

Enhancing research productivity in the Arab world

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The medical research papers emanating from the Arab World medical institutions is really low in number and low in quality. Moreover, the quality and quantity has not changed over the years as exemplified by the nephrology output from the Kingdom of Saudi Arabia (KSA). It has stayed unchanged in number over the last 10 years (approximately 45 per year) and the percentage of those published in cited, indexed journals remained static at approximately 50%.¹ Moreover, the majority of papers are retrospective (78.2%) and clinically based (82.8%).¹ Less than 0.5% of Arab papers appear in the 200 highest impact-factor journals.² The KSA followed by Kuwait was by far the most prolific and accounted for 67 and 16% of publications.³ The same findings regarding the low quality and quantity of research papers from the rest of the Arab World can be found. Lack of resources, incentives and funds have been repeatedly expressed as underlying causes of poor research and research output.⁴ In absolute number of publications, KSA and Egypt have the highest output accounting for 58.4% of the Arab World publications. Looked at in relation to the population density, Kuwait followed by United Arab Emirates (UAE) come top. If on the other hand, one analyzes research output in relation to gross domestic product (GDP), Jordan comes top followed by Lebanon.⁵ Kuwait produces 4.38 per million population (PMP) as compared to 341.33 in North America, 136.88 in Europe 12.81 in Asia, 10.8 in South America and Caribbean region and 3.5 in Africa.⁶

In KSA, there is a Governmental body, which has among its function in funding of research. This Governmental body was called King Abdul-Aziz City for Science and Technology (KACST). Since 1979, KACST has funded 430 medical research

projects at an estimated cost of 185.9 million Saudi Riyals representing approximately 31.2% of the total grants given over the same period. There have been 738 papers out of the total grants given, out of which 243 (32.9%) papers are in the medical field.⁷ Many people believe that there ought to be stable funding for medical research as this is essential for the development of academic medicine and is important for the society.⁸ Gross national product (GNP) per capita and research and development (RD) expenditure emerged as significant factors in the medical research output.⁹ Multiple regression analysis revealed that low GNP per capita ($p < 0.013$), insufficient number of physicians ($p < 0.047$), and inadequate public spending on the health sector ($p < 0.049$) were responsible for the meager number of biomedical publications in Asian countries.¹⁰

Table 1 compares the annual number of medical papers in some Arab and other countries. The numbers stated in this table are based on Index Medicus search and PubMed search. There are many factors contributing to this state of affairs in the Arab World including lack of financial support/allotted budget, incentives, mentorship, research fellowship programs and research culture among doctors or hospital administrators. In addition, there exists no relationship between research outputs to promotion/recruitment and no emphasis on research in pre-graduate curricula. Important other factors are low GDP and low number of physicians.

In this paper, we suggest ways by which the number and quality of papers could be improved without much requirement for financial expenditure. It should be stated very clearly; however, that in order to effectively enhance the quantity and quality

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of papers there is no doubting the importance of incentives and financial expenditure.

Ways of enhancing research with least hardship. 1) **Utilize a newly acquired test.** Whenever a new test becomes available in your institution or even before it is acquired by your institution, think actively on how it could be used in your patient population. This is all the more applicable if it is not invasive in nature. Very often the company producing this test will be only too glad to give you a sufficient number of kits free of charge in the hope of spreading the news about their test and making it known to practitioners. A good example of this in my own experience is the appearance of Cystatin C as a more accurate and consistent way of measuring renal functions. We managed to get the company to provide free kits; we designed a number of studies using Cystatin C in normal kidney donors (to see if it can replace creatinine clearance measurement), in post transplant kidney recipients who develop renal function deterioration (to see if it rises earlier than creatinine in rejection and/or cyclosporine toxicity), in hemodialysis patients (to see if it can usefully replace urea in the measurement of Kt/V). In the future, we are planning to use it in normal and abnormal pregnancies (to see if it can be used as an early marker for the development of pre-eclampsia) and in post-transplant patients at 6 and 12 months (to see if it can be more useful than plasma creatinine as a surrogate for long term kidney function). As a result of utilizing this new test more than 5 interesting and original research projects were set up with no cost entailed.

Table 1 - The total number of annual publications from different countries using PubMed search.

