

Transition to postgraduate practice: perceptions of preparedness and experience of the daily work of junior residents

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Summary

BACKGROUND: The transition from undergraduate to postgraduate training is a crucial career step for physicians. Several international studies have shown that graduates feel insufficiently prepared to perform various aspects of clinical practice. The publication of a national framework for undergraduate medical education triggered major curricular reforms at our institution. Through this study, we explored the perceptions of preparedness for practice of junior residents who graduated from the new curriculum.

METHODS: This was a cross-sectional, triangulation mixed-methods quantitative and qualitative study among junior residents and senior physicians of 13 hospitals in western Switzerland. We administered two online questionnaires aimed at exploring perceptions in five areas of clinical competence (knowledge, clinical skills, clinical reasoning, communication and collaboration), as well in self-confidence and coping with the daily work. The qualitative part consisted of six semi-structured focus groups with junior residents, aimed at further clarifying the perceptions and circumstances of their preparedness. Verbatim transcriptions were analysed through thematic analysis.

RESULTS: Fifty-nine (43.3%) junior residents and 68 (26.5%) senior physicians completed the questionnaire. Among residents, 54.2% considered the curriculum to have adequately prepared them for practice. However, residents felt they were underperforming particularly in developing therapeutic strategies, in communicating with patients' relatives, and in writing discharge letters. 50.8% (95% confidence interval 37.5-64.1) of them felt overwhelmed by the workload and 39% felt unfulfilled at work. Perceptions of senior physicians about residents' clinical competences most often agreed with those of their young colleagues. Nineteen residents volunteered to participate in six focus groups. Thematic analysis allowed us to highlight six areas associated with perceptions of underpreparedness: (1) the adequacy of undergraduate instruction; (2) the ability to work efficiently within an interprofessional team; (3) the ability to communicate with patients and col-

leagues; (4) the effect of the curriculum on the development of critical inquiry and their approach to learning; (5) difficulties in managing their daily clinical work; (6) the negative emotions experienced at the beginning of postgraduate training.

CONCLUSIONS: Several important aspects of daily clinical practice appear to be insufficiently mastered in the first few months of residency. The resulting stress and anxiety negatively affect job satisfaction. This study provides concrete examples and guidance for program directors and educators on how to better prepare students for postgraduate training.

Keywords: preparedness for practice, junior residents, undergraduate curriculum, competences

Introduction

A key role of medical schools is to train medical students so that they are ready to practice within a postgraduate training program [1, 2]. Lately, medical schools have focused their curricula towards the acquisition of predetermined competences, with the aim of preparing physicians for postgraduate practice [3, 4]. Nevertheless, the transition from being a medical student to residency remains difficult for young physicians. Various international studies exploring young graduates' perceptions of their preparedness have shown that several aspects of clinical practice are not sufficiently addressed by current curricula [2, 5–13].

Our study follows a period of curricular reforms, triggered by the creation in 2001 of the first catalogue of study objectives, named *Swiss Catalogue of Learning Objectives (SCLO) for Undergraduate Medical Education*. The SCLO defines the level to be attained by the end of undergraduate training and the content of the new federal licensing exam (2011) [14, 15]. Under the new *Federal Act on University Medical Professions* (2007), adherence to the document also became an essential prerequisite for the accreditation of the curricula of the five Swiss medical faculties [14, 16]. The SCLO was heavily redesigned in 2008, incorporating

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the concept of competency-based medical education and the CanMEDS framework [17].

In order to meet these new standards and requirements, all Swiss medical schools have engaged in a first wave of curriculum reforms. The Lausanne School of Medicine moved from a traditional, six-year, discipline-, hospital-, and lecture-based curriculum to a more transdisciplinary, integrated and system-based curriculum. The new curriculum was aligned with the Bologna system, corresponding to a three-year bachelor's part followed by a three-year master's part [18]. A transdisciplinary committee created a new clinical skills curriculum, starting in the second year of the bachelor's, along with an immersion in the clinical environment starting in the third year of the bachelor's. In all Swiss medical schools, new teaching approaches have been introduced at various stages. These include systematic simulation-based learning sessions (role-play, mannequins, simulated patients), the inclusion of objective structured clinical examinations, and an increased number of periods of clinical immersion.

