BMJ Open

Clinical placements of medical students during a rapid scale-up of health professional education: a qualitative study

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2024-090682.R1
Article Type:	Original research
Date Submitted by the Author:	13-Mar-2025
Complete List of Authors:	Dejene, Daniel; Groningen University Department of Health Sciences, Medical Center ; Jhpiego Ethiopia, Health workforce improvement program Ayalew, Firew; Jhpiego Ethiopia Yigzaw, Tegbar; Jhpiego, an affiliate of Johns Hopkins University, Ethiopia country office, Health Workforce Improvement Program Mengistu, Samuel; Ethiopian Medical Association Aderaw, Zewdie; St. Paul Hospital Millennium Medical College, School of Public Health Moges, Nurilign; Amhara Public Health Institute, Public Health Stekelenburg, Jelle; University Medical Centre Groningen; , Department of Health Sciences, Global Health, Versluis, Marco; University Medical Center Groningen, Department of Health Sciences, Global Health
Primary Subject Heading:	Medical education and training
Secondary Subject Heading:	General practice / Family practice
Keywords:	Clinical Reasoning, MEDICAL EDUCATION & TRAINING, Ethiopia

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

Title: Clinical placements of medical students during a rapid scale-up of health professional education: a qualitative study

Daniel Dejene* (MD, MPH, FMER): Ph.D. student at University Medical Center, Groningen Deputy Chief of Party, Jhpiego Ethiopia P.O. Box 2881, code 1250, Addis Ababa, Ethiopia. Emails: d.j.birhanu@umcg.nl or Daniel.Dejene@jhpiego.org Phone: +251911308713

Firew Ayalew (MSc, Ph.D.), Senior research advisor, Jhpiego-Ethiopia. P.O. Box 2881, code 1250, Addis Ababa, Ethiopia. Email: Firew.Ayalew@jhpiego.org

Tegbar Yigzaw (MD, Ph.D., MPH, FMER), Chief of Party, Jhpiego-Ethiopia P.O. Box 2881, code 1250, Addis Ababa, Ethiopia. Email: Tegbar.Yigzaw@jhpiego.org

Samuel Mengistu (MD, MPH), Project Manager, Ethiopian Medical Association, P.O. Box Addis Ababa, Ethiopia. Email: samuel@ethiopianmedicalass.org

Zewdie Aderaw (MPH, Ph.D.), St. Paul Hospital Millennium Medical College, School of Public Health, Addis Ababa, Ethiopia. P.O. Box 1035/106. Email: zewdie1984@gmail.com

Nurilign Abebe (MPH, Ph.D.), Senior Public Health Researcher, Amhara Public Health Institute, Bahr Dar, Ethiopia. P.O. Box nure113@gmail.com or nurilign_abebe@dmu.edu.et

Jelle Stekelenburg (MD, Ph.D.) Department of Health Sciences, Global Health, University Medical Centre Groningen; P.O. Box196. 9700 AD Groningen, The Netherlands. Email: j.stekelenburg@umcg.nl

Marco Versluis (MD, PhD) Department of Health Sciences, Global Health, University Medical Centre Groningen; P.O. Box 196. 9700 AD Groningen, The Netherlands Email: m.a.c.versluis@umcg.nl

Abstract:

Objectives: In response to a critical shortage of skilled workforce, Ethiopia has scaled up its health professional education (HPE) by increasing the number of training institutions and student enrolment capacity. However, strong evidence that shows how the HPE scale-up affected clinical placements is lacking. This study investigated the challenges and effects of the rapid HPE scale-up in clinical placements, and the adjustments made in response to the challenges.

Design: A qualitative study using focus group discussions (FGDs) and constructivist grounded theory was conducted in July – August 2022.

Setting: The teaching hospitals of six medical schools in Ethiopia.

Participants: 53 purposefully selected participants (25 clinician-teachers and 28 intern students).

Measures: Adequacy of skilled clinicians, student preparedness, and learning environment were input measures. Quality of supervision, assessment, feedback, and practice exposure are process measures. Clinical competence was an outcome measure.

Results: We identified six themes: 1) class size and student motivation, 2) availability of skilled and motivated clinician-teachers, 3) learning environment and practice management, 4) Clinical supervision and assessment, 5) extent of exposure, and 6) clinical competence. The HPE upscaling caused student overcrowding, resource shortages, and unconducive learning environments. Concerns were reported on clinical supervision, assessment, feedback, role modeling, and program management. Clinician-teachers and students had low levels of motivation. Competitions for practice diminished learning collaboration. In response to the challenges, adjustments were made to strengthen clinical rotations, engage teaching methods, and hire more clinician-teachers.

Conclusion: The rapid HPE scale-up affected clinical placements, reducing student authentic practice and skill development. There is a need to optimize student enrolment, train clinicians as teachers, and improve clinical learning resources. Interprofessional education can optimize student practice. Placement coordination facilitates supervision. Student practice should be expanded to primary healthcare settings.

Keywords: *Clinical placement, health professional education, training scale-up, Ethiopia*

Strengths and limitations of the study

- This study showed the status of clinical placement of medical students in Ethiopia from the context, input, process, and outcome aspects of a training program.
- In addition, exploring the views of students and clinicians-teachers from multiple schools of various characteristics (public, private, graduate-entry, and direct-entry), and teaching hospitals enabled us to provide a comprehensive picture of clinical placements in the country.
- The FGD guide was developed based on the national guideline for student clinical practice and in consultation with the HPE experts, making the study contextually relevant, and ensuring the findings' confirmability and replication.
- While the FGD participants were selected purposefully, maximum care was taken to reduce selection bias. |It is still possible that selection bias may be present. Therefore, caution must be taken when extrapolating the findings of this study to other healthcare settings or health training schools.
- In this study, residents, health facility staff, patients, and regulators were not part of the FGD participants who could otherwise have given additional perspectives.

