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English medium instruction in Jordanian medical education: a systematic review

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ABSTRACT

English-medium instruction (EMI) dominates Jordanian medical education, yet its equity implications and consequences for assessment validity remain poorly evidenced, particularly after the disruptions of the COVID-19 pandemic. Following preferred reporting items for systematic reviews and meta-analyses (PRISMA) 2020 guidelines, this review searched Scopus, Web of Science, ERIC, and PubMed for peer-reviewed work published between 2000 and 2024. A total of 34 studies met inclusion criteria after mixed methods appraisal tool (MMAT) quality appraisal and were analyzed through thematic synthesis. The evidence reveals a structural paradox: EMI supports international academic integration while disadvantaging students from Arabic-medium secondary schools by conflating English proficiency with medical competence. The lexical and morphological complexity of medical English increases cognitive demands and became more pronounced during pandemic-related online teaching. Students rely on code-switching and morphological analysis as coping strategies, but neither is recognized in policy or assessment. The review delivers the first PRISMA-aligned synthesis of EMI in Jordanian medical education, proposes the Jordanian Medical English Corpus (JoMEC) as a corpus-based diagnostic for measuring lexical burden, and reframes EMI equity as a measurable issue of assessment validity rather than a normative concern alone. Findings support bilingual scaffolding and validity-oriented assessment reform to advance equity in medical education across Jordan and comparable Middle East and North Africa (MENA) contexts.

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1. INTRODUCTION

Jordanian medical education is delivered almost entirely in English. Curricula, textbooks, examinations, and the licensing pathways that follow them depend on it, an arrangement driven by alignment with international accreditation standards rather than by pedagogical evidence [1]–[4]. All faculties of medicine and health sciences in Jordan teach predominantly in English, mirroring the North American licensing frameworks that absorb their graduates [4]. A substantial proportion of incoming students, however, were educated in Arabic-medium secondary schools and now face what has been described as a dual burden: mastering complex clinical content in a non-dominant medium [5]. A decade-long appraisal of English-

medium instruction (EMI) in healthcare education globally concluded that adoption has outpaced the parallel development of language-equity infrastructure [6], a tension that a recent decolonial systematic review of language barriers in medical instruction situates within wider hierarchies in medical credentialing [7].

Existing studies converge on three recurring patterns. Graduates of Arabic-medium schools report greater linguistic burden and weaker examination performance than English-medium peers [8], [9]. English proficiency operates in practice as a proxy for medical competence on assessment [10]. EMI functions as a credentialing gate rather than a transparent medium of instruction [11], [12]. Wider analysis of academic performance predictors in Jordanian higher education indicates that language-related variables account for substantial variance in university outcomes beyond general aptitude [13]. Comparable patterns in Saudi Arabia [14], [15] and Morocco [16] situate Jordan within a wider Middle East and North Africa (MENA) trajectory. The COVID-19 pandemic sharpened these tensions: online delivery removed the informal Arabic clarification, peer code-switching, and embodied cues that had quietly compensated for monolingual policy in face-to-face teaching [12], [17]. The evidence base, however, remains dominated by single-institution perception surveys. The magnitude of the disadvantage, the conditions under which it is moderated by institutional support, and the actual linguistic properties of Jordanian medical texts have not been measured directly.

The closest antecedent in the literature is the systematic review by Macaro *et al.* [18] of EMI in higher education, which explicitly excluded the medical domain on grounds of disciplinary specificity. A recent systematic review of EMI in Saudi Arabia [14] offers a partial regional comparator but engages neither the medical domain in detail, the COVID-19 disruption, nor corpus-based diagnostics. No preferred reporting items for systematic reviews and meta-analyses (PRISMA)-aligned synthesis of EMI in Jordanian medical education currently exists. No review has applied corpus linguistics as a diagnostic instrument for lexical burden in this context. No work has reframed the equity question as a technically testable claim about assessment validity rather than as a normative grievance. These four gaps define the scholarly opening that the present review occupies.

The review synthesizes peer-reviewed evidence on EMI in Jordanian medical education between 2000 and 2024, with attention to MENA comparators, post-pandemic developments, and the methodological pathways for measurable reform. Five research questions guide the synthesis:

- How has EMI expanded and become structurally entrenched in Jordanian and MENA medical education? (RQ1)
- What psycholinguistic and cognitive burdens does EMI impose on Arabic-speaking students, and under what conditions are these burdens moderated? (RQ2)
- How did the COVID-19 pandemic operate as a structural stress test on EMI implementation? (RQ3)
- What coping mechanisms have students adopted, and to what extent do current assessment practices generate validity concerns? (RQ4)
- How can corpus linguistics supply the diagnostic infrastructure currently absent from the field? (RQ5)

2. METHOD

2.1. Design

The review followed PRISMA 2020 guidelines [19] with thematic synthesis as the analytic method [20]. Meta-analysis was not feasible due to methodological heterogeneity across corpus studies, surveys, and theoretical monographs. Foundational theoretical works were included when necessary to support interpretation [21].

2.2. Search strategy

Scopus, Web of Science, ERIC, and PubMed were searched for records published between January 2000 and December 2024. The Boolean string combined three concept blocks: (“English-medium instruction” OR “EMI” OR “English as medium of instruction” OR “English-taught programmes”) AND (“medical education” OR “health sciences” OR “medicine” OR “nursing” OR “pharmacy” OR “dentistry”) AND (“Jordan” OR “MENA” OR “Arabic-speaking” OR “code-switching” OR “cognitive load” OR “lexical burden” OR “corpus linguistics” OR “COVID-19” OR “morphological awareness” OR “assessment validity”).

