Nigerian Medical Journal
NIGERIA MEDICAL ASSOCIATION
Print ISSN 0300-1652, E-ISSN 2229-774X

Original Research

Extent of research involvement and influencing factors among resident doctors at a tertiary health facility in Osun State, Nigeria

***Oluwaseun T. Esan[1], Blessing T. Ogunoye[2], Taiwo O. Sodimu[2], Oluwatobi O. Olayode[2], Nnamdi E. Okoro[3], Titilope A. Adeyanju[3], Christopher O. Omokanye[3], Abayomi S. Sotomide[2].**

[1]Department of Community Health, Faculty of Clinical Sciences, College of Health Sciences, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria, [2]Department of Medicine and Surgery, Obafemi Awolowo University, Ile-Ife, Nigeria, [3]Department of Community Health, Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria.

Abstract

Background: This study assessed the knowledge, attitude and extent of research involvement among resident doctors at a tertiary health facility in Osun state, Nigeria, and identified its associated factors.

Methodology: This was a cross-sectional study of 199 resident doctors selected via a simple random sampling technique. A structured self-administered questionnaire was used to obtain data with the outcome variable being the resident doctors' total score on extent of research involvement. Data analysis was done using the Stata 17 software.

Result: The respondents' mean age was 34.1±4.6. Only 34(39.1%) of those receiving mentorship in research ranked the support received as good, with majority 177(88.9%) still desirous of a mentor in research. About 121(60.8%) of the residents had good knowledge of basic research but only 58(29.2%) of them had a positive attitude towards research. Only 23(11.6%) reported confidence in research and needing no guidance. Their mean perceived research ability and extent of research involvement scores were 40.3±8.9 and 4.9±2.8 respectively. Their perceived ability to conduct research (β=0.10, 95% CI: 0.07 to 0.14, *P<0.000*), being dental residents (β=1.23, 95% CI: 0.45 to 2.02, *P=0.002*), a perceived need for assistance in research, (β=1.08, 95% CI: 0.16 to 2.01, *P=0.022*), and the types of research designs ever conducted significantly influenced positively their extent of research involvement.

Conclusion: The majority of the resident doctors studied are poorly involved in research despite their knowledge of basic research, with a gross unmet need for guidance in conducting research. Innovative efforts are needed to link their knowledge about research to conducting one.

Keywords: Research Involvement; Engagement; Resident Doctors; Mentorship; Research Knowledge, Research Ability.

***Correspondence:** Dr. Esan, Oluwaseun T. Department of Community Health, Faculty of Clinical Sciences, College of Health Sciences, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria. **E-mail:** seunkayo@yahoo.com; **ORCID:** https://orcid.org/0000-0002-2908-6034

How to cite: Esan OT, Ogunoye BT, Sodimu TO, Olayode O, Okoro NE, Adeyanju TA, Omokanye CO, Sotomide AS. Extent of research involvement and influencing factors among resident doctors at a tertiary health facility in Osun State, Nigeria. Niger Med J 2024;65(5):691-704.https://doi.org/10.60787/nmj-v65i3.536.

Quick Response Code:

Introduction

Research is the bedrock of evidence-based medicine and has significantly contributed to the improvements in healthcare delivery.[1] Research participation by physician-scientists is essential for their acquisition of research skills and competencies.[2] Over the years, there has been a focus on clinical practice among physicians rather than research, resulting in a decline in the number of physician-scientists worldwide, Nigeria inclusive.[3,4]

Africa contributes 2% of global research output.[4] Nigeria is one of Africa's major contributors to scientific research. However, its productivity remains relatively low compared to its capacity. According to SCImago in 2020, Nigeria ranked 48th of 233 countries by volume of publications.[5] Nigerian institutions contributed only 0.8% to the global publications regarding Covid-19 prior to July 2022.[6] A pre-requisite for residents to obtain fellowship awards from the Nigerian postgraduate medical and dental colleges is the submission of a dissertation.[1,7] Residents are also expected to participate in other research endeavours. However, the current engagement of Nigerian resident doctors in non-curricular research activities is still significantly deficient.[1]

Numerous studies have assessed the involvement of resident doctors in research across Europe, America and Asia but there is paucity of such evidence in low- and middle-income countries (LMICs). Oman medical specialty residents had a positive attitude towards research but an inadequate knowledge in it, and were deficient in their research practices.[8] Another survey reported time constraint from residency duties as the most commonly identified barrier to research among Canadian Gynaecology residents.[9] A mixed-method study in the United Kingdom explored barriers to research among Paediatrics trainees, while a national mixed-method study explored the profile, perceptions, barriers, and predictors of research engagement among resident doctors in Nigeria. However, these studies did not quantitatively measure the extent of research involvement by the resident doctors studied.[10] Understanding the extent to which residents are involved in research and the predictors would provide a more objective assessment of the problem. Hence, our study objectives were to assess the resident doctors' level of knowledge of scientific research and their attitude towards it. We also assessed their perceived ability and confidence to conduct scientific research, the facilitators and barriers as well as their extent of involvement in it. Factors influencing their extent of involvement in research were also identified. The findings from this study could inform policy and practice targeted at improving research productivity and enhancing healthcare outcomes in similar tertiary institutions in Nigeria.

