4 (100%)	
Year of Study	Third Year	115 (38.6%)	183 (61.4%)	0.344
	Fourth Year	75 (36.2%)	132 (63.8%)	
	Final Year	69 (43.7%)	89 (56.3%)	
COLLEGE	KGMC	62 (40.0%)	93 (60.0%)	0.031
	KMC	99 (34.3%)	190 (65.7%)	
	KCD	27 (46.6%)	31 (53.4%)	
	PIMC	38 (54.3%)	32 (45.7%)	
	RMC	27 (39.1%)	42 (60.9%)	
	RCD	6 (27.3%)	16 (72.7%)	
Mother Tongue	Pashto	142 (27.3%)	379 (72.7%)	0.001
	Urdu	51 (87.9%)	7 (12.1%)	
	Punjabi	5 (83.3%)	1 (16.7%)	
	Hindko	26 (78.8%)	7 (21.2%)	
	Other	30 (81.1%)	7 (18.9%)	
Primary Language Since Childhood	Pashto	138 (27.4%)	366 (72.6%)	0.001
	Urdu	72 (77.4%)	21 (22.6%)	
	Punjabi	5 (71.4%)	2 (28.6%)	
	Hindko	13 (81.3%)	3 (18.8%)	
	English	7 (63.3%)	4 (36.4%)	
	Other	24 (75.0%)	8 (25.0%)	

A significant majority of respondents (91.9%, n = 238) reported communication difficulties due to language barriers during patient interactions. These difficulties were encountered occasionally by 40.9% (n = 106) and always by 20.1% (n = 52) (Table 3). The severity of these barriers was rated as slightly severe by 29% (n = 75), with 52.5% (n = 136) reporting anxiety when faced with these barriers. Additionally, 86.1% (n = 223) observed that language barriers affected other clinical students (Table 3). Language barriers were perceived to hinder the ability to provide quality care by 69.1% (n = 179) of respondents. This impact included compromised patient medical histories (75.7%, n = 196) and increased misunderstandings (42.9%, n = 111). Regarding training, only 11.9% (n = 31) reported receiving formal training on overcoming language barriers. A significant majority (82.7%, n = 215) believed that more training should be incorporated into the clinical curriculum (Table 3).

Table 3. Frequency and Impact of Language Barriers, Emotional Responses, and Training Needs in Clinical Practice

Characteristic	Categories	Number (N)	Percentage (%)
1. Have you ever experienced communication difficulties due to language barriers during patient interactions?	Yes	238	91.9
	No	12	4.6
	Not Sure	9	3.5
2. How frequently do you encounter language barriers in your clinical practice?	Rarely	51	19.7
	Occasionally	106	40.9
	Frequently	50	19.3
	Always	52	20.1

Table 3 *(continued)*

Characteristic	Categories	Number (N)	Percentage (%)
3. Please rate the severity of language barriers you encounter on a scale of 1 to 5 (1 being not severe and 5 being extremely severe).	Not severe	45	17.4
	Slightly severe	75	29.0
	Moderate severe	65	25.1
	Severe	40	15.4
	Extremely severe	34	13.1
4. How do you feel when faced with a language barrier during patient interactions?	Frustrated	77	29.7
	Anxious	136	52.5
	Confident	21	8.1
	Other	25	9.7
5. Have you observed language barriers affecting other clinical students in their interactions with patients?	Yes	223	86.1
	No	19	7.3
	Not Sure	17	6.6
6. How do you cope with the emotional and psychological impact of language barriers during patient interactions?	Seeking support from colleagues	209	80.7
	self-assessment sessions	53	20.5
	cultural awareness training	10	3.9
	Other	11	4.2
7. Have you ever felt that language barriers hinder your ability to provide quality care to patients?	Yes	179	69.1
	No	45	17.4
	Not Sure	35	13.5
8. In your opinion, how do language barriers affect the quality of communication between clinical students and patients?	patient medical history	196	75.7
	understanding of patient needs	96	37.1
	Delayed diagnosis or treatment	76	29.3
	Misunderstandings, misinterpretation	111	42.9
	Decrease patient satisfaction with care	72	27.8
	Errors in medication administration	45	17.4
	Other	8	3.1
9. Do you feel that language barriers have affected the timeliness of delivering care or obtaining patient histories during your clinical experiences?	Strongly agree	87	33.6
	Agree	151	58.3
	Disagree	20	7.7
	Strongly disagree	1	0.4
10. Do you believe that language barriers disproportionately affect certain patient populations in Peshawar in terms of accessing healthcare services?	Yes, significantly	63	24.3
	Yes, somewhat	132	51.0
	No, not really	59	22.8
	No, not at all	5	1.9
11. Have you observed any disparities in the quality of care provided to patients who face language barriers compared to those who do not?	Yes, frequently	39	15.1
	Yes, occasionally	109	42.1
	No, rarely	84	34.4
	No, never	27	10.4
12. How do you think language barriers influence your ability to establish rapport and trust with patients?	Positively	46	17.7
	Negatively	170	65.4
	No impact	44	16.9
13. Have you witnessed instances where language barriers have compromised the quality of care provided to patients?	Yes	100	38.5
	No	92	35.4
	Not Sure	68	26.2
14. How do you perceive the overall quality of care?	Poor	51	19.6
	Fair	113	43.5
	Good	76	29.2
	Very good	17	6.5
	Excellent	3	1.2
17. Have you received any formal training or education on how to overcome language barriers during patient interactions?	Yes	31	11.9
	No	219	84.2
	Not Sure	10	3.8

