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Clinical experiences and professional identity formation in medical students: a qualitative study

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Abstract

Background & Objective: Professional identity formation is a context-dependent process in medical education. Despite the major focus of research on Western educational systems, there is limited understanding of how this process develops within Iran's national general medical curriculum, which has distinct structural and cultural characteristics. This study aimed to investigate the role of clinical experiences in the professional identity formation of medical students within the context of medical education in Iran.

Materials & Methods: This qualitative study involved 17 medical students (7 females and 10 males). Participants were selected via purposive sampling and included 12 interns and 5 students in the physiopathology stage. Data were collected through 17 individual semi-structured interviews conducted from August 2024 to October 2024, each lasting 45 to 75 minutes. Sampling continued until data saturation was reached. Data analysis was performed manually using conventional content analysis based on the Graneheim and Lundman approach. To ensure the trustworthiness of the findings, Guba and Lincoln's criteria of credibility, including prolonged engagement with data, member checking, and peer debriefing, were applied.

Results: Data analysis revealed three main themes: the experienced curriculum, the perceived clinical learning environment, and student characteristics. The experienced curriculum encompassed the hidden curriculum, the influence of role models and peers, and the formal curriculum structure. The perceived clinical learning environment highlighted inadequate conditions for curriculum implementation and the observation of professional anomalies. Student characteristics included active participation in clinical education activities, student search behavior, and personal development. The findings indicated that challenges in the clinical environment, such as workload and observation of unprofessional behaviors, alongside personal and financial circumstances, were significant factors influencing professional identity formation.

Conclusion: Clinical experiences, behavioral patterns, and the hidden curriculum play a crucial role in the professional identity formation of medical students. Improving the quality of role modeling, managing unprofessional messages, and providing supportive learning environments can help align clinical experiences with the goals of the formal curriculum.

Keywords: professional identity; education, medical; hidden curriculum; clinical clerkship; curriculum

Introduction

Professional identity formation, rather than narrowly focusing on acquiring functional skills and performing clinical tasks, emphasizes the transformation in an individual's ways of thinking, acting, and emotional experiencing toward the externalization of their professional role. This approach, moving beyond a purely competency-based logic, centers on integrating professional values, ethical commitment, and social responsibility into the structure of one's professional self-concept. It thus provides the groundwork for redefining professional meaning within the complex context of contemporary healthcare systems [1, 2].

Professionalization, as one of the foundational concepts in medical education, is a multidimensional process shaped by the dynamic interaction among individual characteristics, learning environments, interpersonal relationships, and cultural and value contexts. Within this framework, medical education scholars believe that educational programs aimed at cultivating students' professional identity are as fundamentally important as programs focused on developing medical knowledge and clinical skills in training future physicians [3, 4].

Professional identity in medicine refers to an individual's perception of what it means to be effective in the physician's professional role and how to behave in accordance with the expectations of this profession [5]. This concept takes shape as a dynamic self-concept over time, during which the characteristics, values, and norms of the medical profession are internalized, providing the foundation for self-reflection and more effective enactment of the professional role [6]. The process of professional identity formation begins at the start of students' academic training and develops throughout theoretical and practical education in medicine. Educational experiences and insights gained during study play an important role in constructing and transforming professional identity [7]. Beyond this, the formation of this identity is influenced by a set of sociocultural, familial, educational, ethical, religious, and gender-related factors that dynamically and continuously shape the trajectory of professional identity evolution by molding individual values, beliefs, and commitments [8, 9]. This process gradually takes shape through interaction with various factors and is constantly evolving [10]. The concept of professional identity formation emphasizes the ethical conflicts and irregularities that medical students will face in their future work environments. In fact, the process of professional identity formation is carried out with the aim of strengthening fundamental principles among medical students and preparing them to navigate these inevitable professional conflicts in their future workplaces [11]. A well-developed professional identity in medical students reinforces a set of behavioral and attitudinal characteristics including empathy, meticulous patient care, honesty, self-awareness, collaboration, altruism, respect, and a sense of justice. Moreover, this process leads to enhanced motivation for continuous learning, professional resilience, and attention to self-care in the course of students' professional development [10]. A positive professional identity, in addition to strengthening self-confidence and a sense of belonging to the profession, also helps improve interpersonal relationships in the professional environment and plays an important role in increasing job satisfaction. Conversely, weakness in professional identity formation can bring negative consequences, including diminished public trust and threats to the autonomy of the medical profession for the professional system [12, 13]. The development of professional identity is intricately linked to the capacities and functions of medical schools as the primary environments for professional education. This process involves professional training through the internalization of values, attitudes, and professional identity, a significant portion of which is shaped under the influence of the hidden curriculum [14]. In this context, medical education, particularly through the implicit mechanisms of the hidden curriculum, is considered one of the most important tools for transmitting fundamental values related to professional identity [15].

