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Research Activity Practices and Affecting Factors among Medical Science Educators in their Early Academic Career

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Abstract

Background: Research activities provide educators with valuable knowledge and skills. Publishing research articles and presenting the findings at conferences are important for medical educators in early academic careers to increase their Contentious Professional Development (CPD). However, the level of their research activity practice and affecting factors has not been investigated at Addis Ababa university.

Objectives: Assessing the level of research activity practices and affecting factors among medical educators in their early academic career at Addis Ababa university, college of health sciences, and school of medicine.

Methods: One hundred ninety-five medical educators in their early academic careers from all departments in the school of medicine participated in this study. Proportional allocation and random sampling techniques were used to select each participant. Socio-demographic and other data were collected using a self-administered pretested questionnaire. Data were entered and processed using SPSS version 25.0. Independent t-tests and one-way ANOVA were used.

Results: The average number of articles published and presented at conferences per year in the last five years was 0.47± 0.35 and 0.45 ± 0.29, respectively. These publications were significantly higher among participants with a monthly salary of >10,470 than a monthly salary of ≤ 10, 470 (0.45 ± 0.37 *vs.* 0.39 ± 0.28, p=0.03) Ethiopian Birr. Participants with moderate attitudes had published more articles than participants with less attitude towards research activities (0.65 ± 0.43 *vs.* 0.20 ± 0.00, p=0.10). Medical educators with a higher academic experience of greater than fifteen years published more research articles than educators with an academic experience of fewer than five years (0.80 ± 0.45 *vs.* 0.39 ± 0.31, p=0.000). Participants from basic science departments presented more articles at conferences than participants from clinical science departments (0.56 ± 0.29 *vs.* 0.39 ± 0.28, p=0.000).

Conclusion: Research activities were low and affected by monthly salary and field of the study. Effective research activity programs and improve attitudes toward research activities are crucial to improve research productivity.

Keywords: Research activities • Research articles • Conferences • Early academic career • Medical educator

Introduction

Education is one of the most significant motivating factors determining economic, social, and political advancements [1]. Education is a never-ending process. Instead, it needs a continuous updating practice [2]. Since the health education system is changing rapidly in the world, the initial training of medical educators may not fit them to cope-up the system [3]. Emphasis has been given to Continuous Professional Development (CPD) activities to i mprove quality education, increase job satisfaction and work performance, enhance teaching confidence, change existing teaching habits, and increase professional practices [4].

The Ethiopian educational level is one of the least developed in the world. This is mainly attributed to the low budget allocation to the sector. In Ethiopia, medical education relied on traditional medical practitioners and most people in the country are depending on traditional medicine still [5]. Herbs and roots were used for medical

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these were traditional medical practitioners who taught and treat different diseases [6]. These traditional medical practitioners are mostly from the religious institutions in Ethiopia (Christian and Muslim). This indicated that modern medical education in Ethiopia is derived from the traditional religious education system.

According to this review made by Mekasha, there were no modern medical doctors until the time of Emperor Menelik II. Modern education was introduced in Ethiopia at the beginning of the 20th century. In this regard, the first medical professional in Ethiopia was Hakim Workineh. He took a medical doctorate degree from Lahore Medical College in 1882 in India. Afterward, number of schools; primary, secondary, tertiary, teacher training, and professional training centers were opened.

No payment for government-sponsored education. Public education is free at primary, secondary, and tertiary levels. However, there is cost-sharing in that a portion of program costs paid by the government for each student during the training time is paid by each student after graduation.

On the other hand, there is a critical shortage of competent health professionals in Ethiopia and most medical educators in Ethiopia are not trained in teaching methods. In this case, Continuing Professional Development (CPD) is very important for lifelong education or learning [6].

Conducting individual and collaborative research, publishing research articles, presenting research findings at conferences, mentoring, or being mentored by others are CPD activities [7]. On the other hand, similar to our university, one of the core responsibilities of the academic staff in most Universities is conducting research and publishing the findings [8]. Research productivity is crucial for researchers and students as research results will positively impact the entire society [9]. Research development is measured through research productivity, such as publications and conference presentations [10].

