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QUALITY MANAGEMENT IN HIGHER PROFESSIONAL MEDICAL EDUCATION: FOCUS ON SERBIA

ABSTRACT: Introduction: The study analyzes quality management systems in higher medical schools of professional studies in Serbia, investigating their compliance with national and international standards, as well as specific challenges of practically oriented education.

Methods: A mixed-methods methodological approach was applied in five accredited institutions. Quantitative analysis included institutional indicators and surveys (n=124 teachers, n=298 students) with the application of Pearson's correlation to examine the relationship between quality factors. Qualitative data were collected through 18 semi-structured interviews and eight focus groups with key actors.

Results: Analytical statistics revealed a strong positive correlation between cabinet equipment and student satisfaction with clinical practice ($r=0.62$, $p<0.01$), while equipment level was significantly negatively correlated with dropout rate ($r=-0.45$, $p<0.01$). It was established that the accreditation process is primarily perceived as an administrative burden and formal fulfillment of norms, and not as a proactive mechanism for essential quality improvement.

Conclusion: Strategic investments in digital infrastructure, modernization of clinical assessment methods and transition from a model of mere compliance to a model of continuous development based on data are necessary for the sustainable improvement of the quality of education of healthcare workers.

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INTRODUCTION

Ensuring and continuously improving the quality of higher education has become a central priority of institutions around the world, fueled by the growing need for accountability, transparency and measurable results in teaching and research (1). In the specific domain of medical education, effective quality management gains additional weight, as higher education institutions not only educate future healthcare professionals, but also directly shape healthcare standards that affect patient well-being (2). Consequently, the adoption of robust quality assurance (QA) frameworks, accreditation processes and precise performance indicators is a key prerequisite for maintaining educational excellence, fostering innovation and protecting public health.

Over the last two decades, global bodies such as the World Federation of Medical Education (WFME) have developed international standards covering curriculum design, student assessment and institutional governance (3). Regional accreditation bodies often adapt these global standards to local contexts, creating hybrid frameworks that combine universal best practices with regional priorities. Such systems promote continuous improvement and enable institutions to compare their progress with internationally recognized criteria (4). In this context, medical schools are increasingly turning to innovative models such as problem-based learning (PBL) and simulation-based training, which require rigorous evaluation strategies, including objective structured clinical examinations (OSCEs) to assess clinical skills (5). Quality management thus goes beyond mere compliance with accreditation requirements and becomes a dynamic institutional commitment to strategic planning and resource optimization.

Serbia has made significant progress in reforming higher education by aligning with European standards through legislative frameworks that define the role of the National Accreditation and Quality Assurance Body (NAT) in monitoring institutional performance (6). The legal framework insists on a systematic approach, requiring institutions to maintain internal quality mechanisms and align programs with established criteria (7). However, despite participation in the Bologna Process, practical challenges remain. Many institutions, especially those in the field of vocational education, face limited budgets, difficulties in retaining qualified staff and the need for constant investment in digital infrastructure (8, 9).

The challenges faced by higher medical schools in Serbia are multiple and interrelated. The limited allocation of resources often makes it difficult to obtain modern medical simulators and laboratory equipment, which can jeopardize the fulfillment of high national and international standards (10). In addition, human capital remains a critical point; unfavorable working conditions and the migration of experts to the

private sector or abroad lead to a lack of permanent staff, which makes it difficult to fully integrate staff into institutional quality systems (11). Although accreditation is mandatory, in practice there is often a gap between the formal fulfillment of administrative requirements and the actual building of an internal quality culture (12). Additionally, the need to balance academic responsibilities, clinical practice, and research work is often hampered by bureaucratic procedures (13). Finally, uneven digital readiness and limited technical support are barriers to full implementation of telemedicine and virtual simulation tools (14).

A systematic examination of quality management practices in Serbian professional medical education is therefore necessary. The main objective of this study is to assess the effectiveness of the accreditation process and identify key obstacles, such as budget constraints and lack of staff, that hinder the implementation of quality mechanisms. The special focus of the paper is on the analysis of correlations between key indicators: it examines how the equipment of institutions and the workload of teachers affect student satisfaction, and to what extent employees' attitudes about quality policies correlate with the dropout rate. By examining the perceptions of faculty, administrators, and students, the research seeks to offer practical strategies for advancing quality policies and supporting sustainable improvements in health professional education.