The development of professional identity in medical students is significantly influenced by the curriculum—a program that plays a central role in shaping their perceptions, attitudes, and values regarding their future roles as healthcare providers. An effective curriculum operates beyond the transmission of theoretical knowledge and, by integrating experiential learning opportunities, enables students' active participation in clinical activities, engagement in ethical decision-making processes, and the strengthening of interprofessional teamwork [16].

Although the international literature on medical education has shown extensive attention to the concept of professional identity formation over the past two decades, this knowledge has been produced primarily within Western educational systems and is grounded in the specific cultural, structural, and institutional assumptions of those contexts. While professional

identity is recognized as a phenomenon deeply dependent on social and organizational context, the direct transfer of theoretical frameworks and empirical findings from these systems to other settings may lead to oversimplification or neglect of contextual complexities. In Iran's national undergraduate medical curriculum, factors such as hierarchical structures in clinical environments, resource constraints, the role of macro-educational policies, and social interactions shaped by cultural context can mold the trajectory of professional identity formation in distinct ways. However, how these contextual forces operate in the lived experience of Iranian medical students remains systematically unexplained. From a theoretical perspective, professional identity is not merely the product of the formal curriculum, but rather the result of dynamic interaction among the formal curriculum, the hidden curriculum, power structures, and students' individual agency in clinical environments. Thus, understanding this process requires examining students' experiences as active agents in the clinical field. Given the strategic role of professional identity development in ensuring quality of care, social trust, and the sustainability of the medical profession, investigating this process in less-studied contexts gains added importance. Accordingly, the aim of the present study is to explain how clinical experiences within the framework of Iran's national undergraduate medical curriculum shape the professional identity formation of medical students, from their own perspective—an explanation that can enrich the theoretical literature and provide a foundation for context-specific curricular reforms in similar educational systems.

Materials & Methods

Design and setting(s)

This qualitative study was conducted using a conventional content analysis approach based on the Lundman and Graneheim framework, between August 1, 2024, and October 30, 2025, at Iran University of Medical Sciences. Participants included medical students in the physiopathology and clerkship phases, and the study was designed and carried out with the aim of explaining the process of professional identity formation within the context of their clinical experiences.

Participants and sampling

Participants were selected from among medical students at Iran University of Medical Sciences through purposive sampling with maximum variation, in order to represent a broad spectrum of experiences related to professional identity formation. Variation was considered based on gender, educational phase (physiopathology and clerkship), and degree of exposure to clinical environments.

Inclusion criteria comprised having at least six months of clinical training experience and willingness to participate and share personal experiences. The sole exclusion criterion was withdrawal from continued collaboration at any stage of the research.

In accordance with qualitative research principles, sample size was not predetermined, and participant recruitment continued until data saturation was reached. Data saturation occurred when no new codes or concepts were identified in the analysis of interviews, and new data merely confirmed prior findings. Saturation was reached after 15 interviews; however, two additional interviews were conducted to ensure comprehensive coverage of the research questions. In total, 17 medical students (7 women and 10 men) participated in the study.

Tools/Instruments

Data were collected through individual in-depth semi-structured interviews. The interview guide was developed with a focus on students' experiences of clinical learning environments and their perceptions of professional identity formation. Questions were designed in an open-ended manner to allow deep exploration of participants' experiences, interpretations, and subjective meanings.

To ensure diversity of perspectives, maximum variation sampling was carried out considering gender, educational phase (physiopathology or clerkship), and level of clinical experience. Interviews were conducted individually in a quiet setting at the medical school, and were recorded with participants' consent and transcribed verbatim.

Data collection methods

Data were collected through individual semi-structured interviews conducted by the first researcher and two doctoral students in medical education. To reduce the likelihood of response bias, the interviewers had no prior educational, supervisory, or personal relationship with the participants before the study. Interviews took place in a quiet and private setting within the medical school premises, at the Medical Education Studies Center, to allow psychological comfort, maintain confidentiality, and facilitate free expression of experiences related to clinical training and professional identity formation.

Selection of the interview location was based on participants' preferences and practical accessibility.

The interview guide was developed based on the study objectives and a comprehensive review of literature related to clinical education and professional identity formation. This guide was pilot-tested before the main data collection process began, in order to assess the clarity, appropriateness, and logical coherence of the questions. Results from the pilot phase led to minor revisions to increase question comprehensibility and better alignment with the research aim.

