Original article

Knowledge, attitude, and practice of residents in medical research and barriers: A cross-sectional survey at Tikur Anbessa Specialized Hospital

Tamirat Moges[1], Milliard Deribew[1], Damen Haile Mariam[2]

Abstract

Background: Research activity is an important component of postgraduate training in medical institutions. However, only a few residents of Tikur Anbessa Specialized Hospital were able to publish research papers. Lack of funding and time, poor infrastructure, belief about research, and inadequate research knowledge and methodology were reported to be among the hindering reasons.

Objective: The objective of this study was to determine the level of knowledge, attitude, practice, and barriers to conduct research among clinical residents.

Methods: Three hundred and forty-four residents from 13 clinical departments were enrolled in a cross-sectional descriptive study conducted during December 2015 - May 2016. Participants of this study were determined using convenient sampling technique. This means that residents who showed willingness to participate in the study were included. Data were collected using standardized field tested questionnaire. After collecting the responses they were entered into SPSS (version 20) software. Descriptive statistics, one sample-T, and Pearson's chi-square tests were used to analyze the data and report the finding.

Results: Mean Knowledge score was 34.6% for all participants. Knowledge score was significantly better among females compared to males (p-value < 0.01 (95% CI: 0.32-0.85). Attitude towards research undertaking was positive with mean score of 3.8 (95 % CI: 3.75-3.86). Research practice (presentations and previous publications) were found to be very low (27.6% and 2% respectively). Research training received during graduate training was positively correlated with publications (practice) (p < 0.01). Inadequate financial and mentor support as well as lack of access to research equipment were found to be the main barriers the study participants face to conduct clinical research.

Conclusion: Participants' attitude towards research was positive, but their knowledge of research made their practice inadequate. There is a need for filling the gap between high level of positive attitude, low research knowledge and low research practice. This can perhaps be achieved through increasing their training during their graduate studies. Improving research equipment and the resident's access to financial and better research mentorship are recommended to raise their knowledge and research practice. [*Ethiop. J. Health Dev.* 2017;31(4):259-265]

Key words: Medical research, Knowledge, Attitude, Post graduate training, Ethiopia

Introduction

Medical research is a systematic process to get new knowledge on disease causation, diagnostic tools and patient care practices. This has made research a compulsory practice both in the undergraduate and postgraduate studies in developed countries. Many also believe that research be incorporated into the curricula of medical school and residency program (1, 2).

Medical doctors and other professionals working in health care system can use routine data to drive quality improvement through data analysis, identification of gaps, and development of quality improvement initiatives(3). Research experience is vitally important to the physician's practice. It helps in sharing skills such as literature search, data collection and analysis and critical appraisal of evidence (4). Studies show that only very few articles are published by post graduates students in many medical institutions (5, 6). There are a number of reasons for this inadequate research practice. Among others are: lack of funding, shortage of time and inadequate research infrastructure (7). It is also reported that graduate students' involvement in research is affected by their lack of research experience during their stay in medical school (6, 8). Many agree that belief, and knowledge of research have important role to play in individuals' effort to publish articles (9). However disparity between positive attitude and actual participation in medical research has been observed (5). Some researchers also comment that many academics from developing countries are seldom aware of the importance of doing research or even the need for reading research published in their area (10). According to Aslam et al., major reasons for poor research activity among Pakistanee residents were poor research training and lack of awareness (11). Another survey conducted in Japan reported that "too much and complicated paper work was the most frequently cited obstacle in conducting clinical research. The survey also reported that the presence of only a few eligible patients and lack of time as other challenges that affcted research practice (9). In a survey carried out in India the majority of participants (91.4%) believed that patient outcome improves with continued medical research. Nearly three-fourths of those surveyed reported to be willing to participate in

[1]School of Medicine, Addis Ababa University, *Corresponding author: TM: Phone -251911405260, E-mail mogest98@yahoo.com;
[2]School of Public Health, E-mail:- chfp.aau@ethionet.et Addis Ababa University, Addis Ababa, Ethiopia

workshop for research methodology (12). According to a report by Hren D, attendance of a course on research methodology is related to a positive attitude towards science (13).

At the School of Medicine, Addis Ababa University, the undergraduate medical curriculum requires students to write a small thesis after formal public health and community research attachment while graduate students are required to produce full research article as a partial fulfillment to graduate in the residency program. In order to determine whether the efforts to promote research in the school were in line with the needs of the trainees, it is important to know the Gap in the knowledge, attitude and practice of the residents and identify the barriers in research. As far as the authors' knowledge is concerned, not much been studied in the college in this regard. The initiative to evaluate the residents' level of knowledge, attitude, practice and barriers to medical research at School of Medicine, Addis Ababa University arose from recognition of this lack.

