

Research productivity among faculty members at medical and health schools in Saudi Arabia

Prevalence, obstacles, and associated factors

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ABSTRACT

الأهداف: التعرف على العوامل والمعوقات التي تحول دون الإنتاج البحثي لدى أعضاء هيئة التدريس في الكليات الطبية والصحية بالمملكة العربية السعودية.

الطريقة: أُجريت هذه الدراسة المسحية المقطعية باستخدام إستبانة ذاتية التعبئة وذلك لجمع البيانات الشخصية، وأخرى متعلقة بالنشاط البحثي ومعوقاته لدى أعضاء هيئة التدريس. تم توزيع 500 إستبانة عشوائياً، وقدمت استرجاع 389 (77.8%) إستبانة كاملة وذلك من 10 كليات طبية وصحية خلال الفترة من يناير إلى أبريل 2011م وتم تحليل البيانات وعرضها بطريقة وصفية.

النتائج: أشارت النتائج إلى أن 150 عضواً (38.6%) فقط من عينة الدراسة قد قاموا بنشر بحثاً علمية خلال السنتين الماضيتين. وقد قام 80% من هؤلاء بنشر بحثاً منفردة، وأن ما يقارب من ربع عينة الدراسة (26%) قاموا بنشر بحثاً مشتركة. وأظهرت النتائج أن أعضاء هيئة التدريس الرجال، والأصغر سناً قد قاموا بنشر أبحاثاً أكثر من نظرائهم الآخرين. كما أن أولئك الذين يقومون بأعمال إدارية هم أقل نشرًا للأبحاث. تبين أن أعضاء هيئة التدريس الذين يشرفون على طلاب الدراسات العليا، أو الذين تلقوا تدريباً على طرق البحث يميلون إلى إنتاج بحثاً علمية أكثر من غيرهم. وأوضح أعضاء هيئة التدريس الذين لم ينشروا أبحاثاً خلال السنتين الماضيتين أن عدم وجود الوقت الكافي، وعدم وجود مساعدين باحثين، وعدم وجود الدعم المادي الكافي للبحوث العلمية، وزيادة العبء الدراسي هي أهم معوقات الإنتاجية البحثية لديهم.

خاتمة: إن فهم العوامل المؤثرة أو المعيقة لإنتاج البحث العلمي يعتبر مطلباً أساسياً ينبغي تحقيقه قبل إجراء أي تدخلات ترمي إلى تعزيز بحوث الخدمات الصحية لدى أعضاء هيئة التدريس في الكليات أو الجامعات الصحية.

Objectives: To identify the prevalence, factors and obstacles affecting research productivity among academic staff at medical and health colleges in the Kingdom of Saudi Arabia.

Methods: This cross-sectional survey employed self-administered questionnaires to collect data on faculty members' profile, research activities, and obstacles impeding research productivity. The questionnaires were distributed randomly to 500 faculty members, of which 389 (77.8%) completed the questionnaire at 10 medical and health colleges during January to April 2011. The data were analyzed and presented in a descriptive fashion.

Results: Only 150 (38.6%) respondents reported published work in the past 2 years. Of these, 80% indicated sole-authors research and around a quarter (26%) reported co-authors work. Males and young faculty members were more likely to publish research than their counterparts. Faculty members who reported involvement in administrative activities were less likely to publish. Those who reported supervising postgraduate students or had attained training on research methods were more likely to produce research. Respondents perceived that lack of time, lack of research assistants, lack of funds for research, and being busy with teaching load were the most cited obstacles impeding research productivity.

Conclusion: Understanding factors and barriers impeding research productivity is a prerequisite for interventions that are directed to promote health services research among faculty members in medical schools.

