So you think you can research?

Dr. Sina Babazadeh
MBBS, Monash University (2006)
Third Year Doctorate of Medicine (MD), University of Melbourne

Prof. Peter Choong MBBS, MD
Sir Hugh Devine Chair of Surgery
Head, Department of Surgery, University of Melbourne, St. Vincent's Hospital
Director of Orthopaedics, St. Vincent's Hospital (Melbourne)
Chair, Sarcoma Service, Peter MacCallum Cancer Centre

Sina is simultaneously working towards an MD and working in the orthopaedics department at St. Vincent's Hospital, Melbourne.

I had always considered myself an exceptional dancer. In my mind, my dance moves were unparalleled. However, in reflection, I must admit that the majority of my moves were employed to impress the scrub-nurses by turning my gown in tune to the bopping background beat of the theatre iPod. However, my delusions of dancing grandeur were shattered after watching a number of the popular dance-based shows on television. I realised it took far more than genetic talent, which I still choose to believe I have in abundance, to make a dancer. It requires hours of practice combined with fitness, good music, choreography and originality to succeed. Research, it appears, is not too dissimilar.

I had never been the most proactive student and my CV was barer than a middle-aged German tourist holidaying in Thailand. I had reached a stage in my career where it was time to contribute to medical research. Those who partake in evidence-based medicine know how important research is to the field of medicine.

If you have ever considered undertaking some formal research yourself, here are a few lessons I learnt the hard way:

What do you need?

So, you want to research? Not sure where to begin?

In dance, you need to start with either good music or a good choreographer. In research, your music is your idea, question or inspiration, and your choreographer is your supervisor.

The music (idea)

The chances are that someone, somewhere, has already attempted to adapt "the sprinkler" to your chosen music. As in research, if you think you have a good idea, someone else may have had it before you. To find out, the next step is to conduct a literature review. Medline is a good place to start.

Don't be disheartened if someone has already researched your hypothesis. In medicine, most people can only answer very specific questions. So, if your good idea has already been partially covered, then read a few articles and find a more specific, unanswered question similar to your original one.

For example, if your question was "How effective is heparin in preventing DVT?" then refine your question to "How effective is low molecular weigh heparin in preventing DVT in male patients aged between 80 and 81 with a past history of smoking 22 cigarettes a day who have just undergone a knee replacement and whose favourite colour is light blue, when compared to Aspirin?" and believe you me, it is unlikely anyone else has researched that topic! Also, if someone has attempted to answer your question, it is worthwhile reading their article. If you find that their methodology is lacking, then you may decide to investigate that topic regardless, albeit with more watertight

P - patient, population

- What population would you like to research on?
- Do you have good access and sufficient numbers?
- A power-study may be helpful to determine how many participants you are likely to require.
- Beware underae children and pregnant women. Can be very difficult to get ethics.

I - Intervention

- What intervention are you seeking to research on?
- Is it new? Is it safe? Do you need ethics approaval?
- Do you have access to the intervention?
- Has it been tested before?
- How much will it cost?

C - Comparison

- What is the best available treatment currently?
- If none, can you use a placebo?
- Can you compare your intervention with this?

O - Outcome

- What outcomes best represent success?
- How can you test these outcomes?
- What statistical methods will you use to test these outcomes?
- Objectives vs. subjectives outcomes.
- Should be exact and comparable.
- Are your outcome measurements the same as the patient's?

***Figure 1**. Using the PICO system is a simple way of formulating a scientific question. [1]*

methods. Boosting the level of evidence is also looked upon favourably. If you find a case report, try and write a case series. If you stumble across a prospective study, aim for a randomized controlled trial.

Your music will need a tempo, a nice bass-line and of course catchy lyrics. Your idea/question will also need specific details. The best way to formulate a methodical question is to use the time-honoured PICO format. [1] PICO stands for Population, Intervention, Control, and Outcome.