Among the criteria for promoting academic staff, conducting research and publishing articles is the primary one. Regarding the academic staff promotion process, academic staffs who wants to promote initiates an application and submits the promotion document to the department. The Appointment and promotions committee (DAPC) of the department reviews the document. After the necessary feedback is given to the candidate and accommodated accordingly, the committee presents the case to the Department Academic Commission (DAC). Upon acceptance by the department commission, recommend it to the school academic commission through the dean's office within a month after application. The school dean brings this promotion case to the school academic commission and then to the college appointment and promotions committee at which the documents are censoriously reviewed within a month. Promotion to the rank of full professor requires the promotion documents to be reviewed by four external reviewers with the related profession. If the promotion is accepted by the college APC, the director of staff affairs will present the recommendation to the college academic commission. The school academic commission processes the promotion case within one month and forwards the recommendation to the Office of the academic vice president through the college staff affair director if the application for promotion is accepted by the college academic commission.

Promotions to the rank of lecturer and below shall be approved by the concerned school at the university. The promotion case is communicated to the candidate and relevant University bodies within one week from the date of approval if accepted. Promotion to the rank of assistant and associate professor shall be approved at the college level and communicated to the office of the academic vice president. Promotion requests to the rank of professor are forwarded by the office of the academic vice-president to the university staff affair, appointment and promotion committee, which in turn processes the promotion request within one month, and upon acceptance, recommends the case to the executive committee university, senate, and board. This promotion to professorship is communicated by the President to the candidate and relevant university bodies within one week after the approval of the promotion by the Board.

Effectiveness in teaching and research (35%), publications (45%), participation in AAU affairs (25%), and professional community service (15%) are evaluation categories and weighted out of 120%. Academic staff scoring a minimum of 70% out of 120% is promoted to the next academic rank. On the other hand, a minimum of four years' service is required for a lecturer to be promoted to the rank of assistant professor and assistant professor to the rank of associate professor. A minimum of four years' service is also required for the associate professor to be promoted to full professor.

However, the level of practice and affecting factors against research activities undertaken by medical educators in their early academic career have not been conducted at Addis Ababa university, college of health sciences, school of medicine. The present study was, therefore, aimed to assess the level of research practices and affecting factors among medical educators in an early academic career at Addis Ababa university, college of health sciences, and school of medicine. The results of this study may contribute to encouraging research activities by medical educators in their early academic careers.

Materials and Methods

Study area and period

This study was conducted at Addis Ababa University (AAU), the college of health sciences, and the school of medicine. AAU is the first higher education in Ethiopia established in 1950. School of medicine, school of pharmacy, school of public health, and school of allied and health sciences are schools within the college of health sciences. Among other medical schools in Ethiopia, the school of medicine is the biggest and oldest school established in 1964 as a

faculty of medicine to produce medical doctors [11]. The study was conducted starting from January 2021 to February 2022.

Study design

A quantitative cross-sectional design was used in this study.

Study participants

Permanent and full-time employed medical educators in the school of medicine who are engaging in teaching-learning processes were included in this study. Medical educators with minimum lecturer rank and maximum assistant professors participated. The participants were selected from all departments in the school of medicine. The study participants from each department were proportionally allocated (nh=(Nh/N)* n. n_h is the sample size from each department, Nh is the population size in each department, N is the total population size in the school of medicine, and n is the total sample size [12].

Sample size determination and sampling technique

The sample size was determined using the single population proportion formula: $n_o=Z^2*pq/e^2$, where n_o is the sample size from a population size of greater than ten thousand, Z is the Z score (1.96 at 95% CI), p is the population proportion (response rate, usually is 50%), q (1-p) is the level of precision and e is the marginal error (usually 5%). However, the population size in the school of medicine during the data collection period was less than ten thousand, which were 422. Thus, the sample size from this population number was as follows: $n=n_o/(1+(n_o-1/N))$, where n is the final sample size, and N is the current population size of the school of medicine [13]. The final sample size in this study was 201.

After the staff list was obtained from the college dean's office, the participants were selected randomly until the calculated sample size was achieved. Both sexes of voluntary medical science educators in their early academic careers were selected to participate in this study.

