Assessment of core teaching competency of health professional educators in Ethiopia: an institution-based cross-sectional study

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ABSTRACT

Objectives Understanding the competency of educators is key to informing faculty development, recruitment and performance monitoring. This study aimed to assess the core teaching competency of nursing, midwifery and biomedical educators, and associated factors in Ethiopia.

Design An institution-based cross-sectional study was conducted in January 2020 using structured tools adapted from the WHO’s nurse and midwifery educator competency frameworks.

Setting Two health science colleges and nine student practice sites in Ethiopia.

Participants All classroom instructors and clinical preceptors of nursing, midwifery and biomedical technician training programmes, and all the graduating class students.

Measures Overall teaching competency scores, teaching domain competency scores, competency gaps and performance gaps of educators were outcome measures. Past training on teaching skills courses, teaching experiences and sociodemographic characteristics of educators were associated factors.

Results Most educators were not trained in teaching methods (82%). The teaching competency scores of classroom instructors and clinical preceptors were 61.1% and 52.5%, respectively. Competency gaps were found in using active learning methods, performance assessment, feedback and digital learning. Professional background of classroom instructors had a significant and strong association with their competency score (p=0.004; V=0.507). Age and teaching experience of clinical preceptors had significant associations with their competency score (p=0.023 and p=0.007, respectively) and had strong associations (V=0.280 and 0.323, respectively). Sex of students and their perceptions of how well the educators give education resources had a significant and strong association (p<0.001; V=0.429).

Conclusions Nursing, midwifery and biomedical educators lacked the competency to undertake important teaching roles, which could contribute to the low quality of education. More attention should be given to strengthening faculty development.

INTRODUCTION

A stronger health workforce is a vital determinant for improving population health outcomes. The world is currently facing health workforce shortages as the result of challenges in health professional education among others.1,2 Globally, 18 million more health professionals are needed by 2030, mainly in developing countries, to achieve universal health coverage (UHC)1; and 9 million more nurses and midwives are required to reach sustainable development goal (SDG) 3 on health.1 Biomedical engineering professionals are required to a great extent to optimise the development and use of medical equipment.7,3 Substantial health workforce investments are, therefore, required to achieve UHC and SDG health targets.

Ethiopia has suffered from a critical shortage of competent nurses, midwives and biomedical technicians.1 The 2018 national health workforce density was a total of 10 doctors, nurses and midwives per 10,000 populations, which was far below the WHO’s
threshold of 45 for achieving the UHC. Few biomedical engineering professionals were available in 2017 (0.002 per 10,000 populations). The shortage of health professionals affected the access to quality healthcare and contributed to undesirable health outcomes.

To address the shortages, the WHO recommended countries rapidly scale up and transform health professional education. Hence, Ethiopia expanded preservice education (PSE) leading to the burgeoning of the graduation capacity. In addition to the 46 universities, Ethiopia opened 23 public regional colleges, 45 private institutions and 4 biomedical training institutions using technical–vocational education and training (TVET) system, which enabled the country to produce the majority of nurses, midwives and biomedical technicians. As a result, Ethiopia was able to address the sharp rise in human resources for health needs that occurred as a result of the primary healthcare expansion in the last two to three decades.

However, education quality received less attention. Scaling up of the education has further deteriorated quality since there were no congruent commitment and resources to support the expansion. In reality, the massive expansion in the face of the shortages of faculty exacerbated Ethiopia’s quality concerns. The country needs a lot of work to ensure that graduates are competent. Qualified educators who mastered teaching competencies for effective facilitation of classroom sessions and student clinical practice, developing learning materials, assessing student learning and providing support to students are critical. Effective educators should have adequate professional, communication, leadership and research skills. In addition, large student size, epidemiological transition, advancing medical knowledge and technology have required educators to improve their teaching. However, the teaching competency among health professional educators in Ethiopia is not well studied. Understanding the competency of educators guides faculty development and other quality enhancement interventions. Such evidence expands the global knowledge and informs health professional education practices in other countries having similar challenges. This study aimed to assess core teaching competency and associated factors of nursing, midwifery and biomedical educators in Ethiopia.

