Original Article

Assessing Research Engagement of Resident Doctors in Training in Northwestern Nigeria

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Abstract

Background: Residency training develops trainees to practice evidence-based medicine using knowledge acquired through researches. Resident doctors are not just expected to be consumers of good researches but are also expected to build their competencies in conducting researches in their fields of specialization. They are expected to engage in journal clubs as well as scientific paper presentations in local and international conferences under the mentorship and guidance of their trainers. In addition, trainers in residency training supervise the compulsory dissertation of senior residents under them. **Objectives:** We aimed to assess research engagement of resident doctors in training and pattern of submission and approval of their dissertation proposal. **Methodology:** It was a descriptive cross-sectional descriptive study involving resident doctors in accredited hospitals in Northwestern Nigeria. Electronic questionnaires were distributed to respondents via their verified electronic media contacts. Data were collected within a period of 1 month from July 10 to August 6, 2020. Data were analyzed using mean, standard deviation, simple tables as well as *Z*-test and Chi-square test. The level of significance was set at 0.05 for decision purposes. **Results:** A total of 120 questionnaires were completed. The mean age of respondents was 38.0 ± 3.8 years, with majority being males 88 (83.3%), and 107 (89.2%) being married. Only 12 (10%) and 44 (36.7%) respondents had published manuscript before and since commencement of residency training, respectively. There was a significant difference between manuscript publication before and since commencement of residency training ($P = 0.012$). Only 32% of the respondents who submitted their dissertation proposal to the colleges did so within 12 months of success in their Part 1 fellowship examination. There was no association between the publication of manuscript during residency training and submission of dissertation to either National Postgraduate Medical College of Nigeria ($P = 0.190$), West African College of Surgeons ($P = 0.686$), or West African College of Physicians ($P = 0.317$). **Conclusion:** Research engagement by resident doctors from this study was not satisfactory. Publication of manuscript by resident doctors was associated with prior publication before commencement of residency training and type of training hospital.

Keywords: Dissertation, manuscript publication, research, residency training, resident doctors

Introduction

Residency training is a postgraduate medical education where graduate doctors undergo further training in specific fields under the tutelage of qualified trainers in accredited hospital settings to become independent specialists.[1,2] The resident doctors are expected to acquire knowledge, expertise, and skills in residency training. In addition, they are expected to develop competence in interpreting, utilizing, and conducting medical researches. Furthermore, senior residency training requires completion of dissertation research which is submitted to the postgraduate medical colleges at the end of residency training.[3]

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In Nigeria, residency training in various fields is carried out in accredited hospitals under the regulation of the postgraduate medical colleges. These colleges include National Postgraduate

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Medical College of Nigeria (NPMCN), West African College of Surgeons (WACSs), and West African College of Physicians (WACPs).[4] They accredit hospitals for training and conduct primary, Part 1, and Part 2 fellowship examinations. They also organize update courses on research methodology and manuscript writing as well as assess the dissertation of doctors in senior residency training.[4] The Medical Residency Training Act (MRTA) currently regulates entry, exit, and entitlement of resident doctors in Nigeria.[5]

Residency training, develops trainees to practice evidence-based medicine using knowledge acquired through researches.[6] Resident doctors are not just expected to be consumers of good researches, but also build their competences to conduct researches in their fields of specialization. They are expected to engage in journal clubs as well as present scientific papers in local or international conferences under the mentorship and guidance of their trainers.[6,7] In addition, trainers supervise the compulsory dissertation of senior residents under them.[6]

Despite its importance, very few studies have assessed the adequacy of resident doctors' engagement in research. A study in Nigeria, on mostly senior registrars, showed that majority of them were lacking grossly in research exposure. Only a few of them had any formal training in research, and only one-third of them had contributed to research publication.[8] These findings were further buttressed by another study conducted in Ghana on resident doctors which revealed that research training was the component of residency training they were least satisfied with.[9] Active engagement of resident doctors in research improves their knowledge base, which is essential in establishing evidenced-based practice. A study carried out in Mayo Clinic in the United States found that research publication by resident doctors was significantly associated with their clinical performances.[10] Their performances increased with increase in the number of their research publications.[10] Further studies revealed that engaging in research before the commencement of residency training was associated with the same outcome during residency.[11] It was also found that resident doctors who actively engaged in research during residency training were more likely to do so in their practice as specialists.[12,13]

