Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/12375
DOI URL: http://dx.doi.org/10.21474/IJAR01/12375

ISSN NO. 2320-5407

RESEARCH ARTICLE

DOES RESTRUCTURING THE RESEARCH CURRICULUM OF ORTHOPEDIC TRAINING PROGRAM AFFECT THE RESEARCH PERFORMANCE? EVIDENCE FROM QATAR

Ghalib Ahmed Alhaneedi[1], AbduljabbarAlhammoud[1], Shamsi Hameed[1], Mohammad Al Ateeq Al Dosari[1] and Abdullatif Alkhal[2]

1. Orthopedic Residency Training Program, Orthopedics Department, Hamad General Hospital, Hamad Medical Corporation, PO Box 3050, Doha, Qatar.
2. Medical Education Department, Hamad Medical Corporation, PO Box 3050, Doha, Qatar.

Manuscript Info

Manuscript History
Received: 25 November 2020
Final Accepted: 28 December 2020
Published: January 2021

Key words: -
Research Curriculum, Orthopedic Training program, Publication, ACGME-I, Accreditation

Abstract

Background: The participation of trainees and faculties in the research is an integral part of postgraduate medical training and education. The educational curriculum of the training program should be structured to support the learning of the trainee's scholarly activities, address research barriers, foster a culture of inquiry, and improve their research performance. The Accreditation Council for Graduate Medical Education International (ACGME-I) standards include participation in scholarly activities by residents and faculties as an essential requirement of the training program.The possible effects of research-based curriculum after accreditation of postgraduate training program on the research performance was examined in a longitudinal study of the orthopedic training program.

Methods: Web-based systematic review for all publicationsfrom our orthopedic training program and only pubmed index publications of other institutional programs before (2009-2013) and after (2014-2018) accreditation was conducted. Data for the type of publications, journal name, impact factors, dates published, orthopedic specialty, level of evidence,and the role of residents and faculties in the authorship were collected.The research academic degree of residents, number of residents applied and matched for a fellowship in North America and/or UK were collected from a resident's portfolio.

Results: The orthopedics training program published a total of 50 articles between 2009 and 2018, which represented 2% of all other institutional programs publications. There was a significant improvement in the number of publications from three (6%) to 47(94%) articles before and after accreditation, respectively. There were 19(38%) original researches, 17(34%) review articles, 13(26%) case reports, and one letter to the editor. International Orthopedics was the most commonly used journal with ten publications (25%). Most of the publications were in orthopedic trauma with 18 articles (36%),

Corresponding Author:- Dr. Ghalib O. Ahmed Alhaneedi
Address:- Senior Consultant Orthopedic Surgeon Director of Orthopedic Residency Training Program Ass. Professor Weil Cornell Medical College, Qatar Hamad Medical Corporation, PO Box 3050.

10(20%) pediatric orthopedics, 7 (14%) foot and ankle and 7(14%) spine articles. The residents were the first author in 50% of publications, and at least one-third were published during their training.
Conclusion: This study showed that the development of the structured research based educational curriculumof the residency training program after accreditation helped in enhancing the research performance and publications in our postgraduate training program. Restructuring of the research-based curriculum after accreditation of the program appears to increase the trainees and faculties chances of being an author or co-author of a scientific article.

……

Introduction:-

The Accreditation Council of Graduate Medical Education International (ACGME-I) is responsible for the accreditation of residency and fellowship training programs outside the USA. The ACGME-I has implemented scholarly activities participation for residents and core faculties as an essential requirement in training programs.[1]

Participation in scholarly activity during residency training benefits trainees by promoting evidence-based practice and quality patient care. It also supports critical thinking skills and evolving as a necessity to help trainees become competent, independent physicians.[2,3]

Fulfilling the scholarly activity requirement means the training programs must develop curriculum that supports research, address research barriers, and foster a culture of inquiry.[4-8]

Large institutions with training programs in multiple specialties face challenges when research-related training needs vary across the training programs.[9,10]

Our institution is an integrated health care system that provides care to over 2.5 million individuals across the country. It sponsors 22 residency and 60 fellowship training programs, of which 14 residency and 9 fellowship programs are ACGME-I accredited.

