RESEARCH PAPER

Medical Education and Research in Hindi Medium in Eastern India: Insight and Dilemma

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ABSTRACT

Background: Medical education in India is predominantly delivered in English, which may create challenges for students from vernacular-medium backgrounds. This study assessed perceptions of medical students and professionals in eastern India regarding the use of Hindi in medical education and explored the acceptability of a bilingual approach.

Methods: A cross-sectional study was conducted from October 2025 to March 2026 among medical students, interns, resident doctors, and faculty members from medical colleges and hospitals in eastern India. Data were collected using a pretested structured questionnaire covering demographic characteristics and perceptions regarding Hindi in lectures, textbooks, clinical teaching, examinations, research, and patient communication. Descriptive statistics and Fisher's exact test were used, with $p<0.05$ considered statistically significant.

Results: Among 537 participants, 78.6% were undergraduate students and 55.3% were male. Overall, 72.6% agreed that Hindi lectures improve conceptual understanding, 77.8% supported Hindi in ward classes/clinical demonstrations, and 84.7% felt confident explaining diagnosis and treatment in Hindi. However, 86.6% considered Hindi medical terminology difficult and 73.0% believed Hindi-medium education could limit international opportunities. Only 31.9% supported Hindi examinations, while 57.0% supported MBBS education in Hindi as an option. A hybrid English-Hindi model received the highest support (86.7%).

Conclusion: Participants favoured selective integration of Hindi, particularly for conceptual learning and clinical communication, while recognising the continuing importance of English for terminology, examinations, research, and international opportunities. A flexible bilingual model may therefore provide a practical approach to improving accessibility without compromising professional mobility.

Keywords: Hindi-medium medical education; bilingual education; medical students; vernacular language; clinical communication; medical education; India.

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INTRODUCTION:

Medical education in India has long been conducted predominantly in English, a legacy of colonial rule that established English as the medium for higher education and scientific discourse. This approach, while facilitating access to global knowledge and standardization, has created significant linguistic barriers for students whose primary education or mother tongue is a regional language or Hindi [1, 2]. The National Education Policy (NEP) 2020 has advocated for greater use of mother tongue or regional languages in education to enhance accessibility, comprehension, and equity, extending this principle to technical and medical fields. Initiatives in states like Madhya Pradesh, which introduced Hindi-translated MBBS textbooks in 2022, have sparked debates on the feasibility and implications of shifting medical instruction toward vernacular languages [1-3].

Eastern India, comprising states such as West Bengal, Odisha, Bihar, and Jharkhand, presents a unique linguistic landscape [4]. With a high prevalence of

Bengali, Odia, Hindi, and other regional languages, many students from vernacular-medium backgrounds enter medical training facing a sudden transition to English. This shift imposes a "dual burden" of mastering complex medical concepts alongside a foreign language of instruction. Empirical evidence highlights these challenges [1, 4, 5]. For instance, Amulya et al. (2021) found that 88.5% of medical students in India struggled with comfortable communication in local languages during bedside teaching, despite English-medium instruction, underscoring disconnects between training and clinical practice in diverse patient populations [5].

Proponents of Hindi or regional language medical education argue it could democratize access, particularly for students from rural and semi-urban areas with limited English proficiency. Improved conceptual understanding, reduced cognitive load, better doctor-patient communication in local contexts, and increased participation from underrepresented groups are potential benefits [1]. Qualitative insights from Mondal et al. (2025) reveal that first-year medical students perceive vernacular options as helpful for overcoming language barriers in books, classes, and examinations, potentially alleviating initial academic stress [5].

However, significant concerns persist regarding standardization, quality, and global competitiveness. Critics highlight the scarcity of high-quality medical literature, terminology, and faculty trained in vernacular instruction, which could hinder students' ability to engage with international research, pursue higher studies abroad, or clear competitive examinations like NEET-PG or foreign licensing tests [6]. Garg et al. (2024) outline infrastructural, terminological, and translational challenges in implementing Hindi and indigenous language medical education, warning of potential fragmentation in a national healthcare system that relies on uniform standards [3]. A cross-sectional study on perceptions in northern India similarly noted dilemmas, with many viewing Hindi-medium education as a hurdle for advanced training and career mobility [6].