The paper is structured so that after the introductory considerations, the methods chapter describes in detail the research design and the analytical procedures used. The results bring key findings obtained through a combination of quantitative processing and qualitative interview analysis, while in the discussion the obtained data are interpreted in the light of the existing literature and set hypotheses. The conclusion summarizes the contributions of the study and offers concrete recommendations for decision makers to strengthen quality systems.

METHODOLOGY

1. Research design and institutional context

The research was conducted using a mixed-methods design, which integrated quantitative and qualitative approaches for a comprehensive assessment of quality management practices in higher medical schools of professional studies in Serbia. The choice of this approach is justified by the need for data triangulation, where quantitative indicators provide insight into measurable trends and levels of compliance, while qualitative findings illuminate the nuanced reality of everyday practice and challenges faced by teachers and administration. Unlike academic studies, these institutions are primarily oriented towards the development of practical skills, which requires specific quality control mechanisms aimed at clinical training and direct employment in the health system.

The study included state and private vocational schools operating under the supervision of the National Accreditation and Quality Assurance Body (NAT), or formerly the Commission on Accreditation (CAQA). A purposive sampling approach of five institutions was used, with selection criteria including current accreditation status, geographic representation (urban centers and regional units), and diversity of study programs, including health care, physiotherapy, and radiology. Three key groups of participants were involved in the research: managers responsible for strategic management, teaching staff involved in the implementation of the curriculum and students of all years of study.

2. Instruments and data collection

The quantitative component included the analysis of accreditation documentation and institutional statistics, including enrollment rates, dropout rates, and the ratio of the number of teachers to students. Structured surveys were used to collect data from participants. The teacher questionnaire focused on assessing the availability of resources, administrative support, and clarity of quality assurance guidelines. The student survey, using a five-point Likert scale, examined satisfaction with the practical orientation of teaching, the quality of clinical training, and the transparency of assessment methods.

Qualitative data were collected through semi-structured interviews with administrators and teaching staff, lasting between 30 and 45 minutes, focusing on the interpretation of quality standards and budget allocation. In addition, focus groups were organized with students (5–8 participants per group) for a deeper understanding of the fit between theoretical learning and clinical practice requirements. Analysis of documents, including strategic plans and minutes of quality meetings, served to understand the formal processes of handling feedback after accreditation cycles.

3. Statistical processing and data analysis

Quantitative data processing was performed in the SPSS software package. In addition to descriptive statistics, which included frequencies, percentages and arithmetic means, analytical statistics were applied to test research hypotheses. Pearson's correlation coefficient (r) was used to examine the relationship between key quality variables, primarily the relationship between classroom equipment, teacher workload, and student satisfaction, as well as the relationship between attitudes toward quality policies and dropout rates. Differences in the perception of quality in relation to the year of study were tested using one-factor analysis of variance (ANOVA).

Qualitative analysis included verbatim transcription of interviews and multilevel thematic analysis. The process proceeded from initial (open) coding of relevant segments, through axial grouping of codes into broader themes (such as resource constraints and clinical partnerships), to selective coding that defined key patterns of institutional culture. The final integration of the findings made it possible to compare the qualitative themes with the quantitative results, thus obtaining a coherent picture of quality management.

4. Ethical considerations and scientific rigor

The research was conducted in compliance with all ethical standards and obtaining institutional permissions. Each participant signed an informed consent, with guaranteed anonymity and assignment of codes to protect identity. The reliability of the instruments was ensured by pilot testing in a vocational school outside the basic sample, which perfected the wording of the questions. The rigor of the results was additionally strengthened through the reflexivity of the research team and member checking, where the preliminary findings were presented to the heads of the institutions to confirm the authenticity of the context.

RESULTS

1. Descriptive analysis of the sample and institutional parameters

The research included five accredited higher medical schools of professional studies in Serbia. Data were collected from official documentation, survey responses of teachers (n=124) and students (n=298), as well as through 18 semi-structured interviews and eight focus groups.

The structure of the sample (Table 1) indicates an experienced teaching staff with a median of 11 years of service. Among the student population, a significant gender disproportion in favor of women was observed (75%), which is in line with general trends in professional medical education in Serbia.

