RESEARCH ARTICLE

An indirect evaluation of medical residents' research writing skills by research synopsis review

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Abstract

Objective: To scrutinise the research proposals of medical residents for inadequacies in writing dissertation synopsis.

Method: The analytical cross-sectional study was conducted at the regional centre of the College of Physicians and Surgeons Pakistan, Islamabad, Pakistan, and comprised synopsis from January to June 2020 of postgraduate residents attached with different hospitals in Rawalpindi and Islamabad. For evaluation purposes, an institutional checklist was used that had 4 domains: general, epidemiological, statistical, and bibliographical review. These were assessed by a single epidemiologist. Data was analysed using SPSS 21.

Results: Of the 400 research proposals, 224(56%) were submitted by male and 176(44%) by female residents. Also, 208(52%) proposals were submitted by residents at public-sector hospitals, and 114(28.5%) by those at private-sector hospitals, while 78(19.5%) were from military hospitals. Significant association of errors was found with training institutions, speciality and duration of training ($p<0.05$). No gender difference was seen ($p>0.05$).

Conclusion: Majority of the research proposals lacked correct understanding of all the concepts related to research. Difference in research writing skills across specialties and training institutions may be related to the lack of availability of research assistance and good mentorship.

Keywords: EBM, Residents, CPSP, Research, EBP, Epidemiology, Statistics. (JPMA 72: .1345; 2022)

DOI: https://doi.org/10.47391/JPMA.3143

Introduction

In this era of evidence-based medicine (EBM), we are all dependent on the understanding and knowledge gained by epidemiological studies. Epidemiology is important for the understanding of disease aetiology and prevention by specific measures, such as screening and immunisation.[1] The main source of information in EBM is research and the goal of research is to improve healthcare. To design and carry out research, epidemiological knowledge is important.[2] Epidemiology and biostatistics should be taught to medical students during undergraduate levels, and regular exercises should be provided during postgraduate training. It is the responsibility of the educators to accord importance to research and develop the right attitude among all undergraduate and postgraduate medical students.[3]

The development of research capacity is peremptory at individual and institutional levels to attain a sustainable upgradation in health research. Several strategies are being employed for this purpose, which include research assignments, scientific conferences focussing on students, transformation of medical curriculum to integrate capacity building for research, and holding of workshops on different aspects of research methodology.[4]

The negative attitude of medical students towards research has been found to serve as an obstacle to learning associated with poor performance in research. In one study, only 44% students felt that research will play a beneficial role in their future career. Most of the students are doing their research just as a mandatory requirement of residency.[5]

Most postgraduate fellowship students face difficulty in preparing research proposals for dissertations, mainly due to lack of support from the supervisors and institutions. Well-equipped research facilitation centres and mentorship should be established to improve the skills of students.[4]

There is need to gather data on the analysis of research proposals and to investigate the errors in writing proposals for dissertation or manuscript writing. This is important for effective and efficient interventions.[6] The current study was planned to scrutinise the research proposals of medical residents for identifying inadequacies in writing dissertation synopsis.

Materials and Methods

The analytical cross-sectional study was conducted at the regional centre of the College of Physicians and Surgeons Pakistan (CPSP), Islamabad, Pakistan, and comprised

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synopsis submitted between January and June 2020. All residents are required to conduct a research during their 4-5 years of training before being considered eligible to take the fellowship examination. About 800 synopses are submitted every year. After approval from the institutional ethics review committee, the sample was raised without employing any particular sampling technique as all the proposals submitted during the study period by postgraduate residents attached with different hospitals in Rawalpindi and Islamabad were included.

For evaluation purposes, an institutional checklist was used by a single consultant epidemiologist who also happened to be a mentor for the students. The checklist is shared with the residents during the routine 4-day mandatory workshop on research methodology biostatistics and dissertation writing (RMBDW) once during the first two years of their training in which basic concepts of research methodology are explained and discussed.

