

ORIGINAL ARTICLE

Research productivity of academic staff in a Medical School

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ABSTRACT

Background: Research productivity is a measure of achievement of a scholar. The number of research publication in peer-reviewed journals and scholastic presentations in conferences and other gatherings of peers are important criteria for assessing productivity and prestige in the academia. **Objective:** This study aimed to explore the research productivity of the academic staff of a College of Medical Sciences in a Nigerian University. **Materials and Methods:** A cross-sectional design study was conducted among 51 academics at the College of Medical Sciences, University of Maiduguri, Nigeria. The participants completed a 31-item questionnaire that explored information on their research publication and conferences presentations in the past 3 years. The questionnaire also elicited information on their teaching load, and the time devoted to research per week. The questionnaire also elicited information on journals, in which the academics published their research, and on any institutional and departmental support for research that is available to them. Descriptive and inferential statistics were used to analyze the data. **Results:** Overall, the mean number of research publication in 3 years for this cohort of academics was 6.6 ± 6.8 (median = 4.0) papers, while that of conference presentation was 4.5 ± 4.0 (median = 4.0) papers in 3 years. Academics in the clinical sciences subgroup tend to have more research papers published and conference papers presented than their counterparts in the Basic and Allied Health Sciences subgroup. The overall subgroups combined number of research papers published increases absolutely but not significantly with age and rank. **Conclusion:** Using a productivity threshold set at six papers in 3 years, many academics in this cohort may not be considered to be highly productive. Future studies on an expanded scale are needed to elucidate on the present findings.

Keywords: Medical academician, research productivity, research publication

INTRODUCTION

Research is a systematic scientific investigation conducted to discover new facts or get additional information needed to elucidate on a particular problem. Research or other synonyms such as inquiry or discovery is an endeavor to know, and it is one of

the fundamental duties of the university, in addition to awarding degrees.^[1] Research is an important part of the academy and is often believed to be the next most valued part of the academic duties after teaching. Research productivity is, therefore, a robust measure of scholastic achievement in the academia, and it is through research that the status of an academic is often determined among peers.

Academic staff productivity is traditionally measured by the number of peer-reviewed articles published, conference presentations made, and grants obtained over a specific period of time.^[2] Research assessment exercise

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is often conducted by funding and donor agencies to determine the capacities of prospective beneficiary academics and their institutions, with the goal of realizing donor funding organization's objectives.^[3] Research productivity is positively associated with promotion and tenure, high salaries,^[4-6] and increased social prestige of the academic staff.^[5] Scholars with higher status are also more likely to have published in journals with high impact factors than those with low status.

Other than the traditional methods of papers counting as a measure of productivity; measures such as the h-index, the i10-index, and the citations index are currently being used for measuring research productivity among academic staff in higher institutions.^[7] Scholarly productivity and the stature of a researcher may also be reflected based on the impact factor of the journal in which the researcher has published. Recently, journals are also being rated or categorized into quality quartiles. Quartile one (Q1), two (Q2), three (Q3), and four (Q4) journals are those in the top 25th, 50th, 75th, and 100th percentiles ranking, respectively.^[8] Academics who obtained research funding are usually required to publish in Q1 or Q2 journals, because these journals rank higher in prestige, and the audiences of such journals are usually top notch in their respective fields.^[9]

Several predictors, determinants, or critical attributes of research productivity have been identified.^[10-13] Indicators of academic productivity have been identified to include innate ability, experience and availability of resources, and leadership of the researcher's institution.^[14] Having research orientation upon starting a career in the university, having the highest terminal degree, and early publication habits were identified as contributory factors to increased research productivity.^[15,16] Other factors are previous publication activity, communication with colleagues, subscriptions to a large number of journals, and sufficient time allocation to research.^[17,18] Researchers are also found to be more productive when they are employed by a university that rewards research work, assigns ample time for faculty to conduct research, and in institutions where academic leadership position is held by someone who uses an assertive participatory management approach.^[19]

The criteria for promotion, productivity, and tenure requirements in a discipline changes over time, as disciplines and institutions change, grow, or mature. Studies on research productivity show that the

relationship between productivity and age is not linear although the overall rate of publications generally declines with age.^[3,4,20,21] Differences in productivity by gender have also been reported, with female researchers tending to be less productive than their male counterparts.^[22,23] Other studies have reported no differences in productivity by gender.^[4,21]

