A qualitative evaluation of a workshop on regression analysis

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Abstract

Introduction: Presently, there is high importance of producing Research papers in post graduation and doctoral courses. Unfortunately, most of the medical students lack knowledge of statistical analysis and interpretation. Regression analysis being the sophisticated statistical tool is widely used but draining to understand and to apply in our studies. To enhance the knowledge in this field a workshop on regression analysis was organized with the objective of learning concepts of regression along with its practical application.

Materials and Methods: The "National Workshop on Regression analysis" was organized by Community Medicine department, Uttarakhand in month of October 2018. To evaluate the workshop, semi-structured questionnaire were developed by using internet-based approach through Google forms and then qualitative analysis was done.

Findings: 23 out of 41 participants responded (profession and designation of participants). Almost all participants mentioned that workshops' objective met their expectations. Sessions on linear regression and hands-on training were found most useful. Applicability of regression analysis in their studies was mentioned by the participants. Lack of time for logistic regression session along with technical and infrastructural issues were emphasized by the participants.

Conclusions: The duration of the workshop for such complex topic should be increased. There should be more hands-on training in the workshop along with practical examples and should have prerequisites before conducting a workshop.

Keywords: Workshop, Regression analysis, Qualitative, Evaluation, Uttarakhand.

Introduction

As per guidelines laid down by university grant commission a post graduate student during post-graduation must undertake a research topic and submit a dissertation.[1] Even though, research and thesis submission is an utmost important criterion to complete the course, students lack the knowledge of statistical tools and proper format.[2] The wrong analysis, interpretation and flawed results impacts clinical practice and affects future research in that area[3] and the resources used in conduct of the research are wasted if no output is useful for the community. Furthermore, the result derived using these statistical analyses and their inferences directly affect policies as these results are used by policy makers and medical doctors for drawing conclusions and decision making.[4] To conduct any successful research, it is important to use the most appropriate statistical tool irrespective of our area of interest.[5] Research papers shows many tools that are highly used and comparatively easy to apply, such as students' t-tests, contingency tables and ANOVA but, rest are complex and tedious statistical methods, such as repeated-measures ANOVA, logistic regression and survival analysis.[6] One such sophisticated tool is the regression analysis.

The use of regression analysis has been immense in the clinical studies to predict the prognosis and prepare diagnostic algorithms,[7] but its knowledge among medical practitioners is very low. According to a study conducted among 277 residents of internal medicine less than half had adequate knowledge and knew about the correct interpretation of the statistical analysis. They markedly lacked in Knowledge about advanced statistics specially Kaplan Meier and regression analysis.[8] Another study done to analyze the use of statistical tools in physiotherapy and nursing students for their dissertations showed that 44.6% of students incorrectly used the statistical tool for their thesis and 65.6% did their analysis without using any software.[9]

Thus, there is utmost need for better understanding of statistical analysis among medical education. To address this gap a "National Workshop on Regression analysis" was organized by joint collaboration of two medical colleges in Uttarakhand. Many studies have shown that workshops help participants learn more about complex topics primarily, that includes hands-on training facilitate better understanding.[10] This workshop aimed to understand: Regression, its types, interpretation, and applicability for prediction of prognosis, policy making and how to write the output of regression analysis. Workshop included how to apply regression in SPSS and its interpretation. In addition, it covered all aspects of the software training using hand-on practice sessions.

This was a two day workshop which included linear regression on first day and logistic regression on the second day. Initially, each session illustrated basics/theory of the topic, followed by hands-on training sessions. Sessions were interactive and Participants were encouraged to be interactive and any queries raised during the sessions were answered at the same moment by resource person.

Following the completion of workshop, an evaluation was planned and undertaken to understand the effectiveness of workshop and to procure participants' views for needed improvement in future workshops.

Materials and Methods
Design and Settings
To evaluate the workshop, qualitative method was chosen. The qualitative approach captures information such as feelings, perceptions, experience, beliefs, motivation and unrevealed expressions. Thus, for better understanding of

participants' views to improve in future workshops qualitative evaluation was chosen.