Resident doctors in training are required to produce a dissertation under the mentorship and supervision of their trainers.[14] On completion, these dissertations are to be submitted to the respective postgraduate medical colleges for assessment as part of requirements for eligibility for Part 2 fellowship examinations.[14-16] Extensive literature review did not find any study on submission of dissertation by resident doctors. Neither were clear guidelines on minimum or maximum duration for submission of dissertation proposal by post Part 1 resident doctors found for any of the three postgraduate medical colleges in Nigeria.

This study, therefore, aims to assess research engagement of resident doctors in residency training as well as the duration of submission of their dissertation proposals.

Methodology

This study was part of a broad research on satisfaction and performance of resident doctors in Northwestern Nigeria which include Kaduna, Kano, Katsina, Kebbi, Sokoto, Jigawa, and Zamfara states. It was a descriptive cross-sectional study involving resident doctors in accredited hospitals as follows: three federal teaching hospitals (Ahmadu Bello University, Aminu Kano, and Usmanu Danfodiyo University Teaching Hospitals); two federal medical centers (of Gusau and Katsina); and four federal specialist hospitals (National Eye Center Kaduna, National Ear Care Center Kaduna, National Orthopaedic Hospital Dala, and Federal Neuropsychiatry Hospital Kaduna).

Respondents were senior registrars who had passed Part 1 examinations in at least one of the postgraduate medical colleges (NPMCN, WACS, and WACP).

The questionnaire of the study was designed using Kobo Tool Kit Version 1.25.1 manufactured by Kobo Toolbox, Cambridge. This was divided into three sections A, B, and C.

Section A enquired about sociodemography and residency training characteristics of participants including age, gender, year of commencement of residency, and passing Part 1 examinations. Section B assessed research engagement of respondents, whereas Section C reviewed predictive factors of research engagement of respondents. The questionnaire was adapted from a previous study involving Nigerian resident doctors[8] validated and pretested before administration.

Ethical approval was obtained from the Health Research and Ethics Committee, Ahmadu Bello University Teaching Hospital, Zaria (ABUTHZ/HREC/W39/2020). The permission of the leaderships of respective association of resident doctors, in centers where the study was conducted, was also obtained. Respondents' informed consent was gotten and self-administered questionnaire was sent via personal contacts or E-mails of respondents to fill and submit. Measures were taken to avoid duplication of submission, confidentiality, and security of respondents' data in the design of questionnaire and storage of data. The data store was passworded and only accessible to key collaborators of the research, whereas questions that may likely reveal the identity of respondents were avoided in the design of the questionnaire.

The questionnaire was administered with the aid of research assistants in each of the centers of study within a period of 1 month from July 10 to August 6, 2020. Convenience sampling was used and a total of 120 respondents completed and submitted the questionnaire, out of 163 administered, giving a response rate of 73.6%.

Data generated were analyzed using IBM Statistical Product and Service Solutions (SPSS) version 25.0 manufactured by IBM, Chicago, IL, USA. This was summarized using tables and simple charts. Test for normality of distribution of data was done using Shapiro–Wilk test. Bivariate Chi-square

analysis was used to test the association between residents' engagement in research and predictive factors at 0.05 level of significance. Multivariate analysis was used to further test for those factors that were significant on bivariate Chi-square analysis. The difference between two means was tested for statistical significance using *Z*-test.

