



Implementation of Student-Selected Components in Iraqi Medical Colleges: A National Cross-Sectional Study

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Abstract Background: Student-Selected Components (SSCs) are a key element of student-centered medical education, promoting self-directed learning, research skills and academic engagement. However, their implementation varies considerably across institutions, particularly in low- and middle-income settings. Despite ongoing curriculum reforms, there is a lack of national-level empirical evidence on SSC implementation in Iraq. This study aimed to assess the implementation of SSCs in undergraduate medical education across Iraqi medical colleges, identify institutional barriers and resource requirements and examine associations between institutional characteristics and SSC implementation. **Methods:** A national cross-sectional survey was conducted among governmental medical colleges in Iraq between September 2024 and May 2025. A structured, expert-validated questionnaire was distributed electronically to all eligible institutions. Descriptive statistics were used to summarize institutional characteristics and SSC practices and associations were examined using Fisher's exact test. **Results:** A total of 27 medical colleges participated. SSCs were implemented in 40.7% of institutions, while 59.3% had not adopted them. Implementation was significantly associated with curriculum model ($p = 0.008$) and geographic region ($p = 0.027$), but not with accreditation status ($p = 0.692$). The main barriers identified were limited administrative support (56.3%) and resource constraints (50.0%). Key requirements included teaching materials (75.0%), faculty training (68.8%) and administrative support (62.5%). **Conclusion:** SSC implementation in Iraqi medical colleges remains limited and uneven. Addressing institutional barriers and strengthening faculty capacity, resources and digital infrastructure are essential for wider adoption. Targeted national policy interventions, curriculum reform strategies and institutional capacity strengthening are required to support sustainable SSC integration.

Key Words Student-Selected Components, Undergraduate Medical Education, Curriculum Development, Student-Centered Learning, Competency-Based Education, Iraq, Medical Education

INTRODUCTION

Undergraduate medical education has undergone substantial transformation over recent decades as medical schools strive to prepare graduates for increasingly complex healthcare systems [1]. Contemporary curricula extend beyond the transmission of factual knowledge to emphasize critical thinking, self-directed learning and active student engagement [2,3]. These shifts have driven the adoption of more flexible and student-centered curricular models that encourage learners to take an active role in shaping their educational experiences [4].

One such approach is the incorporation of Student-Selected Components (SSCs) within undergraduate medical programs. SSCs provide opportunities for students to explore areas beyond the core curriculum, including research activities, specialized clinical exposure

and in-depth study of topics aligned with their interests [5,6]. By promoting autonomy in learning, SSCs support the development of transferable skills such as critical appraisal, problem-solving and independent inquiry. Emerging evidence indicates that participation in SSCs enhances student motivation, academic engagement and research competencies relevant to future clinical practice [7,8]. However, most existing evidence originates from high-income settings, with limited data from Low- and Middle-Income Countries (LMICs), particularly in the Middle East.

SSCs have been widely integrated into medical curricula in several regions, particularly in Europe and the United Kingdom, where they are considered a core component of student-centered education. Their implementation has been associated with improved learning outcomes and better preparation for clinical training [9].

However, the extent and structure of SSC implementation vary considerably across institutions, reflecting differences in curriculum design, institutional capacity, faculty expertise and administrative support [10].

Despite their recognized benefits, the adoption of SSCs remains uneven, particularly in LMIC settings. Structural barriers-including limited resources, insufficient faculty development, rigid curriculum structures and lack of institutional awareness-may hinder their integration into existing curricula [11]. These challenges highlight the need to better understand context-specific determinants of SSC implementation to support effective and sustainable curriculum reform.

In Iraq, undergraduate medical education has traditionally followed a structured and predominantly teacher-centered model. Although recent efforts have been made to modernize curricula and align with global educational standards, the extent to which SSCs have been adopted across Iraqi medical colleges remains unclear. There is currently a lack of national-level empirical evidence regarding SSC implementation, as well as limited understanding of the institutional barriers and resource needs influencing their adoption. This gap restricts the ability of policymakers, accreditation bodies and academic leaders to develop evidence-based strategies for curriculum reform.