Introduction

The global shortage of skilled health professionals has been a major constraint in achieving health development goals, including universal health coverage.[1] Despite an increment in health workforce supply, the shortage is estimated to double and reach about 15 million in 2030.[2] Resource-limited countries have been severely affected by the shortage, carrying nearly three-quarters of the global burden of disease while having an average physician density of 10 times lower compared to the high-income countries.[3, 4] The human resource crisis is threatening health equity at a local and global scale. For instance, the capacity of health systems to respond to the COVID-19 pandemic was challenged by physician shortages. And the shortage reciprocally exacerbated the pandemic.[5] Addressing this crisis, therefore; requires an upscaling of health professional education (HPE) capacity.[6]

The gradual piecemeal HPE expansions have not fulfilled the workforce demands in several resource-limited countries Therefore, a rapid scale-up in health workforce training capacity has been emphasized since 2000, leading to a manifold rise in the number of schools and student enrolments.[7] Ethiopia increased the number of medical schools from 5 in 2005 to 43 in 2022.[8] The existing medical schools enrolled 3 - 4 times more new students.[9] The annual graduation outputs have increased tenfold, reaching 1,500 – 1,600. The increased graduation capacity has contributed to the health system's strategic goal of increasing physicians from 5,624 in 2016 to 28,121 in 2025. [10, 11] The HPE expansion prioritized general practitioners (GPs) among other midlevel professionals to improve access to primary healthcare.

Effective clinical placement improves the outcomes of the HPE.[12] During placement programs, students have hands-on and authentic exposure to real patients.[13] Firsthand lessons of being a physician will be learned through applying medical knowledge, developing patient management capabilities, and professional identities.[14] In Ethiopia, the medical education curriculum is provided in 6 academic years, including one year of internship. Starting from the third academic year, medical students undertake clinical placement in referral hospitals under the supervision of specialists and general practitioners. The primary healthcare settings, however, are not optimally used. During the HPE expansion, student practices in clinical sites are likely compromised, affecting students' opportunity to see various patient problems. Undesirable effects of the HPE expansion in placement quality and student competence were reported in other contexts.[15, 16]

There is a dearth of evidence showing the impact of the rapid HPE scale-up on clinician-educators, students, learning environment, training process, adequacy of exposure, and learning outcomes. A better understanding of the impact can inform actions toward the quality of clinical placements and guide the health system's preparations to train large classes in HPE. Therefore, this study aimed to investigate the challenges and effects of the rapid HPE scale-up on clinical placements, and adjustments made in response to the challenges,

Methods

Study design

We applied a constructivist grounded theory methodology to investigate the impact of the rapid HPE expansion in Ethiopia which has been happening since 2005 on student clinical placement.[17]Using this methodology, we collected and analyzed data in iterative processes in which each step informed our actions of the data collection and analysis in the next steps. Explicitly based on theories from the previous steps, this method helped us generate rich and new data in a flexible manner consistent with the local reality. We looked into training inputs (clinician-teachers, students, and learning resources), processes (student supervision, assessment, feedback, and placement management), and output (competence). We used qualitative data from focus group discussions (FGDs) with graduating medical students and clinician-teachers.

Study setting

We purposefully selected the teaching hospitals of 6 schools from those of 43 medical schools, considering the feasibility issues: namely, Debre Tabor University (DTU), Addis Ababa University (AAU), Hawassa University (HU), Dilla University (DU), Adama Hospital Medical College (AHMC), and Adama General Hospital Medical College (AGHMD). We used criteria to select the schools such as establishment ages, geographic locations in the country, ownership types, and student entry schemes. The selection process ensured that various types, representatives of all medical schools in the country, were considered. In Ethiopia, medical schools implement nationally harmonized competence-based curricula. Of the teaching hospitals affiliated with the six schools, four were comprehensive specialized (tertiary care centers), and one was a general hospital (secondary care center). AGHMC did not own a teaching hospital. Students at AGHMC used the facilities and learning materials of AHMC during clinical placement. Both hospital types

had large catchment populations of 3.5 – 5 million and 1 -1.5 million; respectively.[18] The hospitals also served as clinical placement sites for residents and other health science students.

Study participants

Our study had a focused aim which evolved during the data collection and analysis processes, requiring purposefully selected, knowledgeable, and experienced FGD participants. A theoretical sampling approach was used in recruiting study participants in an iteration fashion where analysis of the first-round data will determine who to recruit next. In consultation with the deans of the medical schools, we selected the medical graduates and clinician-teachers for the earlier FDG rounds. Undergraduate medical students who completed their internship and are expected to graduate in 2022 and experienced clinician-teachers who had time and willingness were selected. Based on the codes and theories from the preliminary data analysis, we selected additional FGD participants for the subsequent FGD rounds. participate. Guided by the concept of information power, we got theoretical saturation and had a total sample of 53 FGD participants.[19]

Data collection

In collaboration with the Ministry of Health (MOH), Ethiopian Medical Association (EMA), and medical schools, we developed a semi-structured FGD guide based on the national clinical practice guideline that ensured the confirmability of the study findings.[20] The FGD guide focused on the challenges and effects caused by the HPE scale-up on clinician-teachers, students, learning environment, supervision, assessment, feedback, practice exposure, and clinical competence. It also focused on the adjustments made to address the challenges. Two experts from the National Medical Education Committee reviewed the FGD guide. Four data collectors (DD, FA, NA, ZA) who were not staff of the six schools were recruited and trained on data collection procedures and tools, data quality assurance, and ethical principles. The data collectors invited six participants from each school to each of the FGD sessions. We conducted separate FGDs for students and clinician-teachers. Students who completed the internship and clinician-teachers with at least 2 years of relevant work experience were included as they could provide valid and comprehensive assessments of clinical placement. Having interest and time to participate were also the inclusion criteria. Those clinician-teachers with less than 2 years of experience, and those who were not full-time and had no interest were excluded. Medical students who did not complete their internship and had no interest were also excluded. The data collectors explained the study objectives and

obtained informed consent from the FGD participants. Two data collectors (moderator and notetaker) facilitated each in-person FGD session by arranging the setting, introducing the sessions, asking questions, giving probes, encouraging participation, recording discussions, taking field notes, and summarizing sessions. Instructions and group norms were provided at the beginning to address concerns. To ensure confidentiality and conceal the identities of FGD participants, we de-identified the FGD data starting from the data collection period. The data was collected in Amharic, a local language to facilitate the free flow of ideas during the FGDs. To avoid distractions, the FGDs were held in quiet and private rooms. Data collectors used digital voice recorders and field notes. The study investigators supervised the data collection process. The data collection was conducted in July and August 2022.