It is a general belief that if Nigeria is going to catch up with educational goals as enshrined in vision 20-20-20 and sustainable development goals, her universities must improve their research capacities. Research productivity can be viewed as indicators of a nation's capacity to solve its problem. It has been speculated that it is knowledge accumulation through research that places advanced countries at the top on the rung of the human development ladder. Due to the research capacities within their boundaries, developed countries are believed to be capable of exercising firm control over their social and human capacity formation and building, giving them an edge over other countries in economic development and living standard and conditions.^[23] Although research institutes exist in Nigeria, the resources and capacities for research in this country are still mainly domiciled in the universities.

At present, there is a paucity of data on the research productivity of academic staff in Nigerian universities. One study was found that shows academic staff in Nigerian federal universities have an average of five papers in 3 years.^[3] Another cross-sectional study on Nigerian academic librarians show that only 2.94% had ≥ 20 publications altogether in their portfolio, 8.82% had between 10 and 15 publications, 17.56% had between 6 and 9 publications, and 58.82% had between one and five publications, whereas 11.77% had no publications at all.^[24] No study was found that it is focused on the research productivity of academics in the medical and health sciences disciplines. The aim of this study was to explore the research productivity of academic staff in the College of Medical Sciences of a Nigerian University.

MATERIALS AND METHODS

Design and setting

This is a descriptive cross-sectional study conducted at the College of Medical Sciences, University of Maiduguri, Nigeria. The university is a public and the oldest university in North-eastern Nigeria. It attracts academics and students from all the 36 states of Nigeria. The College of Medical Sciences of the University is

structured into departments and offers degree programs in Medicine and Surgery, Dentistry, Nursing Sciences, Physiotherapy, Radiography, and Medical Laboratory Science and Anatomy.

Subject and Sampling

The participants in this study comprised all cadres of lecturers constituting the academic staff of the College of Medical Sciences, University of Maiduguri, Nigeria. Staff listing for all the academic staff in the College was obtained from the college prospectus which listed the staff in their order of rank. From the rank-ordered list of 168 academic staffs (8.3% females), every second staff was selected for sampling, for a total of 84 eligible academic staff. Survey questionnaire was then distributed to the 84 academics in the Departments of Human Anatomy, Human Physiology, Nursing Sciences, Radiography, Physiotherapy, and Medical Laboratory Sciences constituting the Basic and Allied Health Sciences subgroup. Lecturers were also sampled from the Departments of Medical Microbiology, Clinical Pharmacology and Therapeutics, Chemical Pathology, Hematology and Immunology, Paediatrics, Obstetrics and Gynaecology, Medicine, Surgery, Community Medicine, Ear Nose and Throat, Radiology, Ophthalmology, Mental Health, and from Dentistry, constituting the Clinical Sciences subgroup.

Measures and procedure

A 31-item researcher developed questionnaire was used to collect the data for the study (Appendix). Section A of this questionnaire solicited information on sociodemographic variables such as age, gender, academic rank, and highest academic degree. Section B solicited information on variables relating to inducement to pursue a higher degree, the reward for research work, and policy of evaluation on teaching skills by students. All questions were rated on a dichotomous scale of “Yes” or “No.” Section C solicited information on scholastic records and institutional support for the lecturers. This section asked for information on the number of research publications (peer-reviewed articles and book) and conferences presentations in the past 3 years, and the teaching load and time devoted to research per week.

The face and content validity of the instrument was attested by two experts in questionnaire design who are also authors of this study (AYO and ALO), both with a combined experience of over 25 years in instrumentation, adaptation, and validation. The test-retest reliability of the instrument was established through a pilot testing among ten lecturers in physiotherapy who

completed the questionnaire twice with an interval of 2 weeks between each completion. The reliability coefficients (Spearman correlations) of the instrument ranged from 0.71 to 0.88 for each of the sections, indicating that the instrument has moderate-to-good reproducibility. The study was conducted between June and July 2014, following approval on 8th May 2014 by the Research and Ethics Committee of the University of Maiduguri Teaching Hospital, Maiduguri, Nigeria (UMTH/REC/14/000102).