Methods

The conduct of the research followed the Helsinki Declaration. Written Informed consent was obtained from all the respondents. They were also assured of the confidentiality of their responses. Ethical approval to conduct the study was obtained from the Health and Research Ethical Committee of the Institute of Public Health, Obafemi Awolowo University, Ile-Ife with an HREC Number IPH/OAU/12/2227.

This study was a cross-sectional quantitative survey of resident doctors at a tertiary health facility in Osun state, Nigeria, conducted between August and November 2023. The study adopted a structured self-administered questionnaire. There were 323 residents at the selected study facility across its 13 clinical departments and the dental unit of the hospital at the time of conducting the study. A resident doctor is a medical practitioner who is enrolled in either or both accredited National or West African postgraduate medical colleges in Nigeria. They can be further categorised into the junior registrars (yet to pass their membership examinations), and senior registrars (yet to pass the fellowship examinations) at the colleges.[1] The duration of the residency training programme is four to six years.

A sample size of 198 respondents approximated to 200 was determined using the formula for determining single proportions based on a reference proportion of 85.8% (0.858) residents who were involved in

research obtained from the 2020 National CHARTING study in Nigeria.[1,7] Other parameters included a 95% confidence limit, 5% level of precision, with a finite population of 323, 80% power and 10% non-response rate. The resident doctors interviewed per department and cadre were selected via a simple random sampling technique.

The research instrument used was a self-administered questionnaire consisting of seven sections (Section A-G) adapted from the literature. Section A assessed their socio-demographic profile such as gender, age, specialty type, and their mentorship need. Section B assessed the respondents' level of knowledge of scientific research while section C evaluated their extent of research activity post-medical school using dichotomous responses of Yes or No. Section D assessed the resident doctors' perceived ability to conduct research. Section E assessed their attitude to scientific research while section F and G assessed their perceived facilitators and barriers of research involvement respectively. Section D, E, F and G were measured on a 5-point Likert scale of agreement. (See Suppl.1) The instrument was pre-tested among resident doctors at another public owned tertiary health facility in Osogbo, Osun State, Nigeria. The reliability tests gave a Cronbach's alpha of 0.794, 0.964, 0.763, 0.833 and 0.863 for Sections C, D, E, F, G respectively. (See Suppl. 2).

Data collection was done using the REDCap software on hand-held tablets after sending out customised survey links. The data collected were cleaned and analysed using the Stata 17 statistical software. Univariate data analysis was done through the summarisation of quantitative data such as the age and years of experiences into their mean and standard deviation. Presentation of the categorical variables was done in proportions using frequency distribution tables and charts. Correct option to the knowledge questions was assigned a score of 1, with a maximum obtainable score of 15. The respondent's attitude to research and their perceived ability to conduct research each had a minimum and maximum obtainable score of 12 and 60. The respondents' total score in knowledge of research and attitude to research were categorised into poor/negative, fair/neutral and good/positive (for knowledge/attitude) using the Bloom's cut-off.[11] The resident doctors' perceived ability to conduct research and their extent of involvement in research were presented as charts. The outcome variable was the respondents' extent of involvement in research. A positive response was assigned a score of 1 with a maximum obtainable score of 11. Association between the resident doctors' extent of research involvement and predictors were determined using the simple and multiple linear regression. At the bivariate analysis, only the predictors with *P-value <0.2* were included in the multiple regression model simultaneously. The level of statistical significance was set at *P-value<0.05*.

Result

Respondents' socio-demographic characteristics and exposure to mentorship and research

A total of 199 resident doctors took part in the study, yielding a response rate of 99.5%. The average age of the respondents was 34.1±4.6 years (95%CI: 33.5 to 34.7), and a higher proportion 128 (64.3%) were males. Those who were married accounted for 156 (78.39%). About 42% of the residents were each affiliated with the College of Physicians and College of Surgeons of their postgraduate medical colleges. However, the 31(15.8%) residents undergoing training in Dentistry were affiliated to either the College of Dental Physicians or Surgeons. There were more registrars surveyed 110 (55.3%). The mean duration of their residency training program was 5.0±2.5 years. Majority of the respondents, 186(93.5%) had engaged in research during their undergraduate medical school. Besides, the professional qualifications, only 31(15.6%) of the respondents had obtained additional academic qualifications such as Diploma 15 (7.5%), master's 14 (7.4 %), or PhD 2 (1.0%). Only 122 (61.3%) of the resident doctors surveyed had a mentor, with 87(71.3%) of these receiving mentorship support in research from their mentors. Only 34 (39.1%) of the 87-receiving mentorship in research could rank these support a score of ≥8.

