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A Systematic Review of Needs Analysis Research in English for Medical Purposes (2010-2024)

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ABSTRACT: *This study systematically reviews English for Medical Purposes needs analysis research findings and methodologies. It addresses the lack of a consolidated synthesis specific to the field, offering integrated insights for researchers, English teachers and medical practitioners. Following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) checklist, 19 academic databases, including Scopus, PubMed, JSTOR, ScienceDirect, and academic search engines, mainly JURN and BASE, were searched using predefined key terms: "English for Specific Purposes," "Needs analysis," and "English for Medical Purposes." From the initial search, 2240 studies were identified. These studies were screened using rigorous inclusion and exclusion criteria, focusing on publication language, peer-review status, publication date (2010-2024), and scope, among other criteria. Ten studies (n=10) were included in the final dataset and further evaluated using the Mixed Methods Appraisal Tool (MMAT). The current synthesis established that the studies emphasised the critical importance of core language skills for medical communication, with seven studies highlighting the importance of medical terminology. The same seven studies also noted widespread dissatisfaction with outdated course materials and significant gaps in the alignment of content and the needs of medical professionals. In terms of methodology, eight studies used a mixed methods approach, nine relied on triangulation, and only six used pilot tests to ensure reliability and validity. A key implication of these findings is the need for an evidence-based approach to English education for medical purposes, grounded in empirical research, to better support researchers, ESP teachers, and medical practitioners. Consequently, more longitudinal research tracking EMP skills across the medical landscape is needed to bridge these critical gaps and advance the pedagogy.*

KEYWORDS: English for Medical Purposes (EMP), English for Specific Purposes (ESP), evidence-based approach, needs analysis (NA), systematic review.

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Introduction

English for specific purposes (ESP, henceforth) instruction is tailored to meet the discipline-related needs of learners, whether academic, occupational, or professional (Brown, 2016; Hutchinson & Waters, 1987; Starfield, 2013; Wette, 2018; Woodrow, 2018). This form of personalised instruction enhances the linguistic competence required for field-specific tasks, enabling learners to navigate their professional environments successfully (Anthony, 2018; Basturkmen, 2013, 2021; Elmotri, 2025; Hyland, 2022). Within the increasingly globalised medical field, characterised by the dominance of English, identifying the specific linguistic requirements of medical professionals is paramount for ensuring effective communication in healthcare settings (Ferguson, 2012; Hull, 2016; Maher, 1986; Skelton & Richards, 2021; Woodrow, 2018).

A substantial body of research has emphasised the importance of needs analysis (NA, henceforth), including studies examining its methodological issues (Mohammed, 2022; Serafini et al., 2015) and pedagogical limitations (Min, 2020). However, this research has consistently reported findings across various disciplines without establishing a comprehensive synthesis outlining the methodological approaches and key findings tailored to the medical field. In addition, a particularly notable issue that has dominated the discussion centres on the overt emphasis of current research on methodological procedures to the detriment of reporting on NA research findings and their applicability in English for Medical Purposes (EMP, henceforth). More broadly, this lack of consolidated synthesis contributes to a fragmented landscape, preventing educators and researchers from accessing integrated insights essential for understanding the high-stakes medical context, improving educational practices, and informing further research. Accordingly, this review aims to contribute to this growing area of research by synthesising research on English language needs, the methodological procedures used, and the implications of these findings for educators, researchers, and medical professionals. This study examines the following research questions:

1. What key findings have emerged from needs analysis studies in the field of English for medical purposes?
2. What data collection methods have been used in needs analysis studies in the field of English for medical purposes?
3. What implications do the needs analysis findings hold for researchers, English for specific purposes teachers, and medical practitioners?

By synthesising the findings of existing research, this study aims to provide a clear picture of the prominent language needs in the increasingly multilingual medical environment and advocate for an evidence-based approach to EMP, as it serves as a crucial resource for educators, medical professionals, and researchers, ultimately helping to bridge the gap between research and practice.

Challenges in Conducting EMP Needs Analysis

Conventionally, NA has focused on describing the language and task requirements relevant to target situations, including professional or academic contexts that learners are expected to encounter (Baumgardner & Chamberlain, 1988; Hutchinson & Waters, 1987; Mackay & Mountford, 1978; Munby, 1978). However, subsequent models have expanded their scope to include a wide range of needs-related information. Such an expansion encompasses analysing learners' current language proficiency, assessing learners' motivation, highlighting desired learning pathways, and examining the teaching environment while considering contextual factors such as resource availability, learners' proficiency gaps, and sociocultural competence (Anthony, 2018; Brown, 2016).

In high-stakes medical contexts, where miscommunication risks patient safety, an expanded NA framework ensures actionable and targeted pedagogical interventions that align medical training with the identified communicative and cultural needs of learners (Anthony, 2018; Basturkmen, 2010, 2013; Brown, 2016; Wette, 2018). This expanded framework addresses diverse, high-stakes demands, such as patient consultations, medical documentation, and various context-specific scenarios, such as discussions in

multicultural care teams. Consequently, these applications directly inform pedagogical practices, such as setting learning objectives, selecting educational materials, identifying suitable teaching methodologies, and designing assessment and evaluation procedures in line with the rigorous demands of the medical field (Anthony, 2018; Basturkmen, 2010; Flowerdew, 2012).