This paper presents the results of a quantitative and qualitative survey of junior residents and senior physicians from all 13 postgraduate training hospitals of the canton of Vaud (Switzerland). The paper explores the range of situations in which graduates felt less competent and assesses the reasons behind these perceptions.

At a time when Swiss medical faculties are facing a new phase of reforms, triggered by the publication in 2018 of the new national framework for undergraduate medical education ("PROFILES") [19], we deem it useful to present the experience of the Lausanne School of Medicine and to analyse the successes and failures of the previous reform phase.

Methods

Study design and participants

A cross-sectional, triangulation mixed-methods study was performed between September 2012 and April 2013. The study integrated qualitative and quantitative data to expand, cross-check and corroborate its results [20]. The data used for analysis originated from questionnaire surveys and six focus groups, performed in two convenience samples. The first sample included junior residents who graduated from the Lausanne School of Medicine under the reformed study curriculum. As evidence exists that new graduates experience performance stress, moral distress and discouragement during the initial months of their professional practice in acute care [21], we selected residents in their first 6-12 months of postgraduate training. This is a phase in which performance in the workplace still depends to a large extent on the skills and knowledge acquired during formal studies. The second sample contained senior physicians and heads of departments of the Lausanne University Hospital and the 12 regional hospitals of the canton of Vaud, where the vast majority of graduates from Lausanne begin their postgraduate training.

Quantitative data collection and analysis

A committee composed of the director of the medical school, representatives of regional hospital departments and the president of the local branch of the medical res-

idents association (l'Association Suisse des Médecin(e)s Assistants et Chef(fe)s de Clinique, section Vaud, AS-MAV), as well as a resident and a medical student, created both questionnaires. These were then tested for content validity by a committee composed of the associate dean for education, senior physicians, and a group of residents and medical students. The resulting 28-item residents' questionnaire and 26-item senior physicians' questionnaire were designed to explore four domains of competence: (1) theoretical knowledge; (2) clinical skills; (3) collaboration and relational skills; and (4) self-confidence and ability to cope with the daily work. All items were answered on a four-point Likert response scale, ranging from 1, "not at all prepared" to 4, "fully prepared". The value 0 was assigned to the answer "not applicable". Demographic data were also collected.

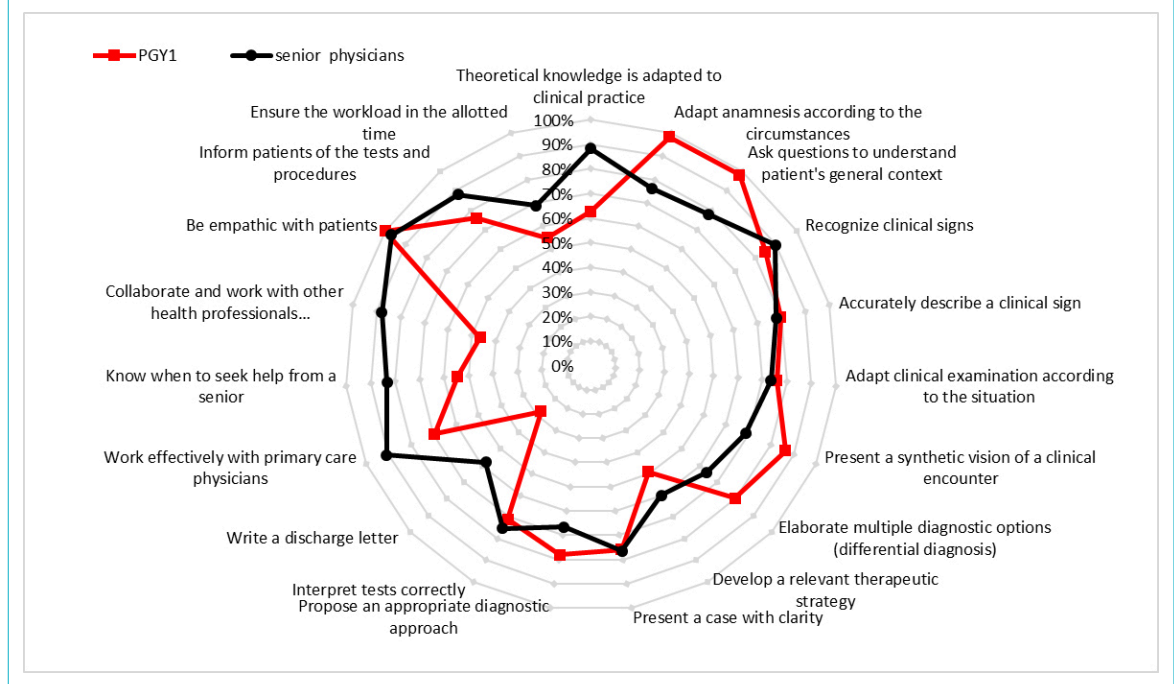
Both questionnaires were administered using the open-source statistical survey web application LimeSurvey®. The link to the questionnaires was sent to participants by e-mail. The e-mail addresses of the cohort of graduates were provided by the students' affairs bureau of the medical school. The e-mail addresses of the heads of departments, available on the corresponding hospital websites, were searched for manually. Since the data from the completed questionnaires were fully anonymous, no follow-up of nonrespondents was possible. We therefore opted for a second general reminder.