Table 1. Demographic characteristics of research participants

Parameter	Teaching staff (n = 124)	Students (n = 298)
Gender (Male / Female)	43% / 57%	25% / 75%
Mean age (SD)	44.3 years (7.8)	20.1 years (2.7)
Years of work experience / Years of study	11 years (median)	I: 33%; II: 36%; III: 31%

Looking at institutional indicators (Table 2), variations in dropout rates (4.9% to 9.3%) were observed. Schools with state-of-the-art equipment and stronger clinical partnerships (Schools B and D) record the highest graduate employment rates, reaching up to 82.5% in the first year after graduation.

Table 2. Key institutional performance indicators by school

Institution	Number of registered users	Abandonment rate (%)	Employment rate (%)	Teacher:student ratio
School A	380	6.5	78.2	1:18
School B	560	5.8	80.1	1:20
School C	290	9.3	73.6	1:15
School D	430	4.9	82.5	1:22
School E	620	7.0	75.4	1:19

2. Analytical statistics: Correlation analysis of quality factors

In accordance with the requirements of the review, analytical statistics were conducted to determine the relationship between key quality management factors (Table 3). The results of the Pearson correlation coefficient (r) indicate a strong and statistically significant positive association between the equipment of the office and the satisfaction of students with clinical practice ($r=0.62$, $p<0.01$). Also, a significant negative correlation was found between the level of equipment and the dropout rate ($r=-0.45$, $p<0.01$), which indicates that infrastructure resources directly affect student retention.

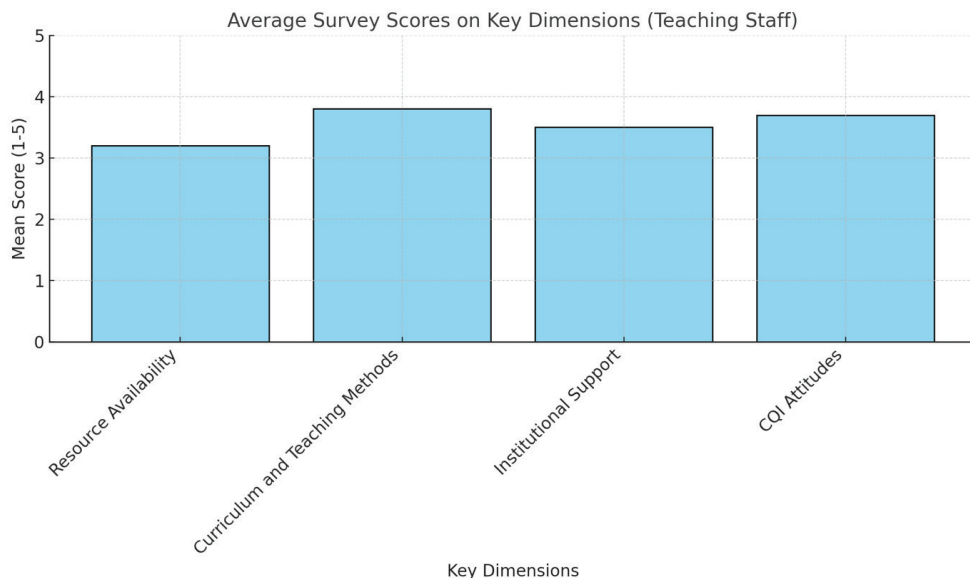
Table 3. Pearson correlation coefficients between quality variables

Variables	Policy implementation (r)	Student satisfaction (r)	Bounce rate (r)
Teachers' attitudes	0.54**	0.41*	-0.28
Cabinet equipment	0.38*	0.62	-0.45
Teacher workload	-0.15	-0.39*	0.22
Satisfaction with clinical practice	0.44*	0.58	-0.31
* $p < 0.05$; ** $p < 0.01$			

3. Perception of quality from the point of view of teachers and students

The analysis of the survey responses of the teaching staff included four dimensions of quality. The results show that the curricula are rated the best (3.8), while the availability of resources is recognized as a point that requires additional investment.

Figure 1. Average results of the survey on key dimensions (teaching staff)



Student perception of quality (Table 4) follows similar trends. Students are most satisfied with the quality of practical training (3.6), but they gave the lowest marks to the learning environment and the modernity of the equipment (3.0). These findings confirm that a practical orientation is highly valued, but that infrastructural backlogs undermine the overall impression of quality.