Overall, 177 (88.9%) of the residents still desired a mentor and mentorship support to enhance their research capabilities. (See Table 1).

Table 1: Resident doctors' background profile (n=199)

Variable	Frequencies	Percentages (%)
Age as at last birthday		
<35 years	99	50.3
≥35yrs	98	49.7
Mean age ± SD	34.1± 4.6 (95%CI: 33.5 - 35)	
Gender		
Male	128	64.3
Female	71	35.7
Marital Status		
Single	43	21.6
Married	156	78.4
Affiliated postgraduate medical college		
College of Physicians	83	42.3
College of Surgeons	82	41.8
Dentistry	31	15.8
Cadre		
Registrar	110	55.3
Senior registrar	89	44.7
Duration in residency (in years)		
<8 years	165	83.3
≥8 years	33	16.7
Mean duration in residency ± SD (95% CI) in years	5.0±2.5 (95%CI: 4.5 - 5.2)	
Participate in research in medical school		
No	13	6.5
Yes	186	93.5

Obtained additional academic qualifications (Diploma/ Masters/ PhD)		
Yes	31	15.6
No	168	84.4
Have a mentor		
No	77	38.7
Yes	122	61.3
Received mentorship in research (n=122)		
No	35	28.7
Yes	87	71.3
Perceived rating of mentorship contribution (n=87)		
≤60%	34	39.1
61-80%	37	42.5
>80%	16	18.4
Mean ± SD rating of mentorship contribution (n=87)	4.3±3.1; (95%CI: 0 – 10)	
Need a mentor and mentorship support in improving research capabilities		
No	22	11.1
Yes	177	88.9

Respondents' knowledge, attitude and confidence in conducting scientific research

In Table 2, more than half of the respondents121 (60.8%) had good knowledge of research with a mean score of 84.6±11.5, (95%CI: 83.0 to 86.2). Almost half of the resident doctors surveyed 74 (46.0%) had engaged in quantitative methods of data collection while only 64 (37.6%) had engaged in both quantitative and qualitative methods of data collection. More than half of the respondents had conducted cross-sectional study designs 107 (53.8%) and case reports 101 (50.8%) with the least 8 (4.0%) being the conduct of randomised control trials. The respondents had performed more team member roles 99 (61.9%) than being the principal investigators in research. Barely a third of the resident doctors had a positive attitude towards research 58 (29.2%). However, majority of the residents 177 (88.9%) were willing to pay for and attend a research methodology course. Less than a quarter 23 (11.6%) of the residents studied expressed confidence in conducting research with no need for assistance. Rather, the majority of them 168 (84.9%) stated their interest in conducting research but expressed a need for guidance.

Table 2: Resident doctors' knowledge, experience, and practice of research

(n=199)

Variables	Frequency	Percentages
Knowledge of research using the Blooms cut-off		
Poor (≤60%)	12	6.0
Fair (61%- 80%)	66	33.2
Good (>80%)	121	60.8
Mean knowledge score ± SD	84.6±11.5; (95%CI: 83.0 - 86.2)	
What methods of data collection have you employed?		
Quantitative methods	74	46.0
Qualitative methods	23	14.3
Both	64	37.6
Type of research study design		
Case report		
Yes	101	50.8
Case series		
Yes	24	12.1
Cross-sectional study		
Yes	107	53.8
Case-control		
Yes	41	20.6
Cohort		
Yes	8	4.02
Randomized control trial		
Yes	19	9.6
Systematic reviews		
Yes	10	5.0
Role(s) in previous research post-medical school		
Team Member	99	61.9
Principal/ Lead Investigator	15	9.4
Both	46	28.8
Attitude towards research using the Blooms cut-off		
Negative (≤60%)	15	7.5
Neutral (61%- 80%)	126	63.3
Positive (>80%)	58	29.2
Willing to pay for and attend a research methodology course		
No	22	11.1
Yes	177	88.9
Level of Confidence in conducting scientific research		
Feels confident in conducting research, have no need for assistance or guidance	23	11.6
Interested in conducting research but would need assistance	168	84.9
Not interested in conducting research and would need NO assistance whatsoever	7	3.5

Respondents' perceived ability to conduct research and extent of involvement in research

In Figure 1 and 2, the resident doctors' perceived ability to conduct research and their extent of research activities previously engaged in are shown respectively. Abilities in data collection and developing a research question were the most prevalent with 60% and 50.1% of the respondents alluding to these respectively. However, for all other research activities assessed, <50% of the respondents expressed these abilities, the least (35.4%) being a perceived ability to prepare manuscripts for publication. The mean score of their perceived ability to conduct research was 40.3±8.9; (95%CI: 39.1 to 41.5).