Faculty and practicing professionals often prefer English for its precision in scientific communication and alignment with global practices. Studies in other contexts, such as Saudi Arabia, show mixed views on native-language instruction, with many favoring bilingual approaches to balance accessibility and excellence [7]. In India, Jeyashri (2024) reported that while regional languages may aid initial understanding and patient interaction, English remains essential for collaboration, research, and professional advancement [8].

The present study seeks to explore the attitudes and perceptions of medical professionals and trainees specifically from eastern India regarding the introduction of Hindi-language medical education. Eastern India's diverse socio-linguistic profile, with varying exposure to Hindi alongside local languages, makes it an important yet understudied region [1]. By examining views across trainees, practicing doctors, and faculty, this research aims to provide nuanced insights into perceived advantages (e.g., equity and comprehension), barriers (e.g., resource gaps and standardization), and potential hybrid models. Understanding these perspectives is crucial for evidence-based policy implementation, ensuring that reforms enhance rather than compromise the quality of medical training and healthcare delivery in a multilingual nation.

MATERIALS & METHODS

This cross-sectional study was conducted over a six-month period from October 2025 to March 2026, aiming to gather insights from a diverse cohort of participants—including undergraduate medical students, interns, residents, and faculty—across medical colleges and hospitals in eastern India. Data collection was carried out using a pretested, structured questionnaire designed to capture informed perspectives on the study topic, ensuring consistency and reliability across respondent groups.

Sampling Method: The study employed a purposive sampling method to recruit participants from medical colleges and hospitals across eastern India. 537 participants were enrolled in this study.

Study Population: The inclusion criteria for this study comprised undergraduate medical students, interns, residents, and faculty members affiliated with medical colleges and hospitals in eastern India who voluntarily consented to participate and completed the structured questionnaire during the study period. Exclusion criteria included individuals outside the specified professional categories, those unwilling to participate, and respondents who submitted incomplete or inconsistent questionnaire data, ensuring the integrity and relevance of the collected responses.

Data Collection Tool

Data were collected using a pretested, structured questionnaire using GOOGLE FORM platform divided into three parts:

- **Part A: Demographic Information** Captured age, gender, professional status, institutional affiliation, medium of instruction, and self-assessed proficiency in English and Hindi. It also included the primary language used during patient interactions.
- **Part B: Attitudes and Opinions on Hindi in Medical Education** Comprised 11 Likert-scale statements assessing participants' agreement (from strongly disagree to strongly agree) on various aspects of Hindi usage in medical

education, including lectures, textbooks, examinations, clinical communication, and research dissemination.

- **Part C: Open-Ended Questions:** Allowed respondents to elaborate on perceived advantages, challenges, and suggestions regarding the integration of Hindi into medical education.

Statistical Analysis:

Quantitative data from closed-ended questions were analysed using descriptive statistics to identify trends and distributions across professional groups. Data were expressed as frequencies and percentages or mean ± SD for comparison. Fisher's exact test was used to assess the significance of the association between responses and other factors, with $p<0.05$ as the cut-off for statistical significance. GraphPad Prism version 8.4.3 was used for statistical analysis.

RESULTS

1. Demographic and Institutional Profile of Participants

Table 1 describes the demographic and institutional profile of the 537 participants included in the analysis. The majority were undergraduate MBBS students (422, 78.58%), followed by resident doctors (66, 12.29%), faculty/consultants (39, 7.26%), and interns (10, 1.86%). There was a slight male predominance, with 297 (55.31%) males and 240 (44.69%) females. Regarding the medium of instruction, 293 participants (54.56%) had primarily English-medium education, whereas 244 (45.44%) reported a mixed English- and Hindi-medium background. The mean age of participants was 24.77 ± 7.42 years. The mean self-rated proficiency was 3.80 ± 0.82 for English and 3.85 ± 0.99 for Hindi on a 5-point scale.