Table 4. Results of the student survey on the quality of education (Likert scale 1-5)

Quality dimension	Average value (AS)	Standard deviation (SD)
Quality of practical training	3.6	0.7
Relevance of theoretical contents	3.4	0.9
Transparency of assessment methods	3.2	1.1
Environment and equipment of facilities	3.0	1.0
Overall satisfaction with the quality	3.5	0.8

4. Qualitative analysis: Systematization of interviews and focus groups

Qualitative analysis enabled a deeper understanding of operational challenges. The findings are systematized in Table 5, which illuminates the gap between administrative accreditation requirements and actual institutional practice.

Table 5. Thematic systematization of qualitative findings (interviews and focus groups)

Key topic	Main research findings	Representative quote
Resource barriers	Financial constraints prevent the acquisition of high-fidelity simulators.	“We’re passing accreditation, but we’re struggling to fund improvements from the report.” (Director, School D)
Staff workload	Large groups of students make it difficult for mentors to work in classrooms.	“It’s hard to maintain engagement with a limited number of simulators and space.” (Lecturer, School E)
Evaluation round	Students doubt the influence of surveys on real changes in teaching.	“We fill out surveys regularly, but we are not sure that this changes the way we work.” (Focus group, School B)

5. *Synthesis of results*

The integration of the data confirms that medical schools in Serbia successfully maintain the practical relevance of the program, as evidenced by the employment rates of graduates. However, analytical statistics clearly indicate that the level of student satisfaction and the rate of completion of studies directly depend on the technological equipment and the optimization of the workload of the teaching staff. These results suggest that the quality management process must evolve from an administrative form into a continuous development supported by strategic investment.

DISCUSSION

The results of this research shed light on a specific dichotomy within higher medical schools of professional studies in Serbia. On the one hand, the strength of practical training models that effectively prepare students for the labor market is recognized, which is confirmed by the high employment rates of graduates. On the other hand, systemic challenges were identified in the form of financial limitations, variable engagement of stakeholders in quality assurance (QA) processes, and uneven integration of modern pedagogical methods. This discussion analyzes the findings in the broader context of quality management and pedagogical innovation.

1. *Gap between accreditation requirements and actual quality culture*

Although accreditation in professional medical education sets basic standards, the degree to which it generates an authentic culture of quality varies significantly (15). The observed “compliance mentality” indicates that institutions primarily mobilize resources ahead of accreditation cycles, leading to temporary improvements that

often stagnate after certification (16). A statistically significant correlation between teachers' attitudes and the effectiveness of policy implementation ($r=0.54$, $p<0.01$) confirms that the human factor and institutional culture play a more important role than the administrative protocols themselves. The transition to a proactive model of continuous quality improvement (CQI) requires the strengthening of internal research capacities and more transparent decision-making (17).

2. The impact of resources on student retention and educational outcomes

One of the most significant findings of this study is the direct dependence of educational outcomes on infrastructural support. A strong positive correlation between the equipment of the office and the satisfaction of students with clinical practice ($r=0.62$, $p<0.01$) clearly indicates that material resources are not only a technical prerequisite, but a key factor in the perception of quality (18). The finding of a negative correlation between the quality of the equipment and the dropout rate ($r=-0.45$, $p<0.01$) is particularly critical. This suggests that outdated equipment directly contributes to the demotivation of students, which in conditions of limited budgets requires strategic connection with regional health institutions and the use of international funds (19, 20).

3. Stakeholder participation and closing feedback loops

Although a moderate level of satisfaction among all actors was determined, inconsistencies were identified in the perception of the fairness of the assessment and the relevance of the practice. Effective quality management implies iterative feedback mechanisms (21). The results of the focus groups indicate that "feedback loops" often remain open - students fill out surveys, but rarely see concrete pedagogical changes resulting from them. Experiences from European vocational systems suggest that the introduction of "quality champions" (employees and students in charge of QA) could strengthen the link between evaluation and institutional reforms (22).

4. Modernization of competency assessment methods

In vocational education, traditional knowledge tests must be supplemented with multimodal assessments that include clinical skills and communication (23). The introduction of objectively structured clinical examinations (OSCE) and e-portfolios, although resource-intensive, would significantly increase the validity of student assessments. The result showing a negative correlation between teacher workload and student satisfaction ($r=-0.39$, $p<0.05$) further emphasizes that the introduction of new

assessment methods requires not only technology, but also optimization of human resources and standardization of evaluation rubrics (24).