Countries	Number of publications
Kingdom of Saudi Arabia	450
Egypt	6365
Jordan	511
Turkey	3048
India	5340
Iran	2575
United Kingdom	23263
Canada	15063
United States of America	146170

2) **Utilize the availability of large numbers of cases to study.** There is no doubt that we see certain diseases more commonly than in other parts of the world. Sometimes one single center in our area can collect more cases in a specific condition than in the West who often resort to multicenter studies or meta analysis to overcome the small numbers per unit. Multicentric studies and meta analyses have their own shortcomings. We may, in some Arab countries, have the advantage of having large number to study using state-of-art diagnostic methods as opposed to other parts of the world where either the condition is rare or the diagnostic facilities rudimentary. Among such common conditions one could mention tuberculosis and brucellosis. In our unit, we seized on the fact that we have large numbers of pregnancies post-transplants to publish often cited papers about pregnancy post-transplantation¹¹ as well as on babies born to women on cyclosporine throughout the pregnancy.¹² Similarly, we have become world experts on post transplantation Kaposi Sarcoma by utilizing the fact that this is a common disease in our area.^{13,14}

3) **Utilize the availability of resident expert in the institution or town.** It can be very rewarding to check in your institution or city for an individual who has special expertise in a specific field. Discuss with him/her joint research you can do together, often, but not always, these are in the diagnostic services such as radiology and histopathology. Using this technique, we had a number of papers on the use on nuclear medicine investigation in transplant patients in collaboration with an expert in nuclear medicine.^{15,16} Similarly, we had joint studies with a histopathologist with a high expertise in nephropathology. We developed a scoring system of the histological severity of diabetic nephropathy¹⁷ and currently working with same pathologists on transplant biopsy findings in hepatitis C virus (HCV) positive recipients as well as study of the prevalence of Hemolytic Uremic syndrome (HUS) in our transplant population

4) **Utilizing the young enthusiastic newcomer to the department.** It can be rewarding to involve the newly appointed consultant or senior registrar in research especially if he has joined from another institution or from abroad. At that stage they are very keen, eager to please and to show their ability in research. Very often they are at their peak of updated knowledge in their chosen field and still have contacts from their previous place of work who they can persuade to share with the research project. It is possible that they bring with them special expertise in specific fields of the specialty such as new practical procedure which can lend itself to a useful bit of research. Many of our research papers had their primary investigator such a "newcomer"^{18,19}

5) Utilize local clinical need and sharp clinical observation. There is still an important place for sharp clinical observation in producing extremely useful research. One has to train oneself in picking up the unusual situation and be able to connect clinical facts and findings in a hitherto untaught-of fashion. So trained, one can often pick up situations worth writing about and worth reporting for their instructive and interesting lessons. It is possible, when one is faced with such a clinical situation for one to then design a simple clinical experiment to highlight and confirm the initial sharp observation. One such example is when, in the early eighties (with the advent of using cyclosporine), we noticed unexplained severe rejection occurring when the patient is being concomitantly treated for tuberculosis with rifampicin. We had to find out to be able to use both drugs without encountering rejection. After a series of trial and error we came to the conclusion that what is required is to quadruple the baseline dose of cyclosporine and give it every 8 hours instead of the usual every 12 years.²⁰ This paper has been consistently quoted whenever a paper is written regarding tuberculosis after transplantation. Another example was the finding in the renal biopsy of a patient with acute renal failure secondary to megalocytic interstitial nephritis. A repeat biopsy in the same patients a few weeks later revealed the presence of renal parenchymal malakoplakia, this allowed us, for the first time to prove that both conditions belong to the spectrum of the same disease.²¹

6) Utilize central organizations. This is particularly useful in multicenter studies and in questionnaire/survey based studies covering many centers. It is likely that if one wrote asking for different centers to join him/her in a joint study or asking them to reply to a questionnaire or survey that his request may be ignored. The chances of a positive response would be strengthened if the invitation letter is sent through a central organization or the concerned national or regional society. The nephrologists working in KSA are fortunate in having the Saudi Center of Organ Transplantation (SCOT) through which such requests may be made with a substantial rate of positive responses. One could also use the national society of his specialty or the Arab Society of his specialty. The author have use SCOT a number of times with successful outcome of survey-based studies²² and a multicenter studies.²³ Currently, a study on the effect of Ramadan fasting of renal patients is being carried out under the auspices of Arab Society of Nephrology and Renal Transplantation.