Data analysis

The de-identified FGDs were transcribed verbatim in Amharic and translated back into English to suit the data for analysis software. We applied interpretive translation to translate the transcripts. Maximum care was taken to preserve the meaning of words, sentences, meanings, and cultural contexts during the translation process. Field notes were included in the transcripts. Transcription and translation were conducted on the same day to avoid the loss of details. We (DD, FA, ZA, and NA) did familiarize ourselves with the data by re-reading the transcripts and re-listening the audio files. The translations were imported into NVIVO v 12 (QSR International). To the best of our abilities, we could not get rigorous clinical placement studies in Ethiopia. Hence, an inductive thematic analysis was used to identify themes that allowed a better understanding of the data and flexibility during data analysis. [21] Open coding was used where the data was broken into individual excerpts and continuously compared with other FGD participants' excerpts. Similar and related excerpts were then grouped into codes which helped us to triangulate the data and check data credibility and dependability. A codebook with research questions, codes, and code summaries was created. We ran queries to explore relationships and patterns of themes, sentiments, and cases. [22] Multiple codes were compared and the related ones were grouped into 6 categories (code summaries) through axial coding. Grounded theory memos were composed throughout the process by reflecting on our analytical thoughts.

Ethical approval

Ethical approval was obtained from the Ethiopian Public Health Association institutional review board (IRB). We also obtained ethical approval from the Johns Hopkins Bloomberg School of Public Health institutional review board with IRB number 21116. The MOH provided permission letters to conduct the study. We also communicated with medical schools to facilitate data collection. Data collectors met with deans and department heads of the target institutions to explain the purpose of the study and data collection processes. Data collectors obtained written consent from each study participant before commencing data collection. Data on study participants' names and other personal identifiers were not collected. The datasets were stored in a password-protected secure place.

Patient and public involvement:

No patients or members of the public were involved in the research design, analysis, and dissemination of the findings of this study. Deans, clinician-teachers, and other experts of the HPE schools, MOH, and EMA were engaged while interpreting and utilizing the study findings.

Results

A total of nine FGDs were conducted with 53 study participants. Of these, five were held with 28 students (29% female), with a mean age of 25.3 years. About 4 – 6 students participated in each of the FGDs. The rest of the four FGDs were held with 25 clinician-teachers (12 % female), with a mean age of 31.8 years. About 5 - 8 clinician-teachers participated in each FGD. Clinician-teachers had an average work experience of 5.5 years. (Table 1)

Table 1: Background characteristics of study participants

Background characteristics	Clinician-teachers	Students
University		
AAU	-	6 (21%)
HU	6 (24%)	6 (21%)
DU	5 (20%)	6 (21%)
DTU	6 (32%)	4 (15%)
AHMC and AGHMC	8 (24%)	6 (21%)
Sex		
Male (%)	22 (88%)	20 (71%)
Female (%)	3 (12%)	8 (29%)
Mean age (age range) in years	31.8 (28 - 50)	25.3 (24 - 37)
Mean work experience of educators in years	5.5	-
Specialty of clinician-teachers		
Surgery	7 (28%)	-
Pediatrics	2 (8%)	-

Internal medicine	5 (20%)	-
Gyn/Ob	2 (8%)	-
General practitioner	2 (8%)	-
Other	7 (28%)	-
Student	-	28
Total	**25**	**28**

We identified six themes showing the challenges and effects of the rapid HPE upscaling on the inputs, processes, and outcomes aspects of student clinical placement, and the congruent adjustments made. The themes included: 1) class size and student motivation, 2) availability of skilled and motivated clinician-teachers, 3) learning environment and practice management in the clinical settings, 4) clinical supervision, 5) extent of practice exposure, and 6) clinical competence.

Theme 1: Class size and student motivation to learn

The first theme described the impact of rapid HPE upscaling on the class size, and the motivation of students to learn. In this regard, students and clinician-teachers emphasized that the upscaling caused student overcrowding at the teaching hospitals, leading to shortages of physical spaces, medical equipment, and supplies. Clinician-teachers were also challenged to follow up with a large number of students. Competition for practice among students was also reported.

> It is not easy to teach due to the number of students in the wards and clinics. Clinics are too narrow to accommodate students. [A 45 – 47-year female clinician-teacher].

> Given there are few clinical procedures with limited BP apparatus, gloves, etc. … students even residents compete for practice opportunities. [A 26 – 28-year male student]

Students and clinician-teachers also claimed that student motivation was affected by shortages of materials, low follow-up from clinician=teachers, high level of competition, and unpleasant relationships with hospital staff. In addition, the lack of jobs and low pay for young physicians were mentioned as demotivating factors.

> … Decreased follow-up from seniors and the shortages of materials have affected my motivation. [A 24 – 26-year female student]

> Our students are getting bored …. witnessing the life of physicians who find it difficult to pay house rent and raise their children with the current salaries. [A 35 – 37-year male clinician-teacher]

Theme 2: availability of skilled and motivated clinician-teachers

The second theme focused on the availability of skilled and motivated clinician-teachers to supervise numerous enrolled students. Students and clinician-teachers claimed that all schools supported and sponsored clinician-teachers' training in various specialty fields to respond to the increased placement needs during the HPE upscaling. As a result, more specialist doctors were trained, hired, and deployed to multiple clinical units in the teaching hospitals

> …. Our students are lucky compared to how we trained in the past. For us, only a few seniors were available in major clinical areas. [A 43 – 45-year male clinician-teacher].
>
> In most schools, the number of specialists and subspecialists has increased. This is a great asset for us. [A 25 – 27-year male student]

However, the students and clinician-teachers claimed that the clinician-teachers had gaps in teaching skills. Despite their experiences in medical care, they were not well-trained in pedagogy. As a result, clinician-teachers had limitations in guiding student practice. The student practice was not always tailored to the curricular goals.

> Being relatively inexperienced in teaching, the pedagogical aspect of the clinician-teachers is not good. [A 24 – 26-year male student].
>
> … medical science is a wide field. Students should have been told what to focus on. Sometimes, students practice beyond their scope. [A 45 – 50-year female clinician-teacher].

In addition, the students and clinician-teachers had concerns about staff motivation and their overall performance due to the high work demands, challenges in the work environment, low salaries, and limited incentives.