Statistical analysis of quantitative data

The data from the questionnaires were analysed using STATA 12 software (StataCorp LLC, Texas, USA). In addition to descriptive statistics, each item was adjusted for respondents' "gender" and "clinical setting" using ordinal logistic regression. Three categories of "clinical setting" were created: "internal medicine," "surgery" and "other" (including anaesthesiology, gynaecology, paediatrics, psychiatry, radiology and emergency medicine). Frequencies of positive responses to items in the two questionnaires were compared using Pearson's chi-square or Fisher's exact test.

Qualitative data collection and analysis

The qualitative part of the study was carried out through focus groups (FGs) involving first-year postgraduate residents who had graduated from our university and who agreed to participate in the study after telephone and email contact. The sessions, which lasted about 60 minutes, were audio-recorded and transcribed verbatim. Two authors (LB, MM) developed the focus group guide and ran the focus group sessions. The focus group sessions were semi-structured, with an initial open discussion about experiences during the first few months of work. Participants were invited to describe aspects of their work for which they felt prepared and those for which they felt poorly prepared. They were encouraged to share concrete situations that illustrated their perceptions. In the second, more structured part of the session, each participant received a set of cards describing the seven roles that make up the CanMEDS framework, which inspired the Swiss model of medical competences [14]. Moderators then asked participants to order the cards by level of perceived mastery of these roles and invited the participants to explain and discuss their choices. Analysis of the verbatim transcripts was

Figure 1: Comparison of residents' and senior physicians' perception of performance.

performed using a thematic analysis approach [22]. The generation of codes and identification of themes were performed independently by two authors (LB, MM). Discrepancies were discussed until a consensus was reached.

The research was exempted from approval by the local ethics committee because under Swiss law, approval is not required for studies in which non-personal health-related data are collected [23]. Participants signed a consent form and were informed that the data would be analysed anonymously.

Results

Participants

Of the 136 residents invited to complete the cohort questionnaire, 59 (43.4%) had fully completed it after one reminder. Of the 257 questionnaires sent to senior physicians, 68 (26.5%) were completed. Demographic characteristics of the respondents are summarised in table 1. Sixty-four residents were female, a percentage reflecting the male-to-female ratio among graduating students. Most

residents worked in internal medicine (49.2%) and surgical (32.2%) departments. Tables 2 and 3 and figure 1 summarise the responses by residents and senior physicians. Since respondents in the senior physicians' questionnaire assessed the performance of a group of physicians, while respondents in the residents' questionnaire evaluated their individual performance, an item-to-item comparison of the results of the two questionnaires was not possible. Therefore, to allow for comparison we converted the categorical data into binary variables. Frequencies represent the percentage of respondents who "rather or strongly agreed" or felt "rather or very well prepared" (scores 3 and 4 on the four-point Likert scales).

Six focus groups were conducted with 19 residents (7 men, 12 women) working in six different hospitals and four departments (internal medicine, surgery, rehabilitative medicine and paediatrics) between November 2012 and April 2013. Figure 2 shows the residents' perceived proficiencies in the seven CanMEDS roles. Hereafter, we integrate quantitative and qualitative findings on the six themes that emerged from thematic analysis of the transcripts.