**METHODS**

**Study design and participants**

We conducted an institution-based quantitative cross-sectional study in January 2020 to serve as a baseline survey for the faculty development project (FDP). Our study questions focused on core teaching competency levels and gaps among the educators, and the associated factors. The FDP aimed to improve the teaching and learning process of vocational nursing and midwifery programmes at Nekemte Health Science College (NHSC), and the biomedical training programme at Addis Ababa Tegebareid Polytechnic College (AATPTC). NHSC, located in western Ethiopia of Nekemte city, was providing vocational nursing, midwifery, health extension and other midlevel health professional training. AATPTC, found in Addis Ababa city administration, was providing vocational biomedical technician training and others. The colleges worked with 14 student practice sites. Based on convenience, we selected five hospitals, two health centres and two biomedical equipment workshops. The biomedical equipment workshops were workplaces for biomedical technicians and engineers where varieties of medical equipment were stored, tested, calibrated and maintained. There were a total of 154 educators for the nursing, midwifery and biomedical technician programmes and 125 graduating class students. Of the educators, there were 57 classroom instructors and 97 clinical preceptors. We used a census sampling technique to include all classroom instructors, clinical preceptors and graduating students. Classroom instructors were teaching staff hired by and work in the colleges to teach and support students. Health workers hired by health facilities or medical equipment workshops to provide patient care or medical equipment services were regarded as clinical preceptors. We decided to include graduating class students as they had adequate exposure and experience enough to make valid judgements on the performance of the educators. We obtained lists of the classroom instructors, clinical preceptors and graduating students from the deans’ and registrars’ offices. The educators and students who were present at work during the data collection period, willing and able to participate in the study were included as study participants. To evaluate the effectiveness of the FDP, an end-line assessment was planned to be conducted at the end of the project using the same methods and data collection tools.

**Data collection**

We adapted the WHO midwifery and nurse educator competency frameworks to develop three structured data collection tools. Since we were interested in assessing teaching competencies only, but not the profession-specific competencies, we used the same data collection tools across the three academic programmes. The first tool (with 63 variables) was a self-administered questionnaire aimed at exploring the perceptions of classroom instructors on their capabilities to implement specific teaching tasks related to six competency domains, namely: facilitating theoretical learning using engaging methods in classrooms; supporting student clinical practice through applying effective practical training methods; using student assessment methods; developing teaching and learning materials; providing guidance, counselling and gender-related support to students; and providing education management and leadership functions. The second tool (with 45 variables) was a self-administered questionnaire for assessing the perceptions of clinical preceptors on four competency domains. The three competency domains of clinical teaching, student assessment and student support are similar to those of the classroom instructors. The fourth domain is about the
Data management and analysis

Electronic data were collected using the REDCap application that was used for checking completeness, consistency of responses and cleaning data. We then exported the data to SPSS V.25. We conducted data analysis by computing proportions, means, SDs and other descriptive statistics. Aggregate scores were calculated as necessary. To assess the competency scores, average composite scores were calculated using weighted averages for each competency domain. Total composite scores were similarly calculated to determine overall competency scores. To calculate the proportion of educators with skills gaps, we combined the responses of all educators who rated themselves as not capable, novice and advanced beginners, and considered them incompetent. Similarly, we considered responses from all students who rated most, and all of their educators apply the teaching skills as well performing while calculating the proportion of performing educators. Pearson’s $X^2$ test with p values was computed to assess the significance of associations among the variables. Cramer’s $V$ coefficients ($V$) were calculated to assess the strength of associations. We considered the values of $V$ less than 0.100, in the range of 0.100–0.250, and greater than 0.250 weak, medium and strong associations, respectively.20 As per the policy of the Ministry of Education (MOE) of Ethiopia, any level IV TVET educator needs to have university education with a minimum of a bachelor’s degree.19 The MOE also set a 60% passing mark to allow educators to graduate with a bachelor’s degree.21 Hence, we adopted the MOE 60% competency score as a cut-off point in our study to classify the educators as ‘competent’ or ‘not competent’.21 22

Patient and public involvement

No patients or members of the public were involved in the research design, analysis and dissemination of the findings. Deans and educators of the health colleges, and experts from the Ministry of Health, the Regional Health Bureau, professional associations and implementing partners were involved in the interpretation and utilisation of the findings.
RESULTS
Background characteristics of study participants
A total of 147 educators and 112 students participated in the study with response rates of 95% and 90%, respectively. The mean age of the educators was 32 years with a range of 19–54 years. More than half of the educators were below 30 years of age (54%). Nearly half of them were female (48%) and had less than 5 years of teaching experience (45%). The mean period of the educators’ work experience was 7 years. The majority of them were not trained in teaching skills courses in the last 2 years (82%; table 1).