Data collection tools and process

A self-administered pre-tested questionnaire was used to collect quantitative data. The socio-demographic characteristics of the study participants were collected using ten closed-ended questions. The principal investigator strictly followed the data collectors to repeatedly communicate with the study subjects. Hard copy questionnaires were given to each study subject in person, and their phone was taken to communicate and follow-up by both the principal investigator and the data collector to complete the questionnaire. Since the budget allocated to this study was small ($440), cash payments were not given to the study subjects. The level of the aggregate of the respondents was evaluated using five points Likert scale with the following scores: 5=Strongly Agree (SA), 4=Agree (A), 3=Partially Agree (PA) 2=Disagree and 1=Strongly Disagree (SD) [14]. After the mean score for each item was analyzed, the levels of the research practice were categorized as follows: mean value of 1.00-1.80 as very low, 1.81-2.2.60 as low, 2.61-3.40 as a medium, 3.41-4.20 as high, and 4.21-5.00 as very high (Table 1).

Likert scale	Mean score interval	Description	Interpretation
1	1.00-1.80	Strongly disagree	Very low
2	1.81–2.60	Disagree	Low
3	2.61–3.40	Partially agree	Medium
4	3.41–4.20	Agree	High
5	4.21-5.00	Strongly agree	Very high

Table 1. Likert scaling score.

Data quality control

A pilot test was administered to medical educators who had not participated in the main data collection. The training was given to the data collectors on the data collection tool and sampling techniques. Supervision was held regularly during the data collection period, and the completeness of the data was checked. Incomplete responses were not included in the statistical analyses.

Operational definition

Continuing professional development activities: Any formal or informal education that helps educators to gain knowledge, skills, and attitudes.

Early career in academics: Medical educators in academic rank between lecturer and assistant professor.

Lecture Equivalent Hours (LEHs): Unit (in hours) used to express the teaching load of academic staff. A lecture equivalent hour=1 credit hour=1.7 ECTS.

Likert scale measurement scores: The 5-point Likert scale consists of strongly disagree (1), disagree (2), partially agree (3), agree (4), and strongly agree (5) refers to the agreement level of each respondent to each question (item) in the questionnaire. However, the mean score interval (1.00-1.80, 1.81-2.60, 2.61-3.40, 3.41-4.20, and 4.21-5.00) calculated for the scale refers to the average agreement level of the respondents and were used to interpret the

level of respondents' attitude towards CPD activity, supports from mentors, departments, and institution or to determine the level of practice according to respondents perception (very low to very high).

Data analysis

The data were entered and processed using SPSS-25.0. Independent sample t-tests and one-way ANOVA were employed to see if statistical differences existed in the average research article published. Mean ± Standard Deviation (SD) for continuous measures, count, and percentages for categorical variables were used. A P-value less than 0.05 were taken as statistically significant.

Results

Socio-demographic characteristics of study participants

A total of 195 medical educators responded to the survey with a response rate of 97.01%. Most study participants were males (70.3%), and most were under the age category between 25 and 34 years (58.5%). 50.3% of the study participants had educational experiences between 5 and 10 years, and most had married (70.3%). Less than half of the study participants (45.1%) had a weekly load greater than the expected load presented in the recent legislation of the university, a maximum of 12 LEHs, and more than half of the respondents (53.3%) were assistant professors (Table 2).

Group	Category	N%	Group	Category	N%
Sex	Male	137 (7.3)	Marital status	Married	137 (7.3)
	Female	58 (29.7)		Single	57 (29.7)
Academic rank	Lecturer	91 (46.7)		Divorced	1 (.5)
	Asst. professor	104 (53.3)		Widowed	0 (0)
Age (year)	18–24	3 (1.5)		Other	0 (0)
	25–34	114 (58.5)	Monthly salary (ETB)	≤ 10,470	59 (3.3)
	35–44	53 (27.2)		>10,470	136 (69.7)
	45–54	19 (9.7)	Initial training	Diploma	17 (8.7)
	55–64	6 (3.1)		Degree	178 (91.3)
	>64	0 (0)	Load/week	≤ 12 LEHs	107 (54.9)
Department 88 (45.1)	Biomedical sciences	97 (49.7)		>12 LEHs	88 (45.1)
	Clinical sciences	98 (5.3)	Family size	1	34 (17.4)
Experience (years)	<5	50 (25.6)		2	37 (19.0)
	5–10	98 (5.3)		3	30 (15.4)
	11–15 48 (24.6)	29 (14.9)		4	48 (24.6)
	> 15	18 (9.2)		>4	46 (23.6)