Therefore, this study aimed to assess the implementation of Student-Selected Components (SSCs) in undergraduate medical education across Iraqi medical colleges, identify institutional barriers and resource requirements for their adoption and examine associations between institutional characteristics and SSC implementation. By providing national-level evidence, this study seeks to inform policy development and support the advancement of student-centered and competency-based medical education in Iraq and similar LMIC contexts.

METHODS

Study Design and Setting

This study employed a national cross-sectional survey design to assess the implementation of Student-Selected Components (SSCs) in governmental medical colleges in Iraq. The study was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies. It was designed to provide a comprehensive overview of SSC implementation and to identify institutional characteristics and barriers associated with their adoption. Data were collected between May 2025 to January 2026.

Study Population and Sample Size Justification

The study population included all medical colleges listed in the World Directory of Medical Schools in Iraq. At the time of the study, Iraq had 34 medical colleges, including 31 governmental institutions, two private colleges and one mixed (public-private) institution.

Governmental medical colleges were targeted, as they represent the primary providers of undergraduate medical education in the country. Private institutions were excluded

due to their limited number and heterogeneity in curriculum structures. All eligible governmental medical colleges were invited to participate; therefore, the study adopted a census sampling approach.

Given the relatively small and well-defined population of governmental medical colleges ($n = 31$), a census approach was considered appropriate to maximize representativeness and minimize selection bias. A total of 27 colleges participated in the study, representing 87.1% of all eligible institutions. This high response rate provides strong national coverage and supports the generalizability of the findings within the context of governmental medical education in Iraq.

Although formal sample size calculation is not typically required for census-based studies, the achieved sample size was sufficient to support categorical statistical analyses, including Fisher's exact test, ensuring adequate analytical validity.

Data Collection Tool

Data were collected using a structured questionnaire developed following a comprehensive review of the literature on student-selected components, elective modules and curriculum innovation in undergraduate medical education. The development of the instrument was also informed by previously published tools assessing curriculum design and elective learning components.

The questionnaire captured information on institutional characteristics, including curriculum model and accreditation status, as well as SSC implementation, delivery structure, assessment and feedback practices, barriers to implementation and future for SSC adoption.

Prior to full-scale data collection, the questionnaire was pilot tested in a small number of institutions to assess clarity, feasibility and relevance. Minor modifications were made based on pilot feedback to improve wording and content clarity.

Content Validity and Reliability

Content validity was established through expert review by five specialists in medical education, who evaluated the clarity, relevance and comprehensiveness of the questionnaire items. Revisions were made based on their feedback to enhance the overall quality of the instrument.

Internal consistency of the questionnaire was assessed using Cronbach's alpha, which was >0.70 , indicating acceptable reliability.

Data Collection Procedure

The questionnaire was distributed electronically to all eligible governmental medical colleges using institutional communication channels. Each institution was requested to designate a single authorized respondent, typically a faculty member or academic administrator with knowledge of curriculum design and implementation, to ensure consistency of institutional-level data.

A total of 27 responses were received from medical colleges across both the Kurdistan Region and federal Iraq, with one response per institution. While this approach ensured standardized reporting, reliance on a single respondent per institution may introduce reporting bias and limit the depth of institutional representation.

Data Analysis

Descriptive statistics were used to summarize institutional characteristics and SSC implementation practices. Categorical variables were presented as frequencies and percentages.

Associations between institutional characteristics (geographic region, accreditation status and curriculum model) and SSC implementation were examined using Fisher's exact test due to the relatively small sample size and expected cell counts of less than five. All statistical tests were two-tailed and a p -value <0.05 was considered statistically significant.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 27 (IBM Corp., Armonk, NY, USA).

Missing data were minimal ($<5\%$) and were handled using complete-case analysis.

Qualitative responses from open-ended questions were analyzed using reflexive thematic analysis following Braun and Clarke's six-step framework [12], including data familiarization, initial coding, theme development, review, definition and reporting.