The questionnaire was self-administered and delivered in person by one of the investigators (DE) or through contacts in each of the departments. Follow-up visit to each department to collect completed questionnaires was done every week until the deadline of 4 weeks set for the completion of the study. A reminder was sent out 2 weeks after the return deadline did not yield any further response. It took about 15–20 min to complete the questionnaire. All participants provided written informed consents before participating in the study. Three staffs who were randomly selected from the listing in the Department of Physiotherapy were not given the survey questionnaires for the main study, because they have participated in the test-retest reliability determination of the survey instrument. The first response of these staff for the reliability assessment was used for the main study.

Data analysis

The collected questionnaires were coded and analyzed using the Statistical Package for the Social Science (SPSS), version 18.0 for windows (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics such as percentages, mean, median, and standard deviation were used to summarize the data. The independent *t*-test and one-way ANOVA were used to explore differences in research productivity by sociodemographic variables, including gender, rank, and faculty. The level of statistical significance was set at $P < 0.05$.

RESULTS

A total of 84 questionnaires were distributed, of which 51 respondents returned the questionnaire within 6 weeks giving a response rate of 61.0% (51 of 84). All returned questionnaires were usable. More male ($n = 40$, 78.4%) than female ($n = 11$, 21.6%) academics were participated in the study. Majority (52.9%, $n = 27$) of the participants were in the Clinical Sciences subgroup, while 47.1% ($n = 24$) were in the Basic and Allied Health Sciences subgroup. Simple majority indicated

the PhD ($n = 15$, 29.4%) as their highest educational qualification, while 8 (15.7%) indicated bachelor's degree as their highest qualification [Table 1]. Nineteen participants were Heads of Department, and 12 (23.5%) had postgraduate medical qualifications other than a terminal academic degree or doctor of philosophy.

The mean age of the participants was 43.8 ± 9.11 years and ranged between 29 and 63 years. The mean years of working experience were 10.5 ± 8.17 years (range: 1–32 years). The mean time spent on research work per week was 5.7 ± 4.70 h, while the mean numbers of articles published by the lecturers in the past 3 years were 6.6 ± 6.77 . Thirteen (25.2%) out of 51 respondents did not report any published papers in the past 3 years, and 23 (45.1%) had six or more papers in the past 3 years. The number of conferences attended with presentation per year was 4.5 ± 3.95 [Table 2].

On the basis of average academic research productivity at six papers in 3 years, majority (54.9%, $n = 28$) of the academic staff published <6 papers in the past 3 years and may be argued to have low productivity rate. Lecturers in the Clinical Sciences subgroup appear to be more productive by publishing more papers in 3 years than their counterparts in the Basic Sciences and Allied Health ($P < 0.05$). Although lecturers in the Clinical Sciences subgroup who had higher rank (senior lecturers and above) tend to report more papers published in the past 3 years than their colleagues who are in the junior ranks (6.55 ± 2.8 vs. 3.23 ± 4.0 ; $P < 0.05$), no such difference was found among lecturers in the Basic and Allied Health Sciences subgroup. In addition, age tends to influence the number of papers published by lecturers in the Clinical Sciences subgroup.

Majority (87.5%, $n = 42$) of the respondents answered “Yes” when asked whether they were induced by the institution to pursue higher degrees or specializations, while 12.5% ($n = 6$) said no [Table 3]. Furthermore, majority (65.9%, $n = 29$) of the respondents answered “No” when asked whether their department or the institution reward their research work in any way, while 15 (34.1%) respondents answered “Yes.” Few (38.0%, $n = 19$) respondents answered “Yes” when asked if they are holding any administrative responsibilities, while majority (62.0%, $n = 31$) answered “No.” Furthermore, majority (94.0%, $n = 47$) answered “Yes” when asked whether they support students’ feedbacks as a means of evaluating their teaching skills while only three (6.0%) answered “No.”