NA is intricate and demanding, often requiring practitioners to reconcile research insights with their own medical experiences (Wette, 2018). Therefore, access to synthesised research findings guarantees clarity and relevance in instructional practices, particularly in the medical field, where tensions such as time constraints in training hinder pedagogical design. These challenges are further compounded by methodological limitations in NA, including overreliance on a single data collection tool, sampling data from non-representative populations based on convenience rather than random assignment, and low participant availability due to demanding schedules (Long, 2005; Mohammed, 2022; Serafini et al., 2015).

To address these issues, ESP practitioners are encouraged to triangulate data from diverse sources using multiple tools such as interviews, surveys, observations, and diaries (Long, 2005; Serafini et al., 2015). This extends to engaging stakeholders with diverse expertise in the field. For example, relying on collaborative input from healthcare staff, applied linguists, and multiple ESP educators ensures alignment between pedagogy and the realities of medical practice (Anthony, 2018; Long, 2005; Serafini et al., 2015). Although there is broad-ranging systematic review research on NA that covers multiple fields, its context-dependent nature often obscures the unique communication demands of the medical domain (Min, 2020; Mohammed, 2022; Serafini et al., 2015). This lack of a domain-specific focus necessitates the adaptation of NA methodologies to uncover domain-specific requirements tailored to healthcare settings. Additionally, the rapid advancement in medicine demands an updated synthesis of how NA frameworks capture the emerging competencies. Consequently, reliance on EMP-focused systematic reviews is crucial for establishing evidence-based practices to improve EMP educational outcomes.

Research Methodology

This study adopts a systematic literature review approach with an in-depth analysis of published research studies on EMP needs analysis findings and methodological procedures. Systematicity refers to a methodical approach to reviewing literature that safeguards evidence from bias and allows for a reliable appraisal of the current state of knowledge through predefined protocols and reproducible procedures (Boland et al., 2017; Jesson et al., 2011). The framework adopted in the current study relied on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure reproducibility and rigor (Page et al., 2021). The process was divided into seven key steps: formulating a research question about EMP needs, conducting a literature search across interdisciplinary academic databases using Boolean operators and key terms, screening titles and abstracts against predefined inclusion and exclusion criteria, extracting research studies, assessing their quality through the Mixed Methods Appraisal Tool (MMAT), thematically analysing results, and finally synthesising the research findings (Hong et al., 2018; Page et al., 2021).

Search Strategy

This systematic review drew upon a comprehensive search of 19 academic databases and search engines, including prominent indices such as Scopus, PubMed, JSTOR, ScienceDirect, Wiley, Springer, ProQuest, ERIC, DOAJ, CORE, Europe PMC, Science Open, Academia.edu, ResearchGate, Google Scholar, the Algerian Scientific Journal Platform (ASJP), and Access to Research UK, further supplemented by specialised engines like JURN and BASE, as detailed in Table **1**, all selected for their relevance, interdisciplinary coverage, and accessibility. The search employed a predefined search strategy, combining key terms and Boolean operators into the following core string: ("English for specific purposes" OR "ESP")

AND ("Needs analysis" OR "Language needs assessment" OR "Identifying learner needs") AND ("Syllabus design" OR "Course design" OR "Curriculum design") AND ("English for medical purposes" OR "EMP").

Primary Bibliographic Databases	Records Retrieved	Primary Bibliographic Databases	Records Retrieved
ResearchGate	1010	Wiley	10
Google Scholar	722	Web of Science	10
CORE	181	DSpace	10
JURN Search	100	BASE Search	7
SpringerLink	59	SNDL	3
Taylor & Francis	47	Europe PMC	3
Academia.edu	21	Scopus	2
ProQuest	20	PubMed Central	2
ScienceDirect	16	Access to Research UK	2
ASJP	15	-	-
Total		2240	

Table 1 Search Yield by Database

Table 1 presents the number of studies retrieved from 19 bibliographic databases and scholarly platforms. The search was notably broad, encompassing multidisciplinary databases and open-access repositories, with Google Scholar and ResearchGate accounting for over 77% of the research records.