Note: N: Number, Asst. professor: Assistant professor, ETB: Ethiopian Birr, LEHs=Lecture Equivalent Hours (A Lecture Equivalent Hour=1 credit hour=1.7 ECT) and LEHs>12 is an overload (AAU legislation)

Table 2. Socio-demographic characteristics of study participants.

Research activity practices per year in the last five years

The most common research activity practice was mentoring students (mean=0.58), followed by the research work presenting to a college community (mean=0.52). The least research practice conducted by the medical educator in the early academic career was the number of grant applications given by agents other than Addis Ababa University (mean=.39). The over-all grand mean score of research activities was 0.48 (Table 3).

Item	Mean ± SD	Item	Mean ± SD
No of research articles you published	47 ± 0.35	No of the research works you have presented at conferences	0.45 ± 0.29
No of the research works you presented to a college community	0.52 ± 0.39	No of the students you mentored	0.58 ± 0.44
No of grant applications given by AAU	0.53 ± 0.36	No of grant applications were given by agents other than AAU	0.39 ± 0.27

No of the research article /books you reviewed	0.39 ± 0.34	
Grand mean		0.48 ± 0.35

Note: No: Number; SD: Standard Deviation; AAU: Addis Ababa University

Table 3. Level of research activity practices per year in the last five years.

Factors affecting the number of articles published

Independent t-test results showed that study participants with a monthly salary of greater than 10,740 had a significantly higher average number of publications per year in the last five years than participants with a monthly salary ≤ 10,7040 (0.45 ± 0.37 *vs.* 0.39 ± 0.28, t (193)=-2.23, p=0.03, 95% CI (0.03, 0.16). Analysis of one-way ANOVA indicated a significant difference in the average number of publications per year in the last five years (F (3,191)=6.77, P=0.000) between participants with different academic experiences. The Post Hoc Tukey's test indicated that participants with experience greater than fifteen years had significantly greater publications than those less than five and between five and ten years (0.80 ± 0.45 *vs.* 0.39 ± 0.31, p=0.000, 95% CI (-.65,-.17) and 0.80 ± 0.45 *vs.* 0.45 ± 0.32 p=0.000; 95% CI (-.58, -.13). The Tukey Post Hoc test didn't show significant differences. However, research publication differences were observed concerning mentor-mentee relationships (F (4,190)=2.81, P=.04). Participants with moderate attitude and motivation toward the CPD activities had a significantly higher average number of publications compared with participants having low attitude and motivation (0.65 ± 0.43 *vs.* 0.20 ± 0.00, p=0.10, 95% CI (-.81, -.09). However, variables such as sex, the field of study, weekly workload, academic rank, age, family size, support from departments, and the institution and lack of grants for staff development did not affect publications (Table 4).

Parameter	Category	Mean± SD	T/F (DF)	95% CI of the MD		P
Sex	Male	0.48 ± 0. 38	1.28 (193)	0.03	0.16	0.2
	Female	0.42 ± 0.29				
Field of study	Basic sciences	0.48 ± 0.34	0.58 (193)	-0.07	0.13	0.56
	Clinical sciences	0.45 ± 0.37				
Monthly Salary (birr)	>10,470	0.50 ± 0.37	-2.23 (193)	-0.21	-0.01	0.03
	≤ 10,470	0.39 ± 0.28				
Load per week (LEHs)	>12	0.50 ± 0. 37	1.56 (193)	-0.18	0.02	0.12
	≤ 12	0.43 ± 0.33				
Initial training	Degree	0.47 ± 0.36	-.61 (193)	-0.2	0.11	0.55
	Diploma	0.42 ± 0.29				
Academic rank	Lecturer	0.42 ± 0.32	1.79 (193)	-0.19	0.01	0.08
	Assistant professor	0.51 ± 0.37				
Lack of staff development grant in the institution	Yes	0.48 ± 0.35	-1.00 (193)	-0.19	0.06	0.32
	No	0.41 ± 0.36				
Poor research skill	Yes	0.42 ± 0.29	1.81 (193)	-0.01	0.19	0.07
		0.51 ± 0.41				
Age (year)	18-24	0.47 ± 0.31	1.19 (4,190)	-0.29	1.22	0.32
	25-34	0.48 ± 0.36		0.41	0.55	
	35-44	0.40 ± 0.29		0.32	0.48	
	45-54	0.48 ± 0.37		0.31	0.66	
	>65	0.70 ± 0.56		0.11	1.29	
Experience (year)	<5	0.39 ± 0.31	6.77 (3,191)	0.3	0.48	0
	5-10	0.45 ± 0.32		0.38	0.51	

