



A view on conducting research and applications of biostatistics is essential to under and post-graduate medical education as per medical education curriculum in India

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Abstract

Research is the main key method of the advancement of medical field. It is a continuous process and it gives the new and best method/way of new treatment/way of medication in the medical field. It is an important and essential education method in the medical education curriculum in India. Not only in India, doing research and submission it in a proper way or method is a mandatory procedure in the medical education process in worldwide medical education. Anybody wants to prove their finding in medical or any other field then; they will do some research with proper permission and procedure and submit their finding using by biostatistical tools and applications and to prove scientifically in a proper way. Research is very much useful to find the consequences, and other information about Covid-19 pandemic to doctors/scientist/health care providers/policy makers/State and Central Governments to take necessary precautionary measures. Biostatistics means the application of statistical tools to scientific research in health care related areas like medicine, biology, and public health. From research only, one can prove or develop a new method or tools or procedure to a new area/field by using biostatistical tools or methods. Research and applications of biostatistical tools are interrelated with each other. Without using of biostatistical tools, no one has to prove their findings are scientifically. So, it is the back bone of any kind research/study. These two things are very important in our Indian medical education/curriculum and other foreign countries also. So, in this short communication, I have to discuss about the needs and importance of research and biostatistics concepts and its applications in the under graduate and post graduate medical education.

Keywords: medical education, medical curriculum, under and post graduate students, research, biostatistical tools, India

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Introduction

Nowadays, research is an important procedure in the medical curriculum in India. It gives the clear picture of the present scenario or situation. The medical students are showing keen interest in doing their research in a European Island State. [1] In a review study by Stone et al. [2] that the students were showing much interest to do their research in globally. Research is very useful and big challenges to conduct at the time of Covid-19 pandemic. [3] All over the world all health care professionals, scientists and research scholars were conducted some studies related to Covid-19 with the existing data in their respective hospitals and research institutes. By the research results only, all over the World people had received the status of Covid-19 virus affect in first three months of the pandemic, information about in what way the virus was spreading, symptoms, treatment methods and its severity in their own areas, district, states, country, neighborhood countries and in the rest of the World. [4] Biostatistics is an important subject in the medical education curriculum. Because, the subject is very frequently used to prove new findings and being using in the medical research. Biostatistics means expressing/explaining the medical data by using statistical tools/methods. In this paper, I am discussing about the research, biostatistics, applications and its improvements in the medical and scientific fields.

Need of the research in UG and PG medical studies: Research doing is an important practice in under graduate (UG) and post graduate (PG) medical students. [5] If a student wants to do any small studies in the posted Rural Health Centre (or) in Urban Health Centre as intern at the time of posted in the Department of Community Medicine as per National Medical Council, New Delhi. So, the concern

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student will prepare one protocol and submitted to the Head of the Department of Community Medicine then, it will be scrutinized by the HOD. Then, any necessary changes have to be done in the particular questionnaire then the research will be done by the concern Intern and submitted the final report and presented it in front of the teaching staff of the department. Moreover, the UG students are dividing into 4 groups as 25 students and involved in each group and choose separate research title to each group, supervised by teaching staffs per group, PG medical students and Interns. Each group of students are presenting their research results in front of all students, students and principal. Finally, the best research group will be selected as a first prize and that group will be appreciated by the HOD and teaching staff with a shield. This type of research is called as "Research Oriented Medical Education Program (ROME)". [6] PG students are preparing their protocols in respective of their specialties (MD/MS/DNB/fellowship/super specialty students). Then the next step, the students have to present their protocols in front to Institutional Research Board and Institutional Ethical Committee for necessary corrections in their protocols. This procedure is following compulsory on the PG student's thesis protocols by each and every medical college in all over India. After this process, the concern specialty students have to start their research and every 6 months the PG medical students have to present their research improvement in front of the IRB and get their approval. If any problem in the student's research, then the IRB has to change the title of their research or to reduce the sample size for rare cases (or) to some PG medical students if it is necessary. After finishing their PG thesis with the help of guide, institutional biostatistician for data analysis, results writing, interpretations and submitted to their concern departments with the institution prescribed format in a particular time period which was designed by their respective medical institution. Then, the final approval will be given to the concern PG medical student and mark will be awarded based on their performance.