Ethical Considerations

Ethical approval for this study was obtained from the Research Ethics Committee of the College of Medicine, Hawler Medical University (Approval No.: 6/12 on 23/4/2025). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Participation was voluntary and informed consent was obtained from all respondents prior to completing the questionnaire. All data were collected anonymously and the confidentiality of participating institutions was strictly maintained.

This study was conducted and reported in accordance with the STROBE guidelines for cross-sectional studies.

RESULTS

Institutional Characteristics

A total of 27 medical colleges participated in this national survey, representing 87.1% of all eligible governmental

medical colleges in Iraq. Participating institutions included colleges from both the Kurdistan Region and federal Iraq.

Traditional and integrated curricula were the most reported models, while Problem-Based Learning (PBL) was less frequently adopted. Most institutions were accredited (66.7%). Overall, 11 colleges (40.7%) reported implementing Student-Selected Components (SSCs), whereas 16 (59.3%) had not adopted SSCs (Table 1).

The distribution of accreditation bodies among participating colleges is presented in Figure 1.

These findings provide context for understanding institutional readiness and challenges related to SSC implementation.

Barriers and Resource Requirements

Among colleges not currently implementing SSCs ($n = 16$), the most frequently reported barriers were lack of administrative support (56.3%) and resource constraints (50.0%), while curriculum integration was rarely identified as a barrier (6.3%).

Key resources identified for future SSC implementation included teaching materials (75.0%), faculty training (68.8%) and administrative support (62.5%). Additional needs included funding (50.0%) and availability of facilities (37.5%) (Figure 2).

Characteristics of SSC Implementation

Among colleges currently implementing SSCs ($n = 11$), more than half (54.5%) had implemented SSCs for over five years. All institutions (100%) reported that SSCs were mandatory within the MBChB curriculum.

Table 1: General Characteristics of Participating Colleges ($N = 27$)

Variable	Category	n	%
Curriculum model	Traditional	12	44.4
	Integrated	11	40.7
	Problem-Based Learning (PBL)	4	14.8
Accreditation status	Yes	18	66.7
	No	9	33.3
Currently provide SSCs	Yes	11	40.7
	No	16	59.3

Accreditation Bodies among Accredited Colleges ($n=18$)

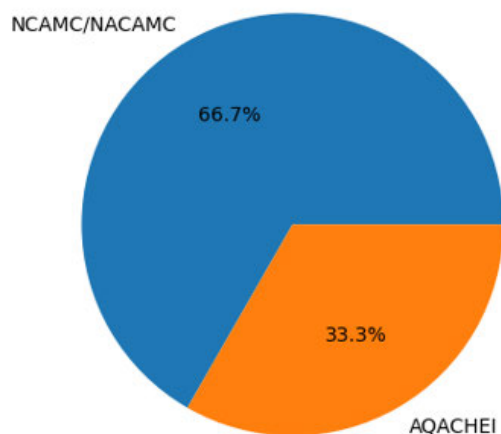


Figure 1: Distribution of Accreditation Bodies among Accredited Medical Colleges

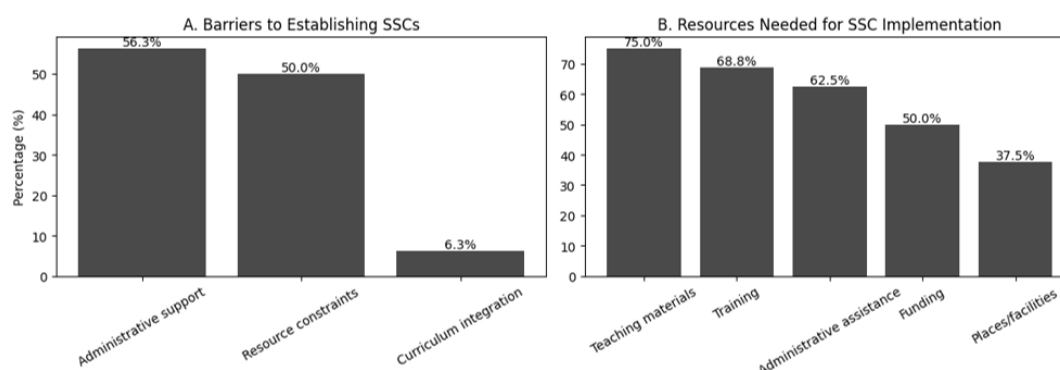


Figure 2: Reported Barriers and Required Resources for Implementing Student-Selected Components (SSCs) among Colleges Not Currently Offering SSCs (n = 16)