2.3. Eligibility criteria

Studies were eligible if they addressed EMI in tertiary medical or health sciences education, engaged Arabic-speaking or MENA contexts (or offered transferable frameworks), appeared in peer-reviewed outlets, and were available in English. Studies on primary or secondary schooling, unrelated disciplines, conference abstracts without a peer-reviewed counterpart, and unverifiable publications were excluded. Exclusion reasons were recorded per record.

2.4. Screening and selection

Two reviewers independently screened titles and abstracts. Inter-rater reliability on a 20% subsample (n=62) reached κ=0.79, classified as substantial [22]. Disagreements were resolved by discussion. Of 312 deduplicated records, 114 advanced to full-text review and 67 met eligibility. Hand-searching added 21 records, yielding 88 eligible records. After mixed methods appraisal tool (MMAT) appraisal and source consolidation, 34 works were retained for synthesis. Figure 1 reports the full PRISMA flow.

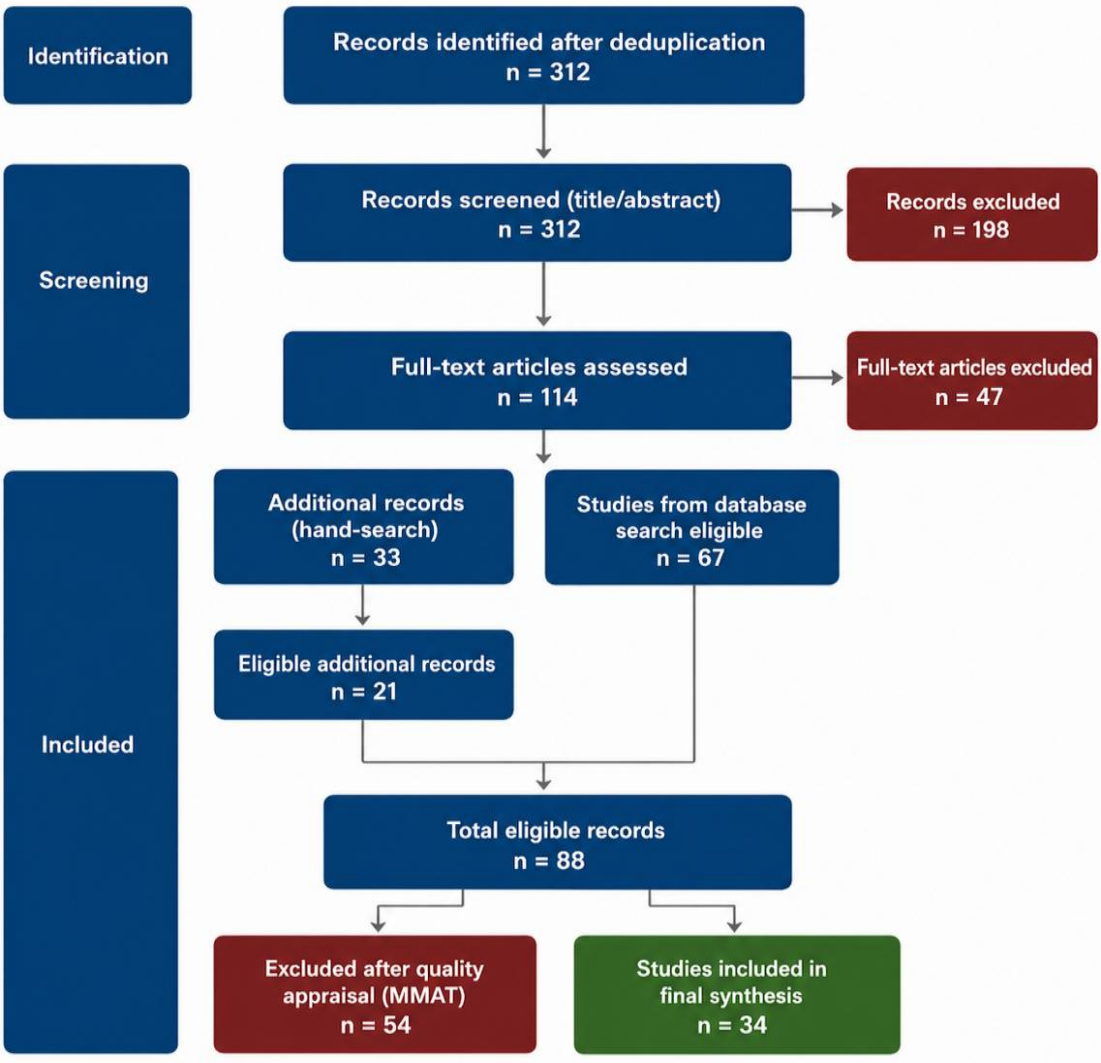

Figure 1. PRISMA 2020 flow diagram

2.5. Quality appraisal

Studies were appraised with the MMAT 2018 [23] across four criteria: clarity of research question (Q1), appropriateness of design (Q2), representativeness of sampling or corpus (Q3), and validity of outcome measures or interpretive adequacy (Q4). Studies scoring ≥4/5 were rated high quality, 3/5 moderate, and ≤2/5 low–moderate; foundational theoretical works were treated as canonical. Lower-quality findings were treated as indicative. No study was excluded on quality grounds alone.

2.6. Synthesis

There were 34 studies met inclusion criteria after MMAT quality appraisal. Thematic synthesis was applied in three stages: descriptive coding, analytical coding, and interpretive theme generation [20]. A second reviewer independently coded a 30% subsample (n=10); agreement reached κ=0.76. A structured Excel matrix and memo system supported coding [21].

3. RESULTS AND DISCUSSION

The 34 included works were organized into five thematic clusters based on recurring conceptual patterns identified during thematic synthesis. Table 1 summarizes all included studies (their methods, principal findings, quality levels, and weight in synthesis) and Table 2 presents the full MMAT quality appraisal.

