

BALANCING RESEARCH AND ACADEMIC DEMANDS IN MEDICAL EDUCATION: A QUALITATIVE META-SYNTHESIS

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ABSTRACT

OBJECTIVES

This qualitative meta-synthesis examined how undergraduate medical students explain and make sense of their experiences balancing research with academic requirements.

METHODOLOGY

A qualitative meta-synthesis was conducted in line with PRISMA guidelines. Systematic searches were performed in PubMed and Google Scholar using predefined keywords related to undergraduate medical students, research engagement, and academic demands. Qualitative and mixed-method studies with identifiable qualitative findings were included. A total of 12 studies conducted across multiple countries (including LMICs and HICs) were selected after screening titles, abstracts, and full texts. Data were analysed using an inductive thematic synthesis approach to generate higher-order themes.

RESULTS

Four higher-order themes were identified: (i) negotiation of academic and research identities, (ii) research as both enrichment and burden, (iii) structural and relational determinants of balance, and (iv) adaptive coping strategies. Research was both viewed positively and as challenging across contexts. In LMIC contexts, there were fewer resources and an examination-based system that added a heavy workload, unlike in high-income settings, where a system of systematic support and integration into the curriculum enabled engagement to be more sustainable. Factors that determined balance were mentorship, institutional support, and curriculum design.

CONCLUSION

Research-academic balance is an institutional rather than a personal process. Curricular integration, mentoring designed with safeguards and moderated time, as well as institutional countermeasures, are necessary to facilitate fruitful and sustainable research engagements in both LMIC and high-income contexts.

KEYWORDS: Undergraduate Medical Students, Research Engagement, Academic Workload.

INTRODUCTION

Over the past few decades, undergraduate medical education has undergone a significant transformation, with an increasing emphasis on early exposure to research and scholarly activities.^{1,2} Engagement in research as part of medical training contributes to critical thinking, analytical thinking, and lifelong learning, which are critical to evidence-based practice.^{3,4} Therefore, as a component of continuing education, undergraduate research participation is increasingly encouraged or required at many medical schools worldwide.^{5,6,7,8} Despite these educational benefits, undergraduate medical training remains

academically intensive. Students are required to manage theoretical learning, frequent assessments, and clinical responsibilities simultaneously.⁹ In many settings, research engagement is introduced as an additional requirement rather than being structurally integrated into the curriculum, creating competition for time and cognitive resources.^{10,11,12} The benefits of undergraduate research have been repeatedly documented in the empirical literature, including increased academic confidence, greater understanding of scientific inquiry, and greater interest in academic medicine.^{3,4,13,14} Existing literature has extensively documented both the advantages of undergraduate research and the barriers to participation, including time

constraints, workload pressure, limited mentorship, and insufficient institutional support.^{2,8,15,16,17,18} However, much of this evidence is derived from quantitative studies focusing on attitudes and perceived barriers. While informative, such approaches provide limited insight into how students actually experience and interpret the process of balancing research with academic demands.^{19,20} Conversely, qualitative research offers deeper insight into it as researchers delve into students' views, meanings, and the realities of their situations.^{4,21} Qualitative research offers a deeper understanding by exploring students' lived experiences, meanings, and contextual realities. However, qualitative studies in this field remain dispersed across different institutions, cultures, and educational systems. Individual studies are often context-specific and limited in transferability when considered in isolation.²¹ This gap is particularly relevant in low- and middle-income countries (LMICs), including Pakistan, where structural constraints, examination-driven curricula, and limited institutional resources shape students' experiences differently from those in high-income settings.^{22,23,24} Pakistan-based studies have noted the presence of extensive academic stress, insufficient time allocation, and irregular and unstructured mentorship as chronic issues in the undergraduate medical education system.^{16,25,26} Qualitative meta-synthesis offers a rigorous methodological framework for synthesizing results from various qualitative studies to develop higher-order interpretations and theories.²⁷ In contrast to narrative reviews, meta-synthesis does not consider qualitative findings as evidence but as data to be directly compared, translated, and reinterpreted.^{28,29} This approach allows the development of new understandings of concepts that extend beyond the conclusions of individual studies and is increasingly valued within health professions education research.^{30,31} The question to be answered by this meta-synthesis is the following: how do medical students in their undergraduate level make sense of their lived experiences of how to balance their research interests and academic demands? Synthesizing qualitative evidence, it examines how students negotiate dual roles and determines the conditions under which research is perceived as enriching or burdensome across a variety of settings, including medical education in Pakistan.^{21,32} A qualitative meta-synthesis focuses on lived experiences and the meanings of the research question. This interpretive approach is subjective and reflects complexities and contextual nuance, unlike quantitative meta-analysis, which estimates effects.^{33,34} According to Leary and Walker (2018), a qualitative meta-synthesis allows the induction of patterns and the development of theories across.³⁵ Combining the results brings forth higher-level themes that are useful in medical