Orthopedic surgery training at our institute is a five-years program that started in 1990 and accredited by ACGME-I in 2014.

This study aimed to assess the possible effect of restructuring of research-based curriculum after ACGME-I accreditation of postgraduate orthopedic training program on the research performance in our program.

Methods:-

Search Strategy

Web-based systematic review for all research publications from our orthopedic surgery and other institutional programs was done using databases like PubMed, Google Scholar, Europe PMC, and ResearchGate from January 2009 till December 2018. A senior resident searched using ACGME-I, research, accreditation, the orthopedic residents' and faculties' names, the orthopedic department, and other institutional programs as keywords.

Inclusion Criteria

All publication from our orthopedic training program and only pubmed index publications of other institutional programs between 2009 and 2018 were included in the study.

Data for the publication names, dates published, orthopedic specialty, study type, level of evidence, journal name, impact factor at the year of publication, and the role of the residents and the faculties in authorship were collected before (2009-2013) and after ACGME-I accreditation (2014-2018).

The number of residents and faculties, research academic degree of residents, number of residents applied and matched for a fellowship in North America and/or UK were collected from a resident’s and faculties’ portfolio in the program.

Data Analysis

All statistical analyses performed using the statistical packages SPSS 22.0 (SPSS Inc. Chicago, IL) and Epi Info TM 2000 (Centers for Disease Control and Prevention, Atlanta, GA).

The categorical and continuous data were expressed in percentage, mean, range and correlated using percentages and graphical comparisons. We considered the positive results statistically significant if the P value was ≤.05.

Results:-

Program's Demographics

There were 57 residents recruited in our orthopedic residency program, 34 before (2009-2013), and 23 after accreditation (2014-2018) with 25 faculties before and 49 faculties after accreditation.

Overall Effects on the Number of Publications

The Orthopedics surgery program published 50 articles between 2009-2018, which represented 2% of all institutional publications (2488) in the same period. There was a significant improvement in the number of orthopedic publications from three (6%) to 47(94%) articles before and after accreditation. The other HMC publications were increased from 628 (25%) to 1860 (75%) articles during the same period (see Figures 1 and 2).