The interview guide covered main domains related to students' lived experiences in clinical training and the process of professional identity formation. Interviews began with general, open-ended questions, such as: "How would you describe your experience of clinical training?" and "What impact has the clerkship period had on your understanding of your future professional role as a physician?" To deepen the data and examine emerging concepts more closely, probing questions such as "Can you explain further?" and "Can you give an example?" were used throughout the interview.

Other guide questions addressed contextual and experiential dimensions of professional identity formation, including interaction with faculty and clinical staff, perception of the hidden curriculum, learning experiences in clinical environments, and understanding of the professional role. The interview guide was applied flexibly, and the order and content of questions could be modified according to participants' responses and emerging concepts. During the data collection process, one of the initial questions was removed due to lack of alignment with data patterns.

Each participant was interviewed once. Interview duration ranged from 50 to 90 minutes. After obtaining written informed consent, all interviews were recorded using an audio recorder. Data saturation was reached after conducting 15 interviews, such that no new concept or code was observed in the data thereafter. However, to ensure adequacy, depth, and richness of the data, two additional supplementary interviews were conducted, and ultimately 17 interviews were used in the final analysis.

Data analysis

Data collection and analysis were conducted simultaneously. Analysis was performed using the conventional (inductive) content analysis approach based on the Graneheim and Lundman method [17]. All interviews were digitally recorded with participants' informed consent and were transcribed verbatim immediately after each session. Transcribed texts were cross-checked with audio files to ensure their accuracy.

Data analysis was carried out manually without using qualitative analysis software. Texts were organized in Microsoft Word, and the coding process was performed through highlighting meaningful phrases, inserting marginal notes, and transferring codes to analytical tables. All analysis steps were documented to preserve the analytical decision-making trail.

Each interview was read through completely several times so that researchers could reach the stage of immersion in the data and gain a comprehensive understanding of the overall content. The entire text of each interview was considered as the unit of analysis. Then, phrases and paragraphs relevant to the research aim were identified as meaning units. These units were condensed while preserving the semantic core, and initial codes were assigned to them.

Subsequently, codes were continuously compared with one another in terms of similarities and differences, and were grouped into subcategories based on conceptual commonalities. Subcategories were merged at a more abstract level into broader categories, and finally, through examining internal relationships among categories, main themes were extracted. This process included open coding, categorization, and abstraction, and continued until a coherent conceptual structure was reached.

To ensure coding stability, three interviews were independently coded by two researchers. Discrepancies were resolved through discussion and re-examination of raw data, so that the final coding framework was established by mutual agreement. After this stage, the remaining interviews were analyzed based on the agreed-upon structure.

Trustworthiness

Trustworthiness of the findings was assessed based on the Lincoln and Guba framework and included four criteria: credibility, dependability, confirmability, and transferability [18].

To enhance the credibility of the study, researchers maintained continuous and prolonged engagement with the data, and data analysis was conducted iteratively and recursively. The complete transcribed text of each interview was sent to the respective participant after the interview to check the accuracy of the recorded content and make corrections if needed. Additionally, emerging themes were shared with a number of participants so that

the researchers' interpretation of the conceptual structure of the data could be evaluated at the semantic and analytical level.

To increase the dependability of the analysis, two researchers independently coded part of the data. Extracted codes were agreed upon through analytical discussion, continuous comparison with raw data, and conceptual review. All analysis steps, including the coding process, code revisions, and the trajectory of category formation, were documented to allow for research auditability. To strengthen confirmability, an independent faculty member from outside the research team, who had expertise in qualitative research and experience publishing qualitative studies in the field of medical education, reviewed a sample of interviews, extracted codes, and the categorization structure, and confirmed the degree of alignment between interpretations and raw data.

This individual did not participate in the study design, data collection, or initial analysis, and acted solely as an external evaluator. To enhance the transferability of the findings, purposive sampling with maximum variation was used, and the demographic and contextual characteristics of participants were reported transparently to allow judgment about the applicability of the findings in similar contexts. Overall, the data analysis process and trustworthiness strategies were carried out systematically and transparently to preserve methodological rigor and reproducibility of the findings [19].

Results

In this qualitative study, a total of 17 semi-structured in-depth interviews were conducted with medical students. Participants included 10 male students and seven female students in the age range of 22 to 27 years. In terms of educational phase, 12 were in the clerkship period and five were in the physiopathology period. All participants had clinical training experience (**Table 1**).