	11-15	0.45 ± 0.37		0.31	0.59	
	>15	0.80 ± 0.45		0.58	1.02	
Family size	One	0.40 ± 0.33	2.09 (5,189)	0.29	0.51	0.07
	Two	0.56 ± 0.42		0.42	0.69	
	Three	0.52 ± 0.38		0.38	0.66	
	Four	0.52 ± 0.36		0.41	0.62	
	Five	0.35 ± 0.25		0.27	0.43	
	>Five	0.40 ± 0.20		-0.09	0.89	
Support from mentors	No support	0.33 ± 0.21	2.81 (4,190)	0.25	0.41	0.04
	Poor	0.52 ± 0.38		0.41	0.63	
	Moderate	0.45 ± 0.34		0.38	0.52	
	Strong	0.58 ± 0.45		0.39	0.78	
Support from department	No support	0.35 ± 0.29	1.27 (3,191)	0.21	0.49	0.29
	Poor	0.43 ± 0.32		0.34	0.52	
	Moderate	0.49 ± 0.37		0.42	0.56	
	Strong	0.53 ± 0.40		0.33	0.72	
Support from institutions	No support	0.37 ± 0.33	1.54 (3,191)	0.24	0.5	0.2
	Poor	0.51 ± 0.37		0.42	0.59	
	Moderate	0.47 ± 0.34		0.39	0.54	
	Strong	0.25 ± 0.10		0.09	0.41	
Attitude and motivation to ward CPD activity	Low	0.20 ± 0.00	4.90 (2,192)	0.2	0.2	0.008
	Medium	0.65 ± 0.43		0.45	0.85	
	High	0.46 ± 0.34		0.4	0.51	

Note: T: Test Statistics; DF: Degree Of Freedom; F: Fisher; CI: Confidence Interval; SD: Standard Deviation; MD: Mean Difference; and CPD: Continuous Professional Development, and 100 Ethiopian Birr is 1 USD.

Table 4. Factors affecting the average number of research articles published per year in the last five years (N=195).

Factors affecting the number of research works presented at conferences

Compared with the participants from clinical science departments, participants from basic science departments had significantly a greater average number of research works presented at conferences (0.56 ± 0.29 *vs.* 0.39 ± 0.28, t (193)=4.01; p=0.000, 95% CI (0.08, .2517). Assistant professors presented significantly more research works at conferences than lecturers (52 ± 0.30 *vs.* 0.43 ± 0.28, t (193) =-2.29, p=.02, 95% CI (-.18, -.01). The Post Hoc analysis showed that ages between 45 and 54 years had greater research works presented at conferences compared with ages between 25 and 34 (.59 ± .31 *vs.* 0.42 ± 0.28, p=0.03, 95% CI (-.29, -.01). Participants who had strong support from departments had greater research outputs presented at conferences compared with no support from the departments (0.54 ± 0.27 *vs.* 0.36 ± 0.22, p=0.03, 95% CI (0.01, 0.27).

Significant differences in the average number of research articles presented at the conference were not observed between the sexes. Weekly workload, staff development grant, research skills, experiences, family size, mentors, and institution support, attitude, and motivation didn't affect the average number of research works presented at conferences (Table 5).