The graduating students were mostly health extension workers by department (70%), in the age group of 20–22 years (64%) and female by sex (80%; online supplemental material 1).

Teaching competency score of the educators
The overall average composite competency scores of classroom instructors and clinical preceptors were 61.1% and 52.5%, respectively. The classroom instructors had less than 60.0% scores in two competency domains, namely: developing and using education materials (55.4%) and providing management and leadership functions (58.4%). However, clinical preceptors scored less than 60.0% in all four competency domains (tables 2 and 3).

Teaching competency gaps of the educators
More than two-thirds of classroom instructors perceived that they had gaps in developing and using student performance assessments: portfolios, log books, objective structured clinical/practical examinations (OSCEs/OSPEs) and digital learning solutions. More than three-quarters of clinical preceptors perceived that they had gaps in developing and using student performance assessments, active learning methods (case study, role-play, discussion and group assignment) and providing constructive feedback (table 4).

Factors associated with the competency score of educators
The professional background of classroom instructors had a significant and strong association with their competency scores (p=0.004; V=0.507). The age of clinical preceptors had a significant and strong association with their competency scores (p=0.023; V=0.280). The teaching experience of clinical preceptors had also a significant and strong association with their competency scores (p=0.007; V=0.323). In addition, the sex of the clinical preceptors had a significant and medium strength association with their competency scores (p=0.019; V=0.240) (table 5).

Table 2  Mean teaching competency scores of classroom instructors in Ethiopia, January 2020 (N=51)

| Competency domain                          | Number of items | Average composite score |
|--------------------------------------------|----------------|-------------------------|
|                                            |                | NHSC Mean (SD) | AATPTC Mean (SD) | All colleges Mean (SD) |
| Facilitate theoretical learning in the classroom | 12             | 67.9 (14.4) | 51.3 (13.0) | 63.7 (15.8) |
| Facilitate student clinical practicum       | 7              | 73.0 (14.4) | 61.9 (17.0) | 70.2 (15.9) |
| Conduct student assessment and evaluation   | 18             | 67.5 (14.8) | 55.6 (13.1) | 64.4 (15.2) |
| Develop and use education materials/resources | 10             | 57.3 (13.1) | 49.9 (12.7) | 55.4 (13.3) |
| Provide student support functions           | 3              | 63.5 (7.9)  | 51.8 (14.7) | 60.5 (17.7) |
| Provide management and leadership functions  | 3              | 61.9 (18.1) | 48.2 (12.2) | 58.4 (17.7) |
| Overall average composite competency score  |                | 65.2 (13.2) | 53.1 (12.4) | 61.1 (13.9) |

AATPTC, Addis Ababa Tegbared Polytechnic College; NHSC, Nekemte Health Science College.

Table 3  Mean teaching competency scores of clinical preceptors in Ethiopia, January 2020 (N=96)

| Competency domain                              | Number of items | Average composite score |
|------------------------------------------------|----------------|-------------------------|
|                                                |                | NHSC Mean (SD) | AATPTC Mean (SD) | All colleges Mean (SD) |
| Clinical teaching skills                        | 10             | 52.3 (20.9) | 57.0 (18.7) | 52.7 (20.7) |
| Student assessment and evaluation               | 15             | 47.5 (18.0) | 45.0 (14.6) | 47.2 (17.8) |
| Student support functions                       | 4              | 51.4 (21.3) | 53.8 (20.3) | 51.5 (21.3) |
| Infection prevention and patient safety         | 5              | 58.7 (24.4) | 59.5 (22.9) | 58.7 (24.2) |
| Overall average composite competency score      |                | 52.4 (19.8) | 53.8 (17.9) | 52.5 (19.6) |

AATPTC, addis ababa tegbared polytechnic college; NHSC, nekemte health science college.
Students’ perception of the application of teaching skills by their educators

Significant proportions of graduating students perceived that most of their educators did not consistently use digital learning solutions (81%), create a conducive learning environment (50%), provide counselling and psychosocial support (50%), use a variety of student assessment methods (49%) and apply active learning methods (43%) (online supplemental material 2).