education, where culture, mentorship, and curricula influence learning processes.^{36,37} Qualitative meta-synthesis overcomes the limitations of studies of individual sites by increasing the transferability of the interpretation.³⁸ Although they cannot be generalized statistically, similarities and differences highlight differences between contexts, leading to the informing of educational practice and policy. This review enhances insight into the roles of research within students' academic needs across diverse contexts.^{30,33,36,39,40}

METHODOLOGY

The present research used a qualitative meta-synthesis to synthesize the results of qualitative studies investigating undergraduate medical students' experiences balancing their research involvement with academic expectations.^{30,33,35,41} The synthesis allowed combining the research rather than merely combining the studies. Following Leary, Walker, Sandelowski, and Barroso, the qualitative data (findings) were considered data and analysed to produce higher-order abstraction concepts.^{38,40} A thematic synthesis methodology (Thomas and Harden, 2008) was utilized, as it facilitates systematic coding and clear analytical development of themes in the analysis of heterogeneous qualitative and mixed-method investigations, which is more appropriate than meta-ethnography in this review. The study was guided by an interpretivist epistemology, operationalised through inductive coding, iterative comparison of meanings across studies, and development of higher-order themes reflecting context-dependent student experiences.⁴⁰ There was no intention to generate universal conclusions; rather, the aim was to develop context-sensitive interpretations of recurring patterns across studies.⁴² This review was conducted in line with PRISMA guidelines and informed by ENTREQ recommendations to ensure transparency in qualitative synthesis. The question that informed the qualitative meta-synthesis is: How do undergraduate medical students describe and interpret their lived experiences of balancing research engagement with academic demands? It is based on phenomenological inquiry, which means it is concerned with lived experiences, feelings, difficulties, and coping mechanisms rather than quantifiable outcomes. In line with Colaizzi's strategy, it aims to capture students' concomitant interpretation and reflection, in alignment with the management of concurrent research and curricular pressures across institutional and cultural contexts.^{43,44,45}

Search Strategy

A systematic literature search was conducted across several electronic databases to identify qualitative