Table 3 *(continued)*

Characteristic	Categories	Number (N)	Percentage (%)
18. Do you believe that more training or education on overcoming language barriers should be incorporated into the clinical curriculum	Yes	215	82.7
	No	21	8.1
	No Idea	24	9.2
19. Which of the following topics do you believe should be included in training programs to address language barriers in clinical settings?	Cross-cultural communication	150	57.7
	Effective use of interpreters	68	26.2
	Non-verbal communication techniques	77	29.6
	Strategies for simplifying language	98	37.7
	Handling challenging situations	81	31.2
	Other	10	3.8

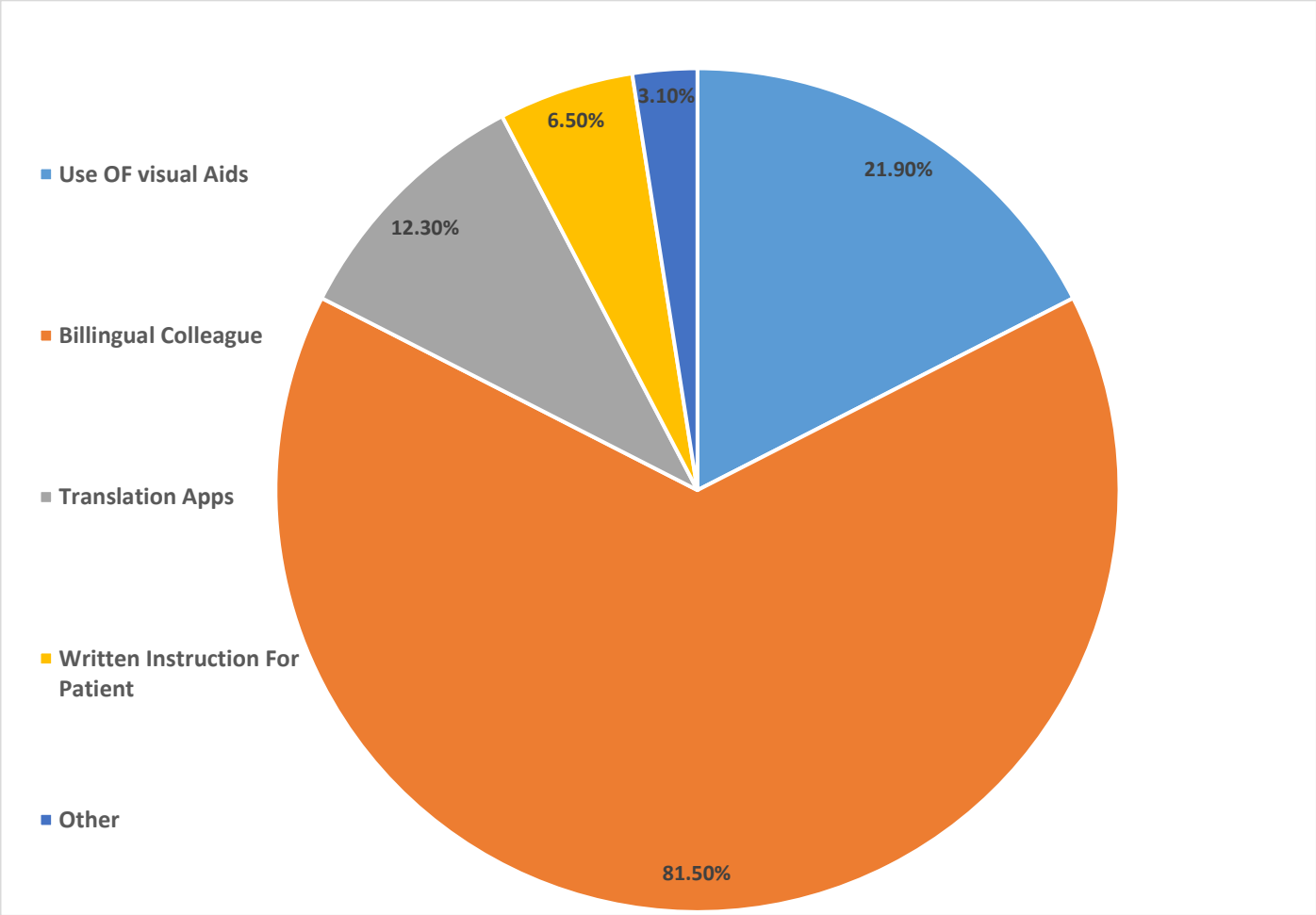

Figure1. Coping Mechanisms

The majority of respondents (80.7%, n = 209) sought support from colleagues during clinical practice. Other strategies included participating in self-assessment sessions (20.5%, n = 53), cultural awareness training (3.9%, n = 10), and seeking other forms of support (4.2%).