Table 1: Demographic and Institutional Characteristics of Participants (N = 537)

Characteristic	Sub-category	Frequency (n)	Percentage (%)
Professional Status	Undergraduate Medical Student (MBBS)	422	78.58%
	Resident Doctor	66	12.29%
	Faculty / Consultant	39	7.26%
	Intern	10	1.86%
Gender	Male	297	55.31%
	Female	240	44.69%
Medium of Instruction	Primarily English	293	54.56%
	A mix of both English and Hindi	244	45.44%
Age (Years)	Mean ± SD		24.77 ± 7.42
English Proficiency (1–5)	Mean ± SD		3.8 ± 0.82
Hindi Proficiency (1–5)	Mean ± SD		3.85 ± 0.99

2. Overall Perceptions towards Hindi in Medical Education

A large majority agreed that Hindi in lectures could improve conceptual understanding (72.6%) and that Hindi could make ward classes and clinical demonstrations more effective (77.8%). Most participants also expressed confidence in explaining diagnosis and treatment plans in Hindi (84.7%) and agreed that Hindi-medium doctors may serve rural populations better (65.3%). However, learning medical terminology in Hindi was perceived as difficult by 86.6% of participants, and 73.0% felt that Hindi in medical education could limit international opportunities. Support for Hindi textbooks was relatively low (23.7%), as was support for conducting theory and practical examinations in Hindi (31.9%). Nearly half supported publication of research articles in Hindi (44.0%), and 57.0% felt that MBBS education should be available in Hindi as an option. The strongest consensus was observed for a hybrid English-Hindi model, supported by 86.7% of participants, suggesting that respondents generally favoured bilingual integration rather than complete replacement of English [Table 2].

Table 2: Overall Response Distribution to Perceptual Statements (N = 537)

Statement	Strongly Disagree (n,	Disagree (n, %)	Unsure (n, %)	Agree (n, %)	Strongly Agree (n, %)

	%)				
1. Using Hindi in lectures improves conceptual understanding.	31 (5.8)	46 (8.6)	70 (13.0)	222 (41.3)	168 (31.3)
2. Hindi textbooks/reference materials would be beneficial.	100 (18.6)	159 (29.6)	151 (28.1)	89 (16.6)	38 (7.1)
3. Learning medical terminology in Hindi is difficult.	9 (1.7)	4 (0.7)	59 (11.0)	169 (31.5)	296 (55.1)
4. Confident in explaining diagnosis/treatment plan in Hindi.	0 (0.0)	5 (0.9)	77 (14.3)	231 (43.0)	224 (41.7)
5. Hindi in ward classes/clinical demos would be more effective.	35 (6.5)	9 (1.7)	75 (14.0)	266 (49.5)	152 (28.3)
6. Theory and practical exams should be offered in Hindi.	128 (23.8)	108 (20.1)	130 (24.2)	110 (20.5)	61 (11.4)
7. Research articles/journals should be published in Hindi.	77 (14.3)	83 (15.5)	141 (26.3)	204 (38.0)	32 (6.0)
8. MBBS education should be available in Hindi as an option.	85 (15.8)	54 (10.1)	92 (17.1)	229 (42.7)	77 (14.3)
9. Hindi in medical education will limit international opportunities.	22 (4.1)	54 (10.1)	69 (12.9)	222 (41.3)	170 (31.7)
10. Hindi-medium doctors will serve rural populations better.	17 (3.2)	56 (10.4)	113 (21.0)	223 (41.5)	128 (23.8)
11. A hybrid model (English + Hindi) is better than a single medium.	9 (1.7)	18 (3.4)	44 (8.2)	208 (38.7)	258 (48.0)

*% is of row total

3. Perceptual Differences across Professional Status

Undergraduate students showed substantially greater agreement that Hindi lectures improve conceptual understanding compared with residents and faculty (79.9% vs. 50.0% and 51.3%, respectively; $p<0.0001$).

Confidence in explaining diagnosis and treatment in Hindi was high across groups, although the difference was statistically significant ($p<0.0001$). Significant differences were also observed regarding the effectiveness of Hindi in ward classes ($p=0.0408$), offering examinations in Hindi ($p=0.0023$), publication of research in Hindi ($p<0.0001$), availability of MBBS education in Hindi as an option ($p<0.0001$), perceived ability of Hindi-medium doctors to serve rural populations better ($p<0.0001$), and preference for a hybrid English-Hindi model ($p=0.0004$). Overall, undergraduate students and interns tended to express greater support for Hindi integration than residents and faculty for several educational and policy-related aspects [Table 3].