studies. The databases to be searched were PubMed and Google Scholar, which are in line with best practices in health professions education reviews.^{30,46,47} Comprehensive coverage of biomedical literature is available in PubMed, and broader retrieval of reading across interdisciplinary and grey literature is possible with Google Scholar. The search strategy combined keywords and Boolean operators: undergraduate medical students, research engagement, academic demands, and qualitative research. Search query (PubMed):AND ("medical students" OR undergraduate medical students) (research OR research engagement) AND (academic workload) or (academic demands) or (balance) and (qualitative OR interviews OR focus groups).^{46,47,48,49} In December 2025, the final search was done. The search was limited to English-language studies published since 2005 and was not restricted to any geographical area, to reflect the varied learning settings over the period, as interest in undergraduate research has grown.^{46,50,51} Despite there being only two databases, attempts were made to be comprehensive by using general search terms and manually screening references. Qualitative studies or mixed-method studies with clear qualitative results, Undergraduate medical students, Research/academic balance, and sufficient methodological description were included. Entirely quantitative research and Editorials, commentaries, and opinion papers were excluded. Studies were screened in three stages: Title screening, Abstract screening, and Full-text review. Study selection followed PRISMA guidelines, and the process is illustrated in Figure 1. The qualitative checklist provided to determine methodological quality of the included studies was the Critical Appraisal Skills Programme (CASP). This instrument was chosen to allow a systematic review of qualitative research regarding rigor, credibility, and relevance. It was appraised across several major areas, including clarity of research aims, suitability of the qualitative methodology, sufficiency of data collection procedures, transparency of data analysis, sensitivity of researcher-participant relations, ethics, and consistency between results and conclusions. The studies were not excluded solely based on quality assessment; it served as a tool to inform the conclusions and to ensure they were grounded in the methodology's strengths and limitations. Moreover, the inclusion of mixed-method and review studies was restricted to cases in which it was clear that some qualitative data was available. Potential methodological variability arising from the inclusion of such studies was also recognised, and the findings were taken with care in the synthesis

process.^{52,53} A summary of the quality appraisal of included studies is presented in Table 2.

Data Extraction

The results sections of the chosen studies provided most of the information. The primary data for analysis consisted of the researchers' explanations, the primary themes identified in each study, and direct quotes from students. To make the results simple to decipher, information on the study's setting and participants was also recorded.^{33,38,54,55} Data were analysed using inductive thematic synthesis (Thomas & Harden, 2008).⁵⁶

1. Line-by-line coding of qualitative data
2. Development of descriptive themes
3. Generation of higher-order analytical themes

Coding was conducted iteratively, with constant comparison across studies.^{40,57,58} A coding framework was developed and refined throughout the analysis process. Reflexivity was upheld in the process by considering the fact that the academic and disciplinary perspectives of the researchers affected the process of interpretation.⁵⁹

Results of the Qualitative Meta-synthesis

Overview of Included Studies

A total of 12 studies were included following systematic screening. Study selection followed PRISMA guidelines and is illustrated in Fig 1.

The included studies were conducted across multiple regions, including Pakistan, South Asia, East Asia, the Middle East, Europe, North America, and multi-country settings. Data collection methods included interviews, focus groups, and narrative reflections. Study designs included qualitative, mixed-method, and review studies; however, only extractable qualitative findings were included in the synthesis. Participants were undergraduate medical students engaged in research through curricular and extracurricular pathways. Across studies, key areas explored included identity negotiation, mentorship, workload, and institutional context. The characteristics of the included studies are presented in Table 1, and the methodological quality appraisal is summarised in Table 2. Fig. 1 shows that 40 records were found after the database search. Six duplicate records were removed, leaving 34 studies to be screened by title and abstract. After screening, 20 full-text articles were evaluated for eligibility. Eight studies were filtered out based on a lack of qualitative depth, inadequate focus on research-academic balance, or inadequate methodology. In the end, 12 articles fulfilled all the inclusion criteria and were added to the final qualitative meta-synthesis (Fig.1)