> There is an imbalance between the workload and what is paid … We are not using our full potential to teach students. [A 44 – 46-year male clinician-teacher]
>
> …there were issues with the punctuality and commitment of seniors. Some even send residents on their behalf, and some don't come prepared. [A 35 - 37-year male student].

Theme 3: learning environment and practice management

This theme described the impact of HPE upscaling on the psychological readiness of students, the conduciveness of the hospital environment for learning, clinical task assignments, and program management related to planning, monitoring, and addressing placement challenges. In this regard, the work relationships of the students with clinician-teachers and other staff were not usually smooth. Students were not always emotionally supported.

> It is usually stressful and frightening for me. Some staff are harsh. We failed to learn humility, patience, and a caring attitude from the seniors. [A 25- 27-year male student].
>
> Due to the class size and busy schedule, we do not give our full attention to the students. [A 34 – 37-year clinician-teacher}

Students mentioned that too many tasks were assigned to the students during the internship period. Some tasks were not well defined. Some tasks were unrelated to the core competencies. There were no specific job descriptions for medical interns, leading to role conflicts with those of nurses and other staff. However, this claim was not supported by the clinician-teachers.

> The significant parts of my assignment as an intern were just the roles of nurses and even porters. It consumes my time and energy. [A 24 – 26-year female student].
>
> Although it is too much work, clinical tasks during placement sessions are important for student development. [A 47 – 49-year clinician-teacher]

The students and clinician-teachers claimed that the clinician-teachers did not always supervise students. And there were also occasions when seniors mismanaged students. In addition, the students were concerned that clinician-teachers were not monitored and held accountable for their absence and student mismanagement. On similar notes, clinician-teachers acknowledged suboptimal academic management at the hospitals.

> … seniors are feared as 'God'. …They miss sessions in many instances. They can give a 'C' or 'D' grade, you couldn't even ask why. This is an inherited culture..." [A 35 – 37-year student.

> The problems in clinical placement should have attracted the attention of school management. …sessions are missed. [A year 38 – 40-year male clinician-teacher].

Theme 4: Clinical supervision

This theme described the impact of the rapid HPE expansion on placement strategies, teaching-learning methods, performance assessments, and feedback. In this regard, the students and clinician-teachers commended the existing clinical rotations, attachment units, bedside teachings, morning sessions, duty assignments, and other teaching methods that helped the schools to accommodate the large classes. However, there were challenges in supervising students closely and monitoring the clinical practice due to the large class sizes.

> There are attachments in most clinical areas. … Good to have teaching rounds, bedside sessions, morning sessions, duty practice, and case-based discussions. [A 30 - 32-year male student].

> Their number even makes it difficult to control who is attending a session. [A 45 – 47-year female pediatrician].

In addition, objective structured clinical examination (OSCE) and logbooks were introduced to build on the existing long-case, short-case, and oral examinations. However, the clinician-teachers and students claimed that the schools failed to use the OSCE and logbooks consistently. The students in particular had negative views about the assessments and feedback. Large classes and low assessment skills of clinician-teachers were underlying issues. In addition, clinician-teachers and students believed that timely, specific, and constructive feedback was not frequently provided.

> Very sadly, assessment is full of bias, and subjectivity, and focuses on superficial things. For example, grading can be based on personal relationships and obedience to unrelated orders. [A 23 – 25-year male student].

> Students should have been continuously assessed, mentored, and given feedback. …more is required in this regard. [A 39 – 41-year male clinician-teacher.

Theme 5: Extent of practice exposure

This theme denoted the impact of upscaling on authentic and hands-on practice exposure to various patient problems. In this regard, those students and clinician-teachers practicing in hospitals with

no residency training and limited student groups had positive views about the extent of practice exposure. Given the hospitals are referral sites with a high catchment population, there were high caseloads and many case varieties that enabled the teaching hospitals to accommodate many students.

> There are a lot of cases in this hospital. We are exposed to a variety of cases. We even see rare health conditions. [A 30 – 32-year male student].

> … hospitals have high catchment areas. A lot of patients were referred to from different corners of the country. It is an opportunity for our students [A 38 – 40-year male clinician-teacher]

However, students and clinician-teachers working in tertiary hospitals where residents and many student groups attached claimed they had no adequate practice opportunities, mainly to learn surgical and procedural skills. Opportunities to see and manage common infectious diseases were also limited. Student overcrowding, competition for practice with other groups, and limited capacity of clinical units were reported as causes.

> Not enough hands-on practice in clinical procedures and surgical cases. We only assisted residents." [A 25 – 27-year female student].

> Due to the lack of proper training in critical procedures like lumbar puncture, chest tube insertion, Oro-tracheal intubation, manual vacuum aspiration … [A 45 – 48-year clinician teacher]

Theme 6: Clinical competence

This theme described how well the students were prepared for independent clinical practice in terms of medical knowledge, skills, and attitude. The students and clinician-teachers generally had a positive outlook on students' competence in conducting basic clinical jobs: history taking, physical examination, interpreting investigations, and managing patient problems.

> I don't think the graduating medical students will have difficulty treating patients. [A 45 – 47-year male clinician-teacher].

However, students from some medical schools did not concur with this claim since they were attached to tertiary hospitals where complicated cases were mostly managed. Medical students had limited opportunities to practice common health problems: TB, malaria, and diarrheal diseases.

> There is a gap in our medical knowledge of common infectious diseases. We are usually trained and assessed on complicated cases like diabetes mellitus, cancer, stroke, congested heart failure … [A 24 – 26-year male student]

> To ensure quality training, there are efforts to expand placement sites to health centers, and primary hospitals… it was not fully successful due to logistical challenges

Concerns about procedural skills to conduct minor surgeries, obstetrics tasks, medical procedures, and other cases were consistently reported due to the shortage of authentic practice, guidance, and manuals.

> Some students even struggle to insert IV cannulations, let alone do chest tube insertion, lumbar puncture, and manual vacuum aspiration. [A 24 – 26-year female student].

In addition, issues were reported in students' communication and collaboration skills. As a result, communication and collaboration with patients, fellow students, clinician-teaches, and other health workers were not up to expectations.