Table 3: Agreement Rate (Agree + Strongly Agree) by Professional Status

Statement	Undergraduate (n=422)	Intern (n=10)	Resident Doctor (n=66)	Faculty/ Consultant (n=39)	p-value (Fisher's Exact Test UG + intern vs Resident + Faculty)
1. Using Hindi in lectures improves conceptual understanding.	337 (79.9)	0 (0.0)	33 (50.0)	20 (51.3)	<0.0001
2. Hindi textbooks/reference materials would be beneficial.	107 (25.4)	0 (0.0)	10 (15.2)	10 (25.6)	0.3042
3. Learning medical terminology in Hindi is difficult.	364 (86.3)	10 (100.0)	57 (86.4)	34 (87.2)	0.6513
4. Confident in explaining diagnosis/treatment plan in Hindi.	345 (81.8)	10 (100.0)	61 (92.4)	39 (100.0)	<0.0001
5. Hindi in ward classes/clinical demos would be more effective.	336 (79.6)	10 (100.0)	42 (63.6)	30 (76.9)	0.0408
6. Theory and practical exams should be offered in Hindi.	146 (34.6)	5 (50.0)	10 (15.2)	10 (25.6)	0.0023
7. Research articles/journals should be	217 (51.4)	5 (50.0)	9 (13.6)	5 (12.8)	<0.0001

published in Hindi.					
8. MBBS education should be available in Hindi as an option.	268 (63.5)	5 (50.0)	18 (27.3)	15 (38.5)	<0.0001
9. Hindi in medical education will limit international opportunities.	306 (72.5)	10 (100.0)	52 (78.8)	24 (61.5)	0.9045
10. Hindi-medium doctors will serve rural populations better.	298 (70.6)	10 (100.0)	33 (50.0)	10 (25.6)	<0.0001
11. A hybrid model (English + Hindi) is better than a single medium.	379 (89.8)	10 (100.0)	42 (63.6)	35 (89.7)	0.0004

*data in n (%), % from column total

4. Influence of Current Institutional Medium of Instruction

Participants exposed to a mixed English-Hindi medium were significantly more likely than primarily English-medium participants to agree that Hindi lectures improve conceptual understanding (82.0% vs. 64.8%, p<0.0001), that MBBS education should be available in Hindi as an option (65.6% vs. 49.8%, p=0.0003), and that Hindi-medium doctors would serve rural populations better (70.5% vs. 61.1%, p=0.0232). The strongest difference was observed for preference for a hybrid English-Hindi model, with 96.7% of participants from mixed-medium institutions agreeing compared with 78.5% from primarily English-medium institutions (p<0.0001) [Table 4].

Table 4: Agreement Rate (Agree + Strongly Agree) by Institutional Medium of Instruction

Statement	Primarily English (n= 293)	Mix of English & Hindi (n= 244)	p-value (Fisher's Exact Test)
1. Using Hindi in lectures improves conceptual understanding.	190 (64.8)	200 (82.0)	<0.0001
2. Hindi textbooks/reference materials would be beneficial.	70 (23.9)	57 (23.4)	0.9190
3. Learning medical terminology in Hindi is difficult.	257 (87.7)	208 (85.2)	0.4461
4. Confident in explaining diagnosis/treatment plan in Hindi.	245 (83.6)	210 (86.1)	0.4709
5. Hindi in ward classes/clinical demos would be more effective.	222 (75.8)	196 (80.3)	0.2124
6. Theory and practical exams should be offered in Hindi.	92 (31.4)	79 (32.4)	0.8525

7. Research articles/journals should be published in Hindi.	131 (44.7)	105 (43.0)	0.7272
8. MBBS education should be available in Hindi as an option.	146 (49.8)	160 (65.6)	0.0003
9. Hindi in medical education will limit international opportunities.	223 (76.1)	169 (69.3)	0.0796
10. Hindi-medium doctors will serve rural populations better.	179 (61.1)	172 (70.5)	0.0232
11. A hybrid model (English + Hindi) is better than a single medium.	230 (78.5)	236 (96.7)	<0.0001

*data in n (%), % from column total

5. Perceptual Variations by Gender

Males reported significantly greater confidence in explaining diagnosis and treatment plans in Hindi than females (95.3% vs. 71.7%, p<0.0001) and were more likely to consider Hindi useful for ward classes and clinical demonstrations (85.5% vs. 68.3%, p<0.0001). Females were significantly more supportive of making MBBS education available in Hindi as an option (63.3% vs. 51.9%, p=0.0085) and were more likely to believe that Hindi-medium education could limit international opportunities (77.9% vs. 69.0%, p=0.0245). Conversely, males were more likely to believe that Hindi-medium doctors would serve rural populations better (70.0% vs. 59.6%, p=0.0137). Both genders strongly favoured a hybrid English-Hindi model, although support was higher among females (90.8% vs. 83.5%, p<0.0001) [Table 5].