Factors associated with students' perceptions of the application of teaching skills by educators

The sex of students had a significant and strong association with their perceptions of how well the educators provide appropriate education materials (p<0.001; V=0.429). In addition, the sex of students had a significant and medium strength association with their perception of how well their educators respect them as adult learners (p=0.031; V=0.204), orientate them (p=0.022; V=0.217) and ensure a conducive learning environment (p=0.035; V=0.199) (online supplemental material 3).

DISCUSSION

In almost every country in the world, there are health workforce shortages, skill mix imbalances and uneven geographical distributions, leaving millions without access to healthcare. A need to scale up PSE has intensified to train more health professionals and transform training quality. Being 1 of the 57 countries with severe health workforce crisis, Ethiopia scaled up health professional education. However, it was challenged to uphold the PSE quality. Other low/middle-income countries (LMICs) faced similar challenges due to a shortage of qualified educators and other factors while addressing the workforce challenges.

In this study, we found out that the educators felt competent in essential teaching tasks, but not in all relevant ones. We identified competency gaps among the educators in using active learning methods, performance assessments, digital learning solutions, gender-responsive pedagogy and performance-based feedback. The findings were not surprising as health profession education in Ethiopia was not well developed as a career. The educators lacked formal teachers’ education opportunities. Health professionals were recruited for the complex tasks without demanding skills and experiences in teaching. Faculty recruitment focused mainly on the academic achievements of new graduates. Similar faculty recruitment and development challenges were reported in many LMICs. On the contrary, educators in a developed country are required to have teaching qualifications and experiences before deployments. One contributing factor to the suboptimal teaching competency was the limited faculty development opportunities in Ethiopia. Meanwhile, faculty development on a wide range of educational activities is recommended.

| Teaching competency of classroom instructors | % of not competent (N=51) | Teaching competency of clinical preceptors | % of not competent (N=96) |
|---------------------------------------------|--------------------------|------------------------------------------|--------------------------|
| Skill area                                  |                          | Skill area                                |                          |
| Develop and use portfolio                   | 82.4                     | Administer the short and long examinations | 93.8                     |
| Use of digital solutions for learning       | 80.4                     | Administer global rating                  | 90.6                     |
| Develop and use of log book                 | 72.5                     | Use portfolio                             | 82.3                     |
| Develop and administer OSCE/OSPE            | 72.5                     | Develop and use a log book                | 81.3                     |
| Conduct education programme evaluation      | 72.5                     | Use 360-degree evaluation                 | 81.3                     |
| Create a conducive learning environment     | 70.6                     | Support unsuccessful students             | 79.2                     |
| Develop and use course syllabi             | 70.6                     | Provide constructive feedback             | 78.1                     |
| Support educational QA processes           | 70.6                     | Use discussion and group assignment       | 78.1                     |
| Provide student support functions          | 68.6                     | Create a conducive learning environment    | 76.0                     |
| Provide gender support to female students   | 66.7                     | Develop and use a case study              | 76.0                     |
| Create and use role-play                   |                          |                                          | 76.0                     |

OSCE/OSPE, objective structured clinical/practical examination; QA, quality assurance.
## Table 5  Factors associated with competency scores of classroom instructors (above) and clinical preceptors (below) in Ethiopia, January 2020