Methods

Study Design: This is a descriptive cross-sectional survey conducted at Tikur Anbessa Specialized Hospital (TASH). The survey was carried out from December 2015 to May 2016. TASH is a major university hospital in Ethiopia, with fairly longer years of experience in post graduate training. The School of Medicine, which is one of the four schools in the College of Health Sciences, offers four undergraduate and over 18 graduate training programs. This study was conducted at a time when the College started to make research undertaking a compulsory requirement in all graduate programs. Only very few clinical departments (Pediatrics, Psychiatry, Ophthalmology, Radiology, and Gynecology/Obstetrics) had mandatory research activity prior to the beginning of this study (14).

Study population: only accessible residents from respective departments were taken as participants of this study. Residents join graduate training from various universities and public hospitals in the country, with different medical school background. In some of the departments, faculty advisors are assigned to guide the residents in their research. Residents are given one month research leave during their second year training in the departments where research is mandatory.

Sample size: Sample size for the study was calculated using single proportion - a mean knowledge score of 19.2% was used based on findings of a previous study in India (12). Indian experience is thought to best represent the scenario in the local context. Using a standard error of 0.04 and 95% confidence interval the calculated sample size became 369 (15).

Operational Definitions

Knowledge: The understanding of research principle or scientific inquiry process, statistics, literature search and critical appraisal of evidence by the study participants (16).

Attitude: The feeling of the participants towards the scientific inquiry process, statistics, literature review and critical appraisal of evidence (17).

Research practice: The ways in which the study participants demonstrated their knowledge and beliefs by their actions (18). "Paper presentation and research publication" were used as a measure of practice in this particular study.

Knowledge score: knowledge score of 50 out of 100 (50%) is defined as 'average' and above this value is defined as 'above average'. Knowledge score below 50% is defined as knowledge score 'below average'.

Data Collection Tools: A pre-tested structured questionnaire was used to collect data. The questionnaire was adapted from a validated questionnaire designed by Vodopivec, et al. The instrument is used for similar surveys in many developing countries (5). The questionnaire was reviewed by an experienced researcher, and then, was pre-tested on a group of 10 pediatric residents. The residents checked the flow of ideas in the questions and the level of difficulty of the questionnaire. Slight modifications were made to some of the items in the questionnaire following the feedback obtained from the pilot study. The questionnaire had four parts: resident profile, knowledge and attitude, research practices, and barriers. In addition, demographic details (age, gender, marital status, year of residency, and mode of learning at medical school) were also parts of the questionnaire.

Knowledge questions were multiple choice questions. Attitude and barrier questions had Likert Scale format (i.e., strongly agree, agree, neither agree or disagree, disagree, and strongly disagree). Questions on research practice had a 'Yes' or 'No' format. Data on participants' knowledge was gathered using 10 questions. The value of each correct was 1 and that of each incorrect answer was 0. The same scoring method was used to gather data on research practice and barriers (See Annex I-IV).

Data management: In order to maintain the data quality, data were cleaned and proof-read manually. Then, they were entered in to SPSS version 20 software. Likert scale items were calculated using a composite score (sum or mean) from the five Likert-type items. Thus analysis for interval scale included the mean and standard deviations. Attitude and barrier questions were analyzed using means, standard deviations and one sample t-test with 95% confidence interval. Socio-demographic data were analyzed by frequency, proportions, mean, median and standard deviation. Knowledge and practice questions were analyzed using frequencies and proportions. Fisher exact value was used to check for statistical association whenever values below 5 occurred in the table. P value of ≤ 0.05 was taken when difference were statistically significant.

Ethical Considerations: First, the study was approved by College of Health Sciences Institutional Review Board (IRB). Following that, participant's verbal consent was obtained. This was done after they were informed about the aim of the study. Names and other unique identifiers were not recorded in the database to secure confidentiality of participants.

Results

The participants of the study were 344 residents. Table 1 shows the background characteristics of the participants. The mean age of participants was 28 years. Eighty two percent of the participants were younger than 30 years of age. Two-thirds of the participants were male. Another two-thirds of the participants were unmarried. Majority of the respondents were in their first year of residency.

Table 1: **Background Characteristics of Participants**

Age category	**Number**	**Percentage**
< 25 years	4	1.2
25-29 years	265	80.8
30-34years	51	15.5
35-39 years	4	1.2
40-44 years	2	0.6
45 and above	2	0.6
Sex		
Male	233	67.9
Female	110	32.1
Marital status		
Single	231	69.2
Married	103	30.8
Year of residency		
Less than 2 years	157	46.7
2-5 years	171	53.0
5 years and above	1	0.3
Mode of undergraduate Learning		
Problem based learning	138	45.2
Lecture based learning	153	50.2
Both	14	4.6

Source: **TASH 2015-2016**

As shown in Table 1, the mean Knowledge score of the study participants was 34.6%. The majority (75.6%) of the respondents reported that they have taken research training during their undergraduate studies. Only 18% reported to have such a training in their graduate studies. In addition, 54.5% of them had some kind of exposure to research, and 2% had publications.

