

# Building research capacity in resource-poor settings: Triumphs and challenges

LOIS J. ARMSTRONG, PHILIP FINNY

## INTRODUCTION

Research is often equated with ivory towers and big educational institutions. Specialist research usually ends up in big tomes that gather dust but make little difference to the real world. On the other hand, research in resource-poor settings has the potential to influence our understanding and management of locally relevant health issues. One example is the work on intrathecal anti-tetanus serum from Bihar that was first published in the *Lancet* in 1977, which sparked off a series of studies that improved the treatment of tetanus.<sup>1,2</sup>

We have been working together for over 5 years in East Champaran, a district of 5 million people in northern Bihar, near the Nepal border.<sup>3</sup> The local population is 92% rural and there are no tertiary healthcare facilities in the district.<sup>3</sup> The research has been based at a 200-bed secondary hospital and the associated community health projects. We acknowledge that our situation does not represent the whole of India but for those working in the 70% rural population, who frequently are less well-resourced, we trust this is an encouragement to begin, or continue, to face the constraints and find ways to research on relevant issues.

One of the early Indian case series on hypokalaemic periodic paralysis (HPP) was published from this hospital.<sup>4</sup> Every year we see around 30 patients, some of whom were admitted repeatedly. One of the junior doctors, in consultation with the physician/endocrinologist, began to investigate the underlying causes to better manage these patients so that repeat presentations were decreased.<sup>5</sup> Two tertiary centres had published on this problem: Lucknow, Uttar Pradesh<sup>6</sup> and Vellore, Tamil Nadu.<sup>7</sup> We found that as a secondary level, general hospital some of our findings differed from those of the tertiary centres. First, we had more cases; 84 over a 3-year period compared to 30 in Lucknow over 3 years and 31 in Vellore over 6 years. In Lucknow, it was the Neurology Department that published the data and in Vellore, the Endocrinology Department.<sup>6,7</sup> We have the advantage of seeing these patients as the first point of entry to the healthcare system, whereas in tertiary centres the referred cases can be spread over a number of departments giving a fragmented picture of the spectrum of the disease.

Most other studies show a male predominance with HPP;<sup>8</sup> Lucknow had only 3 women in their set of 30 patients and Vellore had 12 women in their 31 patients.<sup>6,7</sup> However, our data show only a slight preponderance of males with 54.8%.<sup>5</sup> We suspect this difference may be a referral bias as it is known that the health-seeking behaviour of men is greater than that of women. As we have a large number of cases at their initial presentation, we have shown a seasonal variation noted previously,<sup>8</sup> but now is supported by two other case series.<sup>9,10</sup> This work on HPP at a rural, secondary-level hospital suggests that the HPP data from the tertiary centres may be not generalizable to the broader community setting.

Duncan Hospital, Raxaul, East Champaran District, Bihar 845305, India  
LOIS J. ARMSTRONG Department of Epidemiology and Research  
PHILIP FINNY Department of Medicine

Correspondence to LOIS J. ARMSTRONG; [loisjarmstrong@gmail.com](mailto:loisjarmstrong@gmail.com)

© The National Medical Journal of India 2016

## CHALLENGES AND TRIUMPHS

Our work has not been without challenges. It has been difficult to find staff who have been trained to do research in a rural setting. It has been even harder to find people interested in research as a long-term career. One characteristic we seek in staff is the ability to critically think through issues. With most of the applicants coming from an educational system that relies on rote learning rather than critical thinking, this makes 'ready-made' applicants scarce. We seek to watch out for people who show glimpses of the ability to think critically and ask relevant questions, then to spend time in mentoring these people in developing their skills. Sometimes it is discouraging to see them move on to other places but many have written back to tell how this training has been invaluable to them in postgraduate studies. On the positive side and in the big picture, we see this as contributing towards nation-building.