Based on the interview data, 840 initial codes were extracted. After removing duplicate codes, conducting a thorough review, and merging similar codes, the number was reduced to 93 main codes. This process was carried out iteratively with the aim of eliminating data redundancy, preserving meaning units, and simultaneously maintaining conceptual richness.

The final codes were organized into three overarching themes: 'Experienced Curriculum,' 'Perceived Clinical Learning Environment,' and 'Student Characteristics'. As an example, one participant, in describing the experience of the hidden curriculum, stated: 'In the clinical section, sometimes we learned things that were not in the books and we learned more from the behavior of the professors and the hospital environment.' This quotation is an example of the raw data that illustrates the formation of the extracted themes (**Table 2**).

Table 1. Demographic characteristics of study participants

Participant Code	Age (years)	Gender	Course/Stage
P1	22	Female	Internship
P2	23	Female	Internship
P3	22	Female	Internship
P4	24	Female	Internship
P5	23	Female	Internship
P6	25	Female	Physiopathology
P7	26	Female	Physiopathology
P8	25	Male	Internship
P9	24	Male	Internship
P10	27	Male	Internship
P11	26	Male	Internship
P12	25	Male	Internship
P13	28	Male	Physiopathology
P14	24	Male	Physiopathology
P15	27	Male	Physiopathology
P16	26	Male	Physiopathology
P17	25	Male	Physiopathology
Summary	**Mean: 24.9**	**Female: 7 / Male: 10**	**Internship: 10 / Physiopathology: 7**

Note: This table presents descriptive demographic information for all participants included in the qualitative study.
Abbreviations: P, participant; n, total number of participants (n = 17).

Table 2. Themes, subthemes, and codes identified from participant interviews

Themes	Subthemes	Codes
Experienced curriculum	Hidden curriculum	Learning from human resources
		Observing behaviors
		Work conditions and environment
		Communications and workload
	The influence of role models and peers	Professors characteristics
		Learning from peers
		Interaction styles
		Upperclassmen dynamics
	Formal curriculum	Educational planning and structure
		Educational resources and culture
		Curriculum components
		Assessment and admission
Perceived clinical learning environment	Inadequate conditions for curriculum implementation	Challenges in clinical education
		Mental and emotional well-being
		Educational importance and learning
		Environmental factors
	Observation of professional anomalies	Issues of fairness and behavior
		Professors attitudes
	Active student participation in clinical education activities	Engagement with professors
		Student involvement in education
Student's characteristics	Student search behavior	Student characteristics
		Engagement and motivation
	Student living conditions	Emotional and financial challenges
		Support systems
		Life conditions and priorities
	Personal development of the student	Positive institutional impact
		Professors engagement
		Peer interaction and resources

Note: This table presents the thematic structure derived from qualitative content analysis of semi-structured interviews with medical students (n = 17).
Abbreviations: n, number of participants.

Theme 1. Experienced curriculum

The first theme that emerged was the experienced curriculum, which was shaped by the main categories of hidden curriculum, influence of role models and peers, and formal curriculum. This theme emphasizes different dimensions of the educational experience and shows how formal instruction, informal learning, and social influences interact with one another to impact student identity.

Hidden curriculum: Students in this study understood their learning experience in the clinical environment primarily through informal interactions and observation of the professional behavior of healthcare team members. Their learning was largely shaped by immersion in the hospital setting, observing the daily performance of physicians, residents, and nurses, and direct encounters with patients. One participant, in describing the observational learning experience, stated:

> *"On numerous occasions, a nurse shared a practical point with me that I had not encountered in theoretical classes… Encountering patients taught me that medicine is not just memorizing facts, but understanding the impact of illness on people's lives is also important."* (**Participant 1**)

Observing the behavior of interns and residents also played a role in shaping students' attitudes toward their future professional path. Some students, by witnessing the high workload and occupational pressure present in the clinical environment, gained greater awareness of the realities of the medical profession. One participant stated:

> *"I always imagined that after graduation things would get easier, but seeing residents who worked long hours without rest showed that the road ahead is difficult. This experience caused anxiety, but at the same time it encouraged me to actively prepare for the future starting now."* (**Participant 3**)

From the participants' perspective, the hospital environment functioned beyond scientific instruction and was also considered a platform for learning the professional role. The crowded environment, emergency conditions, work stress, and healthcare team interactions helped students grasp the skills needed for the future responsibilities of the medical profession. One student described the experience as follows:

> *"Sometimes in the emergency department I would just look around at the environment… The flood of patients, calls for help, rapid decision-making by physicians, and the tireless efforts of nurses were a form of education for me. This environment taught me that medicine does not only include diagnosing disease, but also encompasses crisis management, rapid decision-making, and teamwork."* (**Participant 6**)