Table 1: Demographics of first-year postgraduate (PGY1) residents and senior physicians.

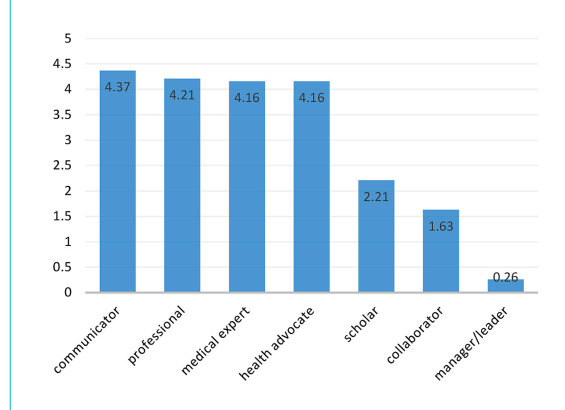
	PGY1 (n = 59)	Senior physicians (n = 68)
Male	21 (35.6%)	60 (88.2%)
Female	38 (64.4%)	8 (11.8%)
Under 25 years	2 (3.4%)	0
25–30 years	56 (94.9%)	0
31–40 years	1 (1.7%)	10 (14.7%)
41–50 years	0	24 (35.3%)
51–60 years	0	26 (38.3%)
Over 61 years	0	8 (11.8%)
Internal medicine	29 (49.2%)	23 (33.8%)
Surgery	19 (32.2%)	16 (23.5%)
Paediatrics	4 (6.8%)	7 (10.3%)
Other	7 (11.9%)*	22 (32.4%)†

* Anaesthesia: 1.7%, psychiatry: 3.4%, other: 6.78% † Anaesthesia: 11.8%; gynaecology: 4.4%; psychiatry: 4.4%; radiology: 2.9%; emergency: 2.9%; other: 5.6%

1. Adequacy of undergraduate instruction for transition to postgraduate clinical practice

Large majorities of residents considered themselves capable of accurately carrying out a medical history (98.3%), identifying clinical signs (84.7%) and dealing with ethical

Figure 2: Residents' ranking of their perceived proficiency of each CanMEDS role. Values correspond to the average score of the rankings (19 observations): 6 = best mastered role; 0 = least mastered role.



and confidentiality problems (91.5%). Senior physicians confirmed that these skills are well-mastered by junior residents (table 3, questions 3, 5, 6, 20) and that residents' knowledge base is adapted for entering postgraduate training (table 3, question 1). The focus groups corroborated these statements:

- “The theory was good, the difficulties were not felt at this level.” FG3
- “The history taking was not a problem. The same for the physical examination. With the clinical immersions, there are always things that we improve, that's clear, but generally speaking we have enough training on these things.” FG6

Regarding their ability in developing differential diagnoses, residents considered themselves more competent than their supervisors assume (fig. 1). Adjustments for gender and clinical setting do not show statistically significant differences.

Residents reported a mismatch between the subject matter taught during studies and the knowledge relevant for clinical practice:

Table 2: First-year postgraduate (PGY1) residents' assessment of their competences as “well or rather well mastered”.