Parameter	Category	Mean ± SD	T/F (DF)	95% CI of the MD		P
Sex	Male	0.47 ± 0.29	-.36 (193)	-0.11	0.08	0.72
	Female	0.49 ± 0.32				
Field of study	Basic sciences	0.56 ± 0.29	4.03 (193)	0.08	0.48	0
	Clinical sciences	0.39 ± 0.28				
Monthly Salary (birr)	>10,470	0.49 ± 0.30	-.73 (193)	-0.13	0.06	0.47
	≤ 10,470	0.45 ± 0.29				
Load per week (LEHs)	>12	0.46 ± 0.29	1.56 (193)	-0.18	0.02	0.12
	≤ 12	0.49 ± 0.30				
Initial training	Degree	0.47 ± 0.29	1.78 (193)	-0.01	0.29	0.08
	Diploma	0.60 ± 0.30				
Academic rank	Lecturer	0.43 ± 0.28	-2.29 (193)	-0.18	0.01	0.02
	Assistant professor	0.52 ± 0.30				
Lack of staff development grant in the institution	Yes	0.48 ± 0.29	.170 (193)	-0.05	0.12	0.87
	No	0.49 ± 0.31				
Poor research skill	Yes	0.44 ± 0.26	1.59 (193)	-0.02	0.15	0.11
	No	0.51 ± 0.32				
Age (year)	18-24	0.60 ± 0.20	3.16 (4,190)	0.1	1.09	0.02
	25-34	0.42 ± 0.28		0.37	0.47	
	35-44	0.56 ± 0.33		0.47	0.65	
	45-54	0.59 ± 0.31		0.44	0.74	
	>65	0.47 ± 0.21		0.25	0.68	
Experience (year)	<5	0.41 ± 0.29	1.39 (3,191)	0.33	0.49	0.24
	5-10	0.49 ± 0. 29		0.44	0.56	
	11-15	0.49 ± 0.28		0.38	0.59	
	>15	0.54 ± 0.35		0.37	0.72	
Family size	One	0.38 ± 0.28	2.22 (5,189)	0.28	0.47	0.05
	Two	0.49 ± 0.26		0.41	0.59	
	Three	0.60 ± 0.32		0.48	0.72	
	Four	0.50 ± 0.32		0.41	0.59	
	Five	0.44 ± 0.28		0.36	0.53	
	>Five	0.33 ± 0.12		0.05	0.62	
Support from mentors	No support	0.43 ± 0.29	.92 (3,191)	0.32	0.54	0.43
	Poor	0.45 ± 0.26		0.37	0.52	
	Moderate	.49 ±.31		0.43	0.55	
	Strong	0.55 ± 0.33		0.4	0.69	
Support from department	No support	0.36 ± 0.22	3.97 (3,191)	0.25	0.46	0.01
	Poor	0.39 ± 0.24		0.32	0.46	
	Moderate	0.53 ± 0.32		0.47	0.59	

	Strong	0.54 ± 0.27		0.41	0.67	
Support from institutions	No support	0.42 ± 0.28	2.33 (3,191)	0.31	0.53	0.08
	Poor	0.43 ± 0.26		0.38	0.49	
	Moderate	0.54 ± 0.33		0.47	0.61	
	Strong	0.40 ± 0.28		-0.05	0.85	
Attitude and motivation	Low	0.40 ± 0.28	.62 (2,192)	0.14	0.66	0.54
	Medium	0.54 ± 0.28		0.4	0.67	
	High	0.47 ± 0. 30		0.43	0.52	

Note: T: Test statistics; DF: Degree of Freedom; F: Fisher; CI: Confidence Interval; SD: Standard Deviation; and MD: Mean Difference

Table 5. Factors affecting the average number of research articles presented at conferences per year in the last five years (N=195).

Discussion

Socio-demographic characteristics

Similar to previous studies, there was gender disparity in our research in that female medical educators were fewer than males. Though studies are required, the social involvement of females, cultural conditions, and academic performance in higher institutions could be some of the reasons for the gender disparity observed in our study. Studies showed a significant difference in academic performance between males and females, which can contribute to variation in males-to-females distribution in universities. A previous study showed that lack of mentoring, lack of interest in academia, family responsibilities, and cultural ideology in the academic careers of females accounted for the observed disparity in academia.