> Communication of students with faculty was dominated by fear and uncertainty. Work relationships with nurses, midwives, and other health workers were not usually positive. [A 38 – 40-year female pediatrician]

Discussion

With the critical health workforce shortage in several resource-limited countries, expanding the capacity of HPE is necessary though it is challenging. Noteworthy to mention its effectiveness depends on the attention paid to the training quality.[23] We described and summarized the challenges and effects in clinical placements resulting from the rapid expansion of undergraduate medical education and the adjustments made by the schools in six themes: students, clinician-teachers, learning environment and practice management, clinical supervision, practice exposure, and clinical competence. Our study can inform the HPE policies and actions in three ways. Firstly,

it can guide the planning, preparations, and responses to the HPE scale-up efforts. Secondly, it provides additional perspectives on curricular design, implementation, and evaluation amidst training expansion. Lastly, it expands the knowledge base on how upscaling affects HPE quality.

The undergraduate medical education programs are expected to produce competent general practitioners (GPs) who provide unspecialized medical care mainly in primary care settings. Quality clinical placement is a vital element of the medical curriculum for developing essential competence.[24] In this study, we found out that the rapid HPE scale-up affected the quality of clinical placements due to inadequate school preparations.[25, 26] Shortages of learning resources, overcrowding of clinical sites, and unsuitable clinical environments were evident, diminishing authentic practice and subsequent skills development among students.[27 – 29] Though adept supervisors are critical for achieving student learning outcomes,[30 - 32] the teaching skills of clinician-teachers were inadequate. Supervisory support to students from clinicians such as role-modeling, skill assessments, and feedback provision were also compromised which were otherwise vital in aligning clinical placement with the curricular goals.[33 - 35] On the contrary, it is well documented that supervised patient encounters are necessary for students to get relevant, adequate, and authentic exposure.[36] In addition, the clinical placements were too much situated in the tertiary referral hospitals whilst the primary care settings and general hospitals were the main deployment sites of GPs, igniting a question: did the clinical placements have an optimal alignment with the GPs' future roles? [37] Expanding the placement sites to primary care settings may enable students to practice common health problems and infectious diseases adequately. The number of primary healthcare settings in the country was also a missed opportunity for bettering student practice amidst a greater placement demand.

A high level of motivation in a complex learning environment determines the commitment of educators and students toward educational goals. It stimulates the cognitive learning process and performance among students and clinicians.[38] In our study, the clinician-teachers had no optimal motivation level[26] due to the high workload, inadequate compensation, unsuitable learning environments, and concerns in academic management. [39, 40] The clinician-teachers were not very good at punctuality, teamwork, and communication which might be due to their low level of motivation, negating soft skill development among the students. [41, 42] Similar challenges could also lower the motivation of students. With such prevalent motivational issues, we can't stop

asking questions about how committed clinician-teachers were to do rigorous student coaching, assessment, and role modeling responsibilities. How well did students study the course materials? In addition, the overcrowding in placement sites could also usher unhelpful student competitions for hands-on practice and even with residents, affecting their motivation, psychological safety, collaboration, and skills learning.[43] The residents might have coached the undergraduate students, had there been better program coordination. To that end, improving performance management, clinical environment, job assignment, and incentive packages requires attention.

The implication of the rapid HPE scale-up on the feature landscape of practice

To ensure access to essential health services, Ethiopia has expanded primary hospitals in rural and remote communities that require many qualified general practitioners (GPs), among other midlevel professionals. The HPE scale-up has created the opportunity to deploy more GPs to rural areas, addressing the physician shortages and maldistribution. [44, 45] However, the graduating medical students had deficiencies in essential skills, particularly in surgical, procedural, communication, and collaboration skills, and lacked the required level of motivation.[46, 47] Unless the new-to-be doctors were prepared well with the essential skills and motivation, having more GPs would have a limited impact on the quality of medical care, patient safety, and population health. Therefore, schools should strengthen interprofessional education to improve students' collaboration, team building, and communication skills. [48, 49] Strengthening interprofessional education during placement programs can optimize the use of learning resources and experienced faculty. There is also a need to design prudent decisions in staff deployment, development, and clinical rotation.

Strengths and weaknesses:

Our study assessed quality of clinical placement from contexts, inputs, processes, and outcomes aspects of a training program. Exploring the views of medical students and clinicians-teachers from multiple medical schools, and teaching hospitals of various characteristics (public, private, graduate-entry, and direct-entry) enabled us to generate comprehensive findings. However, residents, health facility staff, patients, and regulators were not engaged in our study. These people could have otherwise given additional perspectives. The FGD guide was developed based on the national clinical practice guideline and in consultation with the HPE experts, making this research more contextually relevant. The tool development process also helped us to ensure the result confirmability and replication. While the FGD participants were selected purposefully, maximum

care was taken to reduce selection bias. It is still possible that selection bias may be present. Therefore, caution must be taken when extrapolating the findings of this study to other healthcare settings or teaching schools.

Conclusion

The rapid scale-up in HPE capacity challenged student clinical placements in various aspects. It affected the motivation of clinician-teachers and students. It reduced authentic practice exposure to students, affecting clinical skill development. There is a need to optimize student enrolment considering placement capacity, train clinicians as teachers, and improve clinical learning resources. Strengthening interprofessional education can optimize resource use and student learning during placement programs. Placement coordination and scheduling can reduce competition, and facilitate clinical supervision, assessment, and monitoring. The placement needs to expand to primary healthcare settings. Research studies are required to assess the impact on other aspects of student competence and the economic implications of the training scale-up.