	Respondents (max = 59)	PGY1 residents % (95% CI)
A. Theoretical knowledge		
1. Knowledge base is adapted to clinical practice	59	62.7 (49.1–75)
2. Knowledge is mainly theoretical and difficult to apply in practice	59	69.5 (56.1–80.8)
3. Theoretical knowledge is incomplete	57	49.1 (35.6–62.7)
B. Clinical skills		
B.1. History taking		
4. Adapt the anamnesis according to the circumstances	58	98.3 (90.8–100)
5. Ask questions to understand the patient's general context	58	98.3 (90.8–100)
B.2. Physical examination		
6. Recognise clinical signs	59	84.7 (73–92.8)
7. Accurately describe a clinical sign	59	79.7 (67.2–89)
8. Adapt the clinical examination according to the situation	58	75.9 (62.8–86.1)
B.3. Clinical reasoning		
9. Present a synthetic vision of a clinical encounter	59	86.4 (75–94)
10. Elaborate multiple diagnostic options (differential diagnosis)	59	79.7 (67.2–89)
11. Develop a relevant therapeutic strategy	59	49.2 (35.9–62.5)
12. Present a case with clarity	58	75.9 (62.8–86.1)
13. Propose an appropriate diagnostic approach	59	78 (65.3–87.7)
14. Interpret tests correctly	59	71.2 (57.9–82.2)
15. Write a discharge letter	58	27.6 (16.7–40.9)
C. Collaboration and relational skills		
16. Working effectively with primary care physicians	59	69.5 (56.1–80.8)
17. Know when to seek help from a senior	57	54.4 (40.7–67.6)
18. Collaborate with nursing staff	58	69.5 (56.1–80.8)
19. Collaborate and work with other health professionals (physiotherapy, occupational therapy, social services)	58	46.6 (33.3–60.1)
20. Discuss difficult topics with a patient, such as breaking bad news	59	74.6 (61.6–85)
21. Be empathic with patients	59	–
22. Inform patients of the tests and procedures	58	75.9 (62.8–86.1)
23. Conducting an interview with family members	58	48.3 (35–61.8)
24. Deal with ethical and confidentiality questions	59	91.5 (81.3 – 97.2)
D. Self-confidence and coping with the daily work		
25. Complete the workload in the allotted time	59	54.2 (40.8–67.3)
26. Feeling fulfilled at work	59	61 (47.4–73.5)
27. Feeling overwhelmed	59	50.8 (37.5–64.1)
28. Undergraduate training is adapted to clinical practice	59	54.2 (40.8–67.3)

Numbers in bold text indicate competencies in which <70% PGY1 residents considered themselves proficient.

- “It was a shock at the beginning of the residency, I had so many things in mind, I knew so many theoretical things, but using them: a waste of energy! Being trained to be a clinician would be good.” FG2

The ability to propose appropriate therapeutic strategies, in particular drug prescription, was described as poorly mastered (49.2% of residents, 60% of senior physicians). In this area, residents considered the teaching received as very specific but not sufficiently practice-oriented:

- “We know that there are many drugs; angiotensin-inhibitors, diuretics, beta-blockers... but concretely which one we should give?! We look stupid!” FG5

Similarly, when considering the reality of everyday clinical practice, they lamented that the undergraduate curriculum emphasises rare conditions at the expense of common diseases:

- “This is the negative point of the curriculum, the classes focus on topics that are scientifically interesting, while frequent pathologies are not sufficiently addressed.” FG1
- “We don’t master emergency and frequent situations, while those that are rare, we do!” FG1

Important skills for everyday practice, such as correct interpretation of X-rays or of ECGs, also seem to be poorly

mastered. Similarly, residents reported a lack of structured and systematic training concerning invasive procedures, with this training instead occurring opportunistically, mostly during the final-year internships:

- “We are poorly trained for things we use every day, like reading an ECG... we are bad! The first time, you’re all satisfied because you see a P wave! Or how to interpret a chest X-ray? Just what radiological examination to order...!” FG5
- “Procedures are only learned, if you have the chance to do them, during your internship [...] During your studies you otherwise don’t learn that stuff” FG3

Internships were considered a key step in training, where a learned topic finally takes on its full meaning. They were nevertheless described as too disparate in quality, too opportunistic, and too dependent on the training site or the abilities and goodwill of the designated supervisor. Residents suggested a more active involvement of the medical school in the governance of the learning objectives and in the various hospitals which provide internships. Moreover, despite being offered the opportunity to be personally in charge of patients, interns often assumed a relatively passive, “student” role.

Table 3: Senior physicians’ assessment of residents’ competences as “well or rather well mastered”.

