

# STATISTICS ANXIETY AMONG MEDICAL PROFESSIONALS IN DEVELOPING COUNTRIES: PROBLEMS AND WAY FORWARD

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Medical professionals need statistical acumen for research management. Evidence-based practice of bio-statistics guides researchers to correctly apply different statistical techniques.<sup>1</sup> It helps in correct interpretation of results, making right conclusion and rational decision. Lack of formal training in bio-statistics can result in drawing wrong conclusion. p-value fallacy is an example.<sup>1</sup> Understanding p-value is important but it's more important to understand what it doesn't imply. Numerous misconceptions about p-value are known.<sup>2</sup> Statistical cognitions are the cognitive processes to make a clear understanding of different statistical concepts.<sup>3</sup> These processes are context-specific, identified through qualitative inquiries to ensure evidence-based statistical communication. Lack of such studies makes statistical communication challenging, leading to perplexity among the end users.

Statistics anxiety means getting anxious while doing statistical analysis or taking a course on statistics. It has some overlapping as well as some distinctive constructs with mathematics anxiety.<sup>4,5</sup> Apprehension related to manual calculation contributes towards mathematics anxiety while attitude towards statistics constitutes statistics anxiety. Applied bio-statistics for health professionals in the current time involve almost no manual calculations. Health professionals have to understand different statistical techniques, decide when to use them and

how to interpret results. Procrastination induced by statistics anxiety generates a vicious cycle of avoiding statistics and therefore more statistics anxiety among medical professionals.

Courses teaching bio-statistics should be designed using contextually relevant qualitative information. It is important to focus teaching the health professionals about when to use a particular test, how to interpret it and how to execute a particular test using statistical softwares rather than spending a lot of time on manual calculations. Tutors need to get familiar with different constructs of statistics anxiety along with the technique to handle each construct. Administration of the statistics anxiety scale at the beginning of the course might be helpful to identify individuals in need of more attention.

Problem-based learning in teaching statistics might help taking the attention of the health professionals towards the problem.<sup>6</sup> Real world examples while using problem-based learning will keep the participants involved. Errors made in such sessions can be corrected there and then. Teaching strategies in which the trainer build on the existing knowledge of the students are recommended.<sup>7</sup> Using humor in the presentations is a way that can attract trainees and reduce statistics anxiety.<sup>8</sup> Open book exams which are not strictly timed, increase critical thinking and improve performance, especially when the trainees study in couples or

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groups. Reassurance from the tutor that the students can complete the course is also very helpful.<sup>8</sup> Statistics anxiety is inversely related to course performance in research methods courses. This anxiety results in delay among students in enrolling in the statistics courses and academic procrastination.

Most of the developing countries have limited funding allocated to research and development. Therefore as compared to clinical work which has direct monetary reward, research skills are mostly lacking a reward, commensurate to the skillset, knowledge and experience of the researcher. This inherent lack of motivation to learn research skills is an important impediment in learning research skills like statistics. Further, low number of trained and experienced bio-statisticians makes the situation even more difficult.

Considering the fact that health professionals in developing countries have lack of motivation and have statistics anxiety, it is very important to make a plan for teaching statistics with the help of contextual evidence. If most of the health professionals lack knowledge in a particular discipline, it is evident that discipline is rarely discussed. Therefore it results in a number of misconceptions. The plan to teach statistics should first be to understand these misconceptions and then make a strategy to remove them. This is possible through qualitative inquiries to discover the learner's perspective of different concepts like p-value, type I error, type II error etc. Making teachings on the basis of these qualitative inquiries will ensure evidence-based statistical communication.

Furthermore, statistics anxiety needs to be considered and dealt with like any other anxiety. It is important to remove

this anxiety by sequential and planned evidence-based statistical communication. This should be incorporated into the curriculum of different disciplines in such a way that teaching is spread apart to give slow exposure followed by evaluation and feedback. Concentrated courses in which complicated statistical concepts are thrown to the students all at once should be avoided. In addition to this, it is important for trainer to enable health professionals to know about different statistical concepts and tests, their appropriate usage, use of softwares to execute these tests and to interpret the output of these softwares. Details related to formulas and derivations should be avoided.

Before starting a course on statistics, it is important to find the number of trainees in a course on statistics having statistics anxiety. It is also important to stratify the individuals according to the severity of statistics anxiety. In this way

trainer can plan customized training approaches to groups having different levels of statistics anxiety.

Finally, it is important to teach the application of statistical concepts during the practice of clinical medicine on regular basis. Clinicians who have some understanding of statistics are in a much better position to teach statistics to health professionals during their routine teaching sessions as compared to individuals with background only in statistics. It is through giving real world examples during the practice of clinical subjects that health professionals get a better understanding of applied statistics.

## REFERENCES

1. Goodman SN. Toward evidence-based medical statistics. 1: The p value fallacy. *Ann Intern Med* 1999;130(12):995-1004.
2. Goodman S. A dirty dozen: twelve p-value misconceptions. *Semin Hematol* 2008 Jul;45(3):135-40. doi: 10.1053/j.seminhematol.2008.04.003.

3. Kalinowski P, Lai J, Fidler F, Cumming G. Qualitative research: An essential part of statistical cognition research. *Stat Edu Res J* 2010;9(2):22-34.
4. Chew PK, Dillon DB. Statistics anxiety update refining the construct and recommendations for a new research agenda. *Perspect Psychol Sci* 2014 Mar;9(2):196-208.
5. Hunt TE, Clark-Carter D, Sheffield D. The development and part validation of a UK scale for mathematics anxiety. *J Psychoeduc Assess* 2011;29(5):455-66.
6. Boyle CR. A problem-based learning approach to teaching biostatistics. *J Stat Educ* 1999;7(1). [Cited on March 23, 2017]. Available from URL: <http://www.amstat.org/publications/jse/secure/v7n1/boyle.cfm>
7. Tishkovskaya S, Lancaster GA. Statistical education in the 21st century: a review of challenges, teaching innovations and strategies for reform. *J Stat Educ* 2012;20(2):1-55.
8. Onwuegbuzie AJ, Wilson VA. Statistics Anxiety: Nature, etiology, antecedents, effects, and treatments--a comprehensive review of the literature. *Teach High Educ* 2003;8(2):195-209.

### CONFLICT OF INTEREST

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