Table 5: Agreement Rate (Agree + Strongly Agree) by Gender

Statement	Male (n=297)	Female (n=240)	p-value (Fisher's Exact Test
1. Using Hindi in lectures improves conceptual understanding.	224 (75.4)	166 (69.2)	0.1195
2. Hindi textbooks/reference materials would be beneficial.	80 (26.9)	47 (19.6)	0.0523
3. Learning medical terminology in Hindi is difficult.	256 (86.2)	209 (87.1)	0.9013
4. Confident in explaining diagnosis/treatment plan in Hindi.	283 (95.3)	172 (71.7)	<0.0001
5. Hindi in ward classes/clinical demos would be more effective.	254 (85.5)	164 (68.3)	<0.0001
6. Theory and practical exams should be offered in Hindi.	98 (33.0)	73 (30.4)	0.5763
7. Research articles/journals should be published in Hindi.	124 (41.8)	112 (46.7)	0.2572
8. MBBS education should be available in Hindi as an option.	154 (51.9)	152 (63.3)	0.0085
9. Hindi in medical education will limit international opportunities.	205 (69.0)	187 (77.9)	0.0245
10. Hindi-medium doctors will serve rural populations	208 (70.0)	143 (59.6)	0.0137

better.			
11. A hybrid model (English + Hindi) is better than a single medium.	248 (83.5)	218 (90.8)	<0.0001

*data in n (%), % from column total

DISCUSSION

The present cross-sectional study assessed the perceptions of 537 medical students, interns, resident doctors, and faculty members from eastern India regarding Hindi as a medium of medical education. Overall, participants showed favourable attitudes toward the selective use of Hindi, particularly for conceptual learning, clinical teaching, and patient communication, while expressing reservations about its use as a complete replacement for English.

The finding that 72.6% of participants believed Hindi lectures improve conceptual understanding is consistent with Hamad et al. (2025), whose systematic review identified comprehension of foreign-language textbooks and lectures as an important barrier in medical education. Their review showed that learning complex medical concepts through a non-native language may increase academic difficulty and stress [2]. Similarly, Mondal et al. (2025) reported that Indian first-year medical students perceived vernacular-language education as beneficial for understanding books and improving memory [4].

The influence of previous language exposure was also evident. Participants from institutions using a mixture of English and Hindi were more likely to believe that Hindi lectures improve conceptual understanding than those from primarily English-medium institutions (82.0% vs. 64.8%, $p<0.0001$). This finding complements Jeyashri et al. (2024), who reported that students without previous English-medium exposure experienced greater difficulty with English-based medical education. Their finding that difficulties were more common among those without prior English-medium exposure suggests that linguistic familiarity plays an important role in academic adaptation [8]. Together, these findings indicate that students' educational background should be considered when developing language policies for medical education.

Despite the perceived academic benefits of Hindi, only 23.7% of participants in the present study agreed that Hindi textbooks and reference materials would be beneficial. This relatively low level of support is consistent with Mondal et al. (2025), who identified a major shortage of medical textbooks and online learning resources in vernacular languages. Their concerns regarding the availability and quality of regional-language resources may explain why participants appear more comfortable with Hindi as a supplementary teaching language than as the principal language of medical literature [4]. This finding also agrees with Jeyashri et al. (2024), who reported a strong overall preference for English-based medical instruction [8].

A particularly important finding was that 86.6% of participants considered learning medical terminology in Hindi difficult. This observation is strongly comparable with Agarwal et al. (2023), in which 66.7% of participants believed that medical terminology should remain in English while explanations could be provided in Hindi. The similarity suggests that participants may favour a bilingual terminology strategy rather than complete translation of established scientific terms [6].

The strongest support for Hindi was observed in clinical communication. In the present study, 84.7% of participants felt confident explaining diagnosis and treatment plans in Hindi, while 77.8% considered Hindi in ward classes and clinical demonstrations more effective. These findings are consistent with Hamad et al. (2025), who reported that foreign-language instruction can compromise patient communication and empathy, while students feel more confident performing clinical assessments in their mother tongue [2]. Similarly, Amulya et al. (2021) found that 88.5% of North Indian language-speaking students in Karnataka could not communicate comfortably in Kannada, creating substantial barriers during bedside teaching [5]. Agarwal et al. (2023) also reported that 58.9% believed Hindi-medium education could improve patient communication [6].