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Scholars indicated that scientific research is an imperative component of success in the academic and medical disciplines,¹ and that the assessment of the research productivity in academic institutions is an important measure of the extent of their contributions to developing new knowledge.² Faculty publishing productivity is often used as an index of departmental and institutional prestige and is strongly associated with individual,^{3,4} organizational,⁵ and environmental factors.⁶ Understanding factors associated with research productivity is important for leaders of academic institutions and health professionals. Publications are the major output of scientific research, and they are the most commonly used vehicles through which new scientific discoveries are conveyed to the rest of the world.⁷ Publication counts, articles printed in well-known academic journals and research grants are among the common measures of faculty research performance. Other authors used multiple measures to investigate faculty research productivity in an attempt to be more objective.⁸ However, there is no agreement among authors on what constitutes objective criteria that could be used to evaluate research productivity since each criterion has its own merits and deficiencies.^{9,10} The identification of factors promoting or impeding research productivity has been the focus of studies in different disciplines such as management,¹¹ higher education,¹² information systems,¹³ agriculture,¹⁴ as well as medical and health-related studies.¹⁵⁻¹⁸ Most of these factors were classified into 2 broad groups; individual and institutional factors.^{3,5,19} Individual factors included aspects such as researcher's age, gender, salary, academic rank, number of years in the profession, teaching load and the faculty members' confidence in writing refereed works. Institutional factors included the institution size, funds allocated to research, presence of research groups, departmental support, subscriptions of journals, and the availability of information technology. In Saudi Arabia, no research has been undertaken on the prevalence, obstacles, and factors associated with research productivity among faculty members in medical and health schools. Most of the available literature was conducted in developed countries and little is known on research productivity in academic institutions in the developing countries.²⁰ Such studies are particularly important in developing countries where funding for research is limited and where senior administrators have to decide whether to invest their limited resources in scientific research or in support of the educational goals of these institutions.²¹ As such, the purpose of this study was to present an exploratory investigation that identifies the extent of research productivity and to determine factors and obstacles that may influence research productivity among academic staff in medical

colleges. Such studies will help decision makers in these colleges make appropriate interventions that promote research production and remove some of the obstacles that may hinder scientific research.

Methods. This was a cross-sectional study conducted to explore the prevalence, obstacles, and factors associated with research productivity among faculty members in medical and health colleges in Saudi Arabia. Accordingly, 10 medical/health colleges from different universities in the Kingdom were selected randomly. These colleges included medicine, dentistry, pharmacy, applied medical sciences, health sciences and nursing. The sample size was calculated for a 95% confidence interval, estimating a final sample size of 384 individuals. The sample size was increased to 500 to compensate for attrition (namely inadequately filled or missing questionnaires). In each college, 50 faculty members were selected randomly and invited for participation. All questionnaires were returned and no refusal was documented. However, only 389 (77.8%) questionnaires were completed appropriately and valid for analysis. The study took place during January to April 2011.

The questionnaire was developed to capture information relevant to the study and consisted of 3 parts. Part I sought information on the general profile of respondents such as their gender, age, academic rank, and years of experience in the academic profession. Part II consisted of questions regarding research activities and experiences. In particular, respondents were requested to identify whether they had published any peer-reviewed article in the past 2 years (yes/no). Those who answered in the affirmative were asked to identify the type of authorship (sole-authored or joint-authored) and the publication outlet (journal or conference). Similarly, respondents were asked to report whether they supervise postgraduate students' research (yes/no) and whether they had attended any training on research methods after their graduation (yes/no). In order to determine the quality of the published work, respondents were asked to identify whether such research had been accepted or published by any of the journals indexed by the Institute for Scientific Information (ISI) (yes/no). The ISI was used because it is considered one of the most international criterion for measuring research productivity in universities around the world.²² The

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final part requested respondents who did not publish any research in the past 2 years to identify barriers that discouraged them from publishing. In this section, respondents were given a list of possible obstacles, based on an extensive review of the literature, and were instructed to mark as many barriers as applied.

For the purposes of this study, research productivity was defined as the authorship of articles that had been published or accepted for publication by either peer-reviewed journals or conferences or both; although it is recognized that there are other forms of scholarly productivity such as authorship of books and presentations at conferences. However, this definition has been used in other research,²³ and since there is no "gold definition" on what constitutes research productivity, this definition was used; taking into account its limitations.

In order to increase the content validity of the questionnaire, an extensive literature review on faculty research productivity was carried out, 2 medical faculty members and 2 statisticians reviewed the draft questionnaire and it was pilot-tested. On the basis of the suggestions made by the reviewers and the outcome of the pilot survey, the final questionnaire was reformulated. Chi-square test was used to test the difference between categorical variables, and the logistic regression was performed to identify factors that significantly influenced respondents' research productivity. The multivariate-adjusted odds ratio and the corresponding 95% confidence intervals were calculated. All tests were two-tailed with a statistical significance level of 0.05. The data for this study were entered and analyzed using the Statistical Package for Social Sciences version 11 (SPSS Inc, Chicago, IL, USA) and presented in a descriptive fashion.