	Respondents (max = 68)	Senior physicians % (95% CI)
A. Theoretical knowledge		
1. Knowledge base is adapted to clinical practice	68	88.2(78.1–94.8)
B. Clinical skills		
B.1. History taking		
2. Adapt the anamnesis according to the circumstances	67	76.1 (64.1–85.7)
3. Take a structured anamnesis	67	92.5 (83.4–97.5)
4. Ask questions to understand the patient’s general context	68	77.9. (66.2–87.1)
B.2. Physical examination		
5. Search for clinical signs	67	88.1 (77.8–94.7)
6. Recognise clinical signs	67	89.6 (79.7–95.7)
7. Accurately describe a clinical sign	68	77.9 (66.2–87.1)
8. Adapt the clinical examination according to the situation	68	73.5 (61.4–83.5)
B.3. Clinical reasoning		
9. Present a synthetic vision of a clinical encounter	67	68.7 (56.2–79.4)
10. Elaborate multiple diagnostic options (differential diagnosis)	67	64.2 (51.5–75.5)
11. Develop a relevant therapeutic strategy	64	60 (47.1–72)
12. Present a case with clarity	68	76.5 (64.6–85.9)
13. Propose an appropriate diagnostic approach	66	66.7 (54–77.8)
14. Interpret tests correctly	65	75.4 (63.1–85.2)
15. Write a discharge letter	62	58.1 (44.8–70.5)
16. Connect theoretical knowledge and clinical findings	68	79.4 (67.9–88.3)
C. Collaboration and relational skills		
17. Working effectively with primary care physicians	66	90.9 (81.3–96.6)
18. Do not seek help from a senior when it is needed	67	16.7 (8.6–27.9)
19. Collaborate and work with other health professionals (physiotherapy, occupational therapy, social services)	66	87.9 (77.5–94.6)
20. Be empathic with patients	67	97 (89.6–99.6)
21. Inform patients of the tests and procedures	67	88.1 (77.8–94.7)
22. Consider the global context of the patient	67	85.1 (74.3–92.6)
D. Self-confidence and coping with the daily work		
23. Complete the workload in the allotted time	67	68.7 (56.2–79.4)
24. Consider feedback from superiors	66	97 (89.5–99.6)
25. Be able to be self-critical	65	90.8 (81–96.5)
26. To have gained the trust of the service	65	96.9 (89.3–99.6)

- “There’s a lack of collaboration, I find, between the faculty and the hospitals [...] the heads of departments don’t know what you have to learn.” FG4
- “[...] actually, being an intern does not reflect the resident’s work, even if you have to take care of one or two patients, it just does not correspond. We learn a lot, it’s interesting, but there’s no pressure, no responsibility, and that makes a big difference!” FG1

All these points could explain why only 54.2% (95% confidence interval 40.8-67.3) of residents considered undergraduate training to have prepared them adequately for postgraduate practice.

2. Ability to work efficiently within an interprofessional team

According to the CanMEDS definition, “as collaborators, physicians work effectively in a health care team to provide optimal patient care”. This competence was described as seldom formally imparted during medical studies, and many participants felt underprepared in collaborating with nurses (69.5%) or with other health professionals (53.4%). They stressed how an incomplete knowledge of the roles and competences of other health professionals could lead to difficulties in collaboration:

- “We have a lot of multidisciplinary meetings here and I have no clear idea of what physiotherapists do. I have to fill out prescription forms, but I barely know what to write on them. It would be nice to have more information about other health professions, about what our colleagues do.” FG6
- “To give, on your first day, an ‘order’ to a nurse who’s been working for 40 years, I find it requires a bit of preparation!” FG3

3. Ability to communicate with patients and colleagues

In general, residents considered themselves well-prepared in this field. The teaching of communication with patients was unanimously judged as one of the strengths of our university. Simulation-based, hands-on teaching about communication in difficult situations, such as a “motivational interview” or “breaking bad news”, were deemed particularly useful. Difficulties were, however, found in concisely and coherently summarising a patient encounter to the supervisor or in writing a discharge letter (fig. 1):

- “If you have the chance to come across a good internship, yes, you learn to present a case. But we never had a single course in which we learned how to do it or to emphasise what is important or even how to write a discharge letter.” FG5

4. Effect of the curriculum on the development of critical inquiry and the approach to learning

The SCLLO states that “as scholars, physicians demonstrate a lifelong commitment to reflective learning, as well as the creation, dissemination, application and translation of medical knowledge” [14]. In this area, participants considered the undergraduate curriculum deficient in preparing them for searching and critically appraising the literature (fig. 1 and fig. 2). The mandatory master’s thesis research project was mentioned as one of the rare opportunities for the student to independently search for information and de-

velop critical thinking skills. The prevalence of classroom lectures was perceived as preventing the autonomy that students need when seeking new knowledge at postgraduate level:

- “I find that during (undergraduate) training, we are used to receiving ready-made information. It’s comfortable but when you go out, you don’t know where to get new information.” FG2
- “It would be nice if it were more dynamic between teachers and students, if there was more interaction to stimulate discussion and stimulate our critical mind.” FG6