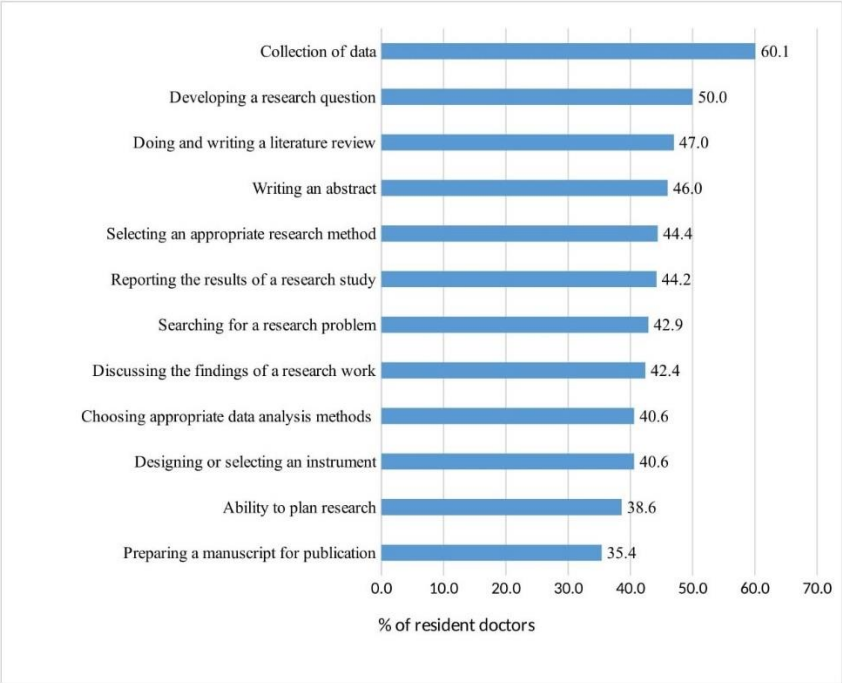

Figure 1: Showing residents perceived ability to conduct research and extent of involvement

As regards the resident doctors' actual research involvement, the majority of them (80.9%) attested to have participated in some forms of research activity prior to the survey with the most, 72.9% being participation in data collection activities. However, only 14.6% of them had ever submitted a proposal for a research grant and <5% had ever won a research grant. Seventeen of the residents (6.0%) had never engaged in any of the 11 research activities assessed while only 1 (0.5%) had engaged in all. Only 25 (12.6%) of the resident doctors had ever engaged in >80% of the research activities assessed. On average, the resident doctors had engaged in about 5 of the 11 research activities assessed, 4.9±2.8; (95%CI: 4.5 to 5.3). See Suppl.3.

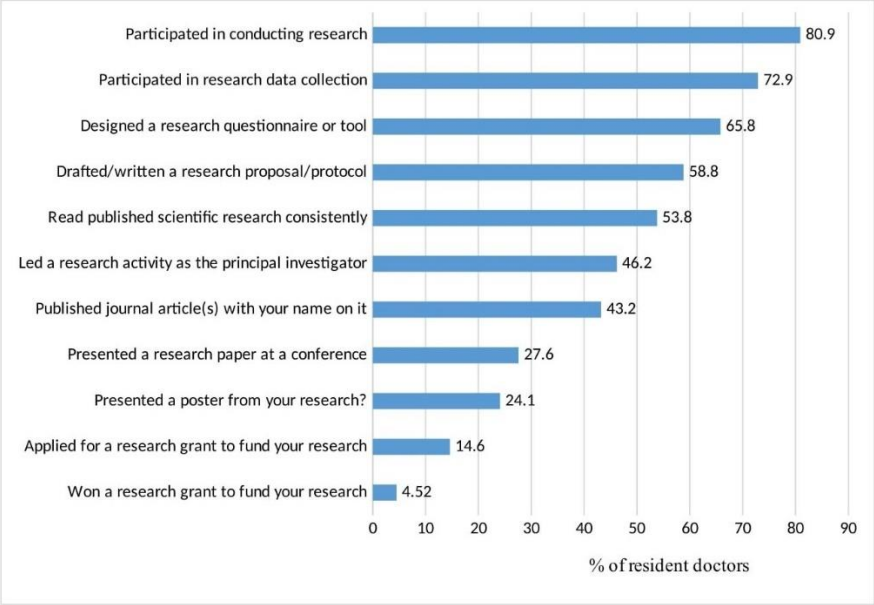

Figure 2: Showing residents perceived ability to conduct research and extent of involvement

Perceived facilitators and barriers to resident doctors' involvement in scientific research

In Table 3, the perceived facilitators and barriers of resident doctors' involvement in research are presented. The leading perceived facilitators of more research involvement among resident doctors identified were provision of funding for research 185 (93.4%), ensuring an effective formal mentoring system in research 183 (92.0%), and mandatory research methodology training courses for resident doctors 180 (90.5%). Similarly, lack of funding for research 171 (85.9%), inadequate training on how to conduct research 171 (85.9%), and the lack of effective mentorship support in research 155 (77.9%) were the residents' leading perceived barriers to more research involvement.