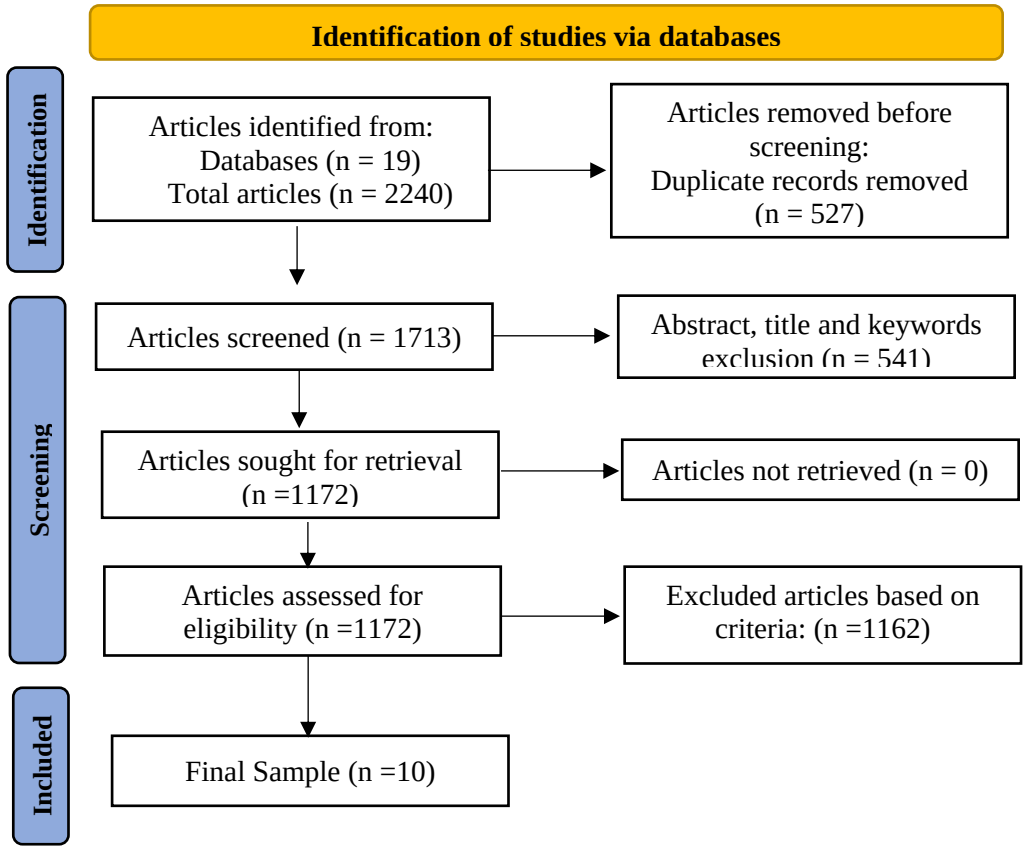

Figure 1 PRISMA Flow Chart for Identifying and Selecting Research Studies

Figure 1 shows the PRISMA flow diagram of the study selection process. The initial search identified 2,240 records from 19 databases and academic search engines. After removing 527 duplicate studies, 1,713 records were screened by title and abstract, resulting in the exclusion of 541 studies from the review. The remaining 1,172 articles progressed to full-text assessment, of which 1,162 were excluded according to the

predefined inclusion and exclusion criteria. Ultimately, 10 studies met the eligibility criteria and were included in this systematic review.

Inclusion and Exclusion Criteria

To ensure methodological rigor and minimise selection bias, a set of clearly defined inclusion and exclusion criteria was developed. These criteria covered a wide range of key parameters, including publication date, language of communication, study type, peer-review status, thematic focus, research sample, publication accessibility, and data quality metrics, as detailed in Table 2.

Criterion	Inclusion criteria	Exclusion criteria
Publication date	Studies published between 2010 and 2024	Studies published prior to 2010
Language	Studies published in English	Studies not published in English
Study type	Empirical studies (quantitative, qualitative and mixed methods)	Theoretical works
Research articles	Peer-reviewed articles	Grey literature (theses, books, book reviews, conference proceedings)
Study scope	ESP needs analysis studies in English for Medical Purposes context	Studies about teaching, general English, studies that do not address needs of English medical learners
Research sample	Medical learners, medical residents and medical doctors	Pharmacy students, nursing, dentistry
Publication access	Open access, full text availability	Paywalled articles
Data quality	Studies with complete information, appropriate reference format, appropriate data selection, analysis and communication	Studies with reference padding, missing information, and inadequately communicated methodologies

Table 2. Inclusion and Exclusion Criteria

As shown in Table 2, the inclusion criteria prioritised peer-reviewed studies published between 2010 and 2024 to ensure a robust and contemporary coverage of the EMP context, with the primary focus on NA research involving medical learners, doctors, and residents. Furthermore, the criteria required an empirical design, publication in English, open access and full-text availability, adherence to proper formatting and academic conduct, and transparent methodologies. Conversely, the exclusion criteria rejected studies that addressed non-medical or general English contexts (e.g. nursing, pharmacy, and dentistry), non- peer-reviewed or grey literature (e.g. conference proceedings, book reviews), studies predating 2010, those without full-text access, non-English publications, and studies with methodological flaws (e.g. reference padding).

Following the application of the inclusion and exclusion criteria, the methodological quality of the final dataset (n=10) was assessed using the MMAT (Hong et al., 2018). The latter, which critically evaluates five categories of study designs, was used to appraise the three relevant designs identified in this review: qualitative, quantitative descriptive, and mixed methods, ensuring a rigorous appraisal of the quality of the synthesised studies.