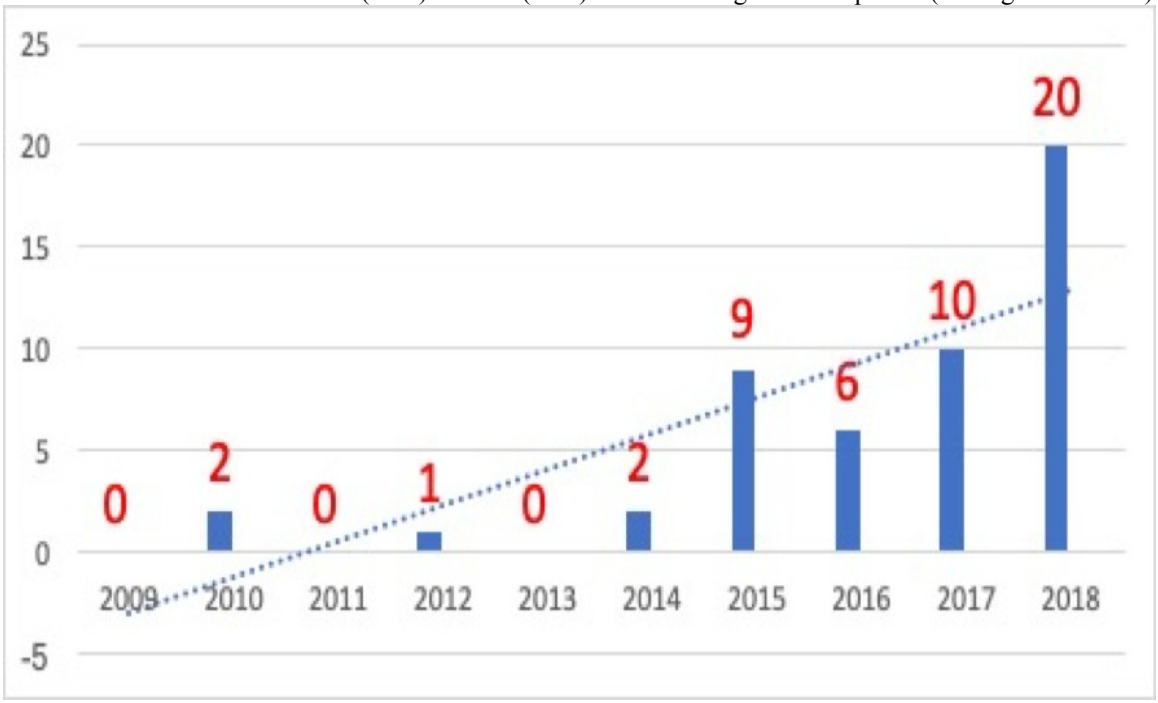

Figure 1:- Orthopedic PubMed and Non-PubMed research publications by year.

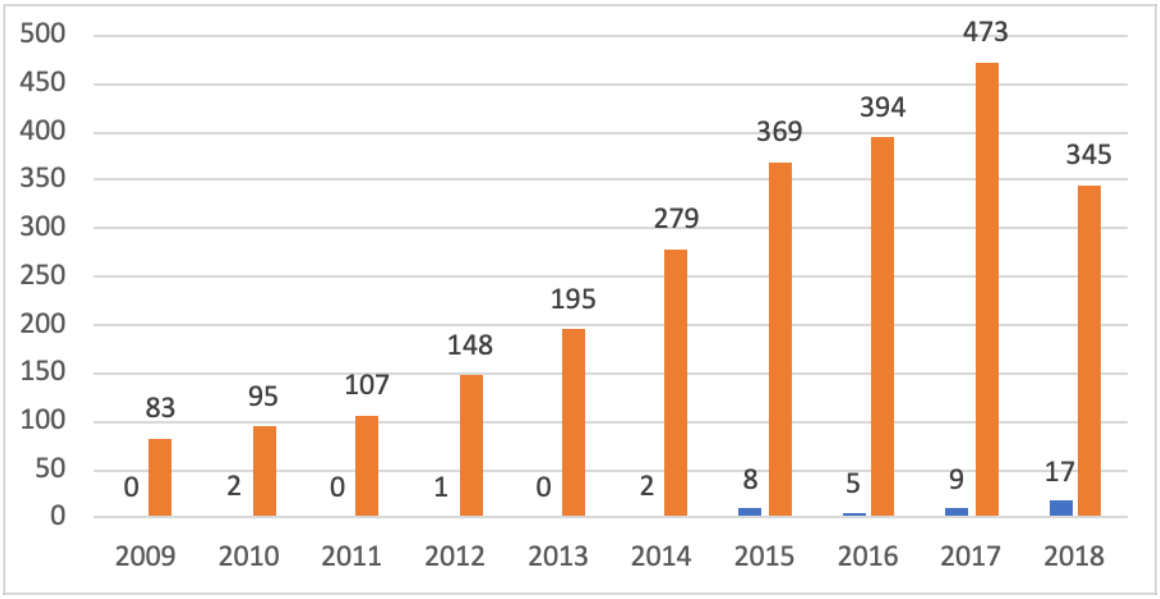

Figure 2:- Orthopedic and other institutional programs PubMed index research publications by year. Orthopedic Publication. Other Institutional programs publications.

TheEffects on the Quality of Publications

There were 19 (38%) original research, 17 (34%) review articles, 13 (26%) case reports, and one (2%) letter to the editor.

According to the hierarchy of evidence by Oxford Center that used to rank the strength of scientific article,[11] there was one level I study, one level II, 10 (20%) level III, 25 (50%) level IV evidence, and 13 (26%) level V studies.

44 (92%) of publications were in PubMed indexed journals and the International Orthopedics was the most used journal with ten (25%) articles followed by the International Journal of the Surgical Case Report. The mean impact factor was 1.2 (0.1-2.51). Most of the publications were in orthopedic trauma with 18 (36%) articles, ten (20%) pediatric orthopedics articles, seven (14%) foot and ankle articles, and seven spines (14%) articles.