The checklist covered four major domains: general review (hospital, specialty, duration of training), epidemiological review, statistical review, and bibliography. All the variables in the checklist were based on the application of epidemiological and biostatistics knowledge during the designing and writing of synopsis. Each domain had multiple categories that were evaluated separately.

In the domain of epidemiological review, the evaluated components included wordings of topic, writing introduction and rationale, explaining methodology that includes study design, sample size, sampling technique, hypothesis statement, operational definitions, selection criteria, and data-collection proforma.

In the domain of statistical review, evaluation was done based on the listing of variables, correct statistical test application, and controlling of confounders. In the domain of bibliography review, Vancouver style of referencing along with recent literature cited from the preceding 5 years were assessed.

Data was analysed using SPSS 21. Descriptive statistics were calculated. Frequencies and percentages were calculated for each domain used for the evaluation of synopsis. Independent samples t test and one-way analysis of variance (ANOVA) were applied for comparison of continuous variables. $P<0.05$ was considered statistically significant.

Results

Of the 400 research proposals, 224(56%) were submitted by male and 176(44%) by female residents. Also, 208(52%) proposals were submitted by residents at public-sector hospitals, and 114(28.5%) by those at private-sector hospitals, while 78(19.5%) were from military hospitals.

The largest number of proposals were submitted by residents in the specialty of Medicine and Allied 106(26.5%), followed by Paediatrics 64(16%), Surgery and Anaesthesia 60(15%), Obstetrics and Gynaecology 60(15%), Dentistry 26(6.5%), Pathology28(7%), Ear-Nose-Throat (ENT) 22(5.5%), Diagnostic Radiology 18(4.5%), and Ophthalmology 16(4%).

A range of errors were detected, with the most common being related to operational definition, rationale, sample size calculation, objective writing and statistical analysis (Table 1).

Mean errors based on type of institution among different specialties showed significant difference both is

Table-1: Descriptive analysis of common errors in synopsis writing.

Domains	Category	n (%)
Ethical approval attached	No	80 (20.0)
	Yes	320 (80.0
)Consent form attached	No	74 (18.5)
	Yes	326 (81.5)
Title related to specialty	No	52 (13.0)
	Yes	348 (87.0)
Title matched with objective	No	168 (42.0)
	Yes	232 (58.0)
Introduction well explained	No	144 (36.0)
	Yes	256 (64.0)
Rationale stated	No	244 (61.0)
	Yes	156 (39.0)
Objective stated clearly	No	174 (43.5)
	Yes	226 (56.5)
Hypothesis stated (if required)	No	86 (21.5)
	Yes	314 (78.5)
Operational Definitions objectively defined	No	264 (66.0)
	Yes	136 (34.0)
Appropriate Study Design	No	116 (29.0)
	Yes	284 (71.0)
Sample Size calculated	No	244 (61.0)
	Yes	156 (39.0)
Correct Sampling Technique	No	116 (29.0)
	Yes	284 (71.0)
Inclusion/Exclusion criteria stated	No	238 (59.5)
	Yes	162 (40.5)
Confounding variables controlled	No	234 (58.5)
	Yes	166 (41.5)
Include relevant variables	No	174 (43.5)
	Yes	226 (56.5)
Appropriate data analysis plan stated	No	188 (47.0)
	Yes	212 (53.0)
Appropriate statistical test applied (if applicable)	No	210 (52.5)
	Yes	190 (47.5)
Reference writing	No	222 (55.5)
	Yes	178 (44.5)
Data collection Proforma & Consent form well designed	No	258 (64.5)
	Yes	142 (35.5)

Table-2: Comparison of mean errors based on type of training institution.