The population should include patients you have easy access to. Also, it should include the subjects most likely to be present in your field of interest. For example, back to our DVT scenario, those requiring DVT prophylaxes are usually surgical patients, especially orthopaedic patients. Be wary of including minors or pregnant females in your population, as you will need to complete piles of paperwork to be given permission to use these subsets for research.

The intervention should be something you are interested in, and probably something that is slightly controversial, yet proven safe. Remember, most journals require evidence of Ethics Committee approval, and it is exceedingly difficult to gain approval for something seemingly dangerous or untested.

The comparison should be the current standard treatment. If no standard treatment exists, then the comparison should be with a placebo or control. But ultimately you should have a comparison or control. Research without this key component lacks validity. For example, instead of merely researching what percentage of DVT patients have the middle name Bob, you need to compare that to a control, that is, what percentage of the population with similar demographics has the middle name Bob.

The outcome should be clearly defined before the research begins. For example, are you looking at the number of DVT? The size of the DVT? The location of the DVT? The mortality and morbidity associated with DVT? The definitions and endpoints should be quite clear. Also, it is worth considering if your outcome measurements are the same as the patient's. For example, if a patient is feeling less pain with a certain drug but suffering many other new side effects, and your outcome is just pain-relief, then you may not be capturing the full picture. The patient may prefer a little more pain instead of all the new side effects!

The choreographer (supervisor)

Although the dancer does most of the legwork, the choreographer is the one behind the scenes who can make or break a routine. Likewise, a good supervisor is worth their weight in gold. A good supervisor should be knowledgeable, approachable and enthusiastic.

Choreographers usually specialise in a certain field of dance and are usually ex-dancers themselves. With knowledge of what works with what music, they know what is original and what has been done before and they have proven they are able to come up with a dance routine that the audience will like.

Your supervisor should be similar. They should be expert in your field of interest. They should know the best way to undertake the research. That is, how to design a study in a clinical trial, or how to go about laboratory work. They should be up-to-date with current knowledge and be able to help devise original ideas. Because of their past experience, their supervision should help validate your research and allow it to be noticed by the audience. Like the choreographer, the supervisor's role is to focus your raw talent and help you avoid common mistakes.

The best place to find a supervisor is to ask around. Find out who has been a supervisor in the past. They are usually associated with a major university and tend to be more academic. You could even ask your university if they have a list of previous supervisors. Or attend scientific meetings to spot potential supervisors. Then it is simply a matter of making a list and approaching each possible supervisor and discussing your research goals with them. You should have a basic idea of what you hope to achieve before you approach them. Then they can guide you in fine-tuning your idea and commenting on its feasibility. If they are too busy to hear your research proposal, then chances are they will be too busy to supervise you. A supervisor should be available when you need them, either to run a question by them, to review any articles you may have written and to give you feedback on what to do next.

Remember, you can always have more than one supervisor. The upside of this is that you can gain advice from different viewpoints, as each supervisor tends to concentrate on different aspects of the research. The downside is you have to appease both supervisors, and this can sometimes be difficult if they do not see eye-to-eye on certain matters.

Paying for your dance lessons (finance)

It's hard to become a professional dancer. While you are learning your steps, you need to have considered your financial position. Practice takes time and will likely consume the spare time usually reserved for part-time work. But you still need to put food on the table and dancing shoes on your feet.

Research is similar; it is always more time consuming than first envisaged. Generally, a little bit of financial backing makes research a lot easier. Depending on your research, the project itself can be either funded by a hospital department, from a government grant (http://www.arc.gov.au) or through private enterprise. Your supervisor would be the best person to speak to about your project funding, as they would have previous experience in such matters. There are also many scholarships available, through your university, your faculty, NHMRC (http://www.nhmrc.gov.au) or specialty groups such as the Cancer Council (http://www.cancer.org.au). Your university is the best place to start looking. You should investigate these options long before you are thinking of beginning a substantial research project, as the deadline for applying for these is generally many months in advance.