Table 2: Characteristics of Colleges Currently Providing SSCs (n = 11)

Variable	Category	n	%
Duration of SSC provision	2 years	1	9.1
	3 years	2	18.2
	4 years	2	18.2
	More than 5 years	6	54.5
SSC mandatory during MBChB	Yes	11	100.0
Year in which SSC is offered	Year 1	1	9.1
	Year 2	2	18.2
	Year 3	3	27.3
	Year 4	3	27.3
	Year 5	1	9.1
	Year 6	1	9.1
Student participation per year	One time	9	81.8
	Two times	1	9.1
	More than two times	1	9.1
Mandatory SSCs required for graduation	One	6	54.5
	Two	5	45.5
Students can choose from topic list	Yes	10	90.9
	No	1	9.1
Number of SSC topics offered	1-4	3	27.3
	10-20	6	54.5
	50-100	1	9.1
	More than 150	1	9.1

SSCs were most offered during Years 3 and 4 (27.3% each). Most institutions require student participation once per academic year (81.8%). For graduation requirements, just over half required completion of one SSC (54.5%), while the remainder required two (45.5%).

Most institutions allowed students to select topics from predefined lists (90.9%), with most colleges offering between 10 and 20 SSC topics (54.5%) (Table 2).

Delivery, Assessment and Feedback Practices

SSCs were most scheduled throughout the academic year (54.5%), followed by fixed timetable scheduling (36.4%) and summer delivery (27.3%).

A range of assessment methods was reported, including written examinations (45.5%), oral examinations (36.4%), project presentations (36.4%) and research papers (36.4%). Continuous assessment and end-of-module assessment were equally reported (45.5% each).

Most institutions reported providing feedback to students (90.9%), primarily through written (81.8%) and verbal (63.6%) formats. Additionally, 81.8% of colleges indicated that students also provided feedback on SSC modules.

Use of Digital Tools

The use of digital tools to support SSC delivery was limited. Learning management systems and collaborative document tools were each reported by 36.4% of institutions, while assessment tools were used by 27.3% and communication tools by 9.1% (Table 3).

Qualitative Findings

Qualitative responses, although limited in number, provided preliminary insights into key themes, including the need to enhance student engagement, improve assessment methods, align SSC topics with community needs and address limited awareness or understanding of SSCs in some institutions (Table 4).

Factors Associated with SSC Implementation

Fisher's exact test demonstrated statistically significant associations between SSC implementation and geographic region ($p = 0.027$) and curriculum model ($p = 0.008$).

A higher proportion of SSC implementation was reported among institutions in the Kurdistan Region and among those employing integrated or hybrid curricula.

Table 3: Delivery, Assessment, Feedback and Digital Tools in SSC-Providing Colleges (n = 11)