Table 1. Summary of included studies

Author(s)	Method	Focus	Principal finding	Quality
[8]	Survey	Language barriers	EMI barrier; language–competence overlap	Moderate
[24]	Quasi-experimental	Language vs term acquisition	Arabic-medium improved term recall.	Moderate
[25]	Documentary	Arabicization of medical terms	Arabicization fragmented; English entrenched by licensing.	Moderate
[26]	Framework essay	Coverage thresholds	95–98% coverage required for comprehension.	High
[27]	Corpus	Medical word list	High-frequency medical morphemes	High
[28]	Corpus	Medical academic word list	Medical English lexically distinct; specialist instruction needed.	High
[1]	Monograph	EMI frameworks; monolingual bias	Weak pedagogical basis.	High
[13]	Conceptual review	Language in EMI	Proficiency conflated with competence.	Moderate–high
[18]	Systematic review	EMI in HE	Evidence base small-scale.	High
[2]	Policy report	EMI as global phenomenon	EMI expanding without evidence base.	Moderate–high
[29]	Discourse analysis	Code-switching in general practitioner (GP) consults	Code-switching is pragmatic.	High
[10]	Quantitative (multi-site)	Predictors of EMI success	Prior medium out predicts proficiency.	High
[12]	Cross-sectional	COVID-19 impact	Stress increased; engagement reduced; rote reliance.	Moderate
[17]	Multi-center	COVID-19 across institutions	Technological and linguistic barriers amplified.	High
[3]	Survey	Arabicization attitudes	Wide principled support; resistance via accreditation.	Moderate
[9]	Survey	Arabic vs English medium	EMI valued for career; burden among Arabic-medium students.	Low–moderate
[30]	Textbook	Corpus principles	Representativeness, keyness, frequency as diagnostic tools.	High
[11]	Survey and test	Morphological awareness	Low awareness; rote dominant; correlates with depth.	Moderate
[31]	Methods chapter	Keyness analysis	Log-likelihood and BIC keyness as defensible metrics.	High
[32]	Corpus	Academic vocabulary list	High-frequency academic core teachable.	High
[14]	Systematic review	EMI in Saudi HE	Structural parallel to Jordan; equity concerns across MENA.	High
[33]	Corpus	EMI lecture transcripts	Corpus surfaces lexical complexity not captured by self-report.	High
[34]	Corpus	Medical academic word list	Medical exceeds general academic demands.	High
[35]	Survey	Arabic in academia attitudes	Arabic as identity; English pragmatic; diglossia documented.	Low–moderate
[36]	Monograph	Arabic ideology in MENA	Asymmetry reflects power; classroom reform insufficient.	High
[37]	Interviews	Language of instruction policy	Accreditation drives English; Arabic marginalized.	High
[38]	Corpus	Grammatical complexity	Medical register among most complex; extraneous load.	High
[39]	Historical	Nominalization origins	Nominalized processes increase density.	High
[40]	Monograph	Bilingualism as norm	Code-switching cognitively efficient.	High
[41]	Experimental	Cognitive load	Working memory limits; foundational for EMI psycholinguistics.	High
[42]	Review	Cognitive architecture	Intrinsic, extraneous, germane load.	High
[43]	Theoretical	BICS/CALP	Academic and conversational proficiency qualitatively distinct.	High
[44]	Theoretical chapter	Consequential validity	Validity includes social consequences and construct-irrelevant variance.	High
[45]	Monograph	Vocabulary learning	Framework for vocabulary instruction and coverage	High

Table 2. MMAT quality appraisal

Study	Study type	Q1	Q2	Q3	Q4	Score	Quality
Sabbour *et al*. [8]	Quant. descriptive	✓	✓	✗	✗	3/5	Moderate
Al-Asal and Smadi [24]	Quasi-experimental	✓	✓	✗	✓	3/5	Moderate
Al-Haq [25]	Qual. documentary	✓	✓	✓	✗	3/5	Moderate
Hsu [27]	Quant. corpus	✓	✓	✓	✓	4/5	High
Lei and Liu [28]	Quant. corpus	✓	✓	✓	✓	5/5	High
Macaro [1]	Theoretical monograph	✓	✓	✓	✓	Theoretical	High
Macaro [13]	Conceptual review	✓	✓	✓	✗	—	Moderate–high
Macaro *et al*. [18]	Systematic review	✓	✓	✓	✓	5/5	High
Dearden [2]	Policy report	✓	✓	✓	✗	—	Moderate–high
Alkhlaifat *et al*. [29]	Discourse analysis	✓	✓	✓	✓	4/5	High
Curle *et al*. [10]	Quant. multi-site	✓	✓	✓	✓	5/5	High
Al-Balas *et al*. [12]	Cross-sectional	✓	✓	✗	✓	3/5	Moderate
AL-Husban *et al*. [17]	Multi-center	✓	✓	✓	✓	4/5	High
Al-Zubi *et al*. [3]	Survey	✓	✓	✗	✓	3/5	Moderate
Al-Shboul [9]	Survey	✓	✗	✗	✗	2/5	Low–moderate
McEnery and Brezina [30]	Textbook	✓	✓	✓	✓	Theoretical	High
Rabadi [11]	Survey and test	✓	✓	✗	✓	3/5	Moderate
Gabrielatos [31]	Methods chapter	✓	✓	✓	✓	4/5	High
Gardner and Davies [32]	Corpus	✓	✓	✓	✓	5/5	High
Alqarni *et al*. [14]	Systematic review	✓	✓	✓	✓	5/5	High
Dimova *et al*. [33]	Corpus	✓	✓	✓	✓	5/5	High
Wang *et al*. [34]	Corpus	✓	✓	✓	✓	5/5	High
Mizher and Al-Haq [35]	Survey	✓	✗	✗	✗	2/5	Low–moderate
Suleiman [36]	Monograph	✓	✓	✓	✓	Theoretical	High
Alshareef *et al*. [37]	Interviews	✓	✓	✓	✓	4/5	High
Biber *et al*. [38]	Corpus	✓	✓	✓	✓	5/5	High
Banks [39]	Historical	✓	✓	✓	✓	4/5	High
Grosjean [40]	Monograph	✓	✓	✓	✓	Theoretical	High
Sweller [41]	Experimental	✓	✓	✓	✓	Theoretical	High
Sweller *et al*. [42]	Review	✓	✓	✓	✓	Theoretical	High
Cummins [43]	Theoretical	✓	✓	✓	✓	Theoretical	High
Messick [44]	Theoretical chapter	✓	✓	✓	✓	Theoretical	High
Nation and Waring [26]	Framework essay	✓	✓	✓	✓	Theoretical	High
Nation [45]	Monograph	✓	✓	✓	✓	Theoretical	High