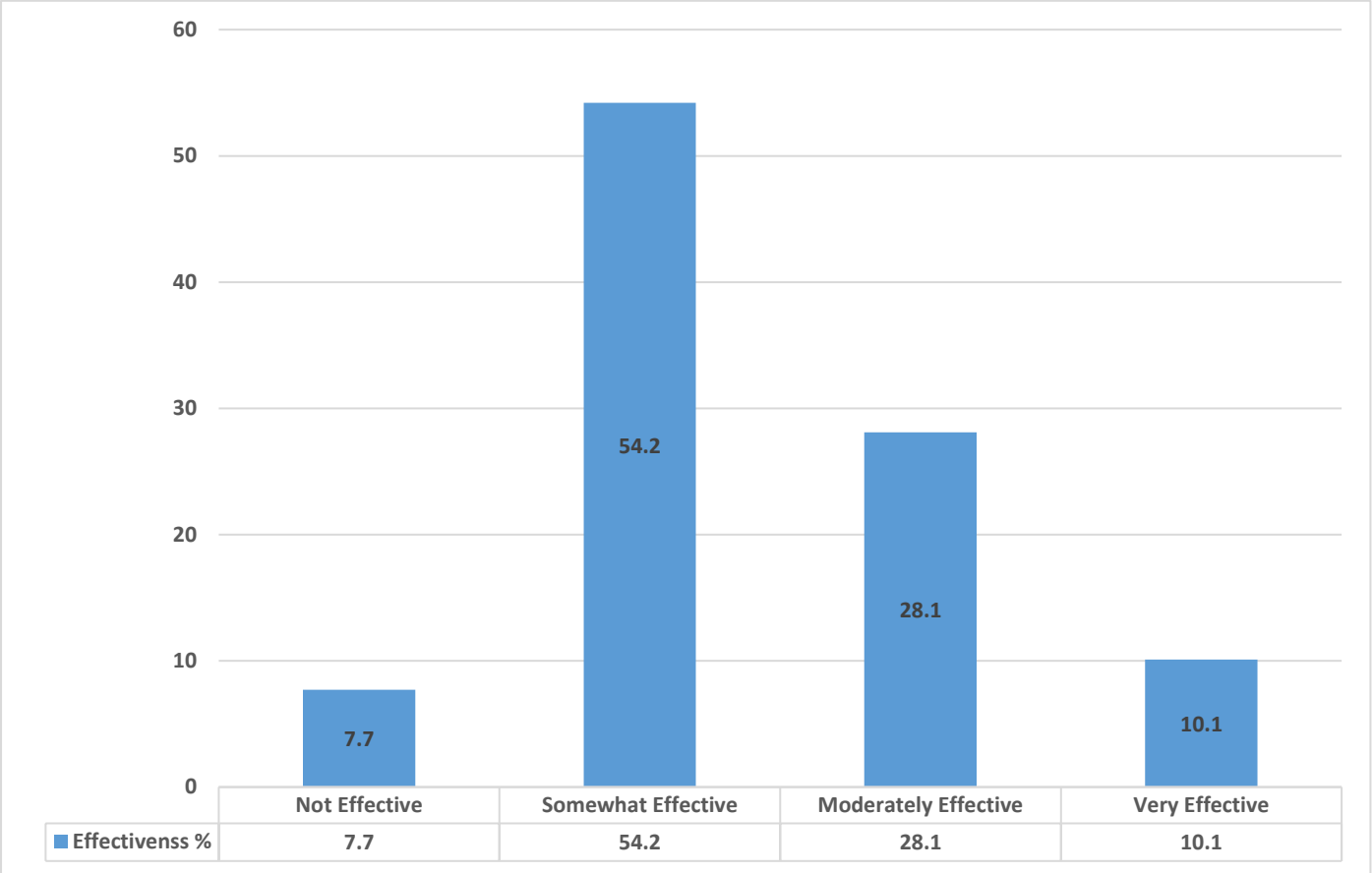

Figure 2. Coping Mechanism Effectiveness

A combined 91.8% (n = 238) of respondents agreed that language barriers affected the timeliness of delivering care or obtaining patient histories, with 33.6% (n = 87) strongly agreeing and 58.3% (n = 151) agreeing. Disagreement was minimal, with 7.7% (n = 20) disagreeing and 0.4% (n = 1) strongly disagreeing.

There was a statistically significant positive correlation ($r = 0.469$, $p < 0.001$) between the frequency and severity of language barriers and their perceived impact on patient care. This indicates that more frequent or severe language barriers correspond with greater perceived negative impacts on patient care (Table 4).

The correlation between general experiences with language barriers and coping strategies was very weak and non-significant ($r = 0.75$, $p = 0.230$), suggesting that the frequency or severity of language barriers does not strongly influence the coping strategies students use. However, a positive correlation ($r = 0.244$, $p < 0.001$) was found between the experience of language barriers and the perceived importance of training (Table 4).

A statistically significant positive correlation was found between the perceived impact of language barriers on patient care and the coping strategies employed ($r = 0.244$, $p < 0.001$), indicating that greater perceived impacts lead to more reliance on coping strategies. Additionally, there was a positive correlation ($r = 0.196$, $p = 0.001$) between the impact of language barriers and the value placed on training, highlighting the recognition of training's importance in mitigating these impacts (Table 4).

Lastly, the correlation between coping strategies and training received was very weak and non-significant ($r = 0.068$, $p = 0.273$), suggesting that the effectiveness of coping strategies is not strongly related to the amount or type of training students have received (Table 4).