Table 1: Participants’ sociodemographic characteristics

Variables	n (%)
Gender	
Male	40 (78.4)
Faculty	
Medicine	27 (52.9)
Basic Sciences/Allied Health	24 (47.1)
Rank	
Professor/assistant professor	9 (17.7)
Senior lecturer	9 (17.6)
Highest qualification	
PhD	15 (29.4)
MSc	11 (21.6)
BSc	8 (15.7)
Postgraduate medical qualification	12 (23.5)
Others	5 (9.8)
Admin responsibility	
HOD	19 (38.0)
None	31 (62.0)

Table 2: Frequency distribution of participants other sociodemographic variables ($n=51$)

Variables	Mean $\pm$ SD	Median	Mode
Age (years)	43.8 $\pm$ 9.11	43.00	41
Working experience (years)	10.5 $\pm$ 8.17	8.00	6
Research hours per week	5.7 $\pm$ 4.70	4.00	4
Journal published (n)	6.6 $\pm$ 6.77	4.00	0
Conference attended (n)	4.5 $\pm$ 3.95	4.00	3
Books/chapters published (n)	0.20 $\pm$ 0.75	0.00	0
Research grants obtained (Naira)	474,538.92 $\pm$ 231,293.88	0.00	0

The values of the research grants obtained is in Nigerian currency (Naira). SD: Standard deviation

Table 3: Institutional supports received, student evaluation, and administrative position held ($n=51$)

Items	Yes, n (%)	No, n (%)
Are lecturers induced to pursue higher qualification?	42 (87.5)	6 (12.5)
Lecturer's support of student evaluating them	47 (94.0)	3 (6.0)
Do the institution reward research work in any way	15 (34.1)	29 (65.9)
Lecturers holding administrative responsibilities	19 (38.0)	31 (62.0)

Academic activities

Majority (60.8%, $n = 31$) of the respondents answered “Yes” when asked whether teaching load is a hindrance to carrying out research activity, while 39.2% ($n = 20$) answered no [Table 4]. Overwhelming number of the academic staff (92.2%, $n = 47$) answered yes when asked whether they will reconsider their academic carrier in their current department when given the opportunity to change department, while only four (7.8%) answered “No.” Furthermore, a greater

Table 4: Academic activities of respondents (n=51)

Variables	Yes, n (%)	Yes, n (%)
Consideration of second academic carrier in current department	47 (92.2)	4 (7.8)
Is teaching load a constraint in carrying out research?	20 (39.2)	31 (60.8)
Should scholarship activity be considered for promotion?	49 (96.1)	2 (3.9)
Are departments in collaboration with other Universities abroad?	19 (48.7)	20 (51.3)
Is time constraints a factor for carrying out research?	39 (76.5)	12 (23.5)

number of the respondents (76.5%, $n = 39$) answered yes when asked whether time constraint is a factor in carrying out research, while 23.5% ($n = 12$) answered “No.” Overwhelming number (96.1%, $n = 49$) of the respondents answered yes when asked whether they were aware of the expectations of scholastic activities for promotions, while 3.9% ($n = 2$) answered No.

DISCUSSION

It is a general belief that in today’s world of growing knowledge-based economy, the quality of goods and services that is produced in any nation depends on its capacity to conduct research and come out with innovations. Research and innovation are traditionally championed by the universities and research centers where citizens with the requisite aptitude are trained. The quality of the products turned out in these institutions depends in turn on the research skills and productivity of the trainers domiciled in the institutions. For over three decades now, Nigeria has been faced with brain drain phenomenon; and for over two decades, in addition, it has also been faced with the problem of medical tourism. Research productivity can be viewed to be an indication of a nation’s capacity to solve its problem. In the absence of this capacity, a nation may have to rely on foreign countries for solutions to problems within its boundaries.

On the basis of academic research productivity whose threshold is set at six papers in 3 years, and a simple majority (54.9%) of the academics having <6 publications, and a quarter not even having any publications to their credit; academics in this study may not be considered to be highly productive as a group. This finding is consistent with those of a previous Nigerian study,^[3] which shows that academics have an average of five research papers (4.99 ± 2.30) published in 3 years. In the present study, age does not seem to have an influence on the number of research papers published although the average number of paper

reported is higher with age; a finding that is inconsistent with a previous report in several studies,^[4,25-27] but in agreement with a previous finding from a study^[28] conducted over a decade ago.

The present study shows that overall, in this cohort of academic staff, rank did not influence research productivity, a finding that is inconsistent with those in other studies^[6,29] that found better productivity among academics in higher ranks. This study also found no gender influence, in contrast with the report by Carr *et al.*^[30] which shows a higher productivity rate among men. Lecturers in the Clinical Sciences subgroup appear to be more productive by publishing more papers in 3 years than their counterparts in the Basic Sciences and Allied Health although lecturers in the Clinical Sciences subgroup reported more years of working experience and tend to hold a higher rank. Overall, this study shows wide variability in the research productivity among academics in this College, consistent with the findings among academics in Croatia.^[31] This variability perhaps is a reflection of the importance of individual characteristics of academic staff in research productivity as noted by Bland *et al.* (2005).