Table 3: Resident doctors' perceived facilitators and barriers of research involvement (n = 199)

Variables	Agree	Disagree	Indifferent
	Freq. (%)	Freq. (%)	Freq. (%)
Facilitators			
Provision of funding for research	185 (93.4)	3 (1.5)	11 (5.1)
Ensure an effective formal mentoring system in conducting	183 (92.0)	5 (2.5)	11 (5.5)
Provision of mandatory research methodology training courses	180 (90.5)	8 (4.0)	11 (5.5)

Organizing regular scientific conferences during residency	177 (89.0)	3 (1.5)	19 (9.6)
Mandatory manuscript publication requirements during residency may foster interest and participation in scientific research	154 (77.4)	8 (4.0)	37 (18.6)
Barriers			
Lack of funding support	171 (85.9)	7 (3.5)	21 (10.6)
Lack of /inadequate training on how to conduct research	171 (85.9)	15 (7.5)	13 (6.5)
Lack of mentorship support in research	155 (77.9)	20 (10.1)	24 (12.1)
Lack of research allocated time	151 (75.9)	19 (9.6)	29 (14.6)
Time to conduct research is too short and so stressful	146 (73.4)	20 (10.1)	33 (16.6)
Lack of or inadequate laboratory facilities to conduct biomedical	145 (72.9)	17 (8.5)	37 (18.6)
Lack of / inadequate statistical support	138 (69.7)	25 (12.6)	35 (17.7)
Non-use of research findings by relevant stakeholders in the country	132 (66.3)	26 (13.1)	41 (20.6)
Lack of or very limited interest in conducting research	118 (59.3)	35 (17.6)	46 (23.1)
Lack of opportunity to conduct research	109 (54.8)	54 (27.1)	36 (18.1)
Lack of departmental interest	95 (47.7)	50 (25.1)	54 (27.1)
Consultants or senior colleagues use and exploit junior ones for their personal research purposes with no gain for the junior	94 (47.2)	51 (25.6)	54 (27.1)

Identified factors associated with resident doctors' extent of involvement in scientific research

The findings presented in Table 4 reveal the influence of various factors on the extent of research involvement among resident doctors. Dental residents had a significant 1.23 higher scores in extent of research involvement compared to the medical residents studied, (β=1.23, 95% CI: 0.45 to 2.02, *P=0.002*). With every unit increase in the residents' perceived ability scores to conduct research, there was a significant 0.10 increase in their extent of actual research involvement. (β=0.10, 95% CI: 0.07 to 0.14, *P<0.000*). Resident doctors interested in research but with a perceived need for assistance had 1.08 higher scores in their extent of research involvement compared to those who were confident in conducting research and needing no assistance as well as those not interested in conducting research, (β=1.08, 95% CI: 0.16 to 2.01, *P=0.022*). Resident doctors who had ever conducted a case-series study design (*P=0.002*), a cross-sectional study (*P<0.001*), Case control (*P<0.001*), cohort (*P<0.010*), randomised study (*P=0.007*) all had significantly higher scores in their extent of research involvement compared to those who had not engaged in any of these study designs. There was no significant association between writing case reports nor conducting systematic reviews and an increased research involvement by the resident doctors studied. Having a mentor, nor acquiring additional qualifications were not statistically significantly associated with the resident doctors' extent of research involvement from our study findings.

Table 4: Factors associated with resident doctors' extent of involvement in research