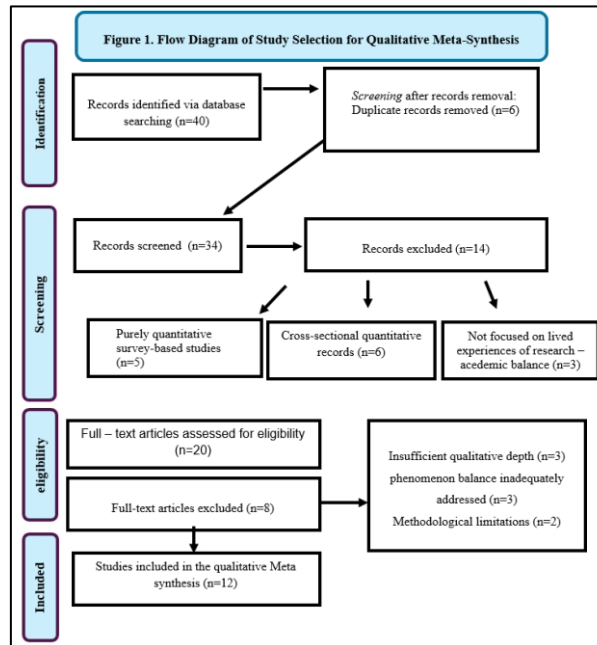


Figure 1: Flow Diagram of Study Selection for Qualitative Meta-Synthesis

Inductive thematic synthesis generated four higher-order analytical themes describing how undergraduate medical students experience balancing research engagement with academic demands.

RESULTS

The twelve studies (Tab. 1) produced four higher-order analysis themes that describe how undergraduate medical students experience and cope with the balancing act between research and academic requirements in different contexts.

Table 1: Characteristics of Included Studies in the Meta-Synthesis

Author (year)	Region	Study design	Title (Shortened)	Major concept relevant to the synthesis
Mahmod et al (2025)	Pakistan (LMIC)	Qualitative (Interviews)	Barriers to Research Engagement	Time limitations, unstructured mentorship, and structural barriers. ¹⁶
Ahmed et al. (2023)	Pakistan (LMIC)	Qualitative (Inductive thematic analysis)	Confronting Challenges:	Institutional barriers, coping solutions, and research culture gaps. ⁶⁰
Bobhate et al. (2024)	India (South Asia) (LMIC)	Mixed Methods (Qualitative Component)	Barriers and Enablers of Research Uptake	Academic stress, motivators, and structural enablers. ⁶
Abdollahipour et al. (2024)	Iran (South Asia) (LMIC)	Qualitative (Content analysis)	Factors Affecting Academic Achievement	Academic stress, coping techniques, and performance burden. ⁶²

Lee et al. (2023)	South Korea (East Asia) (HIC)	Qualitative	Learner - Driven Research Experiences	Relational mentorship, institutional facilitation, structured involvement. ⁶³
Burgoyne et al. (2010)	Ireland (Europe) (HIC)	Qualitative	Undergraduate Medical Research: Student Perspective	Identity stress, motivation, and perceived academic-research stress. ⁶⁴
Sellberg et al. (2022)	Sweden (Europe) (HIC)	Qualitative	Balancing Acting and Adapting	Identity negotiation adaptation to increasing needs. ⁶⁵
Cuschieri et al. (2021)	Malta (Europe) (HIC)	Qualitative	Medical Students' Perceptions on Research	Motivation vs workload stress, academic positioning. ⁶⁶
Bierer & Chen (2010)	USA (North America) (HIC)	Literature Review: Program Evaluation Focus	Impact of Scholarly Program Concentrations	Institutional integration, recognition systems, and structural support. ⁶⁷
Amgad et al. (2015)	Multi - country (Global) (HIC)	Integrated Mixed-Methods Systematic Review	Medical Student Research Review	Global obstacles and facilitators, system-level determinants. ⁶⁸
Wilson et al. (2023)	Saudi Arabia (Middle East) (HIC)	Qualitative	Female Medical Students Research Experiences	Gender barriers, mentorship, cultural and structural tensions. ⁶⁹
Murdoch-Eaton et al. (2010)	United Kingdom (Europe) (HIC)	Qualitative	Understanding Research & Research Skills	Understanding of research, identity development, and curricular exposure. ⁷⁰

Table 2: Quality Appraisal of Included Studies (CASP Summary)

