

## Review Article

### Scientific medical research and publication in Nigeria

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#### Introduction

Research involves undertaking systematic scientific investigation in order to discover new facts or get additional information needed to elucidate a particular problem.

Scientific research seeks primarily to advance knowledge. Scientific Medical research seek not only to advance knowledge, but in its applied form seeks to make use of the knowledge so acquired, in the diagnosis, treatment and prevention of human diseases<sup>1</sup>.

Ill health has a major impact on the economic situation and well-being of an individual in any society. This is particularly true in the lower income countries (where social safety nets are weak or non-existent) and for the absolute poor, due to the vicious circle of poverty and ill-health<sup>2</sup>. Conversely, improvement in health will boost the individual's level of income (due to lower treatment cost, higher revenue, a longer term increase in revenue due to better work opportunities and overall growth in revenues due to longer life-expectancy). It will also improve the individual's capacity to acquire an education, increase the family's productive opportunities and greatly improve the psychological well-being of both the individual and family. The benefit of good health will be even greater for the absolute poor, as they may transform the vicious circle of poverty into a virtuous cycle, with better nutrition, lower risk of unemployment or underemployment, better housing, better use of training opportunities, higher productivity and overall, better control over their life situation and that of their family<sup>2</sup>.

How good and beneficial a research finding may be, it can only be useful if shared with others. This is what communication of research findings is all about. Communication of research findings can be either in oral presentation in a conference/scientific meetings or presentation in a written form otherwise known as publication. There are three main types of publications – Thesis or dissertation, Book or Monograph and a Journal Article.

The aim of this presentation is to review the logical steps in scientific medical research, discuss the types of publications, identify challenges in research and publication in Nigeria and proffer some solution to overcome these challenges.

#### Scientific medical research

Scientific Medical Research is useful in the advancement of knowledge. In its applied form, it is the major step in achieving a healthy life. In the abstract point of view there are, several wrong impressions are held about research including: (i) research must lead to discoveries and inventions (ii) only special breed of people can do meaningful research (iii) highly sophisticated equipment and lots of funds are needed for research (iv) most forms of research are esoteric and of little importance to society and (v) wrong notion of what constitute research<sup>1</sup>.

others believe that every person who is willing should be encouraged to participate in some form of research activity<sup>2</sup> as the potential benefit of research is immense.

The basic tool of research is a creatively imaginative idea.

Some of the attributes a research should have are<sup>1,3,4</sup>,

- Inquisitiveness and the enquiring mind to find out why and how things happen.
- Sense of imagination.
- Ability to look at problems in a different way.

#### who should do research?.

- This is an often asked question and some are of the opinion that it should be done by those who are genuinely interested while

- Keen sense of observation.
- Ability to work hard and persevere.
- Ability to tolerate criticism.
- Modesty, honesty and integrity.
- Ability to weigh evidence.
- Technical competence.
- Genuine interest.
- Ability to accept the way of life of a scientist.
- Ability to work in a team both as a leader and be lead..

Must be scholarly in habit: simplicity, initiative, concentration and love for work.

Scientific Medical Research could take place in the field, in the community, in a hospital setting or in a laboratory. Though it is customary to classify scientific research into pure and applied research, this may not be helpful in medical scientific research. As stated by Akinkugbe<sup>(6)</sup>, There are temporal, spatial, geographical, structural and resource definitions of research and there are many useful implications of short, medium or long term research, of local and international research, of pure and applied research, of field and laboratory, of institutional, collaborative, individualized, departmental or multi-disciplinary research. In practice, scientific medical research makes use of the proficiency of several disciplines including epidemiology, statistics, biomedical engineering, medical physics, immunology, and histopathology .

### Steps in the systematic approach to research<sup>2</sup>

- Identification of a researchable idea.
- Information about the state of knowledge, if any, about such idea.
- Formulation of an experimentally testable hypothesis.
- Design of experiment(s) to collect data with a view to testing hypothesis
- Analysis of data
- Drawing of inferences from data including probable practical application to problem solving.

### Publishing

Writing is an art, how talented an individual may be improves with practice. Publishing scientific work can be for different reasons. For the purpose of this presentation the motives for publishing can be divided into two: *Egoistic* and *Altruistic* motives.

*Egoistic* motives include the strive for academic and/or professional promotion, which in turn, may be associated with financial gain, the will to improve one's knowledge and judgement and the development of professional contact.