Due to the high workload of faculty members, students in some cases turned to residents and interns to obtain

more practical information. Participants believed that limited access to professors led them to experience more active learning in the clinical environment. One student stated:

> *"Many times I wanted to ask professors questions, but they were very busy and the possibility of direct access to them was limited. As a result, I turned to interns and residents for more learning, because they had more time to explain practical points, and this experience taught me to actively seek the information I needed in the clinical environment."* (**Participant 4**)

The influence of role model professors and peers:

In the formation of students' professional identity, professors and educational peers — including senior students, residents, interns, and classmates — played an important role in their clinical learning experience. Students reported that the professional behavior and interaction style of these individuals, particularly in the hospital environment, served as a model for shaping their future attitudes toward the medical profession.

One participant, in describing their experience of the role of professors, stated:

> *"One of the professors taught with enthusiasm and even explained complex concepts in simple, practical language. His respectful treatment of students and encouragement of critical thinking made me realize that a good physician is not defined solely by scientific knowledge, but that communication skills and the way one interacts with students and patients also matter. Now during my clerkship rotations I try to follow this model."* (**Participant 2**)

Positive interactions with professional role models were effective not only in reinforcing theoretical knowledge but also in shaping students' professional attitudes. Observing the behavior of healthcare team members helped students establish standards for their own future professional conduct and enter the process of professional socialization. One participant stated:

> *"In the emergency department, one resident taught us patiently and allowed us to participate in hands-on tasks. In contrast, some residents showed less interest in teaching students. This difference in behavior made me understand that how people treat others can profoundly affect students' learning and motivation. If I become a resident in the future, I will try to model myself after residents who are supportive of students."* (**Participant 8**)

Formal curriculum: The formation of medical students' professional identity was influenced by a combination of clinical experiences and the structure of the formal medical education curriculum at the university and national levels. Participants indicated that various elements of the formal curriculum — including the university's educational planning, medical ethics instruction, the educational culture governing the learning environment, and assessment methods — played a role in their understanding of professional responsibilities. One participant stated:

> *"When I entered the clinical environment, I realized that the university's educational program helped me not only acquire scientific knowledge but also better understand my ethical responsibilities. The medical ethics course and the respectful behavior of professors made me, as a future physician, consider humane interaction with patients and colleagues more important. Also, assessments did not focus solely on theoretical knowledge but also took practical skills and professional ethics into account."* (**Participant 9**)

The present study showed that medical ethics education is one of the important factors in strengthening professional behavior and developing a sense of responsibility in students.

The combination of theoretical medical ethics instruction with real clinical experiences helped students pay attention to the human and ethical dimensions of the medical profession beyond specialized knowledge. One participant stated in this regard:

> *"During my studies, the curriculum encouraged me to think more about my professional identity. The medical ethics course alongside real clinical experiences showed that being a physician does not only mean having specialized knowledge, but also includes ethical responsibility and humane communication with patients. Practical assessment methods were also effective in this process."* (**Participant 10**)

Theme 2: Perceived clinical learning environment

Participants described the clinical learning environment as a determining factor in their educational experience and the formation of their professional identity. They noted that the prevailing atmosphere in hospital wards — including workload pressure, relationships among treatment team members, and the quality of educational interactions — played a significant role in their understanding of the reality of the medical profession. One student described this experience as follows:

> *"When I entered the hospital environment, I realized that what I had learned in the classroom differed*

from the reality of the clinical setting. The tense atmosphere and high workload made me feel that I had to adapt to the conditions very quickly." (**Participant 10**)

This account shows that the clinical environment is not merely a setting for curriculum delivery, but a social and emotional space in which students redefine their professional role.

Confronting the practical realities of the profession moderated students' initial expectations and, in some cases, prompted them to reconsider their outlook on their future career.

Inadequate conditions for curriculum implementation: Participants reported that time constraints, high content density, and the stressful conditions of the clinical environment posed significant challenges to effective curriculum delivery. These conditions meant that their learning experience was more often accompanied by anxiety and pressure than by active engagement in the clinical learning process.

One student noted:

"We are forced to cover a large volume of material in a short period of time, and in a clinical environment that is already stressful on its own, focusing on learning becomes very difficult." (**Participant 7**)

This account shows that curriculum density and time limitations reduce opportunities for reflection and the internalization of professional experiences. Under such conditions, students tend to focus more on meeting academic requirements than on the gradual formation of their professional identity. Beyond this, some participants pointed to the psychological and economic pressures facing interns and residents, and how these affected the quality of teaching. One student stated:

"When we enter the hospital, we see that the physicians responsible for teaching and the residents are under economic and psychological pressure, and this tense atmosphere prevents us from being able to draw on their experiences for learning." (**Participant 2**)

This experience shows that the structural and emotional pressures governing the clinical environment can reduce the quality of educational interactions and weaken students' sense of academic support.