Variables	Simple linear regression				Multiple linear regression			
	Crude	95% CI		p-value	Adjusted	95% CI		p-value
Age	0.165	0.082	0.248	**<0.001**	0.068	-0.003	0.134	0.059
Gender								
Male	Ref	-	-	-	-	-	-	-
Female	-1.349	-2.143	-0.555	**0.001**	-0.447	-0.999	0.104	0.111
Marital Status								
Single	Ref	-	-	-	-	-	-	-
Married	1.120	0.183	2.057	**0.019**	0.166	-0.471	0.802	0.608
Cadre								
Registrar	Ref	-	-	-	-	-	-	-
Senior registrar	2.067	1.336	2.80	**<0.001**	0.504	-0.247	1.255	0.187
Postgraduate College								
College of Surgeon	Ref	-	-	-	-	-	-	-
College of Physicians	-0.463	-1.329	0.403	0.293	-0.150	-0.731	0.429	0.609
Dentistry	1.39	0.249	2.534	**0.017**	1.232	0.4487	2.015	**0.002**
Ever participated in research								
No	Ref	-	-	-	-	-	-	-
Yes	1.565	-0.002	3.132	**0.050**	0.159	-0.884	1.203	0.764
Work Experience								
<8 years	Ref	-	-	-	-	-	-	-
≥8 years	1.819	1.080	2.559	**<0.001**	-0.158	-0.968	0.650	0.699
Have mentors								
No	Ref	-	-	-	-	-	-	-
Yes	1.868	1.109	2.627	**<0.001**	0.543	-0.019	1.105	0.058
Additional Qualifications								
None	Ref	-	-	-	-	-	-	-
Diploma	0.793	-0.627	2.207	0.270	0.039	-0.965	1.04	0.939
Masters	2.964	1.503	4.424	**<0.001**	0.818	-0.238	1.875	0.128
PhD	4.892	1.158	8.626	**0.010**	1.488	-1.160	4.138	0.269
Attitude	0.118	0.048	0.188	**0.049**	-0.054	-0.110	0.002	0.059
Perceived ability	0.179	0.142	0.215	**<0.001**	0.104	0.066	0.142	**<0.001**
Level of confidence								
Feels confident in conducting research, have no need for assistance or guidance	Ref	-	-	-	-	-	-	-
Interested in conducting research but need assistance	-2.307	-3.458	-1.155	**<0.001**	1.084	0.161	2.006	**0.022**
Not interested in conducting research whatsoever	-5.658	-7.893	-3.423	**<0.001**	-1.018	-2.706	0.6702	0.236
Knowledge total score	0.059	0.000	0.027	0.093	-0.054	-0.224	0.116	0.529
Types of research carried out by resident doctors								
Case report								
No	Ref	-	-	-	-	-	-	-
Yes	1.781	1.040	2.522	**<0.001**	0.364	-0.211	0.939	0.213
Case series								
No	Ref	-	-	-	-	-	-	-
Yes	2.786	1.651	3.921	**<0.001**	1.285	0.473	2.098	**0.002**
Cross-sectional study								
No	Ref	-	-	-	-	-	-	-
Yes	2.629	1.937	3.321	**<0.001**	1.997	1.403	2.591	**<0.001**
Case-control								
No	Ref	-	-	-	-	-	-	-
Yes	2.491	1.589	3.392	**<0.001**	1.561	0.874	2.249	**<0.001**
Cohort								
No	Ref	-	-	-	-	-	-	-
Yes	1.250	-0.732	3.233	0.215	1.762	0.435	3.090	**0.010**
Randomized control trial								
No	Ref	-	-	-	-	-	-	-
Yes	1.247	-0.072	2.566	0.064	1.388	0.383	2.394	**0.007**
Systematic review								
No	Ref	-	-	-	-	-	-	-
Yes	2.185	0.421	3.948	**0.015**	0.558	-0.720	1.836	0.390
Constant					-2.125	0.254`	-5.793	1.544
					n=192; Adj. R^2=0.6442; p= **0.001**			

Note: Predictors with *p*≤0.2 from the simple linear regression analysis were included in the multiple regression model; Significant *p* values in bold

Discussion

Good knowledge of research and a neutral attitude to it were more prevalent among the residents studied. Less than one-fifth of the residents had been engaged in 9(80.0%) of the 11 research activities assessed. Data collection was their most prevalent research activity with very few who had ever won a research grant. The majority of the residents were not confident with conducting research. Their perceived ability to conduct research, being dental residents, a perceived need for assistance in research and the types of research designs ever conducted significantly influenced positively their extent of research involvement.

The resident doctors' good knowledge about research implies they are theoretically prepared to conduct basic research. Similarly, a good knowledge was found among resident doctors in Western India which was attributed to their training in the principles of designing and conducting research.[7] Likewise, a high level of knowledge was found among resident doctors in Kenya.[12] In contrast, resident doctors in Ethiopia demonstrated poor knowledge in research reported to have stemmed from the absence of postgraduate research training in their setting.[13] However, in our study, the resident doctors' knowledge of research was not significantly associated with their extent of research involvement. This indicates the difference between knowing and doing. There is a need to support resident doctors to put their knowledge of research into action.

Many studies have underscored the significance of mentorship as it aids in overcoming barriers to the involvement of resident doctors in research.[14] A substantial 88.9% of our respondents expressed that having mentorship support would enhance their research capabilities. However, less than a quarter of them rated their mentorship support in research as good. These findings may be attributed to the absence of a formal mentorship programme for residents in the study location, incompatible mentorship relationships, or an inadequate extent of research involvement by their mentors as well. Similarly, lack of formal mentorship programmes, poor capacity to mentor and an understanding of the mentorship process were a few of the identified reasons for ineffective mentorship in health research as reported by mentors and mentees across 24 health training institutions in Nigeria.[15]It is advised to consider the diverse backgrounds and goals of residents before initiating a mentorship process.[16]

Majority of the resident doctors studied had no confidence with conducting research with a gross unmet need for guidance in conducting research. Similarly, only one-third of the 142 trainee-doctors studied in Bahrain reported confidence in conducting research.[17] Likewise, a workshop held at the Academy of Medical Sciences in the United Kingdom identified the lack of role models to nurture young and promising clinician-researchers as a barrier to improving clinical research capacity in LMICs.[18] However, this unmet need served as a push to engage in more research activities by the resident doctors studied. This suggests that a continuous yearning to learn is needed to increase the involvement of resident doctors in research activities.