Table 4. Spearman's Rank Correlation Analysis of Frequency and Severity of Language Barriers, Impact on Patient Interactions, Coping Mechanisms, and Training Needs

Variables	1	2	3	4
1. Frequency & Severity	1			
2. Impact of Language Barriers on Patient Interactions and Care Quality	.469 <.001	1		
3. Coping Mechanisms	.075 .230	.224 <.001	1	
4. Training and Education on Language Barriers	.244 <.001	.196 .002	.068 .273	1

Discussion

This cross-sectional study was conducted among 663 medical students, 55% female, and 45% male, from 6 major medical colleges in Peshawar: Khyber Medical College, Khyber College of Dentistry, Khyber Girls Medical College, Rehman Medical College, Rehman College of Dentistry, and Pak International Medical College.

39.1% of students faced language barriers during patient interactions, which countered based on gender and mother tongue. Female students and non_pashto speakers were more exposed to these barriers. Previous studies have supported the results. For example, a study in Saudi Arabia found that non-native medical students faced significant challenges due to language differences (1). Previous studies have had similar findings, such as a study conducted in Saudi Arabia, where non-native medical students faced considerable challenges due to language disparities (1). The prevalent language barrier reflects the complex multilingual environment in Peshawar, similar to that observed in other regions with diverse linguistic populations, such as Saudi hospitals (5). moreover, another study on communication barriers in healthcare stated the significant impact of language diversities on patient care quality, emphasizing that such barriers are not only prevalent but also significantly detrimental to healthcare delivery (29).