As a result, the process of professional socialization takes shape in a context marked by burnout and tension; a factor that may well influence students' outlook on their future careers.

Observation of professional anomalies: Some participants reported encountering behaviors in clinical settings that were inconsistent with the professional values they had expected. These experiences included inattention to teaching, prioritizing workload demands over educational interaction, and the overlooking of certain ethical considerations under high-pressure conditions. One student described this as follows:

"When you are in the clinic, the crowding and volume of work reach a point where focusing becomes nearly impossible. Residents are often more preoccupied with their own concerns and set aside no time for teaching. This environment causes many ethical, or even professional, considerations to be ignored." (**Participant 5**)

This account shows that workload pressure and structural priorities can cast a shadow over the quality of educational interactions and professional ethics. Repeated exposure to such situations may lead to the normalization of certain unprofessional behaviors, or conversely, give rise to a critical awareness in students.

Beyond this, some students raised the experience of feeling overlooked or lacking educational support. One participant stated:

"Professors often pay little attention to students. While we are supposed to learn from clinical experiences, instead of receiving guidance, we often find ourselves in situations where we have to defend ourselves." (**Participant 4**)

This experience shows that the absence of educational support can weaken students' sense of professional belonging and reduce their self-confidence. At the same time, some students noted that these very encounters compelled them to redefine their personal professional standards, meaning they decided to avoid reproducing such behaviors in the future. Thus, the observation of professional anomalies can lead both to the weakening and to the conscious reconstruction of professional identity.

Theme 3: Student characteristics

Participants noted that the process of professional identity formation is not shaped solely by the educational environment; rather, their individual characteristics play a determining role in how they interpret and respond to clinical experiences. Several students emphasized that their level of active participation, intrinsic motivation, and personal effort directly influenced the quality of their educational experience. One participant stated:

> *"Ultimately, it is the student who determines how much they learn from the environment. If you are active, ask questions, and follow through, you can make progress even in difficult conditions, but if you are passive, even the best environment will have little effect."* (**Participant 1**)

This account shows that students see themselves as active agents in the learning process rather than mere recipients of a curriculum. Traits such as intellectual curiosity, engagement in clinical activities, and seeking feedback help them gradually internalize their professional role.

In contrast, some students pointed to the influence of personal circumstances and lifestyle on their professional experience. One participant noted:

> *"When you have financial concerns or personal problems, focusing on learning and professional growth becomes harder. Sometimes I feel that these issues outside the university also affect how I perform in the clinical environment."* (**Participant 5**)

This experience shows that professional identity does not form in a vacuum, it is shaped by students' individual, emotional, and social circumstances. Professional growth, therefore, is the product of a dynamic interaction between personal characteristics and the educational environment.

Active student participation in clinical education:

Participants reported that their level of active engagement in clinical activities played a determining role in their experience of professional growth. Students who took part in rounds, morning reports, and clinical discussions felt they had moved closer to the role of a 'treatment team member' rather than remaining a passive 'observer.' One student described this as follows:

> *"When I participate in rounds and morning reports, I find the opportunity to connect with the treatment team and share my knowledge. This active participation makes me feel like part of the patient care process. As a result, my confidence in clinical decision-making grows."* (**Participant 2**)

This account shows that active participation strengthens both a sense of professional belonging and clinical self-confidence. In effect, the experience of fulfilling a role at the student level contributes to the gradual internalization of the physician's identity.

Another student pointed to the importance of dialogue and academic exchange:

> *"Taking part in discussions with faculty and clinical debates allows me to draw on different perspectives regarding patient care. These interactions foster my professional growth and give me a deeper understanding of clinical issues."* (**Participant 1**)

This experience shows that active participation is not limited to knowledge acquisition alone, it also gives rise to a professional attitude grounded in collaboration, mutual respect, and teamwork. In this way, active presence in clinical educational processes serves as the foundation for translating theoretical knowledge into an internalized professional identity.

Student search behavior: Some participants reported playing an active role in seeking out knowledge, viewing their learning as extending well beyond the formal curriculum. They explained that to better understand clinical issues, they independently consult a range of sources and compare the information they gather.