There are two things we have found helpful. One is to consider the carrying out of a research project as not just a project, but an opportunity to mentor local staff through the process of the study. Sometimes the outcome of the study becomes far less important than the growth seen in the staff member when at the end they come out with comments such as, 'Now I understand why we do research' and 'I discovered research can be interesting'. We remember with delight the time a junior doctor told us that he chose to strictly follow the protocol and collect the data accurately even though he had been tempted to deviate when collecting data in the community. At the same time, we remember the frustration when we were unable to submit a project for publication because the data collection had failed to follow the inclusion/exclusion criteria carefully set out at the beginning. One of our junior doctors thought he had finished his project, but when we handed it back to him multiple times to improve the write-up, he seemed discouraged and frustrated, but finally, when it was published, he was thankful. A research project is a long task and much of the work is unseen. It takes a lot of effort to mentor, supervise and encourage a person to complete a project thoroughly.

The second thing we have found to be helpful is to be involved in collaborations between resource-poor and resource-rich settings. Now in our third study, we have been working with a major teaching hospital in India. Our staff have grown through the input from their faculty and teleconferences have been an important part of this collaboration. Our laboratory has added new tests such as serum pseudocholinesterase levels to our routine tests for patients with organophosphate poisonings. Communication, or perhaps miscommunication, has been one of the challenges of such collaborations but there is evidence that this joint work is producing some of the better-quality research.<sup>11</sup> Earlier the research was done only by our clinical staff. Now that we are involved in bigger and multicentric projects, we have found it valuable to have dedicated staff for research. This means these staff cannot be pulled into doing urgent clinical work, so that data collection is not compromised and writing work is not delayed.

So far, staff connected with research were required to be willing to tackle multiple tasks ranging from study design, data

collection and entry, to analysis and writing. They have also covered a variety of topics from interviews of suicide attempters to misuse of glucocorticoids. Underlying these topics are the same basic principles of research. Expert advice has been sought from specialists from within the institution and from external centres. Together, the people with skills in research and specialist health areas have been able to provide teamwork to carry out a project.

#### OUR NEW PROJECT

'Forty cases of attempted suicide by pesticide poisoning in a month!' The managing director of the hospital was shocked. He thought we had an epidemic on our hands. We had begun counting the number of attempted suicides by ingestion of poisons. The number that month was not much higher than that in the previous months, but it was interesting to see the power of numbers at work. Putting a discrete number to the problem called for action.

Deliberate ingestion of pesticides made up almost 10% of the admissions to the medical unit. The psychologist interviewed 153 people who had survived a suicide attempt;<sup>12</sup> women were slightly more than men and the highest incidence was observed in the age group of 16–20 years. It was not farmers as in some other parts of India and the primary reason given for the suicide attempt was family conflict (80%).<sup>12</sup> Pesticide poisoning was the major mode of attempted suicide (94.3%).<sup>11</sup> Using the WHO Major (ICD-10) Depression Inventory, 17.7% of the participants suffered from depression and 56.9% admitted to previous thoughts of suicide.<sup>12</sup>

Knowing that alcohol use and domestic violence were also issues in East Champaran,<sup>13</sup> a community mental health project has been initiated and its work has been well accepted and is continuing to grow. Now we even have a psychiatrist, the only one in a population of 5 million people!

Our research work is extending its sphere of influence beyond this community. The consequences of unregulated use of glucocorticoids is well-known, but poorly documented. Initially, a junior doctor reviewed hospital patients with symptoms of long-term complications of glucocorticoid misuse and hypoadrenal crisis precipitated by the sudden withdrawal of glucocorticoids.<sup>14</sup>

The follow-up study calculated the misuse of glucocorticoids in the community.<sup>15</sup> Betamethasone, prednisolone and dexamethasone are readily available over-the-counter. They are cheap, and they rapidly decrease the symptoms of respiratory, skin and joint diseases. For poor people who are unable to think beyond the needs of the day, glucocorticoids are wonder drugs. However, they are a long-term disaster leading to diseases such as early onset diabetes, hypertension, tuberculosis, cataracts and osteoporotic fractures, and have the potential of death from hypoadrenal crisis, if the drugs are stopped suddenly. We were glad when some newspapers picked up on the scientific publication of this work and published it in the general press.<sup>16,17</sup> We trust more people will begin speaking up on this issue that disproportionately affects the poor.

Initially, our laboratory staff were resistant to being involved in research for it meant more work on top of their usual workload. Special celebrations for inauguration, and completion of projects have helped make the laboratory staff feel their work is important. The extra work which is part of the ongoing National Snakebite Study has been without any complaint. They now appreciate their key role in the research work of our community.