TheEffects on the Trainees and Faculties authorship

The resident and faculties publications were 0% and 6.2% before and 43% and 43.4% after accreditation. The residents were the first author in 25 (50%) of publications, and at least one-third of residents were published during their training. In contrast, the faculties were first authors in 18 (36%) articles.

The Influence of the Trainees' Characteristics on Publications

There were four residents with an academic research degree; the mean number of authorships of residents with an academic research degree was 6 with a significant difference (P-value 0.001).

Out of 57 residents, 41 were eligible to apply for a fellowship in North America and UK;15 of them applied for fellowships, and 11 matched. The mean number of authorships of fellowship matched residents were 3.5, and 3.25 for a non-matched resident with no significant difference (P-value 0.99).

Discussion:-

Given the substantial improvement in the training and the potential impact of accreditation on educational programs, it is crucial to understand the effect of restructuring the research curriculum after the ACGME-I accreditation on research performance. This is important when considering that restructuring the research curriculum after accreditation of training programs is associated with improved research outcomes if supported by the trainees and faculties.[12]

Implications of Development of Program ResearchCurriculum after Accreditation

The results showed a significant improvement in the number of research publications in the orthopedic training program after accreditation. Our finding is consistent with the recent changes in research-related activities made in our orthopedic training program to meet ACGME-I scholarly activity requirements that are needed for accreditation. These changes include; incorporation of two research rotation blocksin the orthopedic residency curriculumfor PGY 2 and 4, conducting the annual orthopedic research day, biannual surgical research and innovation idea symposium, annual institutional research day, organization of free mandatory research methodology course for residents. Research mentorship was assigned for trainees and the efforts by the leadership of the division to provide adequate time and resources for trainees and faculties to meet ACGME-I scholarly activity requirements.

There was also a significant improvement in all other institutional program publications during the same period. However, this increase needs further study to find out whether the accredited or non-accredited programs contributed to this improvement. We noticed a low rate of orthopedic publications compared to all institutional publications. This might be attributed to being a small program, low research funds, and few orthopedic faculties are interested in the research.

The Role of Trainees' and Faculties Characteristics

It is concerning that several trainees felt that research publication would improve their chances of pursuing fellowship opportunities in the USA and UK; however, the difference in the mean number of authorships of fellowship matched residents was not statistically significant from non-matched residents. This may reflect that persuading a fellowship opportunity had no impact on the increase in our research publications.

Campbell et al. reported that the average matched applicant to an orthopedic residency program publishes in the peer-reviewed literature less frequently than reported.[7]

The authorship of residents with a research academic master's degree was significantly better than without a research degree, and this should encourage the program and institute to provide the opportunity for residents and faculties to get an academic research degree to improve the research productivity.

It is interesting to note that only a minority of faculties were actively involved in research, and especially the core faculties who were required to participate in scholarly activities to fulfill the ACGME-I requirement.

Most publications are from certain orthopedic subspecialties, and this might be because of the lack of resources and interest among faculties in the other orthopedic subspecialties.

Institutional Strategy for Future Research Curriculum

Some barriers to research in our program are the shortage of the research faculty, the lack of time and interest, and institutional factors, including lack of medical librarian managerial support and equipment.[13]Also, most publications were evidence level 4, 5, and this may reflect the difficulty in obtaining the needed resources, getting the approval and grants by the institutional Medical Research Center to conduct a high impact on original research.

Some barriers are challenging across the different training programs and need strategies to mitigate barriers to research across all training programs.

There is a need to adopt strategies by our division and institution to overcome any challenges and barriers in the orthopedic training program. These include providing a research faculty, coordinator, medical librarian, statistical support, research funding, space and to facilitate the process through the Medical Research Center for approval of high-impact original researches. Hence, this might facilitate their skills in conducting a high impact on original research and mentoring the residents.

Limitations of Study

We designed it for evaluation of research publication of only orthopedic programs, potentially limiting the generalizability of findings. Another limitation of this study is sample selection, in which it included only the PubMed index articles of other programs.

Conclusion:-

This study showed that the restructuring the research curriculum after accreditation of the residency training program enhanced the development of the structured research-based educational curriculum that helped in advancing the research performance of our postgraduate training program.Hence, the development and implication of research based educational curriculum is essential for research performance in the postgraduate medical training program. However, our results should be considered exploratory and we recommend a larger study to investigate the impact on other accredited institutional programs.