The resident doctors' extent of research engagement as shown in Figure 2 reflects their perceived ability in the specific research activities presented in Figure 1. Our findings showed that the residents felt inadequate in identifying a research problem, designing research, and in reporting and discussing research findings. They were most comfortable with the data collection process. This is reflected in data collection being their most engaged research activity. These perceived inabilities could have negatively impacted their low performance in co-authoring journal publications, presenting research findings at conferences or in winning research grants. Similarly, only one-third of the 438 residents studied in Nigeria had presented in public fora nor published in both international and local journals.[1] A study amongst resident doctors across the geopolitical zones in Nigeria also found that <45% of them had ever co-authored a journal publication.[19,20] These findings imply that resident doctors are not fully engaged in research.[19]

Dental physicians and surgeons in our study outperformed their counterparts in the medical profession with a significantly higher extent of research involvement. Among the medical professionals, the surgeons seemed to perform better than the physicians. The reasons for this may need to be explored qualitatively.

However, ours is one of a few studies to the best of our knowledge that compared the research involvement of resident doctors by their professional type.

For the resident doctors who engaged in research, they were more involved in descriptive studies with <10% of them who were involved in more analytical studies such as randomised control trials and systematic reviews. Existing evidence had shown that clinical trials and systematic reviews are challenging research designs for researchers in LMICs, and most conducted as foreign-led collaborative research.[21–23] However, engagement in randomised control trials alongside other observational study designs significantly influenced the residents' extent of research involvement, which was not so with conducting systematic reviews. There is a need for physician-researchers including resident doctors to engage in more analytical studies such as randomised control trials and systematic reviews as these research designs produce more valid results that could inform policy and improve the health of populations in LMICs.

The provision of funding for research, effective formal mentorship programs and mandatory research methodology training courses were the most popular facilitators reported by the resident doctors studied. The lack of these were also the most popular barriers to their engagement in research. The role of funding in conducting quality research cannot be over-emphasized. Lack of funding for research and research-protected time were the identified barriers reported by 283 clinicians across 23 countries from the Middle East and Africa.[24,25] Lack of research-active mentors or assistance with support in data analysis were the other identified barriers to resident doctors' involvement in research as evidenced in the literature. In addition, the resident doctors studied reported the need for their institutions to support research dissemination outlets such as scientific conferences and mandatory journal publications. These are structured ways to improve their research capabilities.

Strengths and weaknesses of the study

Our quantitative assessment of resident doctors' engagement in research provides more information on which areas of research is lacking and how these can be improved. The reported resident doctors' knowledge in research was based on the basic questions asked. This finding may vary if more advanced questions on research were assessed. A mixed method study design may have further explored why the difference between the extent of research involvement between the dental physicians and surgeons and their medical counterparts differed.

In conclusion, this study has shown a gap in the capabilities of the resident doctors studied to conduct research, and their extent of research involvement despite their good knowledge about research. A lot needs to be done to improve the residents' attitude, confidence, and perceived ability to conduct research. These can be achieved by engaging them in more research lead roles, linking their knowledge about research to conducting one through effective mentorship and providing adequate guidance.

References

1. Igbokwe M, Adebayo O, Ogunsuji O, Popoola G, Babalola R, Oiwoh S, et al. An exploration of profile, perceptions, barriers, and predictors of research engagement among resident doctors: A report from CHARTING study. Perspect Clin Res 2022;13(2):106–13.
2. Seaburg LA, Wang AT, West CP, Reed DA, Halvorsen AJ, Engstler G, et al. Associations between resident physicians' publications and clinical performance during residency training. BMC Med Educ 2016;16(1):1–6.
3. Furuya H, Brenner D, Rosser CJ. On the brink of extinction: The future of translational physician-scientists in the United States. J Transl Med 2017;15(1):1–3.
4. Kasprowicz VO, Chopera D, Waddilove KD, Brockman MA, Gilmour J, Hunter E, et al. African-led health research and capacity building- is it working? BMC Public Health 2020;20(1).