Irrespective of the type of research, the approach must be systematic to achieve a logic conclusion..

*Altruistic* motives are the desire to generate and disseminate knowledge. If approached positively it may become a rewarding and educational experience. A published paper is the most effective method of communicating one's ideas or findings to colleagues throughout the world. This will become part of our scientific and clinical knowledge and should be a source of some personal pride and satisfaction.

As explained by Schein, Farndon and Fingerhut, the more you write and publish the longer is your list of publication. The more publication you have the better should be your writing ability. The better you write the greater the chance of your papers being accepted by leading journals. The more you are published in top journals the greater likelihood of your papers being cited by others. The more you are publishing and cited the higher your score on the *impact factor* and *citation index lists*<sup>7</sup>.

Simply seeing one's name in print can be the strongest motive to writing, this is the truth and there is nothing wrong with it. The sum total is "fame and fun" and as Recharad Feyman, the Noble Laureate Physicist called it "The pleasure of finding things out"<sup>8</sup>.

There are a number of steps involved in publishing a paper this will be discussed:

### When to publish?

The answer to the above question is simple---- NOW! Publication should be as early as possible after completion of study, not only to aid advancement but to prevent unnecessary duplication of efforts by others. In a rapidly-advancing field, a delay may make the information obsolete. There is only one situation where delay in publication is legitimately acceptable, and that is where national security is involved. This is particularly so in research with possible defense or strategic industrial application<sup>1</sup>.

### What To Write & How To Write

It is important to know that before you can know what to write, you must know what has been written. Doing so, very soon you would realize that you could do it as well or even better.

Faulkner said; "Read, read, read everything ----- trash, classics, good and bad see how they do it. Read! You'll absorb it. Then write"<sup>8</sup>.

While ideas are plentiful, only the novice and naïve think all ideas are publishable. Only by repeated formulating ideas worthy of publication and bringing them to fruition will one be able to shade off publishing naivety.

Publications vary from individual case reports, at one extreme, via the results of large prospective international multicentre trials to the latest findings of molecular research. Biomedical research can be basic or applied. It can be experimental, community based or clinical. The detailed format of publication would depend on the nature of the outlet to be used for communication.

It is better to follow strictly the “instructions to authors” as specified by the journal.

A general format will however be discussed in this paper.

Margaret McCaffery, a Canadian Physician introduced an acronym, IMRAD, to aid the writing of medical articles<sup>4</sup>.

I	-	Introduction
M	-	Materials and Methods
R	-	Results
And	-	A---
D	-	Discussion

To this may be added optional format items, such as<sup>1</sup>:

- (i) Summary or abstract, with or without its translation into another language e.g. English or French.
- (ii) Provision of “key words” from the summary which may be used for indexing and abstracting purposes.
- (iii) List of references cited in the presentation.
- (iv) Conclusion
- (v) List of contents, glossary of terms and abbreviations.
- (vi) Certification of work done and
- (vii) Appendices

With the actual writing, the materials and methods (what you did) and results (what you found) are the body of the manuscript; these should be written first. Only then add the skeleton --- Introduction (why the paper was written) and the heart --- discussion (what one feels about it). The abstract is written last as stated by Pascal Pennees: The last thing one settles in writing ..... is what one should put in first”<sup>8</sup>. It should be remembered that most readers will never see the full version of your paper but only the electronic version of your abstract. The author must avoid any discrepancies between the abstract and the body of paper because it irritates the reviewers and biases the validity of the report.

At the end of the write-up, the paper should if possible be *original, topical, relevant, and credible* and must be *scientifically* or *clinically worthwhile*. Additionally, the ethical aspect of the investigation must be beyond reproach.

The emphasis in any form of communication however, is CLARITY and BREVITY of presentation

### Where To Publish

The choice of journal for publishing your article will depend on many factors. Some of these factors are the originality and quality of the paper, the targeted

corrections and should be carried out carefully and methodically with the corrected paper returned to the editor as early as possible.

If the correction is a major one, there may be need to re-do statistical calculation, repeat the experiment, re-analyse the data or re-write a whole section.

audience, subject area, efficiency and regularity of the journal, etc.

Do not fool yourself and think your first paper will appear in *LANCET OR NATURE OR NEW ENGLAND JOURNAL OF MEDICINE OR SCIENCE*. In clinical research for example most giant Researchers/Clinicians had their first published paper as a case report or a limited retrospective clinical experience. It is better to start modestly and aim higher later. One can start with regional or national journal, the findings and recommendations may be of great value to the immediate community.