| Background characteristics | Teaching competency score (N=51) | Pearson's $\chi^2$ | Strength of association (Crammer V coefficient) |
|----------------------------|----------------------------------|--------------------|-----------------------------------------------|
| **Instructors**            |                                  |                    |                                               |
| Age in years               |                                  |                    |                                               |
| <30                        | 12 (54.5)                        | 17 (58.6)          | 0.528                                         | 0.158                                        |
| 30–39                      | 8 (36.4)                         | 7 (24.2)           |                                               |                                              |
| >39                        | 2 (9.1)                          | 5 (17.2)           |                                               |                                              |
| Sex                        |                                  |                    |                                               |
| Male                       | 17 (77.3)                        | 24 (82.8)          | 0.625                                         | 0.068                                        |
| Female                     | 5 (22.7)                         | 5 (17.2)           |                                               |                                              |
| Professional background    |                                  |                    |                                               |
| Nurse                      | 9 (40.9)                         | 5 (17.2)           | **0.004***                                    | 0.507                                        |
| Midwife                    | 0                                | 1 (3.5)            |                                               |                                              |
| Biomedical technician      | 9 (40.9)                         | 4 (13.8)           |                                               |                                              |
| Others                     | 4 (18.2)                         | 19 (65.5)          |                                               |                                              |
| Level of education         |                                  |                    |                                               |
| TVET level                 | 1 (4.5)                          | 2 (6.9)            | 0.907                                         | 0.062                                        |
| BSc degree                 | 19 (86.4)                        | 25 (86.2)          |                                               |                                              |
| MSc degree and above       | 2 (9.1)                          | 2 (6.9)            |                                               |                                              |
| Teaching experience in years|                                  |                    |                                               |
| <5                         | 16 (72.7)                        | 18 (62.1)          | 0.518                                         | 0.161                                        |
| 5–10                       | 1 (4.6)                          | 4 (13.8)           |                                               |                                              |
| >10                        | 5 (22.7)                         | 7 (24.1)           |                                               |                                              |
| Trained in teaching skills courses in the past 2 years | | | | |
| Yes                        | 8 (36.4)                         | 6 (20.7)           | 0.214                                         | 0.174                                        |
| No                         | 14 (63.6)                        | 23 (79.3)          |                                               |                                              |
| **Preceptors (N=96)**      |                                  |                    |                                               |
| Age in years               |                                  |                    |                                               |
| <30                        | 29 (43.3)                        | 21 (72.4)          | **0.023***                                    | 0.280                                        |
| 30–39                      | 27 (40.3)                        | 7 (24.1)           |                                               |                                              |
| >39                        | 11 (16.4)                        | 1 (3.5)            |                                               |                                              |
| Sex                        |                                  |                    |                                               |
| Male                       | 20 (29.8)                        | 16 (55.2)          | **0.019***                                    | 0.240                                        |
| Female                     | 47 (70.2)                        | 13 (44.8)          |                                               |                                              |
| Professional background    |                                  |                    |                                               |
| Nurse                      | 45 (67.1)                        | 17 (56.6)          | 0.715                                         | 0.084                                        |
| Midwife                    | 17 (25.4)                        | 9 (31.0)           |                                               |                                              |
| Biomedical technician      | 5 (7.5)                          | 3 (10.4)           |                                               |                                              |
| Education                  |                                  |                    |                                               |
| TVET                       | 7 (10.5)                         | 2 (6.9)            | 0.584                                         | 0.056                                        |
| BSc degree                 | 60 (89.5)                        | 27 (93.1)          |                                               |                                              |
| Teaching experience in years|                                  |                    |                                               |
| <5                         | 17 (25.4)                        | 16 (55.2)          | **0.007***                                    | 0.323                                        |

Continued
The rapid PSE scale-up in the country exacerbated the shortage of qualified educators. Many educators were less than 30 years of age and had less than 5 years of work experience, which could limit their use of practice-based improvement opportunities. A WHO report corresponded with our findings that only 6.6% of educators in LMICs were adequately prepared and had sufficient teaching qualifications. From an optimistic point of view, one could argue that the educators were doing good, given they had no formal education, inadequate faculty development opportunities and limited experiences. Although we used distinct data collection tools for the classroom instructors and clinical preceptors, it is good to note that the competency scores of the clinical preceptors were lower. This might be due to the differences in their training, duties and work arrangement. Clinical preceptors were hired by the practice sites mainly to provide services with no explicit preceptorship roles. This meant that it is difficult to realise Ethiopia’s TVET education strategy. Reports also claimed that TVET trainers in Ethiopia lacked teaching skills. The significant difference between male and female students’ perceptions of the performances of educators on key tasks could be due to the low gender skills among the educators. The gender audit that was conducted in Ethiopia’s higher education showed comparable findings. Competency-based education programmes need to use non-traditional teaching and assessment techniques. Case study, role-play, group assignment and discussion are proven active learning methods for teaching critical thinking, problem-solving, communication, teamwork and collaboration skills. However, the educators had skills gaps in using them. The educators had limited ability to use OSCE/OSPE, log book, portfolio, 360-degree evaluation and global rating. Hence, assessing and teaching clinical skills, practical procedures, patient management, communication skills and professional behaviours of the students might be difficult. It is known that feedback is the vital cog in the wheel of competency-based education. However, the educators lacked the skills to provide quality feedback. The educators had learning technology skills gaps that might diminish the power of digital learning for transforming PSE in Ethiopia.