69.1% of the students with language barriers stated that language barriers affect the quality of care negatively. These findings align with previous studies and literature, including a study conducted in Saudi Arabia, where language significantly affected clinical learning and patient relations (1). Similarly, research from India reported that 88.5% of medical students encountered difficulties in patient communication during bedside teaching due to language barriers (2) a study conducted in UAE on non-Arabic healthcare practitioners caring for Arabic practitioners stated that language barriers negatively impacted healthcare practitioners' daily clinical practice, they feeling guilty, scared and dissatisfied because of their inability to convey medical information accurately because of the language barrier. Based on social identity theory (SIT), When they cannot effectively communicate with patients or their families because of language barriers, they may feel inadequate and experience dissonance in their professional identity (4). In addition, different studies showed that language barriers increase miscommunication and misunderstandings, leading to compromised patient safety and care outcomes (30).

Coping mechanisms used by students sought support from colleagues 80.7% followed by self-assessment and limited cultural awareness training. These strategies are consistent with those reported by international physicians, who often rely on non-verbal cues and adjustments in speaking style to navigate language barriers (4). However, the weak correlation between coping strategies and the training received suggests that while students employ available strategies, their effectiveness may be limited by inadequate training. This aligns with findings from Saudi Arabia, which emphasized the need for enhanced language courses and professional skills training (1) Moreover, in the report "The Impact of

Language Barriers on Patient Safety and Quality of Care," Prepared for the Société Santé en français, it stated that attention is required to develop a practical plan to promote not only awareness but also proper action on language access issues. This plan should target federal and provincial policymakers, health authorities, and other health service providers (31).

Only 11.9% of students reported receiving formal training to address language barriers, highlighting a significant gap in medical education. This lack of training, discussed in the previous research, emphasizes the importance of integrating language and cultural competence training into medical curricula (1, 5). The strong correlation between experiencing language barriers and recognizing the importance of training ($r = 0.244$, $p < 0.001$) further underscores the need for curriculum reform. A study by Huang X, Zhang Y, and Li Y, "Cultural competence training in medical education," points out that improved training on translation resources and strategies for adapting to limited English proficient (LEP) patients could greatly enhance clinical interactions and patient care (3). A study on the "impact of language barriers on healthcare outcomes" claimed that targeted training programs can significantly decrease communication errors and improve patient satisfaction (32).

This study highlights the urgent need for curriculum reform to incorporate language and cultural training programs for medical students in Peshawar. Providing such training could significantly improve students' ability to overcome language barriers and enhance the quality of care. Future research should concentrate on assessing the long-term effectiveness of these training programs and reviewing the outlooks of students and patients to evaluate their impact on communication and care.

This study has certain limitations. The focus on medical students from a specific region may limit the generalization of the findings. Additionally, the cross-sectional design precludes establishing causality. Future research should consider larger and more diverse samples, as well as longitudinal designs, to better understand how language barriers affect medical education and patient care over time. Qualitative studies could also provide deeper insights into the experiences of both medical students and patients.

Conclusion

This study revealed that language barriers are prevalent among students in Peshawar due to the linguistic diversity of this area. Language barriers negatively affect both patients and students during patient interaction by decreasing self-confidence, hindering the student's ability, and reducing the quality of care for the patients. Our findings suggest extreme reforms in medical curricula, including many language and cultural training programs to overcome language barriers; this would better prepare the students to work in a multilingual setting, dramatically reducing communication errors, improving patient care, and enriching the education experience in diverse areas.

Authors' Contributions

AL and NR designed the study. AL,EFs, LI,AA,MS,SS,HS,KB and NR collected the data. NR analyzed the data. AL,EFs, LI,AA,MS,SS,HS ,KB and NR prepared the draft of the manuscript. AL, RA and NR critically reviewed, rewrote, edited, and finalized the manuscript. All authors reviewed the manuscript

Conflict of Interests

Authors express no conflict of interest in any part of the research.

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