The study protocol was approved by the local ethics committee at each participating institution. Respondents were informed of the purpose of the study and consent was obtained. Respondents were also assured of confidentiality, and it was made clear to respondents that neither their names nor their institutions will be mentioned.

Results. Respondents were predominantly males (73.8%) and the average years of experience in the academic profession was 12.3±6.9 years (range, 2-38 years). The vast majority had an academic rank of assistant professor (63.8%) and the average age of respondents was 45.1±7.1 years (range, 31-63 years). Seniority was positively correlated with age in that 81% of seniors (associate professors and full professors) were 45 years or older ($p<0.001$). The vast majority of respondents did not publish any research in the past 2 years.

Those who reported published work in the past 2 years constituted 38.6% (n=150) of the study sample. Of these, 80.7% had their research work published in academic journals and around a quarter in conference proceedings. The vast majority of respondents who published indicated that their work was sole-authored and around a quarter of respondents reported co-authored work. The least majority of respondents indicated that they had published both sole and co-authored work. Only a quarter of respondents published in the ISI indexed journals (Table 1).

The difference between faculty members who published research and those who did not in the past 2 years is presented in Table 2. The results indicate that a significantly higher percentage of males than females had published research. Similarly, a significantly higher percentage of younger respondents than older ones had published research work. Those who had lower years of experience made a significantly higher percentage of research productivity than those who had higher years of experience. The results also indicate that junior faculty members (assistant professors) were more likely to publish more research than seniors (associate and full professors). Respondents who were involved in administrative activities made a significantly lower percentage of research productivity than those who were not. Respondents who reported supervising postgraduate research projects made a significantly higher percentage of publications than those who did not. Finally, faculty members who attended training on research methods made a significantly higher percentage of research than those who did not attend such training.

Table 1 - Research productivity among faculty members at medical and health schools in Saudi Arabia.

| Aspects | Frequency | (%) |
|--|-----------|--------|
| <i>Had published (or accepted for publication) an article in a peer-reviewed journal in the past 2 years (n=389)</i> | | |
| Yes | 150 | (38.6) |
| No | 239 | (61.4) |
| <i>Type of authorship* (n=150)</i> | | |
| Sole-author only | 133 | (88.7) |
| Co-author only | 39 | (26.0) |
| Both sole and co-author | 17 | (11.3) |
| <i>Publication outlet* (n=150)</i> | | |
| Journals only | 121 | (80.7) |
| Conference proceedings only | 38 | (25.3) |
| Both journals and conferences | 30 | (19.3) |
| <i>Published in the ISI journals* (n=150)</i> | | |
| Yes | 39 | (26.0) |
| No | 111 | (74.0) |

*Only for respondents who published (or obtained acceptance for publication) in the past 2 years, ISI - institute for scientific information

Table 2 - Research productivity according to selected demographic characteristics among faculty members at medical and health schools in Saudi Arabia.

| Characteristics | Published (in the past 2 years)* | | χ^2 | P-value |
|--|----------------------------------|------------|----------|---------|
| | Yes (%) | No (%) | | |
| <i>Gender</i> | | | | |
| Male (n=287) | 121 (42.2) | 166 (57.8) | 5.422 | 0.020 |
| Female (n=102) | 29 (28.4) | 73 (71.6) | | |
| <i>Age (years)</i> | | | | |
| < 45 years (n=190) | 103 (54.2) | 87 (45.8) | 37.116 | <0.001 |
| ≥ 45 years (n=199) | 47 (23.6) | 152 (76.4) | | |
| <i>Years in academic profession</i> | | | | |
| < 10 years (n=195) | 91 (46.7) | 104 (53.3) | 10.170 | <0.001 |
| ≥ 10 years (n=194) | 59 (30.4) | 135 (69.6) | | |
| <i>Academic rank</i> | | | | |
| Junior (Assistant Professor) (n=248) | 110 (44.4) | 138 (55.6) | 9.033 | 0.003 |
| Senior (Associate/full Professor) (n=141) | 40 (28.4) | 101 (71.6) | | |
| <i>Involved in administrative activities</i> | | | | |
| Yes (n=241) | 75 (31.1) | 166 (68.9) | 13.986 | <0.001 |
| No (n=148) | 75 (50.7) | 73 (49.3) | | |
| <i>Supervising theses/research projects of postgraduate students</i> | | | | |
| Yes (n=221) | 124 (56.1) | 97 (43.9) | 64.809 | <0.001 |
| No (n=168) | 26 (15.5) | 142 (84.5) | | |
| <i>Participated in research training in the past 2 years</i> | | | | |
| Yes (n=98) | 55 (56.1) | 43 (43.9) | 16.078 | <0.001 |
| No (n=291) | 95 (32.6) | 196 (67.4) | | |