It is known that self-assessments are not the best method of competency assessment. However, we mainly used self-reports of educators on their competencies in our study to generate reliable and efficient evidence needed for the professional development and regulation of educators. To improve the quality of self-assessment data, the views of students were considered. We also trained data collectors on data collection tools and processes. We did not take representative samples from all colleges. Therefore, the study findings are not generalisable. Given the similar contexts of the health training colleges in Ethiopia and other sub-Saharan African countries, it is clear that other colleges and researchers can learn from these pieces of work.

To ensure the availability of competent educators, the colleges are advised to revisit faculty recruitment, development and retention policies. Teaching experiences and skills of educators should be considered as faculty recruitment criteria. Faculty development programmes on active learning methods, performance assessments, digital learning, feedback and gender-responsive pedagogy should be designed. Strengthening education development units in the colleges can catalyse faculty development programmes. In addition, academic programmes in health profession education should be expanded. More studies are required to understand the causes and effects of low teaching competency among educators.

### CONCLUSIONS

Classroom instructors and clinical preceptors had suboptimal teaching competency. Skills gaps were reported in using active learning methods, performance assessments, feedback, digital learning and gender among the significant proportions of educators. Many educators were young and had limited experience and training in teaching. Faculty development opportunities are critical.

| Background characteristics | Teaching competency score (N=51) | Pearson’s $X^2$ | Strength of association (Crammer V coefficient) |
|----------------------------|---------------------------------|----------------|-----------------------------------------------|
| Instructors                | <60 N (%)                       | 60+ N (%)      | P value                                       |                                           |
| 5–10                       | 26 (38.8)                       | 10 (34.5)      | 0.110                                         | 0.163                                      |
| >10                        | 24 (35.8)                       | 3 (10.3)       |                                               |                                           |
| Trained on teaching skills courses in the past 2 years | Yes | No | |
| Yes                        | 6 (8.9)                         | 6 (20.7)       | 0.110                                         | 0.163                                      |
| No                         | 61 (91.1)                       | 23 (79.3)      |                                               |                                           |

Bolded entries signifies that there exist significant associations between variables.
More studies on the causes and effects of low teaching competency are needed.

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**Contributors**

DD was the first author who contributed to the study concept and design, statistical analysis, result interpretation, and drafting, development and revision of the manuscript. DD was responsible for the overall content as the guarantor who has accepted full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish. The coauthors, JS and MV contributed to the statistical analysis, result interpretations, and drafting and revision of the manuscript. FA and YM, who are the coauthors, contributed to the study design, result interpretation and manuscript revision. All authors read and approved the final version of the manuscript.

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**Competing interests**

None declared.

**Patient and public involvement**

Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication**

Not required.

**Ethics approval**

We obtained ethical clearance from Johns Hopkins Bloomberg School of Public Health Institutional Review Board with IRB number 16606. The Oromia Regional Health Bureau and the training institutions approved the protocol and provided support letters to conduct the study. The study team met with deans, department heads and faculty managers of the target institutions to explain the purpose of the study and data collection processes. Data collectors obtained oral informed consent from each study participant. Data on study participants’ names and other personal identifiers were not collected. We also placed the datasets in a secure place for keeping participants’ information confidential.

**Provenance and peer review**

Not commissioned; externally peer reviewed.

**Data availability statement**

Data are available upon reasonable request.

**Supplemental material**

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