3.1. Theme 1: EMI expansion and structural entrenchment

Included studies consistently report that EMI in Jordanian medical education developed through accreditation logic rather than pedagogical design. Medical licensing frameworks modelled on North American and European standards treat English-language competency as an implicit proxy for professional readiness, embedding linguistic hierarchies into credentialing before clinical training [4], [25]. Documentary analysis at moderate quality shows that English has been institutionalized through accreditation requirements and licensing examinations independently of pedagogical evidence [25], [36]. High-quality interview research with medical decision-makers [37] and moderate-quality survey data from faculty and students [3] corroborate this pattern. Across the included Jordanian studies, the resulting configuration is described as functional diglossia: Arabic in doctor–patient interaction and informal study, English in classrooms, textbooks, and assessment [9], [35]. Suleiman [36] documents wider ideological asymmetries in MENA higher education in which the institutional devaluation of Arabic is structural rather than attitudinal.

Regional studies in Saudi Arabia [14], [15] and Morocco [16] report parallel patterns. Survey and interview research with healthcare alumni and instructors' documents ambivalence: participants value English for international career mobility but report its exclusive institutional use as pedagogically isolating and affectively burdensome [46]. Counter-evidence from comparable contexts is also represented in the corpus. Meta-analytic findings from Chinese settings show net positive effects on content learning when language support is embedded from program inception [47]; a longitudinal Chinese case study reports that structured faculty development reduced initial linguistic disadvantage over three years [48]; and expanding-circle research links outcome variation to program design and institutional preparedness [49].

3.2. Theme 2: psycholinguistic burdens of medical EMI

High-quality corpus-based studies report that medical English is among the most lexically demanding academic registers, combining high density, pervasive nominalization, and systematic reliance on Greco-Latin morphological compounding [38], [39]. A recent synthesis confirms that specialist vocabulary, reading comprehension, and disciplinary writing generate compounding demands that general proficiency measures fail to anticipate [50]. Studies report that students encounter Greco-Latin morphological forms with

limited cross-linguistic correspondence to Arabic and report increased processing difficulty [11], [41]. Emerging evidence links sustained EMI burden to burnout outcomes among healthcare students in unscaffolded programs [51]. Faculty-side studies report that instructors themselves experience linguistic burden, and their adaptive strategies, including simplification, repetition, translanguaging, shape the lexical register students encounter [52], [53].

Coverage analyses [26] applied to empirical studies of medical texts [28], [34] indicate that students without explicit specialist vocabulary training are unlikely to reach the coverage required for minimal comprehension of examination papers. Survey data document the behavioral consequence, namely rote memorization of terms as a survival strategy [8], [24], though such moderate-quality evidence cannot quantify the coverage gap. High-quality corpus-based research in comparable Asian EMI medical contexts reports that targeted morphological instruction produces measurable vocabulary gains [27]. Jordanian survey evidence documents anxiety, reduced participation, and surface compensation concentrated among Arabic-medium graduates [8], [9]. Rabadi [11] reports direct morphological awareness data confirming low levels among Jordanian English as a foreign language (EFL) undergraduates.

3.3. Theme 3: COVID-19 as a structural stress test

Studies of pre-pandemic Jordanian medical instruction described informal compensatory mechanisms, including spontaneous Arabic clarification by instructors, peer-to-peer code-switching in study groups, embodied contextual cues, that functioned as a bilingual scaffold without policy recognition. Online delivery during the pandemic removed these mechanisms. A cross-sectional survey from the first pandemic wave reported decreased engagement, heightened stress, and intensified rote memorization [12]. The moderate-quality single-time-point design limits causal inference, but a higher-quality multi-center study [17] corroborated the pattern and reported that inadequate internet access and limited digital literacy compounded linguistic barriers, disproportionately affecting rural and lower-income students. Comparative studies report convergent findings. Turkish EMI students reported worsened cognitive appraisal of linguistic demands under asynchronous online conditions, with higher anxiety and lower self-efficacy than under face-to-face instruction [54]. A Taiwan case study reported that the absence of real-time non-verbal cues and spontaneous clarification disproportionately disadvantaged students with lower proficiency [55]. Corpus-based European evidence indicates that online EMI amplifies lexical complexity burdens not easily detected by survey instruments [33].

3.4. Theme 4: coping mechanisms and the assessment–practice gap

3.4.1. Code-switching

Discourse analysis of Jordanian GP consultations reports that code-switching between Arabic and English is systematic and purposive: practitioners alternate languages to bridge lexical gaps, ensure patient comprehension, and maintain clinical efficiency [29]. Canonical work on bilingualism reports that code-switching is cognitively economical rather than deficient [40]. Pilot studies in EMI contexts where formal code-switching policies were trialed report improved comprehension without compromised content learning [18].