The present finding that 77.8% favoured Hindi in ward classes and clinical demonstrations further reinforces this clinical advantage. However, professional differences were observed, with agreement among undergraduates, interns, residents, and faculty being 79.6%, 100.0%, 63.6%, and 76.9%, respectively ($p=0.0408$). This pattern is broadly consistent with Alrajhi et al. (2019), who found greater support for native-language use in clinical communication and OSCEs than in conventional lectures [7].

In contrast, support for Hindi examinations was relatively low in the present study, with only 31.9% agreeing that theory and practical examinations should be offered in Hindi. This differs from Agarwal et al. (2023), where 60.1% supported allowing examinations to be written in Hindi [6]. The difference may reflect variations in study populations and educational settings. In the present study, support for Hindi examinations also varied significantly according to professional status ($p=0.0023$), suggesting differing perceptions between learners and more experienced professionals.

More than half of the present participants (57.0%) supported making MBBS education available in Hindi

as an option. This finding closely agrees with Mondal et al. (2025), who recommended providing students with an optional and informed choice between English and vernacular education [4]. A major concern identified in the present study was international and professional mobility. Overall, 73.0% believed that Hindi in medical education could limit international opportunities. This is consistent with Mondal et al. (2025), who identified concerns regarding interstate migration, super-speciality training, and practice abroad [4]. Alrajhi et al. (2019) similarly reported that 91% of participants considered English-taught education advantageous for accessing global medical information, while 83% associated it with better job opportunities [7]. Jeyashri et al. (2024) also found a strong overall preference for English, particularly among migrated participants and those at more advanced stages of medical training [8].

Support for Hindi in research publication was also limited, with 44.0% agreeing that research articles and journals should be published in Hindi. This finding is compatible with the continued preference for English reported by Jeyashri et al. (2024) and Alrajhi et al. (2019) because English facilitates international scientific communication and access to global literature [7, 8].

Evidence from Tripathi et al. (2024) and Rina et al. (2024) nevertheless demonstrates that high-quality Hindi medical resources can be developed when translation is systematic and appropriately validated [9, 10]. Tripathi et al. demonstrated excellent validity of a Hindi instructional module, while Rina et al. demonstrated strong reliability and validity of a Hindi-adapted research scale [9, 10]. Although these studies do not directly evaluate Hindi as a medium of medical education, they demonstrate the feasibility of developing standardised Hindi educational and research materials [11].

The most significant finding of the present study was the overwhelming preference for a hybrid English-Hindi model, supported by 86.7% of participants. Support was particularly strong among those from mixed-medium institutions, reaching 96.7%, compared with 78.5% among primarily English-medium participants ($p<0.0001$). This finding provides a practical synthesis of the apparently competing findings in previous literature. Mondal et al. (2025) advocated optional vernacular education [4], Agarwal et al. (2023) supported retention of English terminology with Hindi explanations, while Jeyashri et al. (2024) and Alrajhi et al. (2019) demonstrated the continuing importance of English for academic and professional purposes but recognised the value of regional languages in clinical communication [7, 8].

The study had several limitations. Its cross-sectional design and purposive sampling limit the ability to establish causal relationships and may introduce selection bias. The study was conducted among participants from eastern India, so the findings may not be generalizable to all regions of India with different linguistic and educational backgrounds. Additionally, the study primarily assessed attitudes and perceptions rather than actual academic performance or clinical outcomes following Hindi-medium education. Further longitudinal and multicentric studies are required to evaluate the effectiveness and feasibility of bilingual medical education.

CONCLUSION

Overall, the present findings suggest that the debate should not be framed simply as English versus Hindi. Hindi appears particularly valuable for conceptual understanding, clinical teaching, and doctor-patient communication, whereas English remains important for scientific terminology, research dissemination, postgraduate education, and international mobility. Therefore, the findings support a flexible bilingual model that permits strategic use of Hindi without abandoning English. Such an approach could improve accessibility and clinical communication while preserving students' ability to engage with national and international medical literature and pursue higher professional opportunities.

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