Results

Sociodemographic and residency training characteristics of respondents

The mean age of respondents was 38.00 ± 3.80 years. Majority 88 (73.3%) of the respondents were males. Furthermore, most of them 107 (89.2%) were married and had children 103 (85.8%) at home [Table 1]. The mean duration from medical school graduation to commencement of residency training was 5.26 ± 3.00 years, whereas the mean duration in residency training was 5.93 ± 1.89 years. About three-fifths 73 (60.8%) of the respondents were primary residents of the training institutions, whereas one-third 40 (33.3%) were supernumerary doctors undergoing residency training in centers they were not primarily employed [Table 1].

The highest and least number of respondents were from faculties of obstetrics and gynecology 20 (16.7%) and dental surgery 1 (0.8%), respectively [Figure 1].

Publication of manuscript by respondents

Only 12 (10%) and 44 (36.7%) respondents had published manuscript before and since commencement of residency training, respectively.

Of the total of 138 manuscripts published by 44 respondents since the commencement of residency training, majority 84 (61%) were research papers [Figure 2], whereas about one-quarter of them 34 (24.6%) had the respondents as first authors. The mean manuscripts published by respondents before commencement of residency training was 0.20 publication per respondent, whereas this value increased to 1.15 publication per respondent during residency training period.

Only 10% of the respondents had published a manuscript before commencement of residency training, whereas 36.7% of them published manuscripts during residency training [Table 2]. There was a significant difference in manuscript publication by respondents before and since commencement of residency training ($P < 0.001$) [Table 2].

There was a positive significant association between publication of manuscript before and since the commencement of residency training ($P < 0.001$) [Table 3]. Similarly, the type of training hospital was significantly associated with publication of a manuscript in residency training [Table 3]. On multivariate analysis using logistic regression, the same variables remained significantly associated with publication of a manuscript in residency training (publication of manuscript before commencement of residency training [$\chi^2 = 10.358$, $P = 0.001$] and type of training hospital [$\chi^2 = 367.00$, $P < 0.001$]). Other factors assessed showed no significant association with publication of a manuscript during residency training [Table 3].

Table 1: Sociodemographic and residency training-related characteristics of respondents

Variables (n=120)	Frequency, n (%)
Gender	
Male	88 (73.3)
Female	32 (26.7)
Marital status	
Married	107 (89.2)
Single	10 (8.3)
Divorced	3 (2.5)
Type of resident doctor	
Primary	72 (60.0)
Supernumerary	40 (33.3)
Honorary	6 (5.0)
On posting	2 (1.7)
Children at home	
Yes	103 (85.8)
No	17 (14.2)
Type of training hospital	
Federal teaching hospital	104 (86.7)
Federal medical center	6 (5.0)
Specialist hospital	10 (8.3)

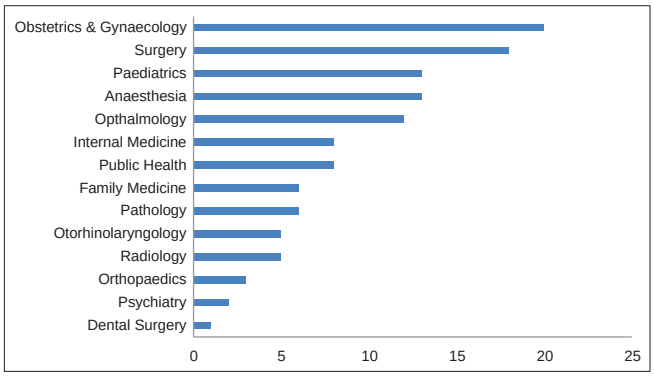

Figure 1: Frequency distribution of faculty of specialty of respondents (n = 120)