5. SCImago, (n.d). SJR —SCImago Journal & Country Rank [Internet]. [cited 2024 Jan 4];Available from: https://www.scimagojr.com/countryrank.php
6. Adebisi YA, Pius M. Nigeria's scientific contributions to COVID-19: A bibliometric analysis. Annals of Medicine and Surgery 2022;80:104316.
7. Pawar D, Gawde S, Marathe P. Awareness about medical research among resident doctors in a tertiary care hospital: A cross-sectional survey. Perspect Clin Res 2012;3(2):57.
8. Abri H, Atiq E, Alrawahi A. Knowledge, attitudes, and practices toward research among Oman medical specialty board residents. Oman J Ophthalmol 2022;15(2):140.
9. Clancy AA, Posner G. Attitudes towards research during residency: a survey of Canadian residents in obstetrics and gynecology. J Surg Educ 2015;72(5):836–43.
10. Mustafa K, Murray CC, Nicklin E, Glaser A, Andrews J. Understanding barriers for research involvement among paediatric trainees: A mixed methods study. BMC Med Educ 2018;18(1):1–8.
11. Akalu Y, Ayelign B, Molla MD. Knowledge, Attitude and Practice Towards COVID-19 Among Chronic Disease Patients at Addis Zemen Hospital, Northwest Ethiopia. Infect Drug Resist 2020;13:1949.
12. Unadkat MB, Mbuba CK, Ngugi AK, Kamya D. Self-reported knowledge, attitudes, practices and barriers in use of evidence-based medicine among resident physicians in Kenya: a mixed methods study. BMC Med Educ 2021;21(1).
13. Moges T, Deribew M, Mariam DH. Knowledge, attitude, and practice of residents in medical research and barriers: A cross-sectional survey at Tikur Anbessa Specialized Hospital. Ethiopian Journal of Health Development 2017;31(4):259–65.
14. Gagliardi AR, Webster F, Perrier L, Bell M, Straus S. Exploring mentorship as a strategy to build capacity for knowledge translation research and practice: a scoping systematic review. Implementation Science 2014;9(1):122.
15. Ughasoro M, Musa A, Yakubu A, Adefuye B, Folahanmi A, Isah A, et al. Barriers and solutions to effective mentorship in health research and training institutions in Nigeria: Mentors, mentees, and organizational perspectives. Niger J Clin Pract 2022;25(3):215–25.
16. Van Schalkwyk GI, Katz RB, Resignato J, Van Schalkwyk SC, Rohrbaugh RM. Effective Research Mentorship for Residents: Meeting the Needs of Early Career Physicians. Acad Psychiatry 2017;41(3):326–32.
17. AlSayyad AS, Al Nashaba S, Al Eid KAE, Al Maskati M, Al Alawi M. Knowledge, Attitudes and Practices of Training Doctors in a Tertiary Care Hospital in Bahrain Towards Health Research. Journal of the Bahrain Medical Society 2019;31(3):23–9.
18. The Academy of Medical Sciences. Strengthening clinical research capacity in low and middle-income countries [Internet]. London: 2017. [cited 2024 Jan 4], Available from: https://acmedsci.ac.uk/file-download/14379931
19. Umar S, Babandi Z, Suleiman A, Umar U, Olorukooba A, Ahmad A, et al. Assessing research engagement of resident doctors in training in Northwestern Nigeria. Nigerian Journal of Medicine 2021;30(1):91.
20. Pascal Iloh GU, Amadi A, Iro O, Agboola S, Aguocha G, Chukwuonye M. Attitude, practice orientation, benefits and barriers towards health research and publications among medical practitioners in Abia State, Nigeria: A cross-sectional study. Niger J Clin Pract 2020;23(2):129–37.
21. World Health Organisation, Dye C, Boerma T, Evans D, Harries A, Lienhardt C, et al. The World Health Report 2013: Research for Universal Health Coverage [Internet]. World Health Organisation. 2013 [cited 2024 Jan 4]. Available from: https://nhsrcindia.org/sites/default/files/2021-04/World Health Research Report 2013%281%29.pdf
22. Franzen SRP, Chandler C, Lang T. Health research capacity development in low and middle income countries: reality or rhetoric? A systematic meta-narrative review of the qualitative literature. BMJ Open 2017;7(1).

23. Oliver S, Bangpan M, Stansfield C, Stewart R. Capacity for conducting systematic reviews in low- and middle-income countries: A rapid appraisal. Health Res Policy Syst 2015;13(1):1–8.
24. Phang DTY, Rogers GD, Hashem F, Sharma S, Noble C. Factors influencing junior doctor workplace engagement in research: An Australian study. Focus on Health Professional Education: A Multi-Professional Journal, 21(1), 13–28. https://doi.org/10.11157/fohpe.v21i1.299
25. Ameh PO, McGuire CM, van Waes A, Fatusin BB, MacIntyre LS, Lelei-Mailu F, et al. Research activity, facilitators and barriers amongst trainee and early-career family physicians in sub-Saharan Africa: A cross-sectional survey. Afr J Prim Health Care Fam Med 2022;14(1). :e1-e10. doi: 10.4102/phcfm.v14i1.3367.