3.4.2. Arabicization

Moderate-quality survey research documents principled support for Arabicization among Jordanian medical faculty and students [3]. Historical and policy analysis traces Arabicization efforts as recurring but institutionally unsupported [25], [36]. Evaluation of simplified bilingual written materials in medical education for non-English-speaking populations reports enhanced comprehension without sacrificing disciplinary accuracy or English-medium examination preparedness [56].

3.4.3. Morphological analysis

Studies report that students who parse complex medical terms into constituent morphemes show better retention and transfer than those who memorize terms holistically [11], [27]. A small set of morphemes (–itis, –ectomy, –pathy, cardi–, hepat–) accounts for a disproportionate share of specialist vocabulary [27]. The included Jordanian studies report that systematic morphological training is absent from medical curricula; students who use the strategy do so through self-directed discovery.

3.4.4. Assessment-validity findings

Across the included studies, Arabic-medium graduates show lower performance than English-medium peers on the same medical examinations [8]–[10]. No psychometric study in the included corpus directly demonstrated differential item functioning by language background in Jordanian medical assessments.

3.5. Theme 5: corpus linguistics as diagnostic infrastructure

The included corpus-linguistic literature establishes three diagnostic tools. Representativeness ensures that corpus findings generalize to the texts students encounter [30]. Keyness analysis identifies lexical items occurring with disproportionate frequency in specialist texts relative to a reference corpus [31]. Coverage calculation maps corpus vocabulary against frequency bands to quantify the comprehension deficit at the text level [26], [45]. Research with European EMI lecture corpora reports that corpus analysis surfaces aspects of lexical complexity not easily captured by survey instruments [33]. Medical word-list studies [27], [28], [32], [34] demonstrate the feasibility of building discipline-calibrated wordlists.

No corpus-based study of Jordanian medical English currently exists. Construction of such a corpus, the Jordanian Medical English Corpus (JoMEC), would draw on prescribed first- and second-year textbooks, examination papers from at least three academic years, lecture slide transcripts, and clinical case templates, stratified by subdiscipline (anatomy, physiology, biochemistry, pharmacology, pathology, clinical medicine) given the variation in lexical density and morphological complexity across medical domains [38]. Frequency, coverage, and keyness analyses [31] would follow established corpus protocols. The infrastructure required (textbook digitization permissions, examination-paper access, and corpus-software expertise) is currently underdeveloped in MENA institutions.

3.6. Discussion

3.6.1. Summary of key findings

Five findings emerge from the synthesis. EMI is structurally entrenched in Jordanian medical education through accreditation rather than pedagogical evidence. Medical English imposes substantial lexical and morphological load, distributed unevenly by prior medium of schooling. The COVID-19 disruption revealed the informal bilingual scaffolding that had stabilized face-to-face teaching. Students' coping strategies, including code-switching, partial Arabicization, morphological analysis, work pedagogically but receive no recognition in formal assessment. Empirical infrastructure for measuring lexical burden directly in Jordanian medical education is absent.

3.6.2. Comparison with previous studies

These findings align with earlier reviews while extending them. Macaro *et al*. [18] review of EMI in higher education reported small-scale evidence base and called for corpus and longitudinal designs; the same pattern holds in the Jordanian medical context. The Saudi systematic review [14] reports a structurally parallel MENA pattern of EMI expansion without proportionate equity infrastructure. Curle *et al*. [10] finding that prior medium of schooling out predicts measured English proficiency is consistent with the Jordanian survey evidence. Counter-evidence from Chinese contexts [47], [48] and expanding-circle research [49] suggests that outcome variation depends on program design and institutional preparedness rather than on EMI as a medium. The findings are also consistent with cognitive load theory [41], [42], the basic interpersonal communicative skills/cognitive academic language proficiency (BICS/CALP) distinction [43], lexical coverage thresholds [26], and Messick's [44] framework for construct-irrelevant variance, which together offer an interpretive lens for the observed performance gradients. The present review differs from previous syntheses in three respects: it addresses the medical domain specifically, it engages post-pandemic evidence, and it integrates corpus methodology as a diagnostic pathway.

3.6.3. Practical and policy implications

Policy: accreditation bodies, including the Jordanian Medical Council, can commission validity audits of existing licensing instruments using differential item functioning analysis. Findings would inform bilingual assessment formats piloted alongside the English-only standard [10], [44]. Jordan's Ministry of Higher Education can require medical school accreditation submissions to include a language support plan covering admission requirement, faculty support training, and annual reporting on assessment outcome disparities by language background.

Institutional: medical schools can invest in faculty development equipping instructors to design assessments that separate linguistic from content demands, deploy deliberate translanguaging, and recognize code-switching as a comprehension scaffold. A credit-bearing year 1 module in English for medical purposes, covering high-frequency specialist terms, Greco-Latin morphological decomposition, and academic reading strategies, can be added within existing curricular structures, drawing on Asian and European templates [18], [27]. Evidence from higher education contexts indicates that teaching competencies, including pedagogical and technological competencies, are positively associated with faculty performance and teaching effectiveness [57].

Classroom instructors can provide pre-lecture vocabulary scaffolding consisting of 10–15 high-frequency specialist terms per session with morphological analysis and Arabic glosses where clinically

appropriate [27]. Bilingual study strategies (concept mapping in Arabic, peer discussion, and Arabic-to-English translation) can be validated rather than treated as remedial. Assessment design can draw on universal design for learning principles, including bilingual examination glossaries and the option to answer short-answer questions in Arabic with English terminology. These measures are implementable without policy change. Recent curricular innovation in North American pre-clinical medical education shows that language-equity content can be integrated into existing modules without additional curriculum hours [58], a model adaptable to the EMI context.