A. SSC scheduling				
Scheduling pattern*		n	%	
Throughout the academic year		6	54.5	
Fixed time in the calendar/timetable		4	36.4	
During the summer break		3	27.3	
B. Assessment methods used				
Assessment method		n	%	
Written exams		5	45.5	
Oral exams		4	36.4	
Project presentations		4	36.4	
Research papers		4	36.4	
Continuous assessment		3	27.3	
Portfolio reviews		2	18.2	
Practical exams		1	9.1	
Self-assessment		1	9.1	
C. Frequency of assessment				
Frequency*		n	%	
Continuous throughout the SSC		5	45.5	
Once at the end		5	45.5	
*One response missing				
D. Feedback practices				
Variable	Category	n	%	
Colleges provide feedback to students	Yes	10	90.9	
	No	1	9.1	
Students provide feedback on SSC module	Yes	9	81.8	
	No	2	18.2	
E. Mode of feedback provided to students				
Feedback mode		n	%	
Written feedback		9	81.8	
Verbal feedback		7	63.6	
Other		1	9.1	
F. How students provide feedback				
Student feedback format		n	%	
Verbal		7	63.6	
Written		1	9.1	
Google Form		2	18.2	
Formal/non-formal process		1	9.1	
G. Digital tools/software used				
Digital tool		n	%	
Learning management systems		4	36.4	
Collaborative document tools		4	36.4	
Assessment tools		3	27.3	
Communication tools		1	9.1	
Other/unspecified		3	27.3	

Table 4: Thematic Analysis of Open-Ended Responses

Theme	Description	Frequency	Example response
Need to improve student engagement	SSC development was linked to increasing student participation and involvement	1	"improve student engagement and improve assessment method"
Need to improve assessment methods	Respondents indicated that assessment strategies for SSCs need strengthening	1	"improve student engagement and improve assessment method"
Alignment of SSC topics with community needs	Future SSC development should reflect local/community priorities	1	"we plan to update topics according to community need"
Unclear future planning	Some respondents were unsure about future SSC development plans	1	"I do not know"
Limited awareness/understanding of SSC concept	Some non-implementing colleges indicated lack of knowledge about SSCs	1	"We do not have any information about this program"
Curriculum-related constraints	Respondents suggested that the curriculum model itself may hinder SSC implementation	1	"Type of curriculum"

Table 5: Association between Institutional Characteristics and SSC Implementation

Variable	Category	SSC Implemented n (%)	SSC Not Implemented n (%)	p-value
Region	Kurdistan Region	5 (83.3%)	1 (16.7%)	0.027
	Federal Iraq	6 (28.6%)	15 (71.4%)	
Accreditation Status	Accredited	8 (44.4%)	10 (55.6%)	0.692
	Not Accredited	3 (33.3%)	6 (66.7%)	
Curriculum Model	Traditional	1 (9.1%)	10 (90.9%)	0.008
	Integrated / Other	10 (62.5%)	6 (37.5%)	

No statistically significant association was found between accreditation status and SSC implementation ($p = 0.692$) (Table 5).

DISCUSSION

This study provides one of the first comprehensive national assessments of Student-Selected Components (SSCs) implementation across governmental medical colleges in Iraq, offering important insights into institutional practices, barriers and determinants of curriculum innovation. SSC adoption was limited (40.7%) and uneven across institutions despite a high response rate (87.1%), indicating that student-centered curricular approaches remain incompletely integrated within Iraqi medical education. Overall, SSC implementation was significantly associated with curriculum model and geographic region, while institutional barriers and resource limitations emerged as key constraints to adoption.

These findings are consistent with global evidence demonstrating that the transition from traditional, teacher-centered curricula to student-centered and competency-based models remains uneven, particularly in low- and Middle-Income Countries (LMICs) [13,14]. SSCs represent a practical mechanism for operationalizing these educational principles by promoting learner autonomy, critical thinking and research engagement. However, their limited adoption in this study reflects persistent structural, organizational and resource-related challenges that constrain curriculum reform in resource-limited settings.

From a conceptual perspective, SSC implementation can be understood as a multifactorial process influenced by institutional capability, opportunity and motivation. Institutional capability includes the availability of trained faculty and teaching resources; opportunity reflects administrative support and curriculum flexibility; and motivation relates to institutional priorities and commitment to educational innovation. This interpretation aligns with established behavior change frameworks, particularly the COM-B model, which conceptualizes behavior as the interaction between capability, opportunity and motivation [15], as well as broader systems-based approaches emphasizing that effective educational reform requires coordinated, multi-level change rather than isolated interventions [16].