Study Limitations

This review has several limitations. First, the small number of studies included in the final dataset (n=10) may have limited the depth of the synthesis, which was a direct result of the rigorous inclusion and exclusion criteria selected for the current review. Broadening these criteria in future reviews may yield a larger corpus of studies. Second, this synthesis did not report on the sampling techniques used in the primary studies, as this fell beyond the scope of the review. Consequently, further research with a specific focus on sampling procedures is recommended. Third, the study findings are limited in scope to medical doctors, residents, and learners, excluding nurses, dentists, and pharmacists, thus narrowing the study's applicability. Therefore, further research is required to map the nuanced medical landscape across all healthcare professions. Fourth, language bias may have been noted, as only studies published in English were considered. While this aligns with the study's focus on EMP, it risks excluding insights from non-Anglophone publications. Therefore, expanding the scope to include studies published in multiple languages is essential for generating relevant insights.

Research Findings and Discussion

This section presents the key findings from the final dataset (n=10), synthesised through qualitative analysis. To establish context, this section begins by outlining the sample characteristics and geographical distribution of the included studies before detailing the thematic results, which are organised by research question to provide systematic conclusions for the EMP field.

Sample Description

This section outlines the participant demographics to frame the interpretation of the findings within their appropriate professional context, as presented in Table 3.

Number	Research Study	Sample Description
1	(Antic & Milosavljevic, 2016)	62 students, 43 medical doctors, and 24 postgraduate students
2	(Azzhrani & Alghamdi, 2020)	315 medical professionals
3	(Bilici & Jodoin, 2017)	Chinese medical staff
4	(Farea & Singh, 2024)	186 students, 4 ESP practitioners, and 10 medical doctors
5	(Hekmati et al., 2020)	282 students, 12 medical instructors, and 15 medical practitioners
6	(Hidayati & Meisani, 2023)	156 students
7	(Hwang & Lin, 2010)	378 students, and 24 faculty members
8	(Özdemir, 2014)	339 students, and administrative staff
9	(Trujeque-Moreno et al., 2021)	191 students, 6 faculty members, and 6 administrators
10	(Willey et al., 2020)	427 medical doctors

Table 3. Sample Description

As shown in Table 3, a heavy reliance on medical students, who were the primary data source in 70% of the studies, created a notable imbalance in the samples. This focus overshadowed other professional groups; for instance, medical doctors and practitioners were included in only 60% of the studies. Furthermore, the needs of medical residents and interns have been largely overlooked, despite their critical in-service context,

a gap potentially attributable to time constraints in such demanding training environments (Bilici & Jodoin, 2017). While questions have been raised about the importance of integrating diverse stakeholder perspectives, only two studies reported insights from administrative staff, three reported on faculty members, and one on ESP instructors (Farea & Singh, 2024; Hekmati et al., 2020; Hwang & Lin, 2010; Özdemir, 2014; Trujeque-Moreno et al., 2021). This limited scope has significant implications for the generalisability of communicative needs in these nuanced medical contexts. Collectively, these findings highlight a theory-practice discrepancy. In ESP theory, needs analysis is positioned as the foundational bridge that connects theoretical understanding to practical application, directly shaping curricula and pedagogical materials (Hyland, 2022). However, this review observed that this link is frequently fractured. While all studies recognised NA as an essential process, only three demonstrated its direct impact on the subsequent development of curricula, syllabi, or course design (Bilici & Jodoin, 2017; Hwang & Lin, 2010; Willey et al., 2020). A possible explanation for this is the resource-intensive nature of NA, paired with a lack of collaboration between ESP practitioners and field specialists (Long, 2005).

These findings align with Min's (2020) observation that the EMP domain remains understudied relative to other fields. Furthermore, these results directly corroborate the work of (Mohammed, 2022; Serafini et al., 2015), who identified a concerning reliance on students as the primary and sometimes sole data source, in doing so marginalising the input of domain experts and other key stakeholders. This highlights the critical need for future NA research to adopt more rigorous and inclusive methodologies that can effectively bridge theoretical frameworks with the dynamic realities of healthcare practice (Antic & Milosavljevic, 2016; Long, 2005; Min, 2020).

Geographical Distribution

This section analyses the geographical distribution of the final dataset (n=10), as detailed in Table 4, to identify disparities in EMP research across different linguistic and cultural contexts. The analysis specifically examines regional biases by highlighting where EMP needs assessments have been predominantly conducted.

Number	Research Study	Geographical Context
1	(Antic & Milosavljevic, 2016)	Serbia
2	(Azzhrani & Alghamdi, 2020)	Saudi Arabia
3	(Bilici & Jodoin, 2017)	China
4	(Farea & Singh, 2024)	Malaysia
5	(Hekmati et al., 2020)	Iran
6	(Hidayati & Meisani, 2023)	Indonesia
7	(Hwang & Lin, 2010)	Taiwan
8	(Özdemir, 2014)	Turkey
9	(Trujeque-Moreno et al., 2021)	Mexico
10	(Willey et al., 2020)	Japan

Table 4. Geographical Distribution

As shown in Table 4, 60% of the included studies originated from Asia, a finding that aligns with previous research highlighting the region’s growing scholarly interest in ESP. This trend is often linked to economic and geopolitical factors, a globally interconnected workforce, and an emphasis on English as a medium of instruction in the academic landscape (Basturkmen, 2022; Bolton & Jenks, 2022; Dou et al., 2023; Min, 2020; Tan et al., 2023). In contrast, other regions were significantly underrepresented, with only two studies from the Middle East, one from South America, and one from Europe each. This scarcity of publications

also extends to Africa, from which no relevant studies were identified. The observed lack of publications in these regions may be attributed to medical training being conducted in local languages, paired with limited dissemination of research in internationally visible journals. Notably, all studies were conducted in non-English-speaking countries, and 60% of studies were published post-2020, a trend that likely reflects post-pandemic demands for English proficiency in the healthcare environment (Azzhrani & Alghamdi, 2020).