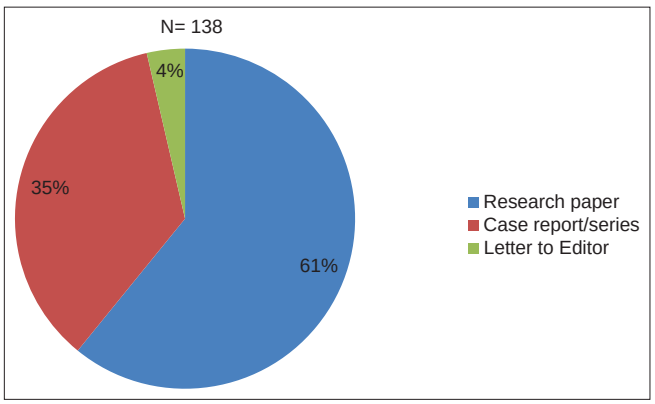

Figure 2: Distribution of published manuscripts in residency training by respondents

Table 2: Publication of manuscript by respondents before and since commencement of residency training

Variables (n=120)	Before residency	During residency	Significance	
			Z test	*P*
Respondents who published manuscript	12	44	4.91	<0.001
Respondents who did not publish manuscripts	108	76		

The mean duration post success in Part 1 examinations was 29.2 ± 17.6, 27.5 ± 16.8, and 25.2 ± 12.1 months for NPMCN, WACS, and WACP, respectively. The minimum and maximum durations from success in Part 1 examinations to submission of a dissertation by respondents were of 7 and 84 months, respectively. Over half of the respondents 37 (51%), 34 (55.7%), and 15 (57.7%) had submitted their dissertation to NPMCN, WACS, and WACP, respectively [Figure 3].

Table 3: Predictive factors for publication of manuscript in residency training by respondents

Predictive factors (n=120)	Publication of manuscript since commencement of residency training		Significance	
	Yes	No	χ^2	*P*
Age (years)				
29-33	4	5	24.068	0.153
34-38	24	40		
39-43	12	25		
44-48	4	6		
Gender				
Male	31	57	0.294	0.587
Female	13	19		
Marital status				
Single	3	1	1.356	0.508
Married	39	68		
Divorced	2	1		
Children at home				
Yes	38	65	0.016	0.899
No	6	11		
Type of resident doctor				
Primary	32	40	6.950	0.074
Supernumerary	9	31		
Honorary	3	3		
On posting	0	2		
Type of training hospital				
Federal teaching hospital	41	63	6.589	0.037
Specialist hospital	0	10		
Federal medical center	3	3		
Publication of manuscript before commencement of residency training				
Yes	12	2	16.419	<0.001
No	32	74		
Department subscribes to relevant journals				
Yes	2	11	2.84	0.09
No	42	65		
Personal access to relevant journals				
Yes	17	23	0.88	0.35
No	27	53		
Trainers valuable mentors in research				
Yes	29	42	1.31	0.25
No	15	34		
Sponsorship for research				
Yes	9	9	1.62	0.20
No	35	67		
Work schedule affects engagement in research				
Yes	15	35	1.64	0.20
No	29	41		

Less than one-thirds (32%) of the respondents, who submitted their dissertation proposals to the colleges, did so within 12 months of success in Part 1 examinations [Figure 4]. The mean duration from submission of the dissertation to approval by the postgraduate medical colleges was 7.3 ± 4.8, 7.3 ± 6.7, and 4.3 ± 2.8 months for NPMCN, WACS, and WACP, respectively. The duration in residency post Part 1 examination success had no significant association with submission of a dissertation for WACS (0.375) and WACP (0.998) but was significant for NPMCN ($P < 0.001$). The faculty of specialty of respondents was significantly associated with submission of a dissertation proposal for WACS ($P < 0.001$) and WACP ($P < 0.001$) but not NPMCN ($P = 0.277$).

For the respective postgraduate medical colleges, there was no significant association between submission of dissertation and publication of manuscripts before (NPMCN [$P = 0.102$], WACS [$P = 0.513$], and WACP [$P = 0.477$]) or since (NPMCN [$P = 0.190$], WACS [$P = 0.686$], and WACP [$P = 0.317$]) commencement of residency training [Table 4].