Research article publication and presentation at conferences

Although conducting and publishing research outputs is one of the core activities of the academic staff in our university, publishing research articles by the study participants was very less. The average number of publications per year in the last five consecutive years was at a low level and less than one (0.47 ± 0.35). A study reported by Tulu showed that 70.3% of study participants replied that the degree to which teachers were participating in research is rated low.

However, the academic staff in most African universities published at least one research article per year [15]. In the study by Olakunle, academic staff in medical colleges found in Nigeria published more than two research articles yearly. Similarly, Oyeyemi et al. reported that the average number of research articles published by medical educators in Nigeria per year was 2.2. The variation in the number of research article publications per year between these studies could be attributed to differences in socio-demographic characteristics, research capacity promotion strategies, staff profile, availability of facilities for research activities, and other institutional factors. In a study by Kazoka and Wema, the availability of facilities for research activities and research capacity promotion strategy were among the factors contributing to research activities. Besides, the COVID-19 pandemic could also be another reason for the low productivity of research article publication in this study. Studies conducted before showed that COVID-19 had a negative impact on research activities [16].

Although more studies are important to see the effects of low research productivity in the early academic career in progressing toward further professional development, few studies showed that lower earl productivity in research activities negatively affects future careers [17].

In this study, the average number of research articles presented at conferences per year in the last five consecutive years was less than one (0.48 ± 0.29). However, in the study conducted by Oyeyemi, et al. the average number of research articles presented at conferences was greater than one (1.5 ± 1.33). The disagreement between these study findings could be attributed to the accessibility of academic conferences, abstract preparation skills, availability of grants, and satisfaction from previous conferences, and educators' perception of the conferences.

Factors affecting research article publication and presentation at conferences

In our study, the average number of publications per year was affected by monthly salary, academic experiences, and attitudes and motivations of study participants toward CPD activities. Similar to our research, the study conducted by Finch et al. revealed that research engagement activities were affected by the overall interest of the study participants in CPD activities including research. Another study also showed that lack of motivation was one of the factors for poor continuous professional development activities, conducting and publishing research articles [18].

Though the Post Hoc analysis didn't show a difference, the one-way ANOVA showed significant variation in the average number of research article publications between participants with no mentor, and poor, moderate, and stronger mentor-mentee relationships. Previous research reported that mentoring improves research productivity, promotes unintended outcomes, and recommends mentoring programs [19]. Kazoka and Wema also indicated that research capacity developments were affected by poor collaboration between senior and junior academic staff. This shows that a better mentor-mentee relationship is essential to increase research capacity by early career academic staff.

Like our study, a previous study showed that teachers with more teaching experience positively perceived CPD activity practices such as research. Personal factors such as motivation and experiences affected teachers' research engagements. Studies conducted before indicated that experience variation between teachers caused variation in the CPD activity practices, including research [20]. A study conducted at Addis Ababa university has shown that one of the factors contributes to limited research publication, particularly among females with fewer academic experiences.

Similar to our research finding, a study conducted in Nigeria showed that low salaries negatively affected employee performance. Another study also found that increased salary enhances workers' productivity. On the other hand, funds greatly impacted research productivity.

Participants with no problems in research skills had more research article publications than those with poor research skills (0.51 ± 0.41 *vs.* 0.42 ± 0.29, t (193)=1.81, p=0.07, 95% CI (-.01, 0.19). A study has done by Kazoka and Wema, displayed that research capacity developments were affected by poor research skills and competencies.

However, age, sex, support from departments and institutions, family size, academic rank, initial training, the field of study, and weekly workload didn't affect the average number of publications. Unlike our study, the previous study indicated that publication numbers increased with age. In this previous study, the average number of publications per year in both sexes was greater than one in the age group between 40 and 60 years. Such a difference was not observed in our study. The disagreement between these findings could be attributed to the sample size, field of study, and academic profiles of the study participants. In the study by Rorstad and Aksnes, 12,400 participants from different fields of study (humanities, medicine, social sciences, and engendering) were involved. Whereas 195 study participants from the field of medicine have participated in our study. Besides, in the previous study, professors, associate professors, postdocs, and Ph. D. students were involved, while only lecturers and assistant professors were involved in our study.