4. CONCLUSION

This review brought together 34 works on EMI in Jordanian medical education and organized the evidence into five themes. Across that evidence, EMI emerges as a system shaped by accreditation requirements rather than deliberate pedagogical design, and the resulting linguistic demands fall unevenly on students from different schooling backgrounds. Arabic-medium graduates carry the heaviest psycholinguistic load. The pandemic-era shift online exposed something the literature had previously overlooked: the informal bilingual scaffolding, including Arabic clarification, peer code-switching, contextual cues, that had quietly held face-to-face teaching together. Assessment is implicated too. Where language background tracks examination performance, validity becomes a concrete concern rather than an abstract one. A methodological gap runs through the whole evidence base: the actual lexical burden in Jordanian medical texts has never been measured directly, with perception surveys carrying most of the weight. Corpus-based diagnostics could complement perception studies and provide measurable evidence for practice. Priorities for the next phase of work follow from this gap: direct linguistic measurement, assessment-validity studies, and evaluation of targeted language-support interventions. The Jordanian case also speaks to a wider pattern across MENA and comparable contexts in which EMI has expanded without the equity-support structures needed to make it work.

Several limitations qualify the conclusions. The Jordan-specific literature is dominated by single-institution perception surveys. The search was restricted to English-language databases, potentially excluding Arabic-language scholarship on Arabicization and medical education policy. The proposed JoMEC framework is operationalized but not empirically executed. Inter-rater reliability procedures were applied to 20% and 30% subsamples, which cannot entirely exclude systematic screening or coding bias across the full corpus. The inclusion of theoretical monographs through purposive theoretical sampling introduces non-standardized evidence not fully evaluable on the MMAT metric.

Future research priorities follow directly. The first is construction of the JoMEC pilot corpus (50,000–100,000 words from examination papers at a single medical school) to generate proof-of-concept keyness and coverage data. The second is differential item functioning analysis on existing licensing instruments to test directly for language-background effects independent of clinical knowledge. The third is controlled studies of pre-clinical English for medical purposes interventions, with content retention and assessment fairness as outcomes. The fourth is longitudinal or discourse-analytic work that documents informal classroom bilingual practice rather than relying on post-hoc institutional performance data.

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AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

DATA AVAILABILITY

Data availability is not applicable to this study.

REFERENCES

[1] E. Macaro, *English medium instruction: content and language in policy and practice*. Oxford: Oxford University Press, 2018.
[2] J. Dearden, *English as a medium of instruction: a growing global phenomenon*. London, U.K.: British Council, 2014.
[3] D. Al-Zubi, A. El-Sharif, and K. H. Alzoubi, "Changes in the attitudes of professors and students of medicine towards arabicizing medical terms in the faculties of medicine: a study from Jordan," *Heliyon*, vol. 8, no. 12, p. e12022, 2022, doi: 10.1016/j.heliyon.2022.e12022.
[4] M. van Zanten, J. R. Boulet, and F. A. Simon, "Flexner's global influence: medical education accreditation in countries that train physicians who pursue residency in the United States," *Academic Medicine*, vol. 85, no. 2, pp. 324–332, 2010, doi: 10.1097/ACM.0b013e3181c87638.
[5] M. Al-Okaily, S. Magatef, A. Al-Okaily, and F. S. Shiyyab, "Exploring the factors that influence academic performance in Jordanian higher education institutions," *Heliyon*, vol. 10, no. 13, p. e33783, Jul. 2024, doi: 10.1016/j.heliyon.2024.e33783.
[6] M. Alhamami, "One decade of 'English as a medium of instruction' (EMI) in healthcare education," *Frontiers in Medicine*, vol. 11, p. 1296563, Feb. 2024, doi: 10.3389/fmed.2024.1296563.
[7] A. A. Hamad *et al.*, "Decolonizing medical education: a systematic review of educational language barriers in countries using foreign languages for instruction," *BMC Medical Education*, vol. 25, no. 1, p. 701, May 2025, doi: 10.1186/s12909-025-07251-2.
[8] S. M. Sabbour, S. A. Dewedar, and S. K. Kandil, "Language barriers in medical education and attitudes towards Arabization of medicine: student and staff perspectives," *Eastern Mediterranean Health Journal*, vol. 16, no. 12, pp. 1263–1271, Dec. 2010, doi: 10.26719/2010.16.12.1263.
[9] O. K. Al-Shboul, "The students' perceptions of Arabic and English as a medium of instruction in Jordan," *Theory and Practice in Language Studies*, vol. 12, no. 7, pp. 1441–1446, Jul. 2022, doi: 10.17507/tpls.1207.26.
[10] S. Curle, D. Yuksel, A. Soruç, and M. Altay, "Predictors of English medium instruction academic success: English proficiency versus first language medium," *System*, vol. 95, p. 102378, Dec. 2020, doi: 10.1016/j.system.2020.102378.
[11] R. I. Rabadi, "Morphological awareness and vocabulary knowledge among English language learners," *Arab World English Journal*, vol. 10, no. 3, pp. 43–63, Sep. 2019, doi: 10.24093/awej/vol10no3.4.
[12] M. Al-Balas *et al.*, "Distance learning in clinical medical education amid COVID-19 pandemic in Jordan: current situation, challenges, and perspectives," *BMC Medical Education*, vol. 20, no. 1, p. 341, Dec. 2020, doi: 10.1186/s12909-020-02257-4.
[13] E. Macaro, "Exploring the role of language in English medium instruction," *International Journal of Bilingual Education and Bilingualism*, vol. 23, no. 3, pp. 263–276, Mar. 2020, doi: 10.1080/13670050.2019.1620678.
[14] O. M. Alqarni, H. S. Mahdi, and J. K. M. Ali, "English medium instruction in Saudi Arabia: a systematic review," *Language Teaching Research Quarterly*, vol. 42, pp. 21–37, May 2024, doi: 10.32038/ltrq.2024.42.02.
[15] K. Alanazi and S. Curle, "Overcoming linguistic hurdles: challenges and strategies for English-Medium Instruction in Saudi Arabian medical education," *Social Sciences & Humanities Open*, vol. 11, p. 101334, 2025, doi: 10.1016/j.ssaho.2025.101334.
[16] S. B. Hammou, H. Razkane, and B. Benzehaf, "Exploring English-medium instruction (EMI) in health sciences: students' experiences and implications for broader implementation in Moroccan higher education," *Journal for Multicultural Education*, vol. 20, no. 1, pp. 27–41, Jan. 2026, doi: 10.1108/JME-03-2025-0057.
[17] N. AL-Husban *et al.*, "Effects of COVID-19 pandemic on medical students in Jordanian universities: a multi-center cross-sectional study," *Annals of Medicine & Surgery*, vol. 67, p. 102466, Jul. 2021, doi: 10.1016/j.amsu.2021.102466.
[18] E. Macaro, S. Curle, J. Pun, J. An, and J. Dearden, "A systematic review of English medium instruction in higher education," *Language Teaching*, vol. 51, no. 1, pp. 36–76, Jan. 2018, doi: 10.1017/S0261444817000350.
[19] M. J. Page *et al.*, "The PRISMA 2020 statement: an updated guideline for reporting systematic reviews," *BMJ*, vol. 372, p. n71, Mar. 2021, doi: 10.1136/bmj.n71.
[20] J. Thomas and A. Harden, "Methods for the thematic synthesis of qualitative research in systematic reviews," *BMC Medical Research Methodology*, vol. 8, no. 1, p. 45, Dec. 2008, doi: 10.1186/1471-2288-8-45.