5. Difficulties in managing daily clinical work

Residents’ difficulties in managing their workload within the allotted time were widely reported, both by senior physicians and by the residents themselves (fig. 1 and fig. 2). The program’s neglect of administrative skills despite their importance in practice reportedly leads to anxiety and frustration:

- “Managing a resident’s day, I didn’t learn it at university, it was lousy at that level.” FG1
- “We do not learn how the day-to-day hospital life works. Not only do we have to start with all our responsibilities as doctors, but we also have to learn how the hospital works, the everyday business, ‘silly’ things, paperwork. That’s a slap in the face! It all comes together at the beginning.” FG2

6. Negative emotions experienced at the beginning of postgraduate training

Half of the resident respondents reported feeling overwhelmed. The first three months of residency were described as particularly difficult and distressing. Residents reported a lack of self-confidence, which was also associated with a sense of anxiety and a fear of making mistakes. Moreover, fear and stress seem to be taboo topics of discussion in the hospital setting:

- “Honestly, the first three months were horrible! At six months, we begin to be reassured because we were not fired, we did not kill anyone, so finally it is okay! After six months, I calmed down, whereas at the beginning I finished late and I did not sleep.” FG2
- “We don’t talk openly about stress. Everyone knows that doctors are stressed. Burnout is reported in the newspapers, but nobody talks about it in the hospital. I’ve never heard anyone saying, ‘If something’s not going well, don’t hesitate to talk about it,’ and yet I think it would be great to have this opportunity.” FG4

Working in emergency wards and night shifts were described as particularly stressful and associated with anxiety. Residents become responsible for decisions they must take with little or no supervision. They felt unprepared and lacked the self-confidence for this. In the first month of residency, these negative feelings persist even at home:

- “I think, at the beginning, I have done some crap because I suddenly had this responsibility. It’s scary! As if, when you get a [‘doctor’ badge] you become capable of everything.” FG4

- *“The anguish is at night, because then you’re all alone! Dealing with responsibilities is difficult and that, during internships, we do not realise, because we are always shadowed.” FG3*

Discussion

This cross-sectional, mixed-methods study describes the perceptions of preparedness for practice of junior residents and of their supervisors after a major curriculum change. This study also illustrates the strengths and weaknesses of the curriculum and the reforms undertaken at the Lausanne School of Medicine. Our results highlight six major areas of perceived underpreparedness. Junior residents felt insufficiently prepared to manage daily clinical work, to communicate with colleagues, to work efficiently within an interprofessional team, and to engage in critical inquiry and self-directed learning. They argued that instructional approaches do not align well with the postgraduate learning environment. The first few months of work were often associated with negative emotions.

Among areas of perceived proficiency, junior residents and heads of hospital departments both mentioned the knowledge bases and basic clinical skills (history taking, clinical examination, communication with patients). Commenting on curricular choices, however, residents regretted the overemphasis on rare diseases at the expense of conditions more frequently encountered in their daily activities. This created a sense of frustration and discomfort when facing difficulties in the management of common diseases. Difficulties were also reported in important and very practical aspects of daily patient care, such as prescribing specific pharmacological treatments, interpreting electrocardiograms and radiological investigations, managing emergency situations, setting and following priorities, and working within an interprofessional team. Our findings are in line with those of a recent systematic review where junior graduates perceived skills such as prescribing, decision making, treatment planning, managing stress in the workplace, team-working, interpersonal skills and performing clinical procedures as lacking [13]. In a survey of 640 German junior physicians, Ochsmann et al. reported that 60% of them felt ill-prepared in the first two years of postgraduate training [6]. Illing et al. compared the perceptions of graduates from three UK medical schools with very different curricula and highlighted very similar areas of underpreparedness in the management of acute situations, in drug prescribing, and in workload management [24]. The difficulties highlighted in these studies, including ours, are probably not so much due to a lack of knowledge, but rather due to curricula that are unable to involve students in the application of knowledge in concrete situations [25] and to engage them in relevant “whole task” activities [26]. In a recent analysis of the curricula of 11 medical schools in the United States, Irby et al. drew up a list of the main weaknesses of current training programs, such as a lack of standardisation, flexibility and student-centeredness, a poor integration between formal knowledge and experiential learning, and inadequate attention paid to the skills required for interprofessional and team work [27]. These problems were also found at the Lausanne School of Medicine.