Importance of the research in UG and PG medical studies:

Doing research in the UG and PG medical students is an important step in their education. Because, by this only they will have to come to know the steps involving in the research methodology. The following things would be learned by the medical students: (a). How to frame the research topic/question for their study? (b). How to form the questionnaire for their particular study? (c). How to find the sample size with the existing literature for their study? (d). How to collect the data for their study (like select the study area, study population, study period, study variables, equipment/study tool (measurable items or questionnaire), sample size calculation, how to proceed the particular study, what are all the statistical analysis (t-test, chi-square/Fisher's Exact test, ANOVA, etc., has to be used when and where?) (e). How to ask the questions with the public/community people? (f). How to enter the data in the Microsoft Excel Sheet? (g). How to analyze the collected data using SPSS software? (h). How to write the results for the analyzed results with Confidence Interval? (i). How to interpret the results and write the conclusion from the results; (j). How to presented the analyzed results through tables like., Simple table, and Complex tables), diagrams like., pictorial diagram, Simple bar diagram, Multiple bar diagram, Sub-divided bar diagram, pie diagram, line diagram and etc.? (k). How fix the level of significance for their study? (l). How to choose the keywords for their research? (m). How to write the ethical clearance statement? (n). How to write the results and interpretations, discussion – How to compare with the previous published articles with their present study results and write the discussion? and conclusion from the results of their particular study. (o). How to write the references to a particular

How to write the recommendation for the study, limitations of the study (or) research, and (p). source of funding for the study (from the parent institution or from outside source), conflict of interest about the study and acknowledgement. These things are doing by the irrespective of the biostatistician of their concern medical institution. If a UG medical students had keen knowledge in doing research types and its methodology, then the student he/she has to shine very well in his/her PG studies. [7, 8] Doing research and submitting the thesis work in PG medical studies is mandatory as per Indian medical education curriculum and National Medical Council. [5, 6]

These things are very important to the medical students in their education. Then, only they will get the knowledge about "How to conduct a study in a hospital/community after finishing their graduation?". Then, only they are knowing about "How to calculate the prevalence, incidence, and what are all the risk factors for a particular disease?". This knowledge is very much essential to the each and every new physician to become a successful medical practitioner in their field/career. [9] Then only they are giving a good service to our Indians and wise versa. In a study by Basakran et al. [10] has revealed that the perceptions of research among UG medical students had positive changes in their PG medical studies.

Need of the subject Biostatistics and its applications in UG and PG medical studies:

Any data in the medical filed, the biostatistical tools are essential. Then, only the severity of a disease/method/treatment will be very clearly explained in a simple manner to the lay-man also. This subject knowledge is very important and useful to the under graduate and post graduate medical students to their exams, practical and in their research/studies. [6, 11] If a UG medical student has to train in using of the application of statistical tools (analysis), then only he can perform well and they have to know what type of higher level of statistics is to be used in the appropriate places of their research or in higher medical studies like Post-graduate /fellowship /DNB /Ph.D /M.Ch and other higher study courses. If they know well about the biostatistics tools and its applications in the correct way like when and where the appropriate statistical analysis/methods to be used, then they will have to do their data analysis for their thesis themselves. They will get promptness/self-confidence in their graduation thesis/in medical education and they will be success in their research or to find new procedure or treatment in present medical field. The UG and PG students will become a good researcher and will produce a greater number of good research in their medical field. [12, 13, 14]

Importance of the application of Biostatistics in Medical fields:

In an article I had explained elaborately about the training of research methodology, data analysis and writing the results to the analyzed data to the each and every batch of UG medical students. [6, 14, and 15] In India, all medical colleges, the subject biostatistics is teaching by a Biostatistician/Statistician. Biostatisticians are teaching the research methodology to the UG and PG medical students through workshop in second- and third-years students. The medical students have trained in a good way in biostatistics and its applications, then only they are using the knowledge of statistics in their future higher studies and to their research/PG thesis preparation time. Hence, the knowledge of applying biostatistical tools/methods in research [15] is an essential part in the UG and PG medical Studies in India and all over the world.

Conclusion

From this I have concluded that the research is an essential thing in under graduate and post graduate medical studies. Therefore, we have to motivate our medical students to do research and properly trained with biostatistical concepts and tools. The institutional research committee and institutional ethical committee are important and essential to all medical colleges in India. This training will be very useful in their medical career. If they have trained in a good way, then only they will shine in our country and in abroad. By this way only, our Indians medical colleges will have to improve the research and biostatistics applications knowledge in our both graduate and post-graduate medical students. By this practice only we will increase the number of researches in our country. Then only, our country will competitive with the neighboring or foreign/developing countries.

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