Table 2 below shows the knowledge score by department. Accordingly, the majority of residents from the departments of Neurosurgery, Dermatology, and Radiology scored below 50% compared to those in other departments.

Table 2: **Research Knowledge Score of Residents**

Residency program	**Research knowledge score**		**X^2**	***P-value***
	Below average (N, %)	**Average & above (N %)**		
Pediatrics	31 (64.6)	17 (35.4)		
Psychiatry	11 (61.1)	7 (38.9)		
Radiology	31 (83.8)	6 (16.2)		
Ophthalmology	15 (75)	5 (25)	13.022	0.367
Neurology	7 (70)	3 (30)		
Anesthesiology	6 (75)	2 (25)		
Oncology	9 (75)	3 (25)		
Dermatology	27 (79.4)	7 (20.6)		
Internal Medicine	26 (63.4)	15 (36.6)		
Emergency Medicine	8 (72.7)	3 (27.3)		
Neurosurgery	18 (94.7	1 (5.3)		
Orthopedic surgery	33 (67.3)	16 (32.7)		
General surgery	26 (70.3)	11 (29.7)		
Total	248 (72.1)	96 (27.9)		

Table 3 shows knowledge score compared to demographic characteristics. Females have greater knowledge score than males ($p < 0.01$). Marital status, year of residency, mode of learning, and previous research publication did not affect knowledge score significantly.

Table 4 shows that research training given during post graduate studies affected research practice more positively than when it is given during the undergraduate training ($p<0.01$).

Table 3: **Knowledge score by demographic characteristics**

Variables	**Research knowledge score**		**X^2 (95%CI)**	***P-value***
	Below average	**Average & above**		
Gender			(0.45)0.88)	
Male	178	55	6.92	0.01
Female	69	41		
Marital Status				
Single	164	67	0.5 (0.77-1.695)	0.51
Married	77	26		
Year of residency				
Less than 2 years	115	42	0.93 (0.62-1.24)	0.63
2-5 years	124	54		
5 years and above	1	-		
Mode of Learning				
Problem based learning	97	41	1.49 (0.74-1.52)	0.47
Lecture based learning	110	43		
Both	12	2		
Previous research publication				
Yes	5	2	0.002 (0.31-	0.625
No	226	87		

Table 4: **Previous research training versus publication outcomes**

	Research knowledge score		**X^2**	***P-value***
	Author didn't publish	**Author published**		
Training during undergraduate study				
No	58	3	4.16 (0.86-20.13)	0.08
Yes	251	3		
Training during postgraduate study				
No	246	2	0.12 (0.02-0.56)	0.01
Yes	57	4		

Figure 1 shows proportion that gave correct answers to the knowledge questions. The least scored items were knowledge on definitions of "scientific truth", "scientific hypothesis" and "characteristics of science"; while knowledge on the definitions of "Introduction" and "Sample" in an article was highly scored.

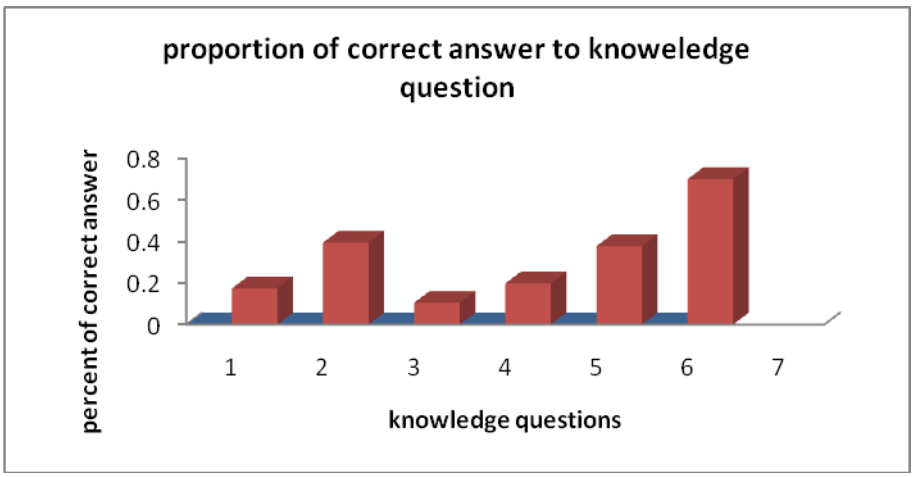

Figure 1: **Proportion of correct answers to the knowledge questions**

Table 5: **Barriers to research as perceived by study participants**

	Current study	Saudi-Arabia	India	Pakistan	Kyoto Japan
Inadequate financial support	94%	54%		20%	
Lack of access to equipment or Research material	93%		38%	20%	
Inadequate mentor support	81%	85%			
In adequate motivation	75%				
Lack of time	10%	72%	74%	45%	17.6%
Lack of acknowledgement for research work	63%				
Lack of training courses			89%		
Lack of research curriculum				42%	
Complicated and onerous paper work					26.2%
Few eligible patients					18.9%