Journals are of two broad groups namely: *referred* ones, which make use of a peer review system, whereby the article is sent to two or three assessors who are supposed to be able to assess its suitability for publication and *non-referred* ones. Though disputable, the former is generally regarded as being of much higher standard.

If reviewed from the point of targeted audience i.e. intended readership, the journal may be classified into

- (i) General Scientific journals e.g. *Nature, Science*
- (ii) General Medical journals e.g. *Nigerian Medical Journal, West African Journal of Medicine, British Medical Journal, New England Journal of Medicine, Lancet*, etc. These have bias for clinical investigation and applied research relevant to patient care.
- (iii) Specialist Medical Journal such as *Cancer, Gut, Diabetologia, and Brain* which specialize in very restricted areas of research in special fields.

When the paper is completed and ready for publication, it is a good habit to seek from a senior or experienced colleague a review, especially with respect to style and interpretation of results.

When sending your paper by post, always remember to have electronic copies on computer. Most journals in fact now ask for diskette or prefer the author(s) sending the paper through electronic mail.

### Expectations after sending paper for publication<sup>1</sup>

1. Acknowledgement – The author or the correspondence author should expect an acknowledgement of receipt.
2. Outcome of review – There are three possibilities: (i) Acceptance (ii) Modification required before publication (iii) Rejection.

Outright acceptance is rare. More often one is asked to carryout some modifications, either to correct points of fact to clear ambiguity or remove unnecessary lines or paragraphs of the text. All these constitute minor

The initial rejection rate can be as high as 85%; of the remaining 15% only a maximum of 25% of these may be acceptable without requiring some form of alteration. As can be appreciated then, as few as 3%-4% of submitted papers will be accepted at the first publication<sup>1</sup>. With these figures, it is therefore

understandable why rejection of a submitted article happens to us all at some time or another.

There is nothing unusual with initial rejection of article; it is the author's response to the comments of editors and referees which determines whether or not an article is ultimately published.

3. If there is need for modification, read the editor and referee's comment carefully, make necessary correction and resubmit the paper. With use of electronic transmission of papers, the specific areas of correction can be emboldened for easy editing.
4. Even if it is rejected, humbly accept the observation of the editors and referees, make necessary corrections and if possible send to another journal.
5. If finally accepted, the author or correspondence author will receive a letter of acceptance and later a "galley proof".
6. The 'galley' proof should be corrected as quickly as possible and returned to the editor. Avoid unnecessary alteration except minor ones in the 'galley' proof.
7. Expect the final publication. Some Journals send copies (1 or 2) of the whole journal plus 'offprint' or 'reprints' free of charge. Some journals insist you pay for them. 'Offprint' is extra copies of the article made during printing and so looks exactly like the journal article. 'Reprints' on the other hand comprise copies of the article printed separately after the journal copies and usually of a different layout such as a front page devoted solely to the title of the article.
8. Depending on how good and acceptable your paper is, interested reader will continue to request for 'offprint' or 'reprints'. This pushes the author and/or the journal up the ladder on the impact factor and citation index list because he is likely to be cited repeatedly by other workers doing similar work.
9. Implementation and execution of research findings can continue years after publication.
10. The research work can be an impetus to further work or scientific innovation.

This word is borrowed from Laitman and Rikkers<sup>9</sup>. Salami-Slicing is the practice of cutting up a body of data to yield several papers where one complete paper would be optimal. It may also be used to give several participants in a study a chance at first authorship, often in different specialty journals. Submitting the same (or substantially the same) study to more than one journal, known as Duplicate publication is done for the same reason. This unfortunately is common in an attempt to have a long list of publication irrespective of the quality. Although all reputable

11.

### Politics Of Publishing

It is important to appreciate that apart from the 'why', 'what', 'where', 'when' and 'how' of publication, there are other determinants of the success or failure of a publication effort. Beyond the author's control is the real-world consideration of virtually every social interaction – politics. Politics has been variously defined – "the art and science of government", "intrigue and maneuvering within a group", etc. For the purpose of this paper, politics is seen as individual or group's attempt at exerting influence on policy or outcome of a publication based on personal interest or basis. This politicking can be from the Author's, Journal or Editor's side.