Domains	Confounders	Categories	Mean±SD	*p*-value
Epidemiology related issues	Hospital			
		Government	1.77±1.268	0.000
		Private	1.16±1.172	
		Military	2.05±1.205	
	Specialty			
		Medicine & Oncology	1.43±1.147	0.004
		Anaesthesia & Surgery	2.03±1.288	
		Paediatrics	1.28±1.240	
		Obstetrics & Gynaecology	1.87±1.420	
		Dentistry	1.92±1.017	
		Other specialties	1.69±1.289	
Statistical issues	Hospital			
		Government	4.59±2.120	0.000
		Private	3.68±1.874	
		Military	4.59±1.558	
	Specialty			
		Medicine and Oncology	3.89±1.958	0.003
		Anaesthesia and Surgery	4.80±2.138	
		Paediatrics	4.06±1.934	
		Obstetrics & Gynaecology	4.03±1.756	
		Dentistry	4.92±2.096	
		Other specialties	4.79±1.933	

SD: Stanadard Deviation.

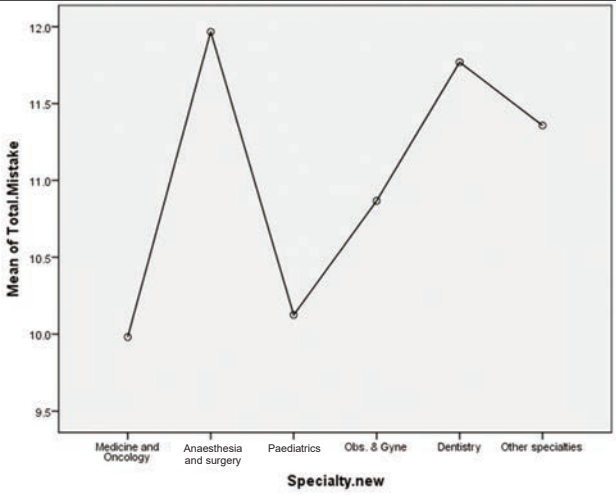

Figure: Mean errors in synopsis writing across different specialities (*p*-0.003).

epidemiological and statistical issues ($p<0.05$) (Table 2), but there was no significant difference in general issues and bibliography ($p>0.05$).

Comparison of total mean errors across different specialties showed significant difference (Figure).

Discussion

Research writing is an integral part of postgraduate training. Thesis is product of systematic collection, analysis and interpretation of data based on the research objective and hypothesis. Thesis writing facilitates the learning process related to all the steps of research writing, from selection of topic to defining methodology and implementation of statistical knowledge.[7]

One study done in Pakistan on postgraduate residents also exhibited the same demographic features as in the current study.[1] The current findings, however, were not consistent with those of a study done in the Middle East where the majority (49.3%) was from specialty of Surgery.[4]

Consent and ethical certificates are mandatory to be attached with synopsis submission, and majority of the residents in the current study attached ethical certificates and consent forms.

Sudheesh K et al. supported the fact that a well-thought-out clear synopsis is the backbone of research. The objective behind submitting a research proposal is to gain approval from institutional authorities and ethical committee also. The research topic should be selected with the rationale that what that particular study adds to the existing knowledge and what will be the benefits of that research. The topic should be innovative, relevant, acceptable to the committee and cost-effective.[8]

In the current study, objective along with rationale and hypothesis writing was incorrect in large proportions. One-third of the residents were unable to write appropriate title for their thesis proposal. Major mistakes were done in writing operational definition (66%), which are meant to control misclassification bias. However, majority knew the correct application of epidemiological study design owing to a good amount of time spent on this topic in research methodology workshops, which is compulsory for the students to attend before their research proposal writing and intermediate module examination.

According to a local study done on postgraduate trainees (PGTs) at a hospital in Peshawar, most had difficulty in writing research proposals, which was significantly associated with specialty and setting.[6] It concluded that a well-equipped research facilitation centre should be developed in each hospital. The CPSP is endeavouring to strengthen the research culture among the fellows. For this purpose, research methodology workshops are made obligatory for both the students and the supervisors. Despite all these efforts, students face difficulty at every step of the way, from selection of topic to writing dissertation or article. About 30% students were unclear about their title, 66% had unsatisfactory introduction, 70% had wrongly developed introduction, and 90% were wrong in methodology. Similar results were reported by another qualitative study, which identified lack of time and lack of