One student stated:

> *"I always try to compare information I find online with credible academic sources to verify its accuracy. This process helps me develop a broader perspective on clinical concepts and reason more effectively when facing clinical challenges."* (**Participant 3**)

This account shows that the student holds themselves responsible for the quality of their own learning and approaches different sources with a critical eye. Such behavior reflects the formation of a professional identity grounded in academic accountability and a commitment to informed decision-making.

Another student pointed to the role of prior experience and informal sources in their learning:

> *"Sometimes past experiences help me grasp new concepts more quickly. Previous mistakes or methods that worked for me serve as my guide. On top of that, online content, as an up-to-date resource, complements my learning."* (**Participant 5**)

This account shows that students draw on personal experience and diverse resources to build their clinical knowledge. Such a process not only deepens learning but also fosters greater professional self-awareness and the development of an independent, self-directed identity.

Student living conditions

Some participants reported that financial circumstances, academic pressures, and personal responsibilities had a tangible effect on their experience of medical education. These factors at times led to reduced concentration, fatigue, and a decline in motivation, shaping how they perceived their professional path.

One student stated:

> *"Sometimes financial problems and academic pressures make me feel unmotivated and exhausted. Even so, I know I have to push myself to keep going and maintain my motivation, and to overcome these conditions."* (**Participant 7**)

This account shows that alongside external pressures, students strive to preserve their professional identity by relying on self-discipline and a sense of purpose. Here, professional identity is seen as a dynamic process that takes shape in dialogue with personal challenges.

Another student pointed to the simultaneous demands of studying and working:

> *"When I dedicate all my time to studying and part-time work, I have little opportunity to focus on my professional development, and this reduces my motivation. Sometimes life responsibilities pull me away from my career path."* (**Participant 9**)

This experience shows that financial strain and lifestyle pressures can limit one's focus on professional growth and even give rise to doubt about the chosen path. Professional identity formation, therefore, depends not only on the quality of clinical education but also on the student's psychological stability and socioeconomic circumstances.

Personal development of students: Some participants reported that involvement in activities related to professional ethics and academic interactions with faculty had laid the groundwork for their personal and professional growth. These experiences helped students align their clinical decision-making with ethical values and a sense of human responsibility.

One student stated:

> *"Since joining the medical ethics society, I have gained a deeper understanding of ethical principles in medicine and learned to make better decisions in sensitive situations. This experience helped me better grasp my responsibility toward patients and place their well-being and rights at the center of my practice."* (**Participant 6**)

This account shows that extracurricular activities and informal educational experiences can play a meaningful role in the internalization of professional values and the development of students' ethical maturity. Such a process contributes to the formation of a professional identity grounded in social responsibility and ethical commitment. Another student noted:

> *"In academic sessions with faculty, beyond acquiring specialized knowledge, I also came to understand their professional attitudes and concerns. These opportunities helped me develop a stronger grasp of ethical values, accountability, and precision in my work, and gave me a broader perspective on my future profession."* (**Participant 8**)

This experience shows that academic interactions and the observation of faculty behavioral patterns create the conditions for transmitting professional values and cultivating a professional outlook in students, ultimately contributing to the gradual development of their professional identity.

Discussion

The present study contributes to the existing literature by offering contextually grounded insights into professional identity formation among Iranian medical students within the framework of the national general medical curriculum. The findings show that professional identity formation is the product of a complex interplay between curriculum structure, clinical learning experiences, and the cultural context of the medical education system. Unlike some educational systems with broader infrastructural resources, structural challenges, limitations of the learning environment, and cultural-organizational characteristics emerged in this study as significant factors shaping students' professional learning experiences.

The experienced curriculum, encompassing both formal instruction and informal clinical interactions, plays an important role in transmitting professional values and norms.

The hidden curriculum functions as a social mechanism for observational learning, through which students observe and internalize the professional behaviors of healthcare team members. These experiences influence students' ethical judgment, clinical decision-making, and professional outlook. However, exposure to unprofessional behaviors can carry a dual effect: on one hand, it may undermine the formation of a positive professional identity; on the other, it can create opportunities for ethical reflection and the redefinition of one's personal identity [1–4].

Professional role models, including faculty, senior students, residents, and peer educators, function as influential agents in social learning. In line with social learning theory, many professional behaviors are acquired through the observation of behavioral patterns. Positive professional role models can strengthen students' ethical commitment, clinical accountability, and professional outlook [1, 5, 6].

Accordingly, training and empowering clinical faculty as professional mentors has the potential to transform

passive observational learning into an active and transformative modeling process.

The formal curriculum also plays a meaningful role in students' professional identity development, as it prepares them to face clinical challenges through the integration of scientific knowledge and ethical education. Medical ethics instruction is particularly effective in strengthening ethical reasoning and professional accountability [7, 8]. A balanced integration of scientific and ethical content within the formal curriculum is essential for the formation of a durable professional identity.