Discussion

The age, gender distribution and proportion of respondents that were married in this study reflect a very similar pattern when compared to a study conducted on senior resident doctors in Nigeria,[8] and another study involving combined population of junior and senior resident doctors in training.[17] These studies[8,17] recruited resident doctors from training hospitals across all the six geopolitical regions of Nigeria unlike this study where participants were limited to a single geopolitical region. Despite this, the similarities in the sociodemographic characteristics of respondents from these studies with those from our study implied that the study population from our study is a true reflection of the demographic characteristics of senior resident doctors in Nigeria, hence findings from the study can, to some extent, be generalized to the context of Nigerian resident doctors.

Residency training is a global practice which originated from the need to specialize as a result of expansion to expand medical knowledge through research.[18-20] It is built on a foundation of evidence-based medicine where resident doctors are trained not just to consume knowledge of medical research in their practice but also to contribute to medical knowledge through active participation in research.[4,6] In fact, a study clearly demonstrated a significant improvement in clinical performance among resident doctors with more research

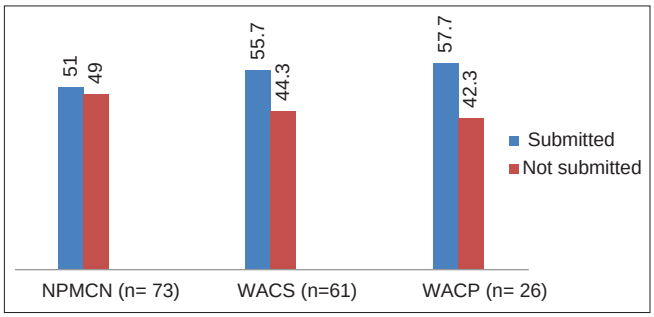

Figure 3: Percentage of respondents who submitted dissertation to respective postgraduate medical colleges since passing Part 1 fellowship examinations. NPMCN: National Postgraduate Medical College of Nigeria, WACS: West African College Surgeons, WACP: West African College of Physicians

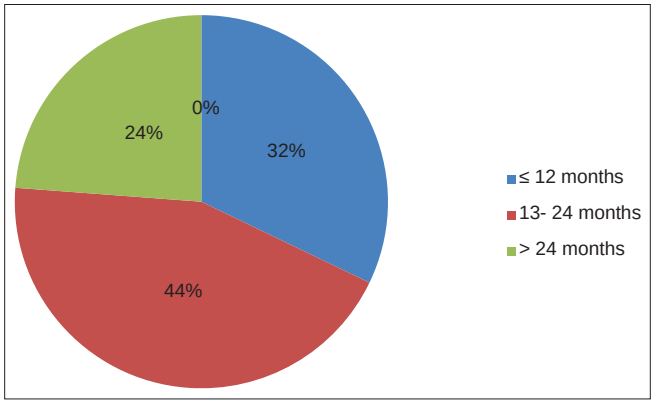

Figure 4: Submission of dissertation from success in Part 1 fellowship examinations (for all colleges) ($n = 84$)

Table 4: Association between manuscript publication by respondents and submission of dissertation to postgraduate medical colleges

Submission of dissertation to postgraduate colleges	Publication of manuscript							
	Before residency training				During residency training			
	Yes	No	χ^2	*P*	Yes	No	χ^2	*P*
NPMCN (*n*=73)								
Yes	7	30	4.57	0.102	18	11	3.32	0.190
No	5	31			19	25		
WACS (*n*=60)								
Yes	3	30	1.34	0.513	13	20	0.75	0.686
No	2	25			8	19		
WACP (*n*=73)								
Yes	2	12	1.48	0.477	7	7	2.30	0.317
No	0	10			5	5		