Competing Interests

The authors declare no conflict of interest and no competing interests.

Funding

The authors report no external funding source for this study.

Authors' Contribution

All authors contributed to the design, data collection, data analysis, and interpretation of the results. GA and AA led the data collection. AA led the data analysis. GA, AA, SH, MA, and AA led the interpretation and presentation of results. GA and AA wrote the initial draft of the manuscript. All the authors read and approved the final manuscript.

Availability of Data

The data that support the findings of this study are available on request from the corresponding author.

Acknowledgements:-

We are thankful toMrs. Zahra Mazhar for her cooperation in this study.

References:-

1. 1. ACGME International foundational and advanced specialty program requirements for Graduate Medical Education. 2016.Accessed July 8, 2020, from https://www.acgme-i.org/Accreditation-Process/Foundational and advanced specialty Requirements.
2. 2. Rothberg, MB.Overcoming the obstacles to research during residency: what does it take? *JAMA* 2012; 308(21):2191-2192. doi: https://doi.org/10.1001/jama.2012.14587
3. 3.Dolmans, D.H.J.M. How theory and design-based research can mature PBL practice and research. *Adv in Health Sci Educ*2019; 24:879–891.doi: https://doi.org/10.1007/s10459-019-09940-2
4. 4. Seehusen, D.A., Weaver, S.P. Resident research in family medicine: where are we now? *Fam Med*. 2009; 41(9):663-668.
5. 5.Vucicevic, D., Mookadam, F., Webb, B.J. *et al*. The impact of 2011 ACGME duty hour restrictions on internal medicine resident workload and education. *Adv in Health Sci Educ* 2015; **20:** 193–203 doi: https://doi.org/10.1007/s10459-014-9525-5
6. 6. Krueger, C.A, Hoffman, J.D., Balazs, G.C., et al. Protected Resident Research Time Does Not Increase the Quantity or Quality of Residency Program Research Publications: A Comparison of 3 Orthopedic Residencies. *J Surg Educ*.2017; 74(2):264-270. doi: https://doi.org/10.1016/j.jsurg.2016.08.008
7. 7. Campbell, S.T., Gupta, R., Avedian, R.S. The Effect of Applicant Publication Volume on the Orthopaedic Residency Match. *J Surg Educ*. 2016; 73(3):490-495. doi: https://doi.org/ 10.1016/j.jsurg.2015.11.011
8. 8. Osborn, P.M., Ames, S.E., Turner, N.S., et al.An Analysis of Research Quality and Productivity at Six Academic Orthopaedic Residencies. *J Surg Educ*. 2018; 75(6):1635-1642. doi: https://doi.org/ 10.1016/j.jsurg.2018.04.022
9. 9. Robbins, L., Bostrom, M., Marx, R., Roberts, T., Sculco, T.P.Restructuring the orthopedic resident research curriculum to increase scholarly activity. *J Grad Med Educ*.2013; 5(4):646-651. doi: https://doi.org/10.4300/JGME-D-12-00303.1
10. 10. Hebert, R.S., Levine, R.B., Smith, C.G, et al. A systematic review of resident research curricula. *Acad Med J Assoc Am Med Coll*.2003; 78(1):61-68. doi: https://doi.org/10.1097/00001888-200301000-00012
11. 11. Oxford Centre for Evidence-Based Medicine - level of evidence. 2009. Accessed October 15, 2019, from http://www.cebm.net/index.aspx?o=5653.

12. 12. Becker, D., Garth, H., Hollander, R., Klein, F., et al. Understanding Faculty and Trainee Needs Related to Scholarly Activity in a Large, Nonuniversity Graduate Medical Education Program. *Perm J*. 2017; 21:16-034. doi: https://doi.org/10.7812/TPP/16-034
13. 13. Bakken, S., Lantigua, R.A., Busacca, L.V., et al. Barriers, enablers, and incentives for research participation: a report from the Ambulatory Care Research Network (ACRN). *J Am Board Fam Med JABFM*. 2009; 22(4):436-445. doi: https://doi.org/10.3122/jabfm.2009.04.090017