coordination between supervisors and students as the main challenges.[9] In a study done in the Middle East, 50.9% subjects had difficulty in getting approval of topic from the authorities, 50% had obstacles in sample size collection and 77.10% in patient follow-ups.[4] An Indian study concluded that residents had problems in writing research proposals.[10] But an Iranian study showed contrary outcomes, showing that 77.8% subjects had favourable knowledge of epidemiology.[11] In a local study , good knowledge required for synopsis writing was found only in 18.6% of the fellows, 76% had average knowledge of epidemiology.[1] It concluded that the reason behind inappropriate knowledge was poor understanding of study design and biostatistics.[1]

Sudheesh K et al. supported the fact that Introduction should be written in such a way that it sets the scene and provides the context of the research. The methodology should be written in such a way that it should represent a study's objective, rationale and hypothesis. Data analysis should also be related to the theme behind the research. Statistical test should be chosen as per the study variables. Software used should be mentioned as well.[8] The same was recommended by Bahadori M.[12]

In the current study, >60% residents had incorrect application based on poor understanding. But this understanding was statistically different with regards to specialty and hospital setting. In another study done on postgraduate students of Islamabad, poor understanding was seen related to biostatistics for application in writing research proposals (42%), which improved (57%) after research methodology workshops were conducted.[13] Only 30% PGTs had knowledge of application of test of significance in research proposals and article writing. Only 58.9% correctly gave the meaning of '*p*' value.[13]

Research methodology workshops are an important source in the perception and understanding of residents.[14,15]

The importance of sample size and its calculation is critical in any research. A study showed that 46.61% residents had done research as a mandatory requirement, and only 7.5% did this to improve their skills. Residents found the elements of statistical analysis and sample size as difficult tasks, with 36.48% having little understanding of them.[16] Another study showed that medical students had moderate knowledge of biostatistics, with 75% of them saying they were unable to read and write the statistical portion of a research paper.[17]

In Pakistan, medical residents have interest in research writing, but inadequate facilities and curriculum are major hurdles. This is supported by a study in Karachi where lack of support from the institution was cited by 79.5% subjects.[18] Biostatistical knowledge, including the use of SPSS software, is crucial for the training of students regarding research writing. To overcome this difficulty, the major task is to impart knowledge followed by comprehension of biostatistics and epidemiology.[19]

According to one study, postgraduate students had difficulty in writing synopsis due to poor knowledge of epidemiology and research. There are many factors involved in regarding lack of interest in research. The most common among them are failure to understand the role of practical applicability and time constraint.[20]

Errors in writing a manuscript or proposal should be dealt with in a positive manner without developing feelings of discouragement. This should be believed that these errors are highlighted just to improve the standard of research.[21]

A study also stated that practical and theoretical knowledge of research plays a vital role in planning and designing and later writing of research proposal. When responsibilities of individuals are not well-defined and unstructured career pathways exist, then these factors can lead to a lack of critical thinking, resulting in research-based problems. Some institutions have started training mentors for their research pro¬grammes.[22] Institutions should be aiming at the development of programmes for the training of residents and undergraduate medical students in research. Mentors should encourage the students, and grants should be provided.[22,24]

The current study, having been done at a single centre, has its limitations. The incorporation of multiple CPSP regional centres may be helpful in understanding the trend among residents across Pakistan.

Some institutions are paying attention to the cause of developing and strengthening the research culture. For this purpose, there is a need to train doctors in research methodology who can provide consultation to both the residents and the supervisors through a research cell within the premises of every tertiary care hospital. Periodic training of these skilled personnel in research is also required to keep them updated with EBM and evidence-based practice (EBP).

Conclusion

Majority of research proposals submitted by medical residents were found to have inadequacies. Difference in research writing skills across specialties and training institutions may be related to the lack of research assistance and good mentorship.

Acknowledgement: The author would like to thank all participants for providing valuable data for this research.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

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