NPMCN: National Postgraduate Medical College of Nigeria, WACS: West African College Surgeons, WACP: West African College of Physicians

publications compared to those with less or none.[10] However, this study found that only 44 (36.7%) senior residents had published any manuscript during residency despite spending an average of over five years in the program. This finding was very similar to another study on senior registrars where only 144 (35.9%) respondents were contributors to research publication during their residency training.[8] Another study, though conducted among medical doctors in a southeastern state of Nigeria, also revealed a similar pattern with 72 (34.2%) respondents having at least one journal publication.[21] A study among Indian postgraduate students on medical research, though with dissimilar demographic distribution of age, gender, and marital status to this study, arrived at similar findings where only 36 (31.1%) respondents had published a research work in a journal.[22] The findings suggest suboptimal research engagement of resident doctors which is contrary to the philosophy of residency training. Some of the likely obstacles to optimal research engagement by resident doctors could include the absence of dedicated research time, perception that research is not important to career development, out-of-pocket financing, lack of competence in research, lack of mentoring in research, and poor motivation, among others.[8,21,22]

Although suboptimal as explained above, the study also found that residency training significantly improved resident doctors' research engagement as more resident doctors had published manuscript during residency training than before commencement of residency training (36.7% vs. 10.0%). This implied that the deliberate research activities inculcated in the curriculum of residency training[14-16,23] had some impact on the voluntary participation of resident doctors in medical researches. The strong correlation between publication of a manuscript by respondents before and during residency ($P < 0.001$), from this study, signified that some factors outside residency training also influence resident doctors' research engagement during residency training. This finding was also corroborated by a similar study mentioned earlier where the contribution to published research work by resident doctors was also significantly correlated with participation in research before residency training ($P = 0.02$).[8] The strong correlation noticed in this research compared to that of the study above, was probably due to the smaller sample size in the former, compared to the latter. Those who had published manuscripts before the commencement of residency training probably had the right motivation and mentorship from other engagements and were overwhelmingly involved in the same during residency training. Unlike other studies where age of respondents,[22] years of practice,[22] and involvement in trainers' research[8] were significantly associated with research publications, these were not significantly associated in this study.

The significant association between publication in residency training and type of training hospital implied that resident doctors training in teaching hospitals were more likely to publish manuscripts compared to their colleagues in specialist hospitals or federal medical centers. The possible reason for this finding could be that trainers in a teaching hospital are affiliated with universities and were more likely to be engaged in conducting research and mentoring trainee resident doctors compared to those in other hospitals. Furthermore, the trainers and some of their trainees in teaching hospital settings require research publications for career progression and promotion, leading to better involvement in research when compared to their contemporaries in other types of training hospitals.

Interestingly, publication of a manuscript before or during residency training by respondents had no advantage in earlier submission of dissertation proposals to any of the postgraduate medical colleges. Although no literature to compare these variables, the expectation was that those who engaged in research and manuscript publication would be more likely to submit their dissertation proposals earlier compared to those not engaged in research. This study found no association between those, implying that other factors influenced submission of a dissertation, for which further research may be needed to explore.

To the best of the knowledge of the authors, none of the postgraduate medical colleges had specified the minimum or maximum duration of resident doctors successful in Part 1 fellowship examinations to submit their dissertation proposals. However, the least duration spent by respondents in this study, post Part 1 fellowship success, was eight months which was adjudged by the authors to be enough for respondents to submit their dissertation proposal to relevant colleges. This study found a very significant association between earlier submission of a dissertation proposal to NPMCN and duration in residency training post Part 1 but no association for WACS and WACP. Conversely, the faculties of respondents were significantly associated with an earlier submission of a dissertation proposal by respondents for WACS and WACP but not NPMCN. Further studies may be required to verify these findings.

Conclusion

Research engagement among resident doctors from this study was not satisfactory. However, residency training influenced research engagement of resident doctors which was significantly associated with research publication before the commencement of residency training and type of training hospital. There was no association between research publication and submission of dissertation proposals by resident doctors in this study.

Recommendation

We recommend that the training hospitals and postgraduate medical colleges devise methods to improve the culture of research among resident doctors through improved mentorship, provision of incentives, and financial supports. We also recommend further research on some of the themes of this study.

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Conflicts of interest
There are no conflicts of interest.

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