The significant association between curriculum model and SSC implementation further supports this interpretation. Institutions employing integrated or hybrid curricula were more likely to implement SSCs compared with those using traditional discipline-based models. Integrated curricula inherently promote interdisciplinary learning, flexibility and student-centered approaches, which facilitate the incorporation of elective and self-directed learning opportunities such as SSCs [17-19]. In contrast, traditional curricula are often more rigid and compartmentalized, limiting opportunities for curricular innovation [20]. Moreover, SSCs have been shown to be adaptable across different curriculum structures but are particularly aligned with models that emphasize active learning and student engagement. These findings are consistent with broader

educational reforms that position SSCs as mechanisms for promoting flexibility, interdisciplinary integration and learner-centered education within modern medical curricula [21,22]. These findings suggest that SSC implementation is closely linked to broader curriculum reform and may serve as an indicator of institutional readiness for student-centered education.

Geographic variation in SSC implementation was also evident, with higher adoption observed in the Kurdistan Region compared with federal Iraq. This disparity may reflect differences in institutional autonomy, exposure to international educational models and the pace of curriculum reform initiatives. Similar regional disparities have been reported in other LMIC contexts [23-26]. This finding underscores the importance of contextual and policy environments in shaping the uptake of educational innovations.

In contrast, accreditation status was not significantly associated with SSC implementation. This suggests that existing accreditation frameworks may prioritize structural and administrative standards without explicitly promoting flexible, student-centered curriculum components. Previous studies indicate that accreditation alone is insufficient to drive meaningful educational innovation unless supported by institutional leadership, faculty engagement and organizational culture [27-29]. This highlights the need for accreditation systems to incorporate innovation-oriented standards that support curriculum transformation.

The study also identified key institutional barriers to SSC implementation, particularly limited administrative support (56.3%) and resource constraints (50.0%). These findings align with a growing body of literature demonstrating that curriculum reform is highly dependent on organizational capacity, availability of resources and leadership support. In resource-constrained settings, inadequate funding, limited institutional infrastructure and weak organizational support structures can substantially impede the adoption of educational innovations. Moreover, effective implementation requires not only structural readiness but also strong leadership and active faculty engagement to translate reform initiatives into practice [30-32]. The identification of teaching materials, faculty training and administrative support as priority needs further emphasizes that SSC implementation requires coordinated institutional investment rather than isolated curricular adjustments.

Among institutions currently implementing SSCs, the findings revealed largely standardized implementation patterns. SSCs were universally mandatory, most delivered during the middle years of the curriculum and typically required once per academic year. The use of structured SSC formats across institutions is consistent with existing literature, which describes SSCs as integral components of undergraduate medical curricula with defined objectives and organized delivery formats [33]. Although the timing and structure of SSCs may vary, they are commonly implemented as recurring modules or blocks across different stages of the curriculum [34,35]. Furthermore, the

widespread use of predefined topic lists reflects a balance between student choice and institutional feasibility, as SSCs are designed to offer guided flexibility while maintaining alignment with available resources and curricular goals [36].

The diversity of assessment methods reported, including written examinations, oral assessments, research projects and presentations-highlights the multidimensional nature of SSC learning outcomes. This finding is consistent with contemporary perspectives in competency-based medical education, which emphasize that no single assessment method is sufficient to capture the complexity of student performance. Instead, multimodal assessment approaches-integrating multiple tools, formats and data sources-are required to provide a comprehensive evaluation of learning [37,38]. Such approaches not only allow learners to demonstrate knowledge and skills through diverse modalities but also promote deeper engagement and meaning-making [39]. Importantly, multimodal assessment is particularly well suited for evaluating higher-order competencies, including critical thinking, communication and research skills, which require integrative and applied forms of assessment beyond traditional examinations [40]. In addition, the widespread use of feedback mechanisms indicates a positive orientation toward continuous curriculum improvement.