Author/year	Clear aims	Methodology appropriate	Data collection on	Analysis rigorous	Overall quality
Mahmood et al. (2025)	Yes	Yes	Yes	Moderate	Good
Ahmed et al. (2023)	Yes	Yes	Moderate	Moderate	Moderate
Bobhate et al. (2024)	Yes	Yes	Yes	Moderate	Good
Abdollahipour et al. (2024)	Yes	Yes	Yes	Yes	Good
Lee et al. (2023)	Yes	Yes	Yes	Yes	Good
Burgoyne et al. (2010)	Yes	Yes	Moderate	Moderate	Moderate
Sellberg et al. (2022)	Yes	Yes	Yes	Yes	Good
Cuschieri et al. (2021)	Yes	Yes	Moderate	Moderate	Moderate
Bierer & Chen (2010)	Yes	Moderate	Moderate	Moderate	Moderate
Amgad et al. (2015)	Yes	Moderate	Moderate	Moderate	Moderate
Wilson et al. (2023)	Yes	Yes	Yes	Moderate	Good
Murdoch-Eaton et al. (2010)	Yes	Yes	Moderate	Moderate	Moderate

Theme 1: Negotiating Dual Academic and Research Identities

As presented in the Table. 1. There was a continuous tension between students' identities as learners and as new researchers across studies in Pakistan, South Asia, Europe, East Asia, and North America. Examinations and clinical duties were considered a priority in Pakistan and South Asia and were not negotiable. Research was commonly seen as an added burden that demanded personal sacrifice.^{16,60,61,62} European studies likewise highlighted identity negotiation, with research viewed as valuable yet secondary to core academic requirements.^{64,65,66,70} Conversely, environments in which research was incorporated into curricular structures had a more coherent identity. This cross-context is summarized in Table 3. South Korean and North American studies revealed that formal scholarly programs and research models led by learners promoted their integration of research into their professional self-concept.^{63,67} The synthesis as a whole indicates that identity integration is effectively mediated by the institutional research framework within undergraduate medical curricula (Table 1).

Theme 2: Research Engagement as Enrichment Versus Burden

All of the studies suggest a major dichotomy, as shown in the Table. 1: Research was seen as both practically challenging and stimulating to the mind. Beyond the demanding academic duties, students perceived it to be engaging and academically useful.^{63,64,66,68} Although research was also mostly experienced as an additional burden along with the demands of the curriculum.^{16,60,61,62} Pakistani and Indian studies emphasized time limitations, academic load, and stress as persistent obstacles.^{16,60,61} Iranian and European studies also reported the same nature of workload stress.^{62,65} In the context of Middle Eastern studies, additional social and structural barriers further complicated engagement in research.⁶⁹ These findings indicate that institutional support, mentorship, and workload co-exist and vary in terms of burden and benefit in various settings (Table.3).

Theme 3: Structural and Relational Determinants of Balance

As Table. 1 shows that structural and relational variables played a significant role in determining students' ability to balance research and academic activities, with supportive mentorship reducing stress and weak supervision amplifying it.^{16,60,61,63,69} Engagement sustainability was also affected by institutional design. In resource-constrained

environments, the absence of protected time, inadequate research infrastructure, and an enormous faculty workload prevented meaningful participation.^{16,60,68} On the contrary, organized school programs and student research projects in North America and East Asia showed how institutional acquiescence justifies research engagement.^{63,67} European literature demonstrated that research incorporated into the curriculum reduces role conflict and enhances equilibrium between academic and research practice.^{65,66} Collectively, the synthesis positions balance as primarily shaped by structural and relational conditions rather than individual capacity alone. These institutional comparisons across LMICs and high-income countries are depicted in the Table. 3.