To many of the academics, the teaching load is a hindrance to carrying out research activity although they would still remain in their department and would not change to other department if given the chance. Furthermore, although time constraint was a factor in carrying out research for many, the academics were still aware of the research expectations for promotion. The low academic research output recorded by the majority of the cohort of academics in the present study can be attributed to lack of devoted time for carrying out research. It may also be attributed to the perception that teaching load is not conducive for research as reported by the majority of the academics. One surprising finding is that majority of the academics responded “No” when asked whether their departments and institution reward research work, despite admitting that they were aware of the expectations of scholastic activities for promotions.

How a promotion and advancement that is based on research publication, believed to be the current practice in Nigerian universities, is not perceived as a reward for research productivity despite monetary benefits that go with the advancement in rank, is unclear. This response shows this cohort of academics was expecting other rewards for research productivity than promotion. In some quarters, research grants attract pay for the estimated after hours or weekend hours spent on the

research.^[32] In others, a percentage of the grant that accrues to the institution is paid to the researcher as a reward, over and above their salary.^[32] Perhaps, the cohorts of staff expect to be rewarded for research productivity through monetary rewards in addition to promotion.

One limitation of this study is the cross-sectional design nature of the study, which limits the determination of causal relationships. Second, this is a single-center study and therefore, limits institutional variability needed for determining the institutional characteristics that impact productivity. Third, the use of self-report assessment tools could produce measurement bias, recall problems, and inaccurate estimates of reported numbers of research publications and conferences attended. Finally, the present study measures productivity in terms of numbers or quantities of activities only. Important quality measures of academic productivity such as h-index and the rating of the journals in which the academics published were not used for assessment. However, this preliminary study provides some insights into the productivity of academics in one institution in Nigeria and can serve as a precursor to a future larger study on academic productivity in many centers in Nigeria.