7) Utilize the ability to design scoring/staging systems in view of large numbers. The large number of patients available for study and the

opportunity to observe their clinical behavior, natural history and response to therapy provides an opportunity for a scoring/staging system for the disease which may relate clinical or investigative findings, or both to recommended therapy and prognosis.

I would recommend you to consider this technique strongly. Our ability to lay our hands on large number of patients suffering certain conditions and to investigate them fully gives us a unique opportunity to draw up scoring/staging/schemata/algorithmic systems for diagnosis/therapy/prognosis and so forth. This is usually very attractive and often cited. One of our papers was no more than a letter, which took 10 minutes to write to describe staging of post-transplant Kaposi sarcoma. This has become highly quoted and labeled as being our scheme.²⁴

8) Utilize eye catching attractive title. The title of the paper can influence its chances of acceptance for publication. Make sure that the title reflects the content. Far too often papers are sent to journals with a title which simply does not reflect the contents. This is most frustrating to the editors who refuse its publication. With regards to attractive titles, an international journal is more likely to accept a paper entitled "Cerebral malaria and its complications" than "Cerebral malaria and its complications: Sudan experience" because the former is more assertive and implies findings of global interest. The latter is timid and almost apologizes in advance to the possible shortcomings of the paper. Another example is that a paper entitled "A new treatment for interdialytic hyperkalemia-the use of fosinopril sodium"²⁵ is more eye-catching than for example "use of fosinopril in dialysis patients". Similarly a paper entitled "No evidence of functional deterioration of renal graft function after repeated pregnancies-a report on 3 women with 17 pregnancies"²⁶ has a better chance of being accepted than if it was entitled "Kidney function and post-transplant pregnancies".

9) Utilize other departments or institutions. Involve and inform colleagues in other departments or institutions. Let other departments use your facilities or patients for their projects. This is a successful recipe for increasing the quantity and quality of your papers. Inform the laboratory, radiology and other diagnostic departments when using their facilities for a study (even if the tests used are routine tests) and offer them that they would be a part of the study before they ask. Failing to do this would result in hurdles being put in your path not to mention hard feelings.²⁷⁻³⁰

The present study outlined some simple ways on how to utilize situations and opportunities to

produce papers. Other techniques, which lead to positive outcome are described below. These are simply based on common sense, emotional intelligence and understanding the human nature. Moreover, they have stood the test of time and I personally found them very useful: A) The study should be cost-effective with clear objectives. Avoid "so what", "i.e." of no interest "follow that band wagon" for example imitating others and "stamp collecting". Collecting tons of unnecessary tons of data. B) Show fairness and diplomacy. Routinely persuade all divisional consultants' to contribute to the research or writing of the paper with the promise that they will appear as authors of the paper. This will ensure their cooperation not least by allowing you to use their patients for the study. The primary investigator; however junior, should be assured that he/she would be the first author. This will not only encourage juniors to contribute to the research but will also show fairness. C) Beware of drug company-supported research projects. Ethically is paramount Add a clinical pharmacist as part of the investigators. They would be of a great help. Should the pharmaceutical company give reimbursement, this should be declared in the open and be for the use of the whole division. You should ensure that free samples will be available to the studied patients after end of project time if the drug is not in the hospital formulary otherwise you will end up with patients suddenly left without drugs they have been using. D) Have a routine weekly research meeting for your department/division. Even if there is apparently nothing to discuss, you will be surprised how the ideas flow. E) Keep a library of photographs of all interesting cases. Take photos of physical signs and histology all the time. Keep a sharp eye on the unusual peculiar clinical situation. F) Organize an "annual award ceremony". This acts as a great motivator specially if the top administrator in the organization attends the ceremony and hands out the prizes. One can envisage awards for (i) The Department with the highest research output (ii) The individual research output (iii) The Fellow with the highest research output. G) Keep a look out for multicenter studies. This gives an opportunity for (a) larger number of patients to be studied (b) Optimization and gathering of resources c) very often such studies are supported by pharmaceutical companies. H) Establish a research mentor in your department preferably at consultant level. I) A small fish in a small pond is better than a very small fish in a very large pond. Try to concentrate on a specific topic. Therefore, you are more likely to establish for yourself a research "niche" by contributing to regional meetings (probably more productive than international meetings) than to international gatherings.

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