[21] M. Dixon-Woods *et al.*, "Conducting a critical interpretive synthesis of the literature on access to healthcare by vulnerable groups," *BMC Medical Research Methodology*, vol. 6, no. 1, p. 35, Dec. 2006, doi: 10.1186/1471-2288-6-35.
[22] J. R. Landis and G. G. Koch, "The measurement of observer agreement for categorical data," *Biometrics*, vol. 33, no. 1, p. 159, Mar. 1977, doi: 10.2307/2529310.
[23] Q. N. Hong *et al.*, "The mixed methods appraisal tool (MMAT) version 2018 for information professionals and researchers," *Education for Information*, vol. 34, no. 4, pp. 285–291, Dec. 2018, doi: 10.3233/EFI-180221.
[24] M. S. Al-Asal and O. Smadi, "The effect of the language of instruction on university participants' acquisition of scientific terms," *European Scientific Journal*, vol. 25, pp. 5–28, 2014.
[25] F. M. A. Al-Haq, "The Arabicization of medical terms in light of language and terminology planning," *Al-Mutargim*, vol. 4, no. 2, pp. 5–62, 2004.
[26] P. Nation and R. Waring, "Vocabulary size, text coverage and word lists," in *Vocabulary: Description, Acquisition and Pedagogy*, N. Schmitt and M. McCarthy, Eds., Cambridge, U.K.: Cambridge University Press, 1997, pp. 6–19.
[27] W. Hsu, "Bridging the vocabulary gap for EFL medical undergraduates: the establishment of a medical word list," *Language Teaching Research*, vol. 17, no. 4, pp. 454–484, Oct. 2013, doi: 10.1177/1362168813494121.
[28] L. Lei and D. Liu, "A new medical academic word list: a corpus-based study with enhanced methodology," *Journal of English for Academic Purposes*, vol. 22, pp. 42–53, Jun. 2016, doi: 10.1016/j.jeap.2016.01.008.
[29] E. Alkhlaifat, P. Yang, and M. Moustakim, "Code-switching between Arabic and English in Jordanian GP consultations," *Crossroads*, vol. 2020, no. 30, pp. 4–22, 2020, doi: 10.15290/CR.2020.30.3.01.
[30] T. McEnery and V. Brezina, *Fundamental Principles of Corpus Linguistics*. Cambridge, U.K.: Cambridge University Press, 2022.
[31] C. Gabrielatos, "Keyness analysis: nature, metrics and techniques," in *Corpus Approaches to Discourse: A Critical Review*, 1st ed., C. Taylor and A. Marchi, Eds., Abingdon, U.K.: Routledge, 2018, pp. 225–258.
[32] D. Gardner and M. Davies, "A New academic vocabulary list," *Applied Linguistics*, vol. 35, no. 3, pp. 305–327, Jul. 2014, doi: 10.1093/applin/amt015.
[33] S. Dimova, J. Kling, and B. Drljača Margić, *EMI classroom communication: a corpus-based approach*. Abingdon, U.K.: Taylor & Francis, 2023.
[34] J. Wang, S. Liang, and G. Ge, "Establishment of a medical academic word list," *English for Specific Purposes*, vol. 27, no. 4, pp. 442–458, Jan. 2008, doi: 10.1016/j.esp.2008.05.003.
[35] R. A. Mizher and F. A.-A. Al-Haq, "Attitudes towards Using Standard Arabic among Academic Staff at Balqa Applied University/Center in Jordan: a sociolinguistic study," *International Journal of English Linguistics*, vol. 4, no. 1, pp. 53–59, Jan. 2014, doi: 10.5539/ijel.v4n1p53.
[36] Y. Suleiman, *Arabic language and national identity: a study in ideology*. Edinburgh, U.K.: Edinburgh University Press, 2019.
[37] M. Alshareef, O. Mobaireek, M. Mohamud, Z. Alrajhi, A. Alhamdan, and B. Hamad, "Decision makers' perspectives on the language of instruction in medicine in Saudi Arabia: a qualitative study," *Health Professions Education*, vol. 4, no. 4, pp. 308–316, 2018, doi: 10.1016/j.hpe.2018.03.006.
[38] D. Biber, B. Gray, S. Staples, and J. Egbert, "The register-functional approach to grammatical complexity," in *Investigating Grammatical Complexity in L2 English Writing Research*, L. K. Wolf and J. Byrnes, Eds., London, U.K.: Routledge, 2021, pp. 432–457.
[39] D. Banks, "On the historical origins of nominalized process in scientific text," *English for Specific Purposes*, vol. 24, no. 3, pp. 347–357, 2005, doi: 10.1016/j.esp.2004.08.002.
[40] F. Grosjean, *Bilingual: life and reality*. Cambridge, MA: Harvard University Press, 2010.