Complex tests require us to send samples out for testing at tertiary centres. It required dry ice coming from Kolkata, before packing the samples and returning them to Kolkata for their long onward journey. This is costly, and complex in logistics but it can

be done. Unforgettable is the precious memory of the sense of wonder on the faces of our laboratory staff, when they saw dry ice for the first time!

Contending with varying environmental conditions such as extreme heat, dust, monsoons and floods has also been a challenge. We recently acquired a –20 degree Celsius freezer for long-term storage of samples and immediately had a special stand built for it so that it will not be damaged during floods. How grateful we are to have a 24-hour supply of electricity to support such a facility.

There have been challenges in learning how to handle the data available to us that will be unique for many resource-poor settings. We found that most people in our area do not have an accurate date of birth, especially if they are over 20 years of age. They guess their age to the nearest multiple of 5. This means that using a mean of age in data analysis is not very relevant; instead we use age intervals which are more practical. However, it is sometimes hard to make comparisons to data from other sources where an accurate age can be determined.

Nine lakh rupees! That was the quote we were given to buy a legal copy of SPSS (Statistical Package for Social Sciences). It was way beyond our budget. Microsoft Excel been the mainstay with respect to computer software, we have used for the research work. Many of our staff have previous exposure to MS Excel, so the advantage is the learning curve is not so steep. Many statistical features are now available on MS Excel, and one can teach oneself with the help of YouTube videos. Data in MS Excel can be easily imported into other statistical programmes if required. We have also used EpiData™ and EpiInfo™ but our preference is for EpiInfo. The new program 'R', which is freely available, may prove to be the best option for complex statistics.

#### THE WRITING AND PUBLISHING PROCESS

'What is an article?' was a question a junior doctor once asked. That young man has now discovered the world of journals, evidence-based medicine and the importance of continuing education. Research relies heavily on access to the internet and online journals. We have been frustrated when the internet is slow or not there at all. The cost of subscriptions to many online journals is beyond our budget but we have been thankful for the increasing number of free, open access journals. Google is now so common but the lesser known Google Scholar has been a good place to help people start searching on the internet for quality reference material.

With so many journals now in existence, entering the world of publishing is rather daunting. How do you choose which journal to publish in? Do you want to go for high impact journals or do you have a particular audience you want to reach? Does your work comply with all the requirements of a particular journal? The cost of publication is also high and although our setting would qualify us for the concessions of a low-income country, the country overall is considered middle-income and so we do not qualify automatically.

The writing up of research can be long and arduous, especially when journals refuse submissions. We have found that the issue of language has multiple layers to it. There is the scientific layer—a specialist English language in its own right. Then there is the layer of regional English. People may have spoken English as their first language all their lives but it is not the British English or American English that journals ask for. Then some of our writers do not have English as their first language and their sentence structures reflect their literal translation from their first

language. In one instance, an article before submission was proofread by an academic in a western institution, and we were told by the reviewers that our English was poor!

## CONCLUSION

Our aim has always been to carry out research that is relevant to our community. As we look back, one of the encouragements we see is that almost every study has impacted our practice in both the hospital and the community. In spite of the challenges, it has been a fulfilling experience to see how research has been increasingly accepted and requested. Over the 5 years, we have built capacity and encouraged people to think about evidence-based practice. We would love to see this experience replicated across India, and overseas, to bring about improvements in clinical management, and to influence public health policy.