*or received a letter of acceptance for publication

Table 3 - Characteristics associated with research productivity among faculty members at medical and health schools in Saudi Arabia.

| Characteristics | Odds ratio (95% CI) | P-value |
|---|---------------------|---------|
| <i>Gender</i> | | |
| Male | 3.64 (2.01-6.58) | <0.001 |
| Female | 1.00 (reference) | |
| <i>Age (years)</i> | | |
| < 45 years | 2.70 (1.54-4.73) | <0.001 |
| ≥ 45 years | 1.00 (reference) | |
| <i>Years in the academic profession</i> | | |
| < 10 years | 1.67 (0.96-2.90) | 0.069 |
| ≥ 10 years | 1.00 (reference) | |
| <i>Academic rank</i> | | |
| Assistant Professor | 1.06 (0.581-1.948) | 0.842 |
| Associate Professor | 1.00 (reference) | |
| <i>Involved in administrative activities</i> | | |
| No | 2.54 (1.52-4.25) | <0.001 |
| Yes | 1.00 (reference) | |
| <i>Supervising postgraduate research projects (or theses)</i> | | |
| Yes | 5.06 (2.79-9.18) | <0.001 |
| No | 1.00 (reference) | |
| <i>Received training after graduation on research methods</i> | | |
| Yes | 2.05 (1.11-3.81) | 0.023 |
| No | 1.00 (reference) | |

CI - Confidence Intervals

Table 3 summarizes the results of the binary logistic regression analysis. The results indicate that male faculty members were more likely to publish research than females. Younger faculty member were more likely to publish research than older ones. Those who were not involved in administrative activities were more likely to publish than those who were involved in such activities. Faculty members who reported supervising postgraduate research theses were more likely to publish research than those who did not. Similarly, faculty members who had attended some sort of training on research methods were more likely to publish research than those who did not attain such training.

Respondents who did not publish research in the past 2 years (n=239) reported a number of barriers that discouraged them from conducting research work (Table 4). Lack of time, lack of research assistants, and lack of financial incentives were the most cited barriers to research productivity and were reported by more than two-thirds of respondents. Obstacles such as heavy teaching schedule, lack of management support, and poor research atmosphere were reported by approximately half of respondents. More than one-third of respondents gave lack of interest in carrying out research, lack of community support, lack of knowledge in statistics, lack of secretarial support and lack of colleagues support as other barriers for conducting scientific research.

Table 4 - Obstacles to the research productivity as perceived by faculty members who *did not* publish research articles. (n=239)

| Obstacles | Frequency* |
|--|------------|
| | n (%) |
| Lack of time in carrying out research | 169 (70.7) |
| Lack of research assistants | 165 (69.0) |
| Lack of financial incentives | 160 (66.9) |
| Overloaded teaching schedule | 125 (52.3) |
| Lack of management/department support | 119 (49.8) |
| Poor research atmosphere | 115 (48.1) |
| Lack of self-interest in carrying out research | 103 (43.1) |
| Lack of community support in carrying out research | 96 (40.2) |
| Lack of knowledge in statistical techniques | 92 (38.5) |
| Lack of secretarial support | 90 (37.7) |
| Lack of colleagues support | 80 (33.5) |
| Lack of knowledge in research methodology | 59 (24.7) |
| Poor access to information sources | 53 (22.2) |
| Lack of computer/technical support | 50 (20.9) |
| Insufficient research equipment/facilities | 38 (15.9) |

*Respondents were instructed to select as many obstacles as applicable.