What key findings have emerged from needs analysis studies in the field of English for medical purposes?

This section synthesises key findings from NA research in EMP, organized by thematic area in Table 5

Core Themes	Sub-Themes	Findings
Core Language Skills	Speaking	The most crucial skill; the weakest skill; technical vocabulary and lay terms; the role of intensive training; avoiding misunderstandings.
	Reading	Academic professional reading vs general reading; adaptive reading strategies; navigating lexical complexity.
	Listening	Importance of active listening, professional interactions, and knowledge assimilation.
	Writing	Research publications, challenging skills, and medical documentation.
Vocabulary Knowledge	Foundational Pillar	Essential role for communication and core language skills; challenging nature; need for intensive practical instruction.
Course Instruction	Widespread Dissatisfaction	Outdated course materials, lack of need alignment to course content.
	Pedagogical Implications	ESP practitioner training; urgent need for a learner-centred shift focusing on communication.

Table 5. Key Needs Analysis Research Findings

The Core Language Skills

As described in Table 5, six out of ten studies emphasised the critical importance of speaking skills in both academic and professional medical settings. Azzhrani & Alghamdi (2020) and Willey et al. (2020), for instance, highlighted the crucial role of speaking during the COVID-19 pandemic, where the effective communication of medical practices and research was indispensable for disseminating findings and safeguarding lives. Furthermore, verbal communication bridges serious gaps between medical personnel and foreign patients, requiring professionals to constantly navigate between specialised medical terminology and lay language to ensure clarity and avoid misunderstandings (Willey et al., 2020). This need for dual-language proficiency is supported by Bilici & Jodoin (2017) and Özdemir (2014), who argued that proficient communication requires not only a strong command of field-specific terminology but also the ability to use non-specialist language. Paradoxically, despite its recognised importance, speaking is still regarded as one of the most challenging skills to master in language learning. These combined findings emphasise the critical need for intensive training aimed at improving overall communicative competence (Antic & Milosavljevic, 2016; Farea & Singh, 2024). These findings align with the well-established consensus on the importance of speaking skills in various academic and occupational contexts, while also corroborating the documented pedagogical challenges in teaching them. The persistent nature of this challenge underscores the necessity for EMP pedagogy to adopt flexible and adaptive approaches to

effectively develop communicative competence (Feak, 2012; Ferguson, 2012; Min, 2020; Skelton & Richards, 2021).

In addition to speaking, reading is an essential skill in EMP. Hwang & Lin (2010) observed that while students and medical faculty members both value reading, their focuses differ in the sense that whereas students prioritise general reading skills, faculty members emphasise academic reading. This academic focus is critical, as reading serves as the primary vehicle for understanding complex medical terminology and accessing essential knowledge, literature, and textbooks (Antic & Milosavljevic, 2016; Farea & Singh, 2024; Hekmati et al., 2020; Hidayati & Meisani, 2023; Trujeque-Moreno et al., 2021; Willey et al., 2020). However, a significant challenge is the lexical density and complexity of medical texts, which entails the use of adaptive learning strategies to improve reading proficiency (Hekmati et al., 2020; Özdemir, 2014; Willey et al., 2020). This pattern is consistent with the wider literature, which frames reading as a foundational tool for accessing specialised knowledge and discipline-specific texts. This skill must be viewed within an interconnected framework, particularly with vocabulary mastery, a component consistently stressed in the literature as vital yet challenging, thereby necessitating strategic pedagogical intervention (Ferguson, 2012; Hirvela, 2012; Min, 2020).

The synthesised research also advocates the critical importance of listening skills in medical contexts. Studies have demonstrated that active listening is fundamental to understanding daily interactions, discussions, lectures, and presentations (Farea & Singh, 2024; Hwang & Lin, 2010; Özdemir, 2014). This was noticeable during the COVID-19 pandemic, where listening was essential for the rapid assimilation of new knowledge and instructions (Azzhrani & Alghamdi, 2020). Furthermore, listening facilitates communication with staff and patients and enables participation during conferences, which often require extended and complex conversations (Bilici & Jodoin, 2017; Özdemir, 2014; Trujeque-Moreno et al., 2021). These results have been extensively discussed, outlining the paramount importance of listening for effective communication in these specialised settings. As with other skills, listening is rarely isolated, and for it to develop effectively, a command of domain-specific and non-specialist terminologies is essential. However, despite this recognised importance, a persistent lack of context-specific teaching strategies remains a systematic barrier to developing this competency (Ferguson, 2012; Goh, 2012; Min, 2020; Skelton & Richards, 2021).