However, the limited use of digital tools represents a critical gap in SSC implementation. Despite the increasing integration of educational technologies in medical education, only a minority of institutions reported utilizing learning management systems or digital assessment platforms. This is concerning, as substantial evidence demonstrates that digital tools enhance flexibility, accessibility and scalability, while enabling efficient learner monitoring and faculty-student interaction through structured platforms such as LMSs [41]. In addition, digital learning environments facilitate self-directed and personalized learning and help overcome geographical and resource-related barriers, making them particularly valuable in resource-constrained settings [42]. Consequently, the underutilization of digital infrastructure is likely to constrain the scalability, standardization and long-term sustainability of SSC programs.

Qualitative findings, although limited, provided important preliminary insights into key areas for improvement, including enhancing student engagement, strengthening assessment practices and aligning SSC topics with community health needs. These findings align with the principles of socially accountable medical education, which emphasize that medical schools have an obligation to direct their education, research and service activities toward addressing the priority health concerns of the communities they serve [43,44]. Emerging literature further highlights that socially accountable education requires responsiveness to evolving health system needs and active alignment with community priorities [43,45,46]. Accordingly, integrating community-oriented SSC topics may enhance not only the

relevance of medical training but also the responsiveness of graduates to local health system demands.

Strengths

This study has several strengths. It represents one of the first national-level assessments of SSC implementation in Iraq and achieved a high institutional response rate (87.1%), enhancing representativeness and reliability. The inclusion of both quantitative and qualitative data provides a comprehensive understanding of institutional practices, barriers and contextual factors influencing SSC implementation.

Limitations

Several limitations should be considered. The study relied on self-reported institutional data, which may introduce reporting bias. The use of a single respondent per institution may limit the depth and accuracy of reported information. Private medical colleges were excluded, which may affect generalizability beyond governmental institutions. Although the response rate was high, the overall sample size remains relatively small, which may limit statistical power. Additionally, the cross-sectional design precludes causal inference. The limited number of qualitative responses also restricts the depth of thematic analysis. Finally, the study did not include perspectives from students or faculty members, which may provide additional insights into SSC implementation.

Implications

The findings of this study have important implications for medical education policy and curriculum development in Iraq and similar LMIC settings. Expanding SSC implementation represents a strategic opportunity to advance competency-based and student-centered medical education. National regulatory and accreditation bodies should prioritize the integration of SSC frameworks into curriculum standards. Strengthening faculty development, institutional capacity and digital infrastructure will be essential to support sustainable and scalable implementation. Addressing regional disparities should be prioritized through targeted policy interventions to ensure equitable implementation of SSCs across institutions.

CONCLUSION

This study provides one of the first national assessments of the implementation of Student-Selected Components (SSCs) in undergraduate medical education across Iraqi medical colleges, demonstrating that adoption remains limited (40.7%) and uneven despite a high institutional response rate (87.1%). SSC implementation was significantly associated with curriculum model and geographic region, highlighting the influence of both structural and contextual factors, while accreditation status showed no measurable impact.

The findings indicate that SSC implementation is constrained by key institutional barriers, particularly limited administrative support and resource availability. Addressing these challenges requires coordinated institutional and national-level strategies, including strengthening faculty

development, expanding access to teaching and learning resources and improving the integration of digital educational technologies to support scalability.

From a policy perspective, embedding SSC frameworks within national accreditation and curriculum standards represents a critical lever for advancing curriculum reform. Expanding SSC implementation offers a strategic pathway to promote competency-based, student-centered medical education and to better align undergraduate training with contemporary global educational priorities.

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Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that there are no competing interests.

Authors' Contributions

Dereen Adeeb Sheet: Conceptualization, study design, data collection, data analysis, interpretation of results, manuscript drafting and final approval. Ali Abdulrazzak Al-Dabbagh: Supervision, critical revision of the manuscript and final approval.

Ethical Statement

Ethical approval for this study was obtained from the Research Ethics Committee of the College of Medicine, Hawler Medical University, Erbil, Kurdistan Region, Iraq (Approval No.: 6/12 on 23/4/2025). The study was conducted in accordance with the principles of the Declaration of Helsinki. Participation was voluntary and informed consent was obtained from all respondents prior to data collection.

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