Unlike our study, previous studies showed that females are less involved in research activities than males. A study by Nega et al. also revealed that though females were involved in research grant applications, their publication activities were limited due to social and family responsibilities, low salaries, lack of research skills, and lack of networking.

Similarly to our study, Atanda and Olasupo didn't show a significant difference in the number of publications between males and females. Female's oriented projects, women empowerment actions, a comprehensive gender equity implementation, and the presence of female academic career development could contribute to the absence of significant differences in the research activities between males and females in our study. According to the survey conducted earlier, a comprehensive gender equity action plan was developed and implemented by Addis Ababa university-CHS faculty and administration. This might contribute to similar research publication numbers between males and females in our study.

Unlike our findings, previous studies showed that the highest qualification and current job classification level predicted research engagement. A review conducted by Wahid et al. revealed that qualification was the primary determinant factor affecting research publication productivity. The disagreement between these findings could be attributed to variations in the study participants. In the study conducted by Finch, et al., female participants were dominant, and the highest percentage of the study participants were bachelor's degree holders. However, in our study, males were dominated, and bachelor's degree holders were excluded from the study.

Significant differences in the average number of publications were not observed between participants from basic and clinical science departments. However, another study indicated that academics in the clinical sciences tend to have more published research papers than their counterparts in the basic sciences.

In our study, more than half of the participants had a weekly workload less than expected. At the same time, the weekly workload didn't affect the number of publications per year in the last five consecutive years, showing that publication productivity was not affected by time. However, other research articles and reviews showed that time is one of the factors affecting research effectiveness.

In this study, the average number of research articles presented at conferences per year in the last five consecutive years was low and significantly affected by the field of study, academic rank, age, and support from departments. Our study showed that the average number of research articles presented at conferences was significantly higher in basic science departments than in clinical departments. However, the study reported by Oyeyemi, et al. showed that academics in the clinical sciences tend to have more published research articles and presented at conferences than basic sciences. The variation in the findings between our study and a study conducted by Oyeyemi, et al. could be attributed to the study participants. In our study, only lecturers and assistant professors were involved, while professors were also involved in the study conducted by Oyeyemi, et al. In addition to differences in the study participants, grants, experiences, interest in academic conferences, and academic positions might also contribute to the variation in the findings. Pavlukovic and Cimbaljevic reported that cost, age, educational level, and academic status affected conference participation and presenting abstracts. According to Pavlukovic and Cimbaljevic's report, conference participation was influenced by

gender, age, education level, and academic status. Researchers from different research fields differ significantly in their opinion about the importance of conferences, indicating that field of study affects the number of articles presented at conferences.

Conclusion

The average number of research articles published and presented at conferences in the last five years was low. Monthly salary, academic experiences, mentor support, attitude, and motivation affected the average number of research articles published per year in the last five years. Research articles presented at conferences were affected by the field of study, academic rank, participants' age, and departments' support.

Recommendation

Effective continuous professional development program offices and coordinators are required at the college level to improve early-career medical educators' research activity practices. Mentoring and other stakeholder support are crucial for research activities.

Ethical Approval

The research was conducted after ethical approval was obtained from the department of health sciences education (reference: HSE/27/22) at the school of medicine, college of health sciences, Addis Ababa university.

Research Involvement

This study was involving human subjects, and medical educators in their early academic careers. The subjects were informed about the purpose of the study by the principal investigator. They have been told their participation is voluntary, they can withdraw at any time from the study, and that not being involved in this study will not influence their activities. All the methods were performed per the Royal Government of Bhutan national statistics bureau guidelines and regulations.

Consent to Participate

After each participant was informed and understood the purpose of the study, they provide consent to participate in the study. Only medical educators who provided informed consent were recruited for the study.

Consent for Publication

Not applicable.

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Author Contributions

Conception, study design, execution, acquisition of data, analysis, interpretation, drafting, and preparing the manuscript were conducted by Dr. Abebeye Aragaw. Professor Amha Mekasha supervised the research. Critically reviewing the article and giving final approval of the version was made by Dr. Abebeye Aragaw and Amha Mekasha.

Competing Interest

We, the authors, declare that we don't have a conflict of interest in this research.

Availability of Data and Materials

The data used during this study will be provided when requested.

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