

Communication among Physicians and Allied Healthcare Associates: The Language of Numbers, and the Value of Biostatistics to the Medical Student, Physician, and Patient

Nicholas A Kerna^{1,2*}¹College of Medicine, University of Science, Arts and Technology, Montserrat, BWI²Department of Biostatistics and Epidemiology, Suriwongse Medical Center, Thailand

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*Corresponding author

Nicholas A Kerna, College of
Medicine, University of Science,
Arts and Technology, USA,
Email: nicholas.kerna@usat.edu

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Preface

Results of public health programs are enhanced through superior communication among project members. In public health, communication requires a medium of language. This medium could be verbal language, sign language, body language or, in the case of biostatistics, a language of numbers (derived mostly from the computation of formulae). Language is a skill that is learned. As with any skill, it requires review and development. Biostatistics is a fundamental tool in public health. Offering (or requiring) continuing education for the review of essential knowledge and skills and the application of new knowledge and skills in biostatistics should be considered. Remaining adept in biostatistics will maintain proficient understanding and communication among physicians and allied healthcare associates.

Discussion

Biostatistics and the Medical Student

Biostatistics classes can cause many medical students to feel frustrated and frantic. Why does the United States Medical Licensing Examination (USMLE) include biostatistics questions and clinical “brain-teasers” containing biostatistics components? Why is biostatistics part of the body of knowledge that is deemed fundamental and essential for the medical student and eventual practitioner? Medical students wanting to practice in the United States know why they need to know biostatistics: *To help them pass the USMLE!* It would be most helpful for them to appreciate—thus motivate them to learn—how understanding biostatistics translates into being a more competent student doctor and medical practitioner in the months, years, and decades ahead. Also, it would be constructive to remind physicians and those who utilize this “language of numbers” in their jobs and professions of the value of biostatistics.

The following is a conclusion of 130 practicing UK physicians that responded to a research questionnaire: “Grounding the teaching of statistics in the context of real research studies and including examples of typical clinical work may better prepare medical students for their subsequent career” [1].

How does biostatistics make medical students better practitioners? This study does not say. Unless one is planning on becoming a researcher or biostatistician, how does the future physician benefit from studying and mastering biostatistics? This question is one that many perplexed (because of trying to comprehend biostatistics) medical students ask. To reiterate, perceiving the functional role (and not just the test-taking role) of biostatistics may better motivate medical students to learn—and to want to learn—the language, purpose, and practicality of biostatistics.

Biostatistics and the Physician

Charles McCulloch, Ph.D., professor and head of Biostatistics at the University of California at San Francisco, states: “Virtually any medical research study uses biostatistics from beginning to end” [2]. A study of practicing physicians reported that biostatistics education was deemed “very and exactly important” by 88.19% of the respondents; 27.8% of the participants did not receive biostatistics education. The following table illustrates the importance that is placed on biostatistics as one climbs the educational “food chain” (Table 1).

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Table 1: The level of importance of biostatistics education in the formal education process.

Education process		The level of importance (1-5) Any Little Middle Very Exactly					x	s.d
		1	2	3	4	5		
Doctorate	f	0	3	25	93	116	4.36	0.71
	%	0	1.27	10.55	39.24	48.95		
Post graduate	f	0	4	46	106	81	4.11	0.76
	%	0	1.69	19.41	44.73	34.18		
Under graduate	f	18	45	108	47	19	3.02	0.98
	%	7.59	19	45.57	19.83	8.02		

Reprinted from The Views of Academic Staff on Biostatistics Education in Health Sciences by Kilic and Celik.

Whether medical students think biostatistics is an unwarranted bore or academic burden, the stark reality is that practicing physicians know that biostatistics is essential. In fact, for those physicians who do not possess biostatistics proficiency, they rely on friends and colleagues for that know-how and those opinions. In medical practice, competence in biostatistics is essential, is practical, is useful, and is utilized and applied, whether it is the physician’s own knowledge or insights gathered from colleagues or learned from other sources; as shown in as shown in Table 2 (below).

Table 2: The sources of current biostatistics knowledge of participants.

Information source	f	%
Lessons received during the education process (undergraduate-post graduate)	149	62.9
Personal (individual) efforts	128	54
Friends who are Knowledgeable on the subject	109	46
Courses-seminars etc.given by private and/or public experts	40	16.9
Scientific meetings (congress, symposium etc.)	29	12.2
Other	2	0.8

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How do physicians know if the facts that are presented to them are true or not so true? Unless they fathom the basics of biostatistics, they may fall prey to unscrupulous advertisers and industry promoters, or merely faulty research. They may be fed bogus or biased findings that serve the vested interests of a research group, product company or sales force, but not necessarily fulfill the requirements of the physician or support the needs of the patient.

Biostatistics for the Patient

To be deemed competent, the practitioner must stand between research and patient, must stand between advertisements and patient,

must stand between hearsay and patient, and must stand between unscrupulous and unscientific practices and patient. The practitioner must act as guardian and judge per se of what practices, procedures, and treatments are beneficial to, and ultimately given to, the patient. The practitioner must be able to rely on their reason and judgment, for there will not always be a higher authority to consult close at hand. Grasping the principles of biostatistics affords the clinical medical student, the medical resident, and the physician the independence and the opportunity to think clearly and to draw rational conclusions.

Conclusion

Biostatistics Benefits All: Medical Student, Physician, and Patient

The medical student must develop and nurture the faculty of critical thinking; biostatistics conditions the mind and promotes thought processes in this regard. The lessons that are taught in biostatistics courses give the medical student, and eventual practitioner, the requisite scholarly knowledge and analytical tools to evaluate research materials, product advertisements, and treatment options; and to choose those options best suited for the patient. Also, physicians (and others who utilize and depend upon biostatistics in their duties) need to continually refresh their proficiency in and upgrade their knowledge of biostatistics through their efforts or continuing education courses or seminars. In this way, biostatistics itself becomes part of the patient’s treatment and part of the patient’s therapy or cure. Developing and maintaining a solid foundation in biostatistics makes for better doctors and better medicine, and results in better care for patients in all parts of the world.

Conflict of Interest Statement

The author declares that this paper was written in the absence of any commercial or financial relationship that could be construed as a potential conflict of interest.

Supplementary Note

This paper is based on prior published research: Kerna NA. The Relevance of Biostatistics to the Medical Student. *Biom Biostat Int J*. 2018; 7: 87-88.

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