Despite receiving less scholarly attention than other competencies, writing remains a critically important skill in EMP courses. For instance, Hekmati et al. (2020) ranked it as the second most required skill, particularly for practitioners aiming to publish articles in medical journals. This need extends to academic and professional contexts, with studies highlighting the essential role of writing in preparing assignments, reports, emails, and other documents (Farea & Singh, 2024; Hidayati & Meisani, 2023; Hwang & Lin, 2010). Despite its established significance, writing has been reported as one of the most difficult skills to master. For example, Antic & Milosavljevic (2016) detailed the significant difficulties students face when writing case reports, illustrating a major barrier to achieving the language proficiency required of medical practitioners. The results further affirm the importance of writing for disseminating academic knowledge, even though it is constantly viewed as a complex procedure because of its context-dependent conventions and high cognitive demands. This perception of complexity may explain why writing sometimes receives less attention in general ESP instruction than other skills. The current study's findings, however, reveal that writing has been significantly emphasised within the specific domain of EMP, particularly through genre-based and research-informed pedagogical approaches (Ferguson, 2012; Hyland, 2012; Min, 2020; Skelton & Richards, 2021).

Vocabulary Knowledge

As highlighted in Table 5, vocabulary and medical terminology constitute a fundamental aspect of effective communication, although their explicit prioritisation varied across the reviewed studies. Several studies have stressed the crucial role of vocabulary in enhancing general communication skills (Azzhrani & Alghamdi, 2020; Bilici & Jodoin, 2017; Özdemir, 2014). However, acquiring this terminology presents significant difficulties, which impede the mastery of all four language skills and ultimately affect the academic and professional success of medical practitioners (Hidayati & Meisani, 2023; Hwang & Lin, 2010; Trujeque-Moreno et al., 2021). Consequently, intensive practical instruction is widely recommended to effectively address these challenges (Antic & Milosavljevic, 2016; Azzhrani & Alghamdi, 2020). This aligns with the observation that some practitioners prioritise communicative practice over decontextualised vocabulary study, particularly in reading-oriented courses, where terminology is inherently reinforced through use (Willey et al., 2020). This tension between the explicit need for vocabulary and the preference for implicit acquisition underscores the necessity of a balanced pedagogical approach. Such an approach must integrate direct vocabulary instruction with immersive, context-driven, and technology-assisted learning to help learners decode the inherent complexity of the medical lexicon (Coxhead, 2012; Ferguson, 2012).

Course Instruction

As noted in Table 5, a recurrent theme across the reviewed studies is significant dissatisfaction among learners and practitioners, who report that EMP courses fail to meet real-world communicative demands and are often perceived as neither useful nor satisfactory (Farea & Singh, 2024; Willey et al., 2020). This dissatisfaction is frequently linked to institutional barriers such as overcrowded classrooms, limited instruction time, low course credit, lack of needs analysis implementation, and outdated course materials (Azzhrani & Alghamdi, 2020; Farea & Singh, 2024; Hwang & Lin, 2010; Trujeque-Moreno et al., 2021). To address these issues, scholars have urged a fundamental pedagogical shift. This includes ESP practitioners developing greater content knowledge and pedagogical expertise, as well as employing targeted instructional strategies, moving away from rote memorisation toward learner-centred activities that foster autonomy and interaction (Antic & Milosavljevic, 2016; Bilici & Jodoin, 2017; Hwang & Lin, 2010; Özdemir, 2014). Ultimately, overcoming these challenges requires practical, context-specific training and, most importantly, a flexible and customised approach to course design that acknowledges real-world institutional constraints (Ferguson, 2012; Skelton & Richards, 2021).

What data collection methods have been used in needs analysis studies in the field of English for medical purposes?

This section analyses the methodological approaches and triangulation procedures employed in EMP needs analysis research, as summarised in Table 6.

Research study	Data collection method	Triangulation of data collection method/source	Pilot Tests
(Antic & Milosavljevic, 2016)	Questionnaire and Semi-structured interviews	Multiple Instruments and participants	Not reported
(Azzhrani & Alghamdi, 2020)	Questionnaire and Semi-structured interviews	Multiple Instruments	Reported
(Bilici & Jodoin, 2017)	Speaking exam scores and Semi-structured interviews	Multiple Instruments	Not reported
(Farea & Singh, 2024)	Questionnaire and Semi-structured interviews	Multiple Instruments and participants	Not reported
(Hekmati et al., 2020)	Questionnaire and Semi-structured interviews	Multiple Instruments and sources	Reported
(Hidayati & Meisani, 2023)	Questionnaire	No triangulation	Not reported
(Hwang & Lin, 2010)	Questionnaire	Multiple participants	Reported
(Özdemir, 2014)	Reflective Journal, questionnaire, interview	Multiple Instruments and participants	Reported
(Trujeque-Moreno et al., 2021)	Questionnaire and Semi-structured interviews	Multiple Instruments and participants	Reported
(Willey et al., 2020)	Questionnaire and Semi-structured interviews	Multiple Instruments	Reported