Theme 4: Adaptive Coping and Self-Regulation Strategies

As indicated across contexts in Table 1, students employed adaptive coping strategies to manage competing academic and research responsibilities. These included time management, prioritization, reducing research scope during examination periods, and compartmentalizing tasks.^{62,64,65} Self-regulatory strategies were more evident in structured environments where research expectations were clearly defined. Students described aligning research with long-term goals, planning proactively, and monitoring progress.^{63,67} However, in settings characterized by rigid curricula and limited mentorship, coping strategies were often insufficient to offset structural constraints fully. This institutional comparison is reflected in the Table 3.^{16,60,61,69} Thus, while individual regulation supports short-term adaptation, sustainable equilibrium appears to depend on institutional alignment, as demonstrated across the studies summarized in the Table 1. Taken together, the 12 studies in Tab. 1 demonstrate that balancing research engagement with academic demands is a dynamic, context-dependent process. Identity negotiation, fluctuating perceptions of benefit and burden, mentorship quality, institutional design, and adaptive strategies interact to shape lived experiences across geographical regions.^{16,60,61,62,63,64,65,66,67,68,69,70} Despite overall trends worldwide, variations across well-organized, high-income environments and resource-constrained contexts strongly influence how research can be easily incorporated or perceived as an extra burden. To clarify cross-contextual variations, a comparative construct of HICs and high-income countries (HICs) institutional trends is presented in the Table. 3.

Table 3: Research & Academic Balance Across Institutions of LMICs and HICs

Dimension	HIC ICs (Pakistan, India, Sudan)	HICs (Europe, North America, East Asia)
Identity Negotiation	Stronger learner-researcher role ^{16,60,61,62}	Current but restrained by institutional assistance ^{65,66,69,70}
Workload Stress	Exam-centered, with emphasis on limited time ^{16,60,61,62}	Systematic program lessen burden ^{63,66,67}
Mentorship Quality	Deficient supervision, unstructured guidance ^{16,60,70}	Well-designed mentorship program ^{63,67,70}
Curricular Integration	Research tends to be voluntary or extracurricular ^{16,60,61}	Institutional scholarly programs and integrated research programs ^{63,67,70}
Institutional determinants	Resource scarcity and social challenges ^{16,60,61,62,69}	Institutional support, recognition, and time security ^{67,68}
Gender considerations	Gender based institutional and cultural barriers ⁶⁹	Managed by designated bodies ^{67,68}
Key interpretive conclusion	Balancing stressfully, institutionally constrained ^{16,60,61,62,69}	Institutionally research validated, balance facilitated ^{63,67,70}

DISCUSSION

This qualitative meta-synthesis examined how undergraduate medical students balance academic workload with research engagement across diverse contexts. The findings (Tab.1) indicate that this balance is not solely an individual responsibility but is largely shaped by institutional structures, mentorship, and curricular design. In the literature, a tension emerged between students' roles as learners and as new researchers, though to varying degrees depending on the situation. Mahmood et al. (2025) and Ahmed et al. (2023) in Pakistan (LMIC) reported that research was frequently viewed as an added burden, competing directly with examination preparation and academic performance.^{16,60} Likewise, Bobhate et al. (2024) in India (LMIC) characterized role strain due to academic performance-based settings, in which academic research involvement was challenging to maintain with academic requirements.⁶¹ Conversely, the results from high-income environments offer a more differentiated picture. European authors Murdoch-Eaton et al. (2010) found that students were uncertain about their competence in research, indicating the difficulty in building a research identity.⁷⁰ High-income settings. Burgoyne et al. (2010) observed that although students valued research highly and appreciated its role in medical practice, their awareness of institutional research opportunities and the sense that research was unrelated to clinical practice affected their participation.⁶⁴ Moreover, it was evidenced by Bierer