Discussion

Findings of the present study show that the participants had positive attitude towards research. Their research knowledge and practice, as measured in their presentation or publication of research, however, did not demonstrate this claimed attitude. In addition, residents' knowledge level on selected elements of science was low. In the questionnaire, the residents were asked definitions of *scientific truth*, *scientific hypothesis*, and *essential characteristic of science*. Their knowledge on the different sections of s*cientific manuscript* was also low.

The data had evidence of gender difference in the residents research knowledge. Female respondents appear to have better research knowlegedge. A lack of postgraduate research training was also noted as a factor that affected the residents' research practice.

Only 18% of the participants reported to have research training during their graduate studies program. However, Meher (19) in a study carried out in Karachi, Pakistan, reported that 80.4% of the medical doctors considered in the study had attended research methodology course in their graduate academic program. The level of graduate research training given to the residents in the present study was low. Even that limited exposure to research training was reported to have led to better research practice. Much more is desirable, however.

In the current study, no significant difference in research knowledge was observed between participants who experienced problem based research course and those who took lecture-based research courses. However Abdul Haseeb, et al. (20) reported the supremacy of problem based learning over lecture based learning in achieving higher knowledge score in research methodology.

Many studies reported globally also show disparity between positive attitude and actual participation in research among health care professionals. It was also observed that very few resident doctors succeeded in publishing their research papers (5).

Similar to the present findings, Purushottam et al. reported that the concept of research hypothesis was known by only 18.9% of the graduate students, whereas 17.2% and 21.5% students knew the full form of MEDLARS and MEDLINE respectively (12). On the other hand, according to the findings reported by Memarpour, et al., 77.8% of the respondents' scores were above the middle of the possible attainable score (21). Marathe reported that the concept of research hypothesis was understood by the majority (58%) of resident respondents (5). According to various studies, low research knowledge could be due to inadequate number of hours of teaching, inadequate time for reading, lack of qualified teachers, and lack of access to internet or teaching materials (10).

Gender difference in the knowledge score was observed in the current study. Similarly, Memarpour et al (21) reported that female students showed better knowledge of research than their male counter parts. Further study is required to verify the finding.

The findings of the present study showed that participants in this study had positive attitude towards medical research, even though this is was not reflected in actual practice. Low research practice in the context of positive attitude may be due to the various barriers discussed. Similar results were reported from different countries in this regard. For instance, a report from India showed that 91.4% of respondents believed patient outcomes to improve with continued medical research, and 70.7% were willing to participate in research methodology workshops (11, 12, 23). Researchers from Japan also reported the need by most doctors to acquire knowledge on the concepts of clinical research, especially those related to statistics (9).

In the current study, research participations before and after the respondents joined residency were 54.5% and 29.6% respectively. This is comparable with the report from Saudi Arabia where 30.4% had participated in research during residency (24). Dattarty et al. also reported that 50% of their study participants had participation in research activities (5). Residents' publication and research paper presentation in the current study were low. Similar result has been reported from India where as low as 4% of study participants had published articles and 28% had presented research papers at national conferences (5). Lack of time was the most common reason cited as an obstacle to their research practice. However, according to a study in Pakistan, 50% of the respondents had, on average, seven publications (25). According to a report by Abu-Zeid, research training given during graduate period has been observed to affect research outcome positively (1, 26). Other studies showed the association of research experience in medical schools with better and more publications (8, 27).

Among the barriers to conduct research in this study are: inadequate financial support, lack of material to support research, and inadequate mentor support. Similarly, Yetilu de Baessa's (10) observation in the third world indicated limited source of funding and lack of time as barriers of research. In a study carried out in India, residents' workload was cited as an obstacle to their participation in meaningful research work (28, 29). Similarly, limited time, poor research infrastructure and inadequate research funding opportunities were reported as major hurdles faced by graduate trainees at Aga Khan University in Pakistan (7). Lack of research training, lack of time, work-related stress, and lack of supervisors were also reported as barriers to doing research in Saudi Arabia (24).

Conclusion:

The current study demonstrated that the residents had high level of interest to conduct research. However, the participants did not have adequate knowledge of research and sufficient skill in research presentation or publication. The barriers of medical research were also identified.

Recommendations

The School of Medicine at Addis Ababa University needs to strengthen research training in the graduate studies. Departments in which residents' scores on knowledge test were low should work harder to address this gap. Research equipment such as computers and printers should also be made available to the residents during their stay in the graduate program.

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