Working all day, dancing all night (time)

So, you would love to learn to dance, but never seem to have the time? It takes many hours of dedication to become a good dancer. Likewise, research is a huge time commitment. Even the smallest project can snowball to consume all your time. A rule of thumb in the research world is to always allow twice as much time as you think you will need. As a medical student, or junior doctor, it may already be hard to juggle a busy academic life and social life, let alone adding some research commitments. You may already feel like an overburdened horse! But remember, the more you progress in your career, the busier you are likely to become! So the earlier you start the better off you will be, not only as you will have more time, but because the research you complete will be invaluable in improving your resume and securing those sought after opportunities in the future. Looking back at my student days, only now do I realise how much spare time was available to me. A few hours a week (far less than you would spend watching television) can add up to a substantial project over a year.

If you are really time-poor you have two options: either choose a very simple project, such as a review article or case report, or take time off to commit to research. It can be very rewarding to take a year or two out of medicine to focus on research. This is compulsory at many universities in the form of a Bachelor of Medical Science or similar degree. Once out of university, a year off to complete a Masters degree by research can not only be enjoyable but also very rewarding for your career.

Ballet, ballroom, contemporary, hip-hop… I like them all (types of research)

So, you want to dance, but not sure what style suits you best? There are so many to choose from and all have their positives and negatives. Once again, research is similar.

Did you love chemistry during high school and enjoy playing around with chemicals? Then laboratory work may suit you. This type of research is commonly used to find better ways to treat cancer. Advantages include

flexible time commitment and mind-boggling scope. Disadvantages include the long hours spent with only a beaker for company.

Are you a physics nut who is in love with forces and motion? Then you may be more suited to biomechanical research. This is common way of researching prosthetics and sports medicine. Advantages include interacting with fun machinery and lots of modern tools. Disadvantages include costs associated with buying these tools and hence the limited number of biomechanical labs around.

Do you enjoy talking and working with patients and volunteers? Then you may also enjoy clinical research, where interaction with patients and colleagues is key to success. Advantages include patient interaction and discovery of instantaneously relevant clinical information. Disadvantages include total reliance on patients and colleagues following the projects instructions and difficulty in obtaining ethics approval.

Are you good with numbers and mathematics? Then epidemiological or population studies may be the best way to utilise your skills. Advantages include the ability to control your time, minimal overheads and ability to do small projects quickly. Disadvantages include the headaches associated with advanced statistics and large numbers.

No matter what pathway you choose, they are all rewarding in their own way. Yes, you will have your good days and you will have days you would rather forget, but in the end, nothing is as fulfilling as knowing you have contributed to your field. So take the challenge and like Isaac Newton, stand on the shoulders of giants and find out how far you can see!

Conclusion

Like dance, research can be extremely fulfilling. At first, it can be difficult to find your feet. But once the basic moves are learnt and confidence is gained, dancing becomes natural and you will find yourself the envy of your peers and colleagues in no time at all.

Correspondence

S Babazadeh: sbabazadeh@gmail.com

References

[1] Richardson WS, Wilson MC, Nishikawa J, Hayward RS. The well-build clinical question: a key to evidence-based decisions. ACP J Club 1995;123(3):12-3.

Producing books for over 30 years

Ligare produces books for major global publishers, such as Elsevier Science, as well as individuals wanting to self-publish. We have a range of print solutions across Australia, New Zealand and Asia that we can tailor to your requirements.

Ligare produces:

• Text books • Journals • Manuals • Novels
• Coffee table books • Magazines

Ligare

For more information
visit our web site www.ligare.com.au
and call Elizabeth Finniecome on
02 9584 7644
elizabethf@ligare.com.au

138 Bonds Rd
Riverwood, NSW , 2210
02 9533 2555
Ligare Pty Ltd is a proud sponsor of the AMSJ