and Chen (2010) that structured research programmes in high-income settings help facilitate research engagement by increasing student understanding, academic output, and interest in research careers, though issues regarding balancing between research and clinical training persist.⁶⁷ Combined, these results suggest that, in LMIC contexts, even identity negotiation processes are highly fragmented, and research is on the outside of academic agendas. Located, however, in the realm of high-income environments, despite the existing problems, more curricular integration and institutional support are used to achieve a more articulated formation of dual academic and research identities. Research involvement was presented as an intellectually stimulating, time-consuming experience, but the experience depended on the situation. In high-income environments, a South Korean and Maltese study by Cuschieri et al. (2021) and Lee et al. (2023) found that research participation empowered, built confidence, and contributed to professional growth when offered within the framework of structured or learner-oriented approaches.^{63,66} Such results suggest that the positive experience of research can be taught through institutional support and curricular integration. By contrast, LMIC-based studies point to workload overload as the primary factor. According to Abdolalipour et al. (2024) in Iran, significant participation in research was limited due to academic pressures, and Mahmood et al. (2025) and Ahmed et al. (2023) in Pakistan reported that research was done in conjunction with the preparation of examinations, which resulted in fatigue and overwork.^{16,60,62} Such results indicate that research can be seen as an extra burden and not a value-adding exercise in resource-deprived and examination-focused settings. The dimension of burden also prevails in some conditions, even in high-income contexts. Wilson et al. (2023) found that female Saudi students perceived a greater burden of research engagement due to institutional and gender-based barriers.⁶⁹ In line with it, Amgad et al. (2015) emphasized the fact that institutional infrastructure and balance between workloads are fundamental to the experience of research as a beneficial or burdensome process.⁶⁸ All these results can be interpreted to mean that research engagement is a continuum between enrichment and overload. The institutional support and academic pressure in LMIC settings hinge on this balance and burden, making it harder. In high-income settings, academic programmes make the experience more pleasant and fulfilling, but they still face contextual challenges that might persist. The emergence of structural and relational factors proved pivotal drivers of sustainable research-academic balance, but their roles differed depending on the context. Mahmood et al.

(2025) and Ahmed et al. (2023) reported that weak supervision, unclear expectations, and inadequate institutional support were the greatest barriers to effective research engagement in LMIC settings, especially in Pakistan.^{16,60} In high-income countries, studies reveal the beneficial effect of instituted mentorship and institutional support. According to Lee et al. (2023), relational trust and the overall continuity of faculty mentorship led to confidence and continuity in research activities.⁶³ On the same note, Sellberg et al. (2022) also emphasized that structured supervision promotes adaptation to competing academic demands.⁶⁵ Bierer and Chen (2010) have also shown that institutionalised research programmes offer a systematic platform that justifies student involvement and promotes long-term involvement, whereas Murdoch-Eaton et al. (2010) identified the relevance of well-stated research competencies in undergraduate programmes.^{67,70} As a whole, all these findings point to the fact that research-academic balance is mostly mediated structurally. There are fragmented engagements in LMICs caused by a lack of infrastructure and unorganised mentoring, whereas smooth engagements in high-income settings are enabled by organised supervision, safeguarded time, and curriculum alignment to enable sustained contacts in research activities. Students in different settings used adaptive coping and self-regulatory strategies to balance competing academic and research demands, yet did not manage these demands equally across settings. In LMIC settings, it was common that individual strategies could not overcome structural constraints. Mahmood et al. (2025) and Bobhate et al. (2024) also reported that Pakistani and Indian students used time management and prioritisation but remained constrained by inflexible curricula and exam pressures.⁶¹ Equally, Abdolalipour et al. (2024) in Iran highlighted the importance of attention to planning and time organisation as one of the strategies to sustain academic performance, but these factors did not allow complete participation in the research.⁶² Conversely, existing research in high-income backgrounds suggests that coping mechanisms are better when organizational frameworks reinforce them. Sellberg et al. (2022) showed that adaptive role negotiation in dealing with competing demands occurs through structured supervision.⁶⁵ But even in these settings, there are still shortcomings; Wilson et al. (2023) found that institutional and gender-based constraints in Saudi Arabia minimized the effectiveness of individual coping behaviors.⁶⁹ The findings are also consistent with Amgad et al. (2015), who stressed that institutional facilitators, not personal resilience, are determining factors of long-term research engagement.⁶⁸ On the whole, these data imply that although students used