The university's educational culture and positive faculty-student interactions in the clinical setting contribute to students' professional confidence and ethical maturity. Assessment systems that emphasize professional behaviors and are accompanied by ongoing feedback can help students identify their strengths and weaknesses and improve their performance [9, 10]. These elements operate synergistically, showing that the educational environment must simultaneously attend to its relational, instructional, and evaluative dimensions.

Structural limitations, including inadequate educational infrastructure, restricted clinical training time, poor quality of some hospital learning environments, and psychological pressures during clerkship and residency, were among the factors undermining professional identity formation. These findings align with studies reporting the risk of burnout and limited clinical learning opportunities [3, 11–15].

Active participation in clinical educational activities, such as ward rounds, morning reports, and academic discussions, was associated with an increased sense of professional belonging and clinical competence. Additionally, scientific inquiry behavior and self-directed learning played an important role in students' acceptance of their professional role and skill integration [5, 17–19].

Exposure to unprofessional behaviors, while potentially causing emotional tension in the short term, in some cases provided opportunities for ethical reflection and the redefinition of professional standards. Individual factors such as the student's living conditions, personal self-regulation, family upbringing, and cultural background form the foundation for the development of a stable 'professional self' [18]. Supportive learning environments and positive faculty-student alignment also play a meaningful role in facilitating successful professional identity formation. Furthermore, students' personal development through engagement in clinical interactions, medical ethics societies, and informal academic activities also contributes to strengthening professional identity through real-world ethical engagement [20, 22].

Although this study offers important contextually grounded insights into professional identity formation among medical students, several limitations must be considered when interpreting the findings. First, reliance on participants' self-reported experiences may increase the likelihood of recall bias and subjective interpretation of the data, affecting the objective accuracy of some findings. Second, conducting the study within the framework of a national medical curriculum in Iran limits the possibility of direct comparison with other educational systems, and caution should be exercised when generalizing the results to different educational contexts. Third, the cross-sectional design of the study does not allow for examination of longitudinal changes in professional identity formation across different stages of medical education.

Conclusion

This study shows that professional identity formation among Iranian medical students is the product of a complex interplay between the formal curriculum structure, the effects of the hidden curriculum, and the contextual factors of the clinical learning environment. Professional identity is shaped not only through structured academic and ethical education, but also through observation of professional behaviors among healthcare team members, active participation in clinical activities, and direct engagement with hospital educational culture.

The findings carry important implications for medical education policymakers. Focusing exclusively on formal curriculum content design, without attending to the quality of the clinical learning environment and the effects of the hidden curriculum, may limit the effectiveness of educational reforms.

Accordingly, the cultural management of educational settings, monitoring of professional behaviors in clinical departments, and strengthening of positive educational interactions should be regarded as integral components of medical education planning.

From a practical standpoint, given that students acquire a significant portion of their professional learning through observation of healthcare team members, particularly residents, interns, and nurses, it is recommended that a structured clinical mentorship system be designed with the involvement of trained

educators drawn from various healthcare team groups. Furthermore, in light of the influence of economic circumstances and psychological pressures on student motivation, developing welfare support programs, psychological counseling services, and measures to reduce educational stressors can contribute to strengthening students' professional growth. In addition, holding reflection sessions following clinical clerkship rotations and providing formal professionalism training for clinical educators can help mitigate the negative effects of the hidden curriculum.

Taken together, professional identity formation in medical education requires an integrated approach that simultaneously addresses formal instruction, clinical experience, educational culture, and institutional support.

Ethical considerations

This study was approved by the Iran University of Medical Sciences Ethics Committee (IR.IUMS.REC.1403.166). The research followed the guidelines and regulations stipulated in the Declaration of Helsinki. All participants provided written informed consent prior to participation. Participation was entirely voluntary.

Artificial intelligence utilization for article writing

During the preparation of this work, the authors used Sider (GPT-4.1 mini) to improve readability and language. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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Conflict of interest statement

The authors have no conflict of interest to declare.

Author contributions

ZN and KS contributed to the conceptualization of the study. All authors contributed to its design. MG, MB, and SM collected data through semi-structured interviews. ZN and MN analyzed and interpreted the data. KS, ZN, and MG wrote the initial draft of the manuscript. All authors contributed substantially to reading, editing, and revising the manuscript, and all read and approved the final version.

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Data availability statement

Data generated as part of this study, along with replication codes for all analyses, are available from the corresponding author upon reasonable request.

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