The data collection was done from 12th October to 18th November 2018 through internet-based approach. The workshop was conducted in the month of October 2018 which was organized by two medical colleges in Community Medicine Department in Uttarakhand.

Participants

All the participants who attended the National Workshop on Regression Analysis on 12th and 13th October 2018 were included in the study. We included faculty members and postgraduates medical students of all disciplines, clinicians, public health researchers, statisticians and policy makers. Out of 41 participants who attended the workshop 23 submitted the Google forms.

Data Collection Tool

A semi structured questionnaire was developed using "Google Forms". Google forms are full featured forms building tool which can be customized according to the requirement of the evaluation need. It is now being used in evaluating courses in many universities.[11] In workshops, since participants don't have enough time to answer question therefore, a semi structured were developed through Google forms which saves the time and provides flexibility to write their views.

The questions were as follows

1. Did the training/workshop meet the expectation as per our objective? If yes or no, please elaborate
2. What areas/topics of the training/workshop did you find to be most useful and why?
3. What are your views on the applicability of the workshop in your studies (either present or forthcoming)? How do you plan to apply regression analysis in your work? Could you please specify?
4. What areas/topics of the training/workshop did you find to be most useful and why?
5. What are your views on Hands on Training on SPSS and Epi-info in this workshop?

The participants' enrollment was kept anonymous and confidentiality was maintained during submission of the forms, analysis and sharing the result. The link of the Google forms was mailed to all the participants in the last day of workshop. The objective of administering Google forms were clearly stated to the participants. The participants were requested to fill and submit the forms within a week to avoid recall bias.

Data Analysis

The transcripts were read several times for data familiarization. The unnecessary data were cleaned and coded based on the themes generated in the codebook. The codebook was made during the preparation of the semi structured questions. Different variables and their relationship with each other and the logical flow were identified. Finally, we extracted relevant quotes for each theme and segregated them according to the semi-structured questions.

Ethical Consideration

Informed Consent from participants was taken during the enrollment in the study when the form was mailed to the participants. Approval from Institutional Ethical Review Committee was taken before conducting the study.

Findings

Socio Demographic Details

Out of twenty three participants who responded to the Google forms, 14 were females and 9 were male. Number the participants according to their designation, professors (4), associate professors (4), assistant professors (8), statisticians (3), and junior residents (4).

Workshops Objective Met the Expectations

Out of 23 participants who responded to the questions, 18 of them responded that their expectations were met as per the objectives of the workshop. An Assistant professor said that "Yes to a great extent. It indeed has boosted up my capacity to work with Regression Analysis in my future research". In Addition, an Associate professor agreed that learning regression analysis is complex and appreciated the hard work of the presenters, in her words she said "Yes a complex topic was taught and explained in a comprehensive manner. All the speakers were knowledgeable and tried their best to deliver the sessions in a lucid manner". Rest of the participants expressed that workshop partially met their expectations and they needed more time on hands-on training on SPSS. A 36 years old assistant professor felt that there was time constraint for such elaborated topics. She wrote that "It partially fulfilled the objective of the workshop because it requires more time to work on analysis software's like SPSS and Epi info and regression analysis is a vast topic to cover in…"

Perception of one of the junior resident was different from all as he couldn't learn the application and interpretation of regression. He explains "No. because I could not learn the application and interpretation of regression, which we have to use in our publication".

Most useful: Linear Regression and Hands-on Training

Most of the participants found hands on training and session on linear regression to be most useful. One of the Statisticians who have been using it for various studies in past, expressed "The hands on training and the assumption before applying regression was the most useful for the study because we always expect the use of SPSS in various analyses". One of the associate professors expressed that more focus should be given to output and its presentation which will be used in their publication "… I found topics on interpretation of results most useful. I suggest that more of these results in output must be discussed and subsequently how they should be presented in publications as writing". A 38 years old associate professor said that she learned to create dummy variables and check the assumptions of linear regression. She mentioned clearly about what she learned "...Creation of dummy variable for categorical explanatory/ independent variable in multiple linear regression. Checking

of assumptions of linear regression like error/ residuals should be normally distributed and there should be constant variance".

Applicability of Regression Analysis in the Studies
Almost all the participants found