As highlighted in previous studies [12, 13, 28], some residents also reported difficulties in managing administrative and other nonclinical tasks that are part of residents’ daily work, a major cause of workplace dissatisfaction [29]. Although somewhat unavoidable, the reported discomfort and anxiety arising during the first months of postgraduate training are concerning. If experienced chronically, these could lead to burnout [30]. Shanafelt et al. showed how burnout is common among resident physicians and is associated with self-reported suboptimal patient care practices [31].

Strength and limitations of the study

To our knowledge, this is the first Swiss study exploring the preparedness of residents for postgraduate practice. While the number of senior physicians who responded is relatively low, the fact that nearly half of the students filled in the questionnaire despite a heavy workload means it gives a fair illustration of their opinions. Our response rate corresponds with what is usually found among physicians in online surveys [32]. In addition, the mixed-methods approach allowed us to illustrate some of the findings of the questionnaire. Lastly, by surveying first-year residents with around six months of practice experience, we selected the optimal representative population of this transition phase.

Our study has several limitations. The first is that we report on the measurement of perceptions and not of objective outcomes of preparedness, a challenge that has already been mentioned in a previous publication [33]. Another limitation is the relatively low number of senior respondents to the surveys, and the low number of residents who attended the FGs. Third, the data date from 2013, and the situation may have changed since then. However, as no major changes to the curriculum have been undertaken since 2013, we think the results are still valid. The inclusion of students graduating from the same medical school may limit the generalisability of our results. Nevertheless, generalisations can be made to all medical schools similar to Lausanne’s, including those beyond Switzerland.

Implications for medical schools

Two actions can be taken to address the weaknesses identified in our study. The first is to translate them into specific learning objectives and to ensure that the learning methods match the desired training outcomes. One of the most promising ways to describe learning objectives reflecting “real-life” clinical activities is the development of entrustable professional activities (EPAs) [34]. EPAs are easily observable tasks reflecting day-to-day clinical work that trainees are entrusted to perform without supervision when they have attained sufficient competence [34]. The EPAs provide guidance both on teaching and on evaluation methods. The new Swiss framework for undergraduate medical education (PROFILES) [19], edited in 2018, provides a set of nine EPAs. This framework also emphasises clinical and personal competences such as self-assurance and autonomy in dealing with common clinical circumstances and lists a series of situations encompassing the most frequent health care needs of patients. The publication of PROFILES triggered new collaborations between Swiss medical schools, one of which recently led to the publication of a joint document on measures to be imple-

mented in order to comply with the new training objectives [35].

The second action is to incorporate the desired training objectives into a programmatic assessment [36]. This should encompass frequent and comprehensive formative assessments, including of those aspects for which residents feel less prepared. As all health care institutions receiving medical students will have to adopt the concept of EPAs and the corresponding assessment methods, it will be necessary to develop a systematic faculty development program for clinical teachers.

Even if these measures are properly implemented, it is difficult to predict to what extent it is possible to mitigate the "transition shock" (as described by Duchscher [21]) and to better prepare medical graduates to assume their responsibilities in the clinical ward. Indeed, besides curricular aspects, preparedness requires confidence and the ability to adapt to future work [37–39], and depends on internal factors, attributable to the trainee's personality or behaviors, as well as on external factors such as the support received, the workplace organisation and the workplace culture [21]. Finally, but of paramount importance, the successful implementation of these curricular changes will require the development of an effective academic governance to ensure that all these steps and decisions are taken, implemented and monitored [40].

Conclusion

A small majority of junior residents consider medical school to have prepared them adequately for entering postgraduate training. We highlighted underpreparedness in six critical areas of practice, which limits residents' autonomy and self-confidence in dealing with their daily clinical practice. The first months of residency are associated with anxiety and fear of making mistakes. By highlighting areas of underperformance, their underlying reasons and their potential repercussions, our study can inform medical schools and program directors about specific actions which can be taken in order to better prepare students and to facilitate their transition to postgraduate practice. Although no formal recommendations can be drawn from this study, it will provide a basis for comparison with larger studies on the impact of the new framework.

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