## REFERENCES

- Sanders RK, Martyn B, Joseph R, Peacock ML. Intrathecal antitetanus serum (horse) in the treatment of tetanus. *Lancet* 1977;1:974–7.
- Thomas PP, Crowell EB Jr, Mary Mathew M. Intrathecal anti-tetanus serum (ATS) and parenteral betamethasone in the treatment of tetanus. *Trans R Soc Trop Med Hyg* 1982;76:620–3.
- Purbi Champaran (East Champaran) District: Census 2011 data. Available at [www.census2011.co.in/census/district/56-purbi-champaran.html](http://www.census2011.co.in/census/district/56-purbi-champaran.html) (accessed on 15 Oct 2015).
- Thomas SM, Booth BE, Rao A. Preponderance of hypokalaemia as a cause of acute onset quadriparesis in northern India/southern Nepal. *Trop Doct* 1999;29:148–51.
- Kumar V, Armstrong L, Seshadri MS, Finny P. Hypokalaemic periodic paralysis in rural northern India—most have secondary causes. *Trop Doct* 2014;44:33–5.
- Maurya PK, Kalita J, Mishra UK. Spectrum of hypokalaemic periodic paralysis in a tertiary care centre in India. *Postgrad Med J* 2010;86:692–5.
- Rao N, John M, Thomas N, Rajaratnam S, Seshadri MS. Aetiological, clinical and metabolic profile of hypokalaemic periodic paralysis: A single-centre experience. *Natl Med J India* 2006;19:246–9.
- Balakrishnana RK, Chandran SR, Thirumalnesan G, Doraisamy N. Thyrotoxic periodic paralysis. *Indian J Endocrinol Metab* 2011;15 (Suppl 2):S147–S149.
- Kalita J, Goyal G, Bhoi SK, Chandra S, Misra UK. Comparative study of thyrotoxic periodic paralysis from idiopathic hypokalaemic periodic paralysis: An experience from India. *Ann Indian Acad Neurol* 2012;15:186–90.
- Alkaabia JM, Mushtaq A, Al-Maskarib FN, Moussac NA, Gariballaa S. Hypokalaemic periodic paralysis: A case series, review of the literature and update of management. *Eur J Emerg Med* 2010;17:45–7.
- Dandona L, Raban MZ, Guggilla RK, Bhatnagar A, Dandona R. Trends of public health research output from India during 2001–2008. *BMC Med* 2009;7:59.
- Nair S, Armstrong LJ, Finny P. Family conflict—the major underlying influence in suicide attempts in northern Bihar, India. *Christ J Global Health* 2015;2:23–34.
- Annual Health Survey 2010–11, Bihar. 2012. Office of the Registrar General and Census Commissioner, India.
- Nalli C, Armstrong L, Finny P, Thomas N. Glucocorticoid misuse in a rural and semi urban community in northern Bihar—a pilot study. *Trop Doct* 2012;42:168–70.
- Masih S, Stephen SC, Armstrong LJ, Finny P. Use and misuse of glucocorticoids in the community of Raxaul block, North Bihar. *Trop Doct* 2015;45:68–72.
- Sukanyi S. Doc glare at unregulated steroid use. *The Telegraph*. 12 Dec 2014. Available at [www.telegraphindia.com/1150213/jsp/bihar/story\\_3091.jsp#.VN15z-aUfjs](http://www.telegraphindia.com/1150213/jsp/bihar/story_3091.jsp#.VN15z-aUfjs) (accessed on 15 Oct 2015).
- Singh J. Steroid overuse behind chronic diseases in Bihar town. *Down to Earth*. Available at [www.downtoearth.org.in/news/steroid-overuse-behind-chronic-diseases-in-bihar-town-48661](http://www.downtoearth.org.in/news/steroid-overuse-behind-chronic-diseases-in-bihar-town-48661) (accessed on 15 Oct 2015).

## Attention Subscribers

The subscriptions for *The National Medical Journal of India* are being serviced from the following address:

The Subscription Department  
*The National Medical Journal of India*  
 All India Institute of Medical Sciences  
 Ansari Nagar  
 New Delhi 110029

The subscription rates of the journal are as follows:

	One year	Two years	Three years	Five years
Indian	₹600	₹1100	₹1600	₹2600
Overseas	US\$ 85	US\$ 150	US\$ 220	US\$ 365

**Personal subscriptions paid from personal funds are available at 50% discounted rates.**

Please send all requests for renewals and new subscriptions along with the payment to the above address. Cheques/demand drafts should be made payable to **The National Medical Journal of India**. Subscription amounts may be transferred electronically to State Bank of India, Ansari Nagar, New Delhi account no 10874585172, IFSC code SBIN0001536. Please send a scanned copy of the the money transfer document to [nmji@nmji.in](mailto:nmji@nmji.in) along with your name and address.

If you wish to receive the Journal by registered post, please add ₹90 per annum to the total payment and make the request at the time of subscribing.