References:

1. GBD 2019 Human Resources for Health Collaborators. Measuring the availability of human resources for health and its relationship to universal health coverage for 204 countries and territories from 1990 to 2019: a systematic analysis for the global burden of disease study 2019. Lancet 2022; 399 (10341): 2129–2154. https://doi.org/10.1016/S0140-6736(22)00532-3
2. Liu, JX, Goryakin Y, Maeda A, Bruckner T, Scheffler R. Global health workforce labor market projections for 2030. Human Resources for Health 2017; 15 (11): https://doi.org/10.1186/s12960-017-0187-2.
3. Boniol M, Kunjumen T, Nair TS, Siyam A, Campbell J, Diallo K. The global health workforce stock and distribution in 2020 and 2030: a threat to equity and 'universal' health coverage? BMJ Global Health 2022;7: e009316. https://doi:10.1136/bmjgh-2022-009316
4. World Health Organization. World health statistics 2022: Monitoring health for the SDGs, Sustainable development goals. Geneva: World Health Organization 2022. https://www.who.int/data/gho/publications/world-health-statistics
5. Shryock T. How COVID-19 exacerbates the physician shortage. Medical Economic Journal 2022; 99(3).
6. World Health Organization, Transforming and scaling up health professionals' education and training. World Health Organization (WHO) guidelines 2013.
7. Rigby PG, Gururaja RP. World medical schools: The sum also rises. JRSM 2017; 8(6). doi:10.1177/2054270417698631
8. Ministry of Education (MOE) and Education and Training Authority (ETA), Lists of universities and colleges with medical and other health science programs in Ethiopia, 2022 (unpublished databases)

9. Derbew M, Animut N, Talib ZM, Mehtsun S, Hamburger EK. Ethiopian medical schools' rapid scale-up to support the government's goal of universal coverage. Academic medicine. 2014;89(8 Suppl):S40-4. https://doi:10.1097/ACM.0000000000000326
10. Ministry of Health. The national human resources for health strategic plan for Ethiopia 2016 – 2025. September 2016. https://pdf.usaid.gov/pdf_docs/PA00TWMW.pdf
11. BZY Consult and DAB DRT. Status of health workforce education, training, management and regulation capacity in Ethiopia. Health Workforce Improvement Program (HWIP). Baseline assessment final report. 2021 (unpublished report)
12. Johnson P, Fogarty L, Fullorton I, et al. An integrative review and evidence-based conceptual model of the essential components of pre-service education. Human Resources for Health 2013: 11 (42). https://doi.org/10.1186/1478-4491-11-42
13. Ramani S, Leinster S: AMEE guide No. 34: teaching in the clinical environment. Med Teach 2008; 30 (4):347–364. https://doi:10.1080/01421590802061613
14. Dornan T, Conn R, Monaghan H, et al. (2019). Experience-based learning (ExBL): clinical teaching for the twenty-first century. Med Teach 2019; 41(10): 1098-1105. https://doi.org/10.1080/0142159X.2019.1630730
15. Dos Santos RA, Nunes MPT. Medical education in Brazil. Medical Teacher 2019; 41 (10) doi:10.1080/0142159X.2019.1636955
16. Kraakevik JA, Beck Dallaghan GL, Byerley JS, Monrad SU, Davis JA, et al. Managing expansions in medical students' clinical placements caused by curricular transformation: Perspectives from four medical schools. *Medical Education Online 2021; 26 (1)*. https://doi.org/10.1080/10872981.2020.1857322
17. Charmaz K. Constructing grounded theory: A practical guide through qualitative analysis. London: Sage Publications 2006.
18. Ministry of Health, Ethiopia standards ES3618:2012. Comprehensive specialized hospital requirement. 2015 http://www.forsslund.org/StandardHealthFaclitiy/Specialized%20Hospita.pdf
19. Malterud K, Siersma VD, Guassora AD. Sample size in qualitative interview studies: Guided by information power. Qual Health Res 2016;26(13):1753-1760. https://doi:10.1177/1049732315617444
20. Ministry of Health, clinical practice guideline for medical and health science students 2018
21. Kiger ME, Varpio L. Thematic analysis of qualitative data: AMEE Guide No. 131, Medical Teacher 2020; 42 (8): 846-854. DOI: 10.1080/0142159X.2020.1755030.
22. Allsop DB, Chelladurai JM, Kimball ER, et al. Qualitative methods with Nvivo software: A practical guide for analyzing qualitative Data. Psych 2022; 4 (2):142–159. https://doi.org/10.3390/psych4020013
23. Frank J, Chen L, Bhutta ZA, Cohen J, Crisp N, et al. Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. The Lancet 2010; 376 (9756):1923–1958. https://doi:10.1016/S0140-6736(10)61854-5
24. AlHaqw AI, Taha WS. Promoting excellence in teaching and learning in clinical education. Journal of Taibah University Medical Sciences 2015;10(1):97-101 http://dx.doi.org/10.1016/j.jtumed.2015.02.005
25. Safarani S, Ravaghi H, Raeissi P, Maleki M. Challenges and opportunities faced by teaching hospitals in the perception of stakeholders and hospital system managers. Education in Medicine Journal. 2018;10(4):9–21. https://doi.org/10.21315/eimj2018.10.4.2