### The Author

#### Authorship For Sale

Authorship carries responsibility for the content of an article. The politics of publishing is perhaps nowhere more obvious than in assignment of authorship. While the person who conceived an ideal and does most of the work is indisputably entitled to first authorship, co-authors by no means should always contribute equitably. This is often abused. Some co-authors are included as a form of academic homage – senior colleague, head of department, etc. despite the fact that they have made no discernable contribution. This is not only fraudulent but dishonest. Ideally, the names should be arranged in descending order of individual contribution to the work. The only exception to this rule is where names are arranged in alphabetical order regardless of the seniority or degree of contribution of the authors. Others may be awarded co-authorship as personal thank you for commercial sponsors of the research work.

Some authors extend co-authorship to renown professional to add credibility to the work. This constitutes fraudulent use of someone else's reputation, and in fact, the person whose name has been used might well find substantial fault with the work being proffered. **Authorship should never be for sale.** It must be reserved only for those who make an active and substantial contribution to the work being reported<sup>1</sup>. Free lunches are rarely appreciated.

#### Duplicate Publication And "Salami-Slicing"

journals have policies against these practices, their prevalence is all too widespread – up to 25 per cent of the published literature by some estimates<sup>10</sup>. This practice is harmful because it creates problem for editors who are constantly wrestling with publisher – imposed page limitations and with the professional and ethical responsibility to optimize the use of available pages. This also tends to over-estimate the effect of whatever drugs, techniques and interventions are being discussed which leads to misuse of the resources.

A good researcher should avoid slicing his work. The more it is sliced into tiny pieces, the more of its original taste you lose. The more you slice it the more it becomes tasteless thin pieces. Remember, FISH TASTE BEST WHEN FRESH OUT OF THE WATER. A day later, at lunch, its bitterness has to be disguised with mayonnaise. It is the same with your study; if reprocessed – duplicated in another journal - it will offend your colleagues and may even cause food poisoning<sup>8, 11</sup>. In publishing avoid fabrication, falsification and plagiarism. These constitute outright research fraud..

### Peer review process.

Ideally, ‘peer review weeds out bad studies and recognize good ones’, but the process is far from perfect. Reviewers may be biased. They might downgrade a manuscript sent to them for review if the content of the paper contravenes what they themselves practice. They may also be biased in favour (or against) a particular institution or researcher. In these days of specialization, and sub specialization, reviewers may lack the expertise to evaluate a paper sent to them. The Reviewers may be too busy to provide a careful review. Irrespective of the peer review problem, it is the editor’s responsibility to resolve any question of review quality, thoroughness or fairness. At times it may be necessary to get additional reviewers to achieve this.

### Commercial Sponsorship Of Submitted Works

Financial pressures to order the medical agenda also exist in the form of for-profit sponsorship of medical research. It is an irony of drug regulation that the burden of proof of safety and effectiveness rests with the very companies (pharmaceutical or medical device) that stand to profit most. Perhaps these companies and manufacturers of medical devices offer financial support to academic scientists for expert evaluation of new products. The researchers who accept support from a commercial sponsor must take scrupulous care to remain scientifically objective and not succumb to the temptation to identify with the benefactor<sup>9</sup>. When the results of a commercially sponsored study are submitted for consideration to a peer – reviewed journal, it must be identified as such. On the other side of the publishing equation, the journal editor must take great care that the sponsorship of any study is clearly stated on the first printed page so that readers can take that into account when deciding on the work’s validity.

### THE Editors

The Editors and referees are said to be “gate keepers” of science<sup>13</sup>. They have also been variously accused of ignorance, carelessness and even deliberate in the environment or have a peculiar natural history in the environment. Poor technological infrastructure

obstructiveness. However Editors and reviewers are a pain in the ass but, nevertheless, without them our world of scholarship would be chaotic and meaningless. The Editors choose who will review a paper and as Arthur Baue pointed out, ‘the fate of a manuscript can be determined by the selection of reviewers’<sup>9, 14</sup>.

A good Editor, in spite of his best attempt to be fair, if an author of a rejected manuscript requests (or sometimes demands) reconsideration, he needs to be very honest with himself and decide whether there is a legitimate gripe, and proceed accordingly. Not often, but at least on several occasions, truly excellent manuscripts have emerged from this sequence of rejection – reconsideration – acceptance. Perhaps the most politically blatant scenario in publishing is when a prominent academician attempts to influence an editorial decision to accept, or to advance the priority of a paper, in assignment for publication. All the same, editors have an immense responsibility and expect authors to believe (1) that their manuscripts will be reviewed fairly and with honest feedback, (2) the editor to be an honest and objective adjudicator and (3) the editor to be equitable in the selection of reviewers<sup>15</sup>.