CONCLUSION

The research productivity of many academics at the Medical College of the University of Maiduguri, Nigeria, may be considered as relatively low. Academics in the Clinical Sciences had higher research productivity than their counterparts in the Basic Medical and Allied Health Sciences, and most academics considered time constraint as a barrier to research productivity. This preliminary study provides some insights to the productivity of academics in one institution in Nigeria and can, therefore, serve as a precursor to future larger studies on academic productivity to involve many centers in Nigeria.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Kyvik S. Academic work in Norwegian higher education. In: Tight M, editor. *Academic Work and Life: International Perspectives on Higher Education Research*. Amsterdam: Elsevier Science; 2000. p. 33-72.
- Olorunfoba A, Ajayi MT. Gender and research attainment in Nigerian agricultural universities. *JHEA RESA* 2006;4:83-98.
- Okiki OC. Research productivity of teaching faculty members in Nigerian federal universities: An investigative study. *Chin Librariansh* 2013;36:99-118. Available from: <http://www.iclc.us/cliej/cl36okiki.pdf>. [Last accessed on 2019 Jul 04].
- Kotrlik JW, Bartlett E, Higgins CC, Williams HA. Factors associated with research productivity of agricultural education faculty. *J Agric Educ* 2002;43:1-10.
- Bassey U, Akuegwu B, Udida L, Udey FU. Academic staff research productivity: A study of universities in South-South Zone of Nigeria. *Acad J Educ Res Rev* 2007;2:103-8. Available from: <http://www.academicjournals.org>. [Last accessed on 2019 Jul 04].
- Chiemeke S, Longe OB, Longe F, Shaib IO. Research outputs from Nigerian tertiary institutions. An empirical appraisal. *Libr Philos Pract (e-journal)* 2009. p. 233. Available from: <http://www.webpages.uidaho.edu/~mbolin/chiemeke-longe-shaib.pdf>. [Last accessed on 2019 Jul 04].
- Ball P. Index aims for fair ranking of scientists. *Nature* 2005;436:900.
- Okafor K. Latest Scimago. *J Citation Ranking Quartile Scores (Q1-Q4) 2016-2018* [Online resources]. [doi10.13140/RG.2.2.30329.98408]. Available from: https://www.researchgate.net/publication/325157268_LatestScimago_Journal_Citation_Ranking_and_Quartile_Scores_Q1-Q4_2016-2018. [Last accessed on 2019 Jul 04].
- Godin B. The Impact of Research Grants on the Productivity and Quality of Scientific Research. No. 2003. INRS Working Paper; 2003. Available from: <http://www.csi.ca/PDF/NSERC.pdf>. [Last accessed on 2019 Jul 12].
- Brocato JJ, Mavis B. The research productivity of faculty in family medicine departments at U.S. Medical schools: A national study. *Acad Med* 2005;80:244-52.
- Mahoney MC, Verma P, Morantz S. Research productivity among recipients of AAFP foundation grants. *Ann Fam Med* 2007;5:143-5.
- Ogobodu CO. An analysis of female research productivity in Nigerian universities. *J High Educ Policy Manag* 2009;31:17-22.
- Obembe OB. Determinants of scientific productivity among Nigerian university academics. *Indian J Sci Technol* 2012;5:2.
- Kpolovie PJ, Onoshagbegbe ES. Research productivity: H-Index and I10-Index of academics in Nigerian universities. *Int J Quant Qual Res Methods* 2017;5:62-123.
- Ndege TM, Migosi JA, Onsongo J. Determinants of research productivity among academics in Kenya. *Int J Educ Econ Dev* 2011;2:288-300.
- Horta H, Cattaneo M, Meoli M. PhD funding as a determinant of PhD and career research performance. *Stud High Educ* 2016;43:542-70.
- Finkelstein MJ. *The American Academic Profession: A Synthesis of Social Scientific Inquiry Since World War II*. Columbus: Ohio State University Press; 1984.
- Creswell JW. *Faculty Research Performance: Lessons from the Sciences and Social Sciences*. Vol. 4. Washington, DC: Association for the Study of Higher Education; 1985.
- Bland CJ, Seaquist E, Pacala JT, Center B, Finstad D. One school's strategy to assess and improve the vitality of its faculty. *Acad Med* 2002;77:368-76.
- Finkelstein MJ, Seal RK, Schuster JH. *The new academic generation: A profession in transformation*. Baltimore, MD: The John Hopkins University Press; 1998.
- Teodorescu D. Correlates of faculty publication productivity: A cross-national analysis. *High Educ J* 2000;39:201-22.
- Bartlett J, Kotrlik J, Higgins C, Williams H. *Exploring Factors Associated with Research Productivity of Business Faculty*. At National Association of Business Teacher Education Member Institutions; 2001.

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23. Sabo B. Universities, Research and Development in Nigeria: Time for a Paradigmatic Shift. Paper Prepared for 11th General Assembly of CODESRIA, on Rethinking African Development. Beyond Impasse: Towards Alternatives, Maputo, Mozambique; 2005.
24. Agboola AT, Oduwole AA. Staff seminars and publications productivity: A study of academic librarians in Ogun State, Nigeria. *Libr Manage J* 2005;26:478-80.
25. Webber KL. Factors related to faculty research productivity and implications for academic planners. *Plan High Educ* 2011;39:32-43.
26. Dundar H, Lewis D. Determinants of research productivity in higher education. *Res High Educ* 1998;39:607.
27. Fawzi H, Al-Hattami A. Faculty production of research papers: Challenges and recommendations. *Int J Hum Soc Sci* 2017;7:2221-0989 (Online).
28. Horner KL, Rushton JP, Vernon PA. Relation between aging and research productivity of academic psychologists. *Psychol Aging* 1986;1:319-24.
29. Bland CJ, Center BA, Finstad DA, Risbey KR, Staples JG. A theoretical, practical, predictive model of faculty and department research productivity. *Acad Med* 2005;80:225-37.
30. Carr PL, Ash AS, Friedman RH, Scaramucci A, Barnett RC, Szalacha L, *et al.* Relation of family responsibilities and gender to the productivity and career satisfaction of medical faculty. *Ann Intern Med* 1998;129:532-8.
31. Dakik HA, Kaidbey H, Sabra R. Research productivity of the medical faculty at the American university of Beirut. *Postgrad Med J* 2006;82:462-4.
32. Fairweather J. Beyond the rhetoric: Trends in the relative value of teaching and research in faculty salaries. *J High Educ* 2005;76:418.