26. Assefa T,Haile Mariam D, Mekonnen W, et al. Health system's response for physician workforce shortages and the upcoming crisis in Ethiopia: a grounded theory research. Human Resources for Health2017; 15:86. https://DOI:10.1186/s12960-017-0257-5
27. Gonzaga W, Drateru KC. Challenges of clinical teaching in developing countries. Journal of Healthcare and Advanced Nursing. 2023;1:1
28. Morgan C, Teshome M, Crocker-Buque T, et al. Medical education in difficult circumstances: analysis of the experiences of clinical medical students following the new innovative curriculum in Aksum rural Ethiopia. BMC Med Education 2018:18:119
29. Kelly CM, Vins H, Spicer JO, Mengistu BS, Wilson DR, Derbew M, et al. The rapid scale-up of medical education in Ethiopia: Medical student experiences and the role of e-learning at Addis Ababa University. PLoS ONE.2019;5(49):e0221989. https://doi:10.1371/journal.pone.0221989
30. Rayatdoost E, Jahromi RR, Ayalbar A et al. Factors affecting the quality of clinical education from the perspective of medical students. Int J Med Invest. 2022;11 (1); 142-153
31. Thomson JS, Anderson K, Haesler E, Barnard A, Glasgow N. The learner's perspective in GP teaching practices with multi-level learners: a qualitative study. BMC Medical Education 2014, 14:55 http://www.biomedcentral.com/1472-6920/14/55
32. Moswela1 B, Mphale LM. Barriers to clinical supervision practices in Botswana Schools. Journal of Education and Training Studies. 2015 3 (6) doi:10.11114/jets.v3i6.1054
33. Dolmans D, Wolfhagen I, Essed, G, et al. The Impacts of Supervision, Patient Mix, and Numbers of Students on the Effectiveness of Clinical Rotations, Acad. Med. 2002;77:332–335.
34. Lauterjung ML, Ehlers E, Guntinas-Lichius O. PJplus - a project improving practical training during the final year of medical education. Education in Health care. 2021, 164: 70 -78 https://doi.org/10.1016/j.zefq.2021.05.009
35. Burgess A, van Diggele C , Roberts C. et al. Key tips for teaching in the clinical setting. BMC Med Educ **20**20(Suppl 2); 20 (463). https://doi.org/10.1186/s12909-020-02283-2
36. Thyness C, Steinsbekk A, Andersson V, Grimstad H. What aspects of supervised patient encounters affect students' perception of having an excellent learning outcome? A survey among European medical students. Advances in Medical Education and Practices. 2023; 14:475–485. https://doi.org/10.2147/AMEP.S391531
37. Widyanda D, Majoor G, Scherpbier A. Preclinical students' experiences in early clerkships after skills training partly offered in primary health care centers: a qualitative study from Indonesia. BMC Medical Education. 12, 35 (2012) https://doi.org/10.1186/1472-6920-12-35
38. Pelaccia T, Viau R. Motivation in medical education. Medical Teacher 2017; 39 (2):, 136-140. DOI: 10.1080/0142159X.2016.1248924
39. Muthaura PN, Khamis T, Ahmed M, Hussain SY. Perceptions of the preparedness of medical graduates for internship responsibilities in district hospitals in Kenya: a qualitative study. BMC Medical Education (2015) 15:178. https://doi:10.1186/s12909-015-0463-6
40. Mennin S. Ten Global Challenges in Medical Education: Wicked Issues and Options for Action. Medical science educator. 2021; 31 (supplement 1):s17-s20. https://doi.org/10.1007/s40670-021-01404-w
41. Sarikhani, Y., Shojaei, P., Rafiee, M. *et al.* Analyzing the interaction of main components of the hidden curriculum in medical education using interpretive structural modeling method. *BMC Med Educ* **20**, 176 (2020). https://doi.org/10.1186/s12909-020-02094-5

42. Ahmady S, Minouei MS. Explanation of medical students' experiences of educational clinical supervision: A qualitative study. Journal of Education and Health Promotion 2021;10. https://DOI:10.4103/jehp.jehp_620_20
43. Snell L. The Resident-as-Teacher: It's More Than Just About Student Learning. J Grad Med Educ. 2011 Sep;3(3):440-1. https://doi:10.4300/JGME-D-11-00148.1
44. Haileamlak A. How Can Ethiopia Mitigate the Health Workforce Gap to Meet Universal Health Coverage? Ethiop J Health Sci. 2018 May;28(3):249-250. doi: 10.4314/ejhs.v28i3.1. PMID: 29983523; PMCID: PMC6016355.
45. Kapanda, G.E., Muiruri, C., Kulanga, A.T. et al. Enhancing future acceptance of rural placement in Tanzania through peripheral hospital rotations for medical students. BMC Med Educ 16, 51 (2016). https://doi.org/10.1186/s12909-016-0582-8
46. Dejene, D., Ayalew, F., Yigzaw, T. *et al.* Assessment of clinical competence of graduating medical students and associated factors in Ethiopia. *BMC Med Educ* **24**, 17 (2024). https://doi.org/10.1186/s12909-023-04939-1
47. Dejene, D., Yigzaw, T., Mengistu, S. *et al.* Practice analysis of junior doctors in Ethiopia: consequences for strengthening medical education, practice and regulation. *glob health res policy* **3**, 31 (2018). https://doi.org/10.1186/s41256-018-0086-7
48. Stalmeijer RE, Varpio L. The wolf you feed: Challenging intraprofessional workplace-based education norms. Med Educ. 2021 Aug;55(8):894-902. doi: 10.1111/medu.14520. Epub 2021 Apr 10. PMID: 33651450; PMCID: PMC8359828.
49. Hodson N. Landscapes of practice in medical education. *Medical Education*. 2020;54(6):504-509. doi:10.1111/medu.14061

Patient consent for publication: Not applicable

Provenance and peer review Not commissioned; externally peer-reviewed.

Funding source: Jhpiego-Ethiopia, under its Health Workforce Improvement Program, received a donation from USAID, contract/agreement number 72066320CA00008, which provided the financial resources for the study.

Data availability statement: With reasonable request, we can share relevant data on which the analysis, results, and conclusions reported in the study are based.

Author contributions in order:

Daniel Dejene (DD) contributed to the conceptualization, protocol development, study planning, data collection and statistical analysis, results interpretation, write-up, and manuscript

development. **DD** is responsible for the overall content as a guarantor**. Firew Ayalew (FA)** contributed to the protocol development, data collection, and analysis, result interpretation, and manuscript development. **Tegbar Yigzaw (TY)** contributed to the study conceptualization, protocol development, result interpretation, and manuscript review. **Samuel Mengistu (SM)** contributed to the study planning, data collection, and manuscript review. **Zewdie Aderaw (ZA**) contributed to the data collection& analysis and manuscript review. **Nurlign Abebe (NA)** contributed to the data collection, analysis, and manuscript review. **Jelle Stekelenburg (JS)** contributed to protocol development, result interpretation, and manuscript review. **Marco Versluis (MV)** contributed to protocol development, result interpretation, and manuscript review.

Competing interest declaration:

We, the authors, declare no competing interests existed while conducting this study. This study was conducted independently, and the funder did not influence the study outcomes**.**

Focus Group Discussion (FGD) guide for students and clinician-teachers

I. Introductory section for FDG

Welcome and thank you for volunteering to take part in this FGD.
My name is ---------- I am working on this research conducted by Jhpiego-Ethiopia as a data collector/ assessor. I want to ask you some questions and will be invited to participate in this FGD session. Before the questions, I will provide you with full information about this study so that you can decide whether or not to take part in the data collection process using a consent form.
This study is a part of a big research project that has intended to assess the clinical competence of graduating medical students and associated factors in Ethiopia. The objective of this qualitative arm of the research is to assess the impact of medical education expansion on the quality of clinical placements for medical students. You have been asked to participate as your point of view is important. I realize you are busy and I appreciate your time. The focus group discussion will take no more than two hours.