Table 6. Methodological Approaches in EMP Needs Analysis Studies

As shown in Table 6, various data collection methods were used to collect language-related medical professionals' needs, with a notable inclination toward the mixed methods approach. This preference is justified, as this approach utilises both quantitative and qualitative means to safeguard validity and reliability, allowing researchers to gather crucial data that address specific research questions and objectives (Creswell & Creswell, 2018; Flowerdew, 2012; Min, 2020; Mohammed, 2022; Serafini et al., 2015). Among the synthesised works, five employed a convergent mixed methods design (Antic & Milosavljevic, 2016; Bilici & Jodoin, 2017; Hekmati et al., 2020; Trujeque-Moreno et al., 2021; Willey et al., 2020). These studies collected data simultaneouslyvia questionnaires and semi-structured interviewson English language usage, proficiency, and the perceived significance of language skills in medical contexts. Additionally, two studies adopted an explanatory sequential mixed methods design, collecting quantitative data first, followed by a qualitative phase to explore and contextualise the initial findings (Azzhrani & Alghamdi, 2020; Farea & Singh, 2024). In contrast, Özdemir (2014) opted for an exploratory sequential design, where the qualitative phase informed the development of a tailored questionnaire for the subsequent quantitative phase, ensuring that the instrument aligned closely with participant needs. Despite the clear preference for mixed methods across the corpus, two studies adopted a strictly quantitative approach, relying solely on questionnaires for data collection (Hidayati & Meisani, 2023; Hwang & Lin, 2010).

To fully map the needs within the field of EMP, it is necessary to triangulate both the methodologies and data sources. Methodological triangulation, which employs multiple tools such as questionnaires, interviews, and observations, was featured in nine studies. Furthermore, these studies utilised source triangulation by gathering data from diverse participant groups—including medical doctors, students, ESP teachers, medical instructors, and administrators—to enhance the robustness of their findings (Antic & Milosavljevic, 2016; Azzhrani & Alghamdi, 2020; Bilici & Jodoin, 2017; Farea & Singh, 2024; Hekmati et al., 2020; Hwang & Lin, 2010; Özdemir, 2014; Trujeque-Moreno et al., 2021; Willey et al., 2020). Pilot testing, along with triangulation, is widely recommended to ensure the validity and reliability of the NA (Long, 2005; Min, 2020; Mohammed, 2022; Serafini et al., 2015). Reflecting this, six of the reviewed studies reported conducting pilot tests using feedback from preliminary samples to refine their data

collection instruments (Azzhrani & Alghamdi, 2020; Hekmati et al., 2020; Hwang & Lin, 2010; Özdemir, 2014; Trujeque-Moreno et al., 2021; Willey et al., 2020). However, four studies did not report any pilot-testing procedures. This gap in reporting—or in practice—may be attributed to practical constraints, such as time limitations and recruitment challenges (Antic & Milosavljevic, 2016; Bilici & Jodoin, 2017; Farea & Singh, 2024; Hidayati & Meisani, 2023).

What implications do needs analysis findings hold for researchers, English for specific purposes teachers, and medical practitioners?

These findings collectively affirm that the multifaceted nature of EMP requires a mixed-methods approach. Furthermore, they demonstrate that methodological rigour—achieved through the triangulation of data sources and pilot testing—is indispensable for capturing the nuances of language needs, ensuring validity, and ultimately designing effective EMP programmes (Flowerdew, 2012; Mohammed, 2022; Serafini et al., 2015). The prevalent dissatisfaction with existing EMP courses, driven by a misalignment between instruction and real-world demands, underscores the urgent need for an evidence-based approach and systematic course evaluation (Antic & Milosavljevic, 2016; Ferguson, 2012). Specifically, the use of authentic medical materials, dynamic teaching methods, and student-centred approaches, such as pair and group work, directly addresses the communicative needs of medical professionals in training. These approaches effectively integrate core language skills, medical terminology, and everyday language, moving beyond orthodox instructional models (Anthony, 2018; Antic & Milosavljevic, 2016; Basturkmen, 2010). Consequently, targeted teacher training and continuous professional development in ESP methodology are crucial to equip educators with the expertise needed to identify and address the complex needs of these learners (Basturkmen, 2021; Johns, 2012; Wette, 2018).

These findings illuminate the demands of the modern multilingual medical field, where English proficiency is essential in both academic and professional spheres. As the dominant language of scientific research and medical literature, English is a foundational tool for practitioners in the field. Hence, command of the language enables professionals to meet core demands, such as presenting at international conferences, publishing research, and communicating complex ideas clearly. Furthermore, English fluency directly influences patient safety and the efficacy of professional collaboration in diverse healthcare teams, making proficiency not merely beneficial but critical (Ferguson, 2012; Min, 2020; Skelton & Richards, 2021; Wette, 2018)

Research Recommendations

This review highlights several critical avenues for future research and pedagogical development in EMP. A primary recommendation is the adoption of a learner-centred, genre-based pedagogy to ensure that instruction is aligned with the real-world tasks medical professionals encounter. To support this, there is a clear need to develop curricula around authentic medical materials, such as clinical guidelines, recorded medical scenarios, AI-powered simulations, and virtual patient interactions, to bridge the current gap in relevant teaching resources. Furthermore, effective EMP instruction must balance the development of communicative skills with the systematic teaching of medical terminology. This can be achieved through corpus-based methods, mnemonic techniques, and dedicated language applications that contextualise complex lexical items. Finally, overcoming the inherent challenges of EMP requires practitioners to receive robust training in ESP methodologies while also engaging in sustained collaboration with medical experts to co-design relevant and impactful learning materials.