5. Technological readiness and digital transformation

Digital platforms and telemedicine are becoming an integral part of health care, but vocational schools in Serbia still integrate these tools in a fragmentary way (25). Sporadic e-learning efforts face obstacles in the form of inadequate IT infrastructure and lack of specific training for staff. Without a systematic technology adoption strategy at the institution level, early digital initiatives cannot achieve their full effect on the quality of theoretical and practical teaching (26).

6. Local context in a global framework

Serbian vocational schools must balance between national regulatory requirements and broader European standards that insist on competency-based curricula (27). Engagement at the global level opens up avenues for knowledge sharing, but geographic and financial differences within countries create inequalities in access to those opportunities. Policy makers should therefore develop support programs that reduce these differences and use the specific strengths of each institution (28).

7. Towards a mature institutional culture of quality

Finally, the findings confirm that comprehensive quality assurance goes beyond merely meeting external norms. It depends on fostering an organizational ethos in which excellence in teaching becomes an institutional imperative, not an administrative obligation (29). Achieving this level of maturity requires schools in Serbia to move from episodic accreditation efforts to a long-term evidence-based approach, supported by transparent leadership and active collaboration of all stakeholders.

CONCLUSION

Summary of key findings

This research sheds light on the efforts of higher medical schools of professional studies in Serbia to balance practical education focused on the needs of the labor market with the reality of limited resources and sporadic engagement in quality assurance (QA) processes. Quantitative indicators, such as high graduate employability

and relatively stable graduation rates, indicate moderate success in meeting basic educational goals. However, qualitative data collected through interviews and focus groups reveal significant variability in the depth and sustainability of continuous quality improvement efforts.

The analysis identified two key strengths of the system: a distinct practical orientation, which enables students to directly develop skills through clinical experience adapted to the needs of the health sector, and successful alignment of core values with accreditation processes. Accreditation served as a catalyst for curriculum standardization and the establishment of institutional quality bodies, bringing periodic technological and pedagogical advances.

Despite these strengths, the study identified three critical challenges:

- Resource constraints and regional disparities: Inconsistent access to modern simulation equipment and digital platforms creates an uneven student experience across institutions.
- Dominance of a “compliance mentality”: Accreditation is often seen as an end point rather than the beginning of a continuous improvement process, leading to stagnation of quality between two verification cycles.
- Inadequate feedback systems: Although data is collected, “feedback loops” often remain open, giving students and teachers the impression that their suggestions have no real impact on institutional change.

Practical implications and recommendations

In order to improve the quality management system, it is necessary to implement the following strategic measures:

1. Strategic infrastructure investments: Policymakers must prioritize the modernization of clinical simulation laboratories. The solution can be sought in public-private partnerships, international grants and stronger cooperation with health institutions.
2. Integration of quality into daily practice: It is necessary to move from episodic self-evaluations to regular monitoring of measurable indicators. This means educating staff and strengthening the sense of shared responsibility for educational outcomes.
3. Innovation of assessment methods: The transition to multimodal systems, such as OSCE (Objective Structured Clinical Examination) and structured clinical examinations, would enable a more accurate measurement of students’ practical readiness.

4. Internationalization and cooperation: Formalization of international exchange and participation in global networks would enable vocational schools to access the latest pedagogical methodologies and technological trends.

Directions for future research

Future research should focus on longitudinal studies that would monitor the long-term effects of accreditation on graduates' competencies and their professional reputation. Also, comparative analyzes with vocational systems in neighboring countries could identify universal challenges and offer common European solutions. Special focus should be placed on digital integration, i.e. examining the scalability of telemedicine and virtual laboratories in the specific context of vocational education. Finally, a more detailed survey of the perceptions of all stakeholders, including employers, would help fine-tune curricula to the dynamics of modern health care.

Final remarks

This study confirms the enormous potential of Serbian higher medical schools of professional studies as key channels for supplying the health system with quality personnel. However, their sustainability depends on the willingness of administrators and educators to embrace a long-term, evidence-based reform process. Only with a proactive approach, which goes beyond the mere administrative fulfillment of norms, professional programs can optimize the learning experience and effectively respond to the demands of modern medicine.

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