

BMJ Open 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 are 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

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The use of validated nurse and midwifery educators' competency frameworks improved the quality of data in this study.
- ⇒ We considered multiple data sources from classroom instructors, clinical preceptors and students to strengthen the study findings.
- ⇒ Although self-assessment is not the best method to determine competency, we used it to obtain reliable and efficient findings for informing professional development and regulation of educators.
- ⇒ Since there was no nurse and midwifery graduating class during the study period, health extension workers-students who were taught by the same educators were included.
- ⇒ Though we did not take representative samples to draw generalisable findings, we applied a feasible methodology to broaden knowledge in the health professional education field.

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.^{2 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.⁴ 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.⁵ Few biomedical engineering professionals were available in 2017 (0.002 per 10 000 populations).⁶ The shortage of health professionals affected the access to quality healthcare and contributed to undesirable health outcomes.⁵

To address the shortages, the WHO recommended countries rapidly scale up and transform health professional education.⁷ Hence, Ethiopia expanded preservice education (PSE) leading to the burgeoning of the graduation capacity.^{8,9} 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.¹⁰

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.^{9,11} The country needs a lot of work to ensure that graduates are competent.^{12–14} 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.^{15–18} Effective educators should have adequate professional, communication, leadership and research skills.^{7,15,16} In addition, large student size, epidemiological transition, advancing medical knowledge and technology have required educators to improve their teaching.¹⁹ 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.^{16,17} 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

Table 1 Background characteristics of educators in Ethiopia, January 2020 (N=147)

Background characteristics	NHSC N (%)	AATPTC N (%)	Total N (%)
Type of educators			
Classroom instructors	37 (30)	14 (64)	51 (35)
Clinical preceptors	88 (70)	8 (36)	96 (65)
Age in years			
<30	60 (48)	19 (86)	79 (54)
30–39	48 (38)	2 (9)	50 (34)
>39	17 (14)	1 (5)	18 (12)
Sex			
Male	63 (50)	14 (64)	77 (52)
Female	62 (50)	8 (36)	70 (48)
Education			
TVET level 4	9 (7)	4 (18)	13 (9)
BSc degree	112 (90)	18 (82)	130 (88)
MSc and above	4 (3)	0 (0)	4 (3)
Profession			
Nurse	76 (61)	0 (0)	76 (52)
Midwife	27 (22)	0 (0)	27 (18)
Biomedical technician	0 (0)	22 (100)	22 (15)
Others	22 (18)	0 (0)	22 (15)
Teaching experience in years			
<5	50 (40)	17 (77)	67 (45)
5–10	37 (30)	5 (23)	42 (29)
>10	38 (30)	0 (0)	38 (26)
Trained on teaching skills course in the past 2 years			
Yes	18 (4)	9 (41)	27 (18)
No	107 (6)	13 (59)	120 (82)

AATPTC, Addis Ababa Tegbareid Polytechnic College; NHSC, Nekemte Health Science College; TVET, technical–vocational education and training.

ability of clinical preceptors to apply infection prevention and patient safety principles and protocols during patient care. The third tool (with 49 variables) was also a self-administered questionnaire for graduating class students aiming to obtain information on the current teaching performances of their educators. All three tools had variables about the background characteristics of the study participants. In collaboration with five national health professional education experts, we validated and piloted the tools at two health training institutions.

To assure data quality, we selected seven data collectors who had an education level of master's degree and relevant experiences. We trained the data collectors for 2 days on data collection procedures, the contents of

the tools, the REDCap application and ethics. The data collectors orientated and supported study participants to fill out the questionnaires correctly. The responding educators rated their perceptions of competencies for each teaching task on a 5-point Likert scale, where '1' meant not capable and '5' meant proficient. The graduating students rated the performance of the educators on a 5-point Likert scale, where '1' meant no educator applies the skill consistently and '5' meant that all instructors apply the skill consistently. The data collectors were closely supported by three supervisors. Errors and omissions found during data collection were corrected timely. The data collection period was from 14 January to 22 January 2020.

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 proportions 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.

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 Tegbareid Polytechnic College; NHSC, Nekemte Health Science College.

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 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 tegbareid polytechnic college; NHSC, nekemte health science college.

Table 4 Top competency gaps of classroom instructors on the left and clinical preceptors on the right, Ethiopia, January 2020

Teaching competency of classroom instructors Skill area	% of not competent (N=51)	Teaching competency of clinical preceptors Skill area	% of not competent (N=96)
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.

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.^{1,2,7} A need to scale up PSE has intensified to train more health professionals and transform

training quality.⁷ Being 1 of the 57 countries with severe health workforce crisis,⁷ Ethiopia scaled up health professional education. However, it was challenged to uphold the PSE quality.⁹⁻¹² Other low/middle-income countries (LMICs) faced similar challenges due to a shortage of qualified educators and other factors while addressing the workforce challenges.¹³⁻²³⁻²⁵

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.¹⁹⁻²² Health professionals were recruited for the complex tasks without demanding skills and experiences in teaching.²⁶⁻²⁷ Faculty recruitment focused mainly on the academic achievements of new graduates. Similar faculty recruitment and development challenges were reported in many LMICs.²³⁻²⁵⁻²⁸ On the contrary, educators in a developed country are required to have teaching qualifications and experiences before deployments.²⁹⁻³² One contributing factor to the suboptimal teaching competency was the limited faculty development opportunities in Ethiopia.²⁷ Meanwhile, faculty development on a wide range of educational activities is recommended

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 χ^2	
	<60 N (%)	60+ N (%)	P value	Strength of association (Cramer 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

Table 5 Continued

Background characteristics	Teaching competency score (N=51)		Pearson's χ^2	
	<60 N (%)	60+ N (%)	P value	Strength of association (Cramer V coefficient)
Instructors				
5–10	26 (38.8)	10 (34.5)		
>10	24 (35.8)	3 (10.3)		
Trained on teaching skills courses in the past 2 years				
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.
TVET, technical–vocational education and training.

to educators.^{33–35} The rapid PSE scale-up in the country exacerbated the shortage of qualified educators.^{9–12} 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.¹⁷ 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.²⁶ Reports also claimed that TVET trainers in Ethiopia lacked teaching skills.^{19 21}

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.³⁶ 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.^{37 38} 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.^{39 40} It is known that feedback is the vital cog in the wheel of competency-based education.⁴¹ 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.^{42 43}

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.

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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