### Problems & Challenges

Despite the critical role of Scientific Medical research, it has suffered a lot of setbacks, particularly in developing countries. One major problem is overall lack of funding and discrepancy between the allocation of research funding and the diseases or conditions that account for the highest global disease burden. About US\$73 billion is invested annually in global health research by the public and private sectors. Of this amount, less than 10% is devoted to research into the health problems that account for 90% of the global disease burden (measured in Disability Adjusted Life Years or DALYs)<sup>2</sup>. Though the World Health Organization (WHO) has attributed poor research output of the developing countries to lack of sophisticated equipment and of trained manpower needed to maintain such equipment, there are other problems:

*Inadequate funding of research.*

*Poor Technological infrastructure.*

*Research culture*

*Attendance at National and International Conferences,*

The government, by appropriate fiscal measures, such as corporate and wealth taxation, can generate additional fund for research. Non-governmental sources from Non-Governmental Organizations (NGOs) can also be helpful as additional sources of funding. Re-ordering of priorities is very important in the face of limited resources. High priority rating should be accorded to diseases that are more prevalent

can be improved by establishment of industries to provide common reagents and equipments, improve

instruction in biomedical instrumentation in technical colleges and seeking the assistance of local and international research organizations to train the technical manpower to support scientific medical research. In this new era of information technology, we must instill in the citizens particularly the young ones, the culture of research. The use of the superhighway information system must be taught from the early days in our educational institutions. For us to join other parts of the world in making impact in medical research not only must we be computer literate, we must know how to store, retrieve and analyze data and search for relevant information on internet. To face the challenges of medical research in the 21st century, we must learn and adopt the current trend in publishing. We must transmit information electronically, review papers on-line, publish on-line and get to read our journals on-line. The production of journals should not only be continuous and regular but must be readily available and affordable by all. We must have fora for generating ideas. Regular brainstorming sessions to discuss research ideas and priorities as well as logistics of tackling them should be encouraged at the institutional and national levels.

#### **Chances To Be Published<sup>16</sup>**

**Do you really want to publish?** Involves: Time, effort and uncertainty. Potential benefits Personal benefits – enhance self confidence and esteem, to see one's work in print, enhance curriculum vitae (for jobs, promotion, awards, etc), essential in some specialties.

**What's Impeding you?** I am too busy with my clinical work weekly study period, quiet call periods, applying for study leave. I am not clever enough – You don't have to be a genius. If you can go through medical school then you should be able to publish something worthwhile. 3. Plan realistically

#### **Conclusion**

This paper has attempted to stimulate interest in research and publication. The challenges in developing countries like Nigeria are highlighted. The time to start is now. Sooner or later one will do it naturally in one's own way. To paraphrase Baue ;"we wish to offer to the young and old surgeon to put words on paper, write and rewrite and rewrite again. Surgical literature needs all worthwhile contribution,

**What type of publication will fulfill your objectives?** – original papers, reviews, editorials, case reports, book,

**How long do they realistically take?** A letter – a day, a book – may be a year.

**When do you need to achieve these publications by?**- For an important job, or award or training.

It is better to start with something easy in order to gain experience and confidence.

**Get support and collaboration?.** Benefits of collaboration: Effort sharing Many heads are better than one.

Maintain morale by mutual encouragement. Complementary skills. Publications like books may be better with multiple authors especially experienced co-authors with established reputation.

To avoid problematic collaboration which can be disastrous: Agree from the onset the role of each person.

**The order of Authorship.** Provisional timetable for the project. Preferably collaborate with people you can work as equals. With advent of e-mail, geographical separation no longer a barrier.

**How to get Ideas:** Capitalize on your strengths – areas where you are knowledgeable and interested in. Capitalize on your existing work. Form local "publication group", where you can brainstorm regularly; critically appraise recent article in journal.

**Evaluate the Market.** Identify the target audience or readership. If you plan to write a book discuss and ensure acceptability of proposal with publishers before commencing.

**Acquire relevant skills.** Literature searching, basic research methods, computing skills, data gathering, data analysis, writing skills, Collect relevant information; write the article and send manuscript for publication

reports and ideas"<sup>10</sup>. This is applicable to all clinicians and scientist and not only surgeons.

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