These findings strongly recommend longitudinal EMP studies to track learners' evolving needs as they transition between academic and professional contexts. Such research should employ a rigorous

mixed-methods approach, utilising triangulation and pilot testing to capture the nuanced linguistic and cultural demands of global healthcare. A critical yet underexplored dimension of this research is the role of cultural competence in medical communication. Furthermore, to be truly comprehensive, future studies must expand their scope to include a diverse range of medical specialties and populations, such as nurses, pharmacists, and residents, rather than focusing predominantly on medical students. Crucially, EMP research must extend beyond simply identifying needs to directly inform course, syllabus, and curriculum design. This necessitates the active cooperation of policymakers, who must base their pedagogical decisions on these empirical findings, thereby adopting a bottom-up, data-driven approach to ensure improved educational outcomes.

Third, these findings underscore the critical need to support medical practitioners in multilingual domains, where language proficiency is foundational to achieving shared clinical goals and ensuring effective teamwork. To mitigate the direct risks that miscommunication poses to patient safety, institutions must develop adaptive communication strategies tailored to high-pressure medical environments. This necessitates robust policy support, including the provision of blended language courses, targeted teaching materials, and programmes for strategic competency development, all of which are designed to be integrated into demanding medical workflows.

Conclusion

By synthesising research findings on NA and methodological approaches within EMP, this study makes a major contribution by indicating a knowledge gap in previous research reporting findings across various disciplines without establishing a specific comprehensive synthesis tailored to the medical field. The investigation has shown the need for an evidence-based approach based on empirical research to guide researchers, ESP teachers, and medical professionals through the nuanced landscape of the medical domain. One of the more significant findings to emerge from this study is the current role of mixed methods methodologies, advocating both methodological and source triangulation, along with extensive pilot tests to maintain the reliability and validity of NA. The second major finding was the emphasis on the importance of mastering core language skills, along with medical terminology, to perform real-world communicative tasks such as delivering presentations, interacting with patients, and accessing medical knowledge. Dissatisfaction with EMP courses is a common theme, mainly due to the mismatch between the course content and the actual needs of medical practitioners, along with the outdated materials and ineffective teaching methods that characterise these courses. The evidence from this study also emphasises the importance of teacher training and continuous professional development, reflecting the need for reform in EMP education, focusing on language proficiency as an integral part of both professional practice and academic development. However, the current investigation was limited by its focus on medical doctors and students, as well as its reliance on English-only published studies, which may limit the generalisability of the results. More broadly, future studies should adopt longitudinal research to track evolving needs within the context of EMP, prioritising learner-centredness and integrating technology and authentic materials to bridge the current gaps in the globalised healthcare environment.

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Appendix A
Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) Checklist

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	
Study characteristics	17	Cite each included study and present its characteristics.	
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	
	23b	Discuss any limitations of the evidence included in the review.	
	23c	Discuss any limitations of the review processes used.	
	23d	Discuss implications of the results for practice, policy, and future research.	
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	
Competing interests	26	Declare any competing interests of review authors.	
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. This work is licensed under CC BY 4.0. To view a copy of this license, visit https://creativecommons.org/licenses/by/4.0/

Appendix B
Mixed Methods Appraisal Tool (MMAT)

Part I: Mixed Methods Appraisal Tool (MMAT), version 2018

Category of study designs	Methodological quality criteria	Responses			
		Yes	No	Can't tell	Comments
Screening questions (for all types)	S1. Are there clear research questions?				
	S2. Do the collected data allow to address the research questions?				
	Further appraisal may not be feasible or appropriate when the answer is 'No' or 'Can't tell' to one or both screening questions.				
1. Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?				
	1.2. Are the qualitative data collection methods adequate to address the research question?				
	1.3. Are the findings adequately derived from the data?				
	1.4. Is the interpretation of results sufficiently substantiated by data?				
	1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?				
2. Quantitative randomized controlled trials	2.1. Is randomization appropriately performed?				
	2.2. Are the groups comparable at baseline?				
	2.3. Are there complete outcome data?				
	2.4. Are outcome assessors blinded to the intervention provided?				
	2.5 Did the participants adhere to the assigned intervention?				
3. Quantitative non-randomized	3.1. Are the participants representative of the target population?				
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?				
	3.3. Are there complete outcome data?				
	3.4. Are the confounders accounted for in the design and analysis?				
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?				
4. Quantitative descriptive	4.1. Is the sampling strategy relevant to address the research question?				
	4.2. Is the sample representative of the target population?				
	4.3. Are the measurements appropriate?				
	4.4. Is the risk of nonresponse bias low?				
	4.5. Is the statistical analysis appropriate to answer the research question?				
5. Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?				
	5.2. Are the different components of the study effectively integrated to answer the research question?				
	5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?				
	5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?				
	5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?				

2