adaptive self-regulatory strategies both in the LMIC and high-income environments, their effectiveness is largely dependent on alignment in institutions. Structural constraints in LMIC contexts limit coping, whereas in high-income settings, supportive systems make personal approaches more effective and allow a more sustainable balance. The relationship between research and academia is shown in the Table. 1 is a relative balance mainly influenced by institutional settings, mentoring, and workload. In LMIC contexts, research is often cumbersome due to limited resources and a focus on examination systems, unlike in high-income settings, where curricular integration and support can make research more sustainable. These variations make the difference between experiencing research as an enrichment or a strain, and it is important to note that curriculum design, mentorship, and protected time should be aligned. The meta-synthesis shows that research engagement in undergraduate medical education cannot be considered an appendix but, rather, should be planned and organized as an inseparable part of academic needs. When research is seen as extracurricular, there is role conflict and strain of workloads. Examination driven study settings in studies indicated that research is considered a secondary consideration to regular academics, but that when structured programs have integrated into the curriculum, the legitimacy and sustainability are presented. The findings imply that research ought to be institutionalized instead of being an optional activity.^{16,60,61,62,66} Longitudinal, curriculum-based research pathways need to be implemented at medical schools because Murdoch-Eaton et al. (2010) stated that well-defined research competencies minimize ambiguity and enhance identity coherence.⁷⁰ Workload compression emerged as a consistent determinant of overload across contexts. Abdolalipour et al. (2024) and Bobhate et al. (2024) demonstrated that students frequently conduct research during the evenings or examination periods, which contributes to fatigue and diminished well-being. Similarly, Mahmood et al. (2025) identified time scarcity as a major structural barrier.^{16,60,61,62} Institutions should therefore consider introducing protected research time, flexible scheduling, or credit-bearing research modules. Lee et al. (2023) illustrated that learner-driven research programs, when structurally supported, enhance engagement without compromising academic performance.⁶³ Without temporal alignment between research and academic expectations, promotion of research may intensify stress rather than enrich learning.^{16,60,61,63} Across studies, mentorship quality consistently differentiated enriching from stressful research experiences. Mahmood et al. (2025) and Ahmed et al. (2023) identified supervision gaps as

significant barriers, whereas Lee et al. (2023) emphasized relational trust as foundational to sustained engagement. Burgoyne et al. (2010) similarly highlighted the motivational role of supportive faculty relationships.^{16,60,63,64} Investment in structured mentorship systems, faculty development, and clear supervisory expectations is therefore essential. Sustainable research engagement appears to depend as much on relational scaffolding as on curricular design.^{16,60,63,65} Institutional signaling strongly shapes student priorities. Bierer and Chen (2010) demonstrated that recognition systems legitimize research participation, while Burgoyne et al. (2010) showed that visible institutional valuing of research enhances student motivation. Conversely, where examination performance dominates institutional reward systems, research engagement is marginalized.^{16,60,61,64} Medical schools should therefore cultivate explicit research cultures through structured programs, opportunities for public dissemination, and recognition of student scholarship. The study by Wilson et al. (2023) identified barriers specific to women in medical student research and emphasized the importance of equity-sensitive methods. The same observation was made by Amgad et al. (2015), who stated that context-specific systemic facilitators and barriers differ, and that policies should focus on equity, workload, and inclusive mentorship support.^{68,69} At the policy level, curricular integration, designed mentoring, guaranteed time, and institutional alignment should support undergraduate research to enable meaningful engagement. The strategies must focus on the development of longitudinal competency, workload, and institutional support.^{16,60,70}

LIMITATIONS

The uneven distribution of studies between LMIC and high-income settings may limit representativeness and generalizability. Inclusion of mixed-method and review studies may have introduced methodological variability. Additionally, interpretive synthesis introduces subjectivity, and findings should be interpreted in light of contextual and quality differences across studies.

CONCLUSIONS

This meta-synthesis helps to realize that institutional structures influence and shape the balance between research and academic needs among undergraduate medical students much more than personal initiative. Successful participation in research demands curricular incorporation, ordered mentorship, provision of escorted time, and favourable institutional arrangements. It is necessary to address these aspects to make research not

a liability, but an important part of medical education, especially in various LMIC and high-income settings.

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The authors accept responsibility for all aspects of the work and will ensure that any concerns regarding the accuracy or integrity of any part are properly investigated and resolved.



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