[41] J. Sweller, "Cognitive load during problem solving: effects on learning," *Cognitive Science*, vol. 12, no. 2, pp. 257–285, Apr. 1988, doi: 10.1207/s15516709cog1202_4.
[42] J. Sweller, J. J. G. van Merrienboer, and F. G. W. C. Paas, "Cognitive architecture and instructional design," *Educational Psychology Review*, vol. 10, no. 3, pp. 251–296, Sep. 1998, doi: 10.1023/A:1022193728205.
[43] J. Cummins, "Cognitive/academic language proficiency, linguistic interdependence, the optimum age question and some other matters," *Working Papers on Bilingualism*, vol. 19, pp. 1–9, 1979.
[44] S. Messick, "Validity," in *Educational Measurement*, 3rd ed., R. L. Linn, Ed., New York, NY: American Council on Education/Macmillan, 1989, pp. 13–103.
[45] I. S. P. Nation, *Learning Vocabulary in Another Language*. Cambridge, U.K.: Cambridge University Press, 2001.
[46] M. Alhamami and A. Almelhi, "English or Arabic in healthcare education: perspectives of healthcare alumni, students, and instructors," *Journal of Multidisciplinary Healthcare*, vol. 14, pp. 2537–2547, Sep. 2021, doi: 10.2147/JMDH.S330579.
[47] J.-E. Peng and X. (Serina) Xie, "English-medium instruction as a pedagogical strategy for the sustainable development of EFL learners in the Chinese context: a meta-analysis of its effectiveness," *Sustainability*, vol. 13, no. 10, p. 5637, May 2021, doi: 10.3390/su13105637.
[48] M. Yang, P. S. O'Sullivan, D. M. Irby, Z. Chen, C. Lin, and C. Lin, "Challenges and adaptations in implementing an English-medium medical program: a case study in China," *BMC Medical Education*, vol. 19, no. 1, p. 15, Dec. 2019, doi: 10.1186/s12909-018-1452-3.
[49] K. Alanazi and K. Gallagher, "Making sense of English-medium medical education in the expanding circle," *Asian Englishes*, vol. 27, no. 2, pp. 572–590, May 2025, doi: 10.1080/13488678.2025.2475719.
[50] Z. M. Gaffas, "Language challenges in medical education," *AILA Review*, vol. 38, no. 1, pp. 5–44, Sep. 2025, doi: 10.1075/aila.24013.gaf.
[51] M. Alhamami, "Burnout in healthcare education programs and English as a medium of instruction: the dark side of the language of instruction," *Frontiers in Medicine*, vol. 12, Jul. 2025, doi: 10.3389/fmed.2025.1619177.
[52] H. Gustafsson, "Capturing EMI teachers' linguistic needs: a usage-based perspective," *International Journal of Bilingual Education and Bilingualism*, vol. 23, no. 9, pp. 1071–1082, Oct. 2020, doi: 10.1080/13670050.2018.1425367.
[53] S. Dimova and J. Kling, "Assessing English-medium instruction lecturer language proficiency across disciplines," *TESOL Quarterly*, vol. 52, no. 3, pp. 634–656, Sep. 2018, doi: 10.1002/tesq.454.
[54] H. G. Yüksel, "Remote learning during COVID-19: cognitive appraisals and perceptions of English medium of instruction (EMI) students," *Education and Information Technologies*, vol. 27, no. 1, pp. 347–363, Jan. 2022, doi: 10.1007/s10639-021-10678-x.
[55] S.-L. Lin, T.-H. Wen, G. S. Ching, and Y.-C. Huang, "Experiences and challenges of an English as a medium of instruction course in Taiwan during COVID-19," *International Journal of Environmental Research and Public Health*, vol. 18, no. 24, p. 12920, Dec. 2021, doi: 10.3390/ijerph182412920.
[56] T. Alsuliman, L. Alasadi, A. Mouki, and B. Alsaid, "Language of written medical educational materials for non-English speaking populations: an evaluation of a simplified bi-lingual approach," *BMC Medical Education*, vol. 19, no. 1, p. 418, Dec. 2019, doi: 10.1186/s12909-019-1846-x.

[57] E. Sokro, T. Obuobisa-Darko, and B. Okpattah, "Online teaching competencies and teacher effectiveness in higher education: the mediating effect of perceived career support," *Journal of Applied Research in Higher Education*, vol. 17, no. 5, pp. 2170–2185, Oct. 2025, doi: 10.1108/JARHE-03-2024-0150.
[58] M. G. V. Coto *et al.*, "Teaching foundational language equity concepts in the pre-clinical curriculum," *BMC Medical Education*, vol. 24, no. 1, p. 485, May 2024, doi: 10.1186/s12909-024-05474-3.

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