II. Ground rules

- Only one person speaks at a time. There may be a temptation to jump in when someone is talking but please wait until they have finished.
- There are no right or wrong answers.
- You do not have to speak in any particular order.
- When you do have something to say, please do so.
- You do not have to agree with the views of other people in the group**.**
- I'm now going to ask you some questions that I would like you to answer to the best of your ability. If you do not know the answer, please say so.
- Does anyone have any questions? (answers). OK, let's begin

(Note to FGD discussant: You may need to probe to gather the information you need).

III. General information

S. №	Interview type	Response/description
1	Region	
2	Type/ownership of medical schools (public or private)	
3	Location of the FGD	
4	Type of FGD participants (clinician-teachers or students)	
5	Code of discussant	
6	The date of discussion held	

7	Starting time	
8	Ending time	
9	General observations/comments e.g., discussion cut, short, noisy environment, etc.	

IV. FGD Participants' background characteristics

Code of participants	Address (school /hospital)	Age	Sex	job	Professional background	Work experience related to undergraduate medical education	Remark for any additional and relevant
01							
02							
03							
04							
05							
06							
07							
08							

V. Main FGD Questions

Warm-up question
First, I'd like everyone to introduce themselves. Can you tell us your name and experiences
Guiding questions

1. What do you say about the level of clinical competence of graduating medical students?
   [Probes: which essential competencies do they fail to master? Why? give concrete examples]
2. Describe how the training expansion impacted the quality and sufficiency of clinical placement of medical students.
   [Probes: clinical exposure of students, clinical teaching skills of faculty and preceptors, feedback given to students, clinical skills evaluation]
3. What factors facilitated the development of clinical competencies by medical students? **(probes:** number of students, clinical learning environment, variety of clinical settings, clinician-teachers, teaching strategies, residents and hospital staff)
4. What major challenges have affected the attainment of clinical competencies by medical students?
   [Probes: student number and readiness, preceptor number and motivation, patient number and variety, clinical learning environment, supporting staff, medical supplies]
5. Which interventions and responses were taken to address the challenges and strengthen clinical placement?
6. Is there anything else you would like to add?

Concluding question:
Of all the things we've discussed today, what would you say are the most important issues you would like to express about the clinical placement of medical graduates?

Wrap-up
Thank you for participating. This has been a very successful discussion. Your opinions will be a valuable asset to the study. We hope you have found the discussion interesting. If there is anything you are unhappy with or wish to complain about, please contact the local PI or speak to me later. I would like to remind you that any comments featured in this report will be anonymous. Before you leave, please hand in your completed personal details questionnaire. Please, write your report based on the results of the focus group. Please remember to maintain the confidentiality of the participating individuals by not disclosing their names.

SRQR Reporting checklist for qualitative study.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below. SRQR reporting guidelines: O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. Acad Med. 2014;89(9):1245-1251.

		Reporting Item	Page Number
Title			
	#1	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g. ethnography, grounded theory) or data collection methods (e.g. interview, focus group) is recommended	Title 1
Abstract			
	#2	Summary of the key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results and conclusions	Abstract 2
Introduction			
Problem formulation	#3	Description and signifcance of the problem / phenomenon studied: review of relevant theory and empirical work; problem statement	Introduction, Paragraphs 1-3 3 - 4
Purpose or research question	#4	Purpose of the study and specific objectives or questions	Introduction Para 4 4
Methods			
Qualitative approach and research paradigm	#5	Qualitative approach (e.g. ethnography, grounded theory, case study, phenomenolgy, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g. postpositivist, constructivist / interpretivist) is also recommended; rationale. The rationale should briefly discuss the justification for choosing that theory, approach, method or technique rather than other options available; the assumptions and limitations implicit in those choices and how those choices influence study conclusions and transferability. As appropriate the rationale for several items might be discussed together.	Introduction – Para 4 Methods – Para 1 4
Researcher characteristics and reflexivity	#6	Researchers' characteristics that may influence the research, including personal attributes, qualifications / experience, relationship with participants, assumptions and / or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results and / or transferability	Methods: Reflexivity Para 1 5
Context	#7	Setting / site and salient contextual factors; rationale	Methods: setting and site selection 5
Sampling strategy	#8	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g. sampling saturation); rationale	Methods: Participants 5
Ethical issues pertaining to human subjects	#9	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	Ethics – Back Material page & journal system + Methods: Data collection 6
Data collection methods	#10	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources / methods, and modification of procedures in response to evolving study findings; rationale	Methods: Data Collection Para 1-3 5
Data collection	#11	Description of instruments (e.g. interview guides,	Methods: Data 5

instruments and technologies		questionnaires) and devices (e.g. audio recorders) used for data collection; if / how the instruments(s) changed over the course of the study	collection. Para 2	5
Units of study	#12	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	Results: Paragraph 1 and Table 1	5
Data processing	#13	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymisation / deidentification of excerpts	Methods: Analysis Paragraph 1	5-6
Data analysis	#14	Process by which inferences, themes, etc. were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale	Methods: Analysis Paragraph 2	5-6
Techniques to enhance trustworthiness	#15	Techniques to enhance trustworthiness and credibility of data analysis (e.g. member checking, audit trail, triangulation); rationale	Methods: Analysis Paragraph 1-2	5-6
Results/findings				
Syntheses and interpretation	#16	Main findings (e.g. interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	Results. Paragraph 2-4 + results	7-11
Links to empirical data	#17	Evidence (e.g. quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Results	7-11
Discussion				
Intergration with prior work, implications, transferability and contribution(s) to the field	#18	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application / generalizability; identification of unique contributions(s) to scholarship in a discipline or field	Discussion	12-13
Limitations	#19	Trustworthiness and limitations of findings	Discussion: Strengths and Limitations	13
Other				
Conflicts of interest	#20	Potential sources of influence of perceived influence on study conduct and conclusions; how these were managed	Back materials	18
Funding	#21	Sources of funding and other support; role of funders in data collection, interpretation and reporting	Back materials	18

None The SRQR checklist is distributed with permission of Wolters Kluwer © 2014 by the Association of American Medical Colleges. This checklist can be completed online using https://www.goodreports.org/, a tool made by the EQUATOR Network in collaboration with Penelope.ai