Discussion. The results emerged from this study indicated that only 38.6% of the academic faculty members have published a research work in the past 2 years, and that only 25% of them published in high quality journals. Comparing the results reported here with those from other countries is difficult because of the variations in the definitions used. While some authors defined research productivity as the “publication counts”,²⁴ others extended this definition to include the journal’s impact factor,²⁵ research grants,²⁶ and citation counts.²¹ Such discrepancy in the definition makes comparison difficult and may lead to discrepant conclusions. Regardless of these variations, scholars indicated that academic medical professionals ought to increase knowledge in their medical or health fields.²⁷

The low prevalence of research productivity reported in this study could be attributed to the obstacles and challenges perceived by respondents. It is possible that some faculty members find themselves comfortable with teaching, and do not wish to interrupt such patterns of work. It is also possible that faculty members were busy with their daily responsibilities beside their teaching load. Others might have been away from the research environment, which makes shifting to research productivity difficult.²⁸ Many faculty members, however, might have the interest in carrying out the research work, but are confronted with lack of skills and

time that should be devoted to conducting scientific research.

The findings of this study identified several characteristics of the medical faculty members that warrant attention. For example, female faculty members were less likely to publish scientific research than their male counterparts. This finding is consistent with previous research that indicated that female faculty members are lagging behind males in terms of carrying out research projects.^{29,30} Authors noted that the discrepancy in research output between males and females could be attributed, directly or indirectly, to the gender patterns in disciplinary and institutional affiliation, workload, and faculty rewards.³¹ However, the results reported here might not be surprising, giving the fact that females in Saudi Arabia are less mobile than males and more isolated from collaborated research teams or groups because of customs and religious reasons. In this study, there was no association between research productivity and the academic rank. This finding was surprising since it was expected that senior faculty members would demonstrate higher research productivity than juniors. It is worth mentioning that in the Saudi education system, as probably in other systems, senior faculty members are not motivated in carrying out research for the purpose of promotion. However, the results reported here contradicts those reported by other investigators,³² who found that faculty staff with higher academic ranks produce more research articles than those with lower academic ranks. This finding should question the promotion criteria adopted in the Saudi context. Incentives are needed to encourage senior faculty members to invest some of their experience in producing scientific research.

In this study, faculty members who reported supervising postgraduate students were more likely to produce more research output. Previous research identified that the number of postgraduate students supervised by faculty members does assist in improving research quality and quantity, but cannot be considered as the driving force alone.²³ This was supported by authors who noted that high ratios of graduate students to faculty correlates with research output, and the percentage of graduate students that were hired as research assistants correlated highly with research production as well.^{14,33} These results have important implications for increasing the research productivity by carrying out a collaborative research work between postgraduate students and their supervisors. Our results indicated that faculty members who received some sort of training on research skills and methodology were more likely to publish research articles. This implies that inexperienced faculty members should be acquired with the necessary research tools and methods that familiarize them with research design, proficiency in methods of statistical analyses, and techniques.²⁸ Continuing

education may play a significant part in alleviating part of the issue.

In this study, faculty members who did not publish in the past 2 years cited several barriers that hindered them from conducting health or medical research. Similar obstacles were reported in other studies.^{34,35} However, most of these obstacles were organizational in nature and could be tackled at the institutional level. Incentives, training on research, allocating appropriate funds, departmental support and creating a research atmosphere were among measures that could be taken to increase the research output both in quality and quantity. The impact of such measures on research productivity could be examined in further research. This study has several limitations. First, due to time and financial constraints, the study was limited to a few medical colleges. Therefore, the results cannot be generalized. Replicating the study with additional medical colleges in different parts of the Kingdom would provide a richer understanding of research productivity in medical and health schools. Second, the results reported here were based on perceptual data provided by respondents. Using more objective data on research productivity are recommended to further explore the issue. Finally, the definition of “research productivity” employed in this study was not sufficient to determine the research output among respondents and may have influenced the results. However, for the purpose of this descriptive study, this definition was made simple and supported by the available literature.^{23,31} Despite these limitations, the study is unique in that it recruited its respondents from several medical and health colleges at different geographical locations in the Kingdom. The study also provides valuable insight into factors and obstacles that may hinder research productivity among faculty members in the Saudi context, which may pave the way for future research.

In conclusion, research productivity is an imperative mission of medical schools and often associated with individual and institutional factors. Understanding factors and barriers that may impede research productivity is a prerequisite for interventions that are directed to promote health services research among faculty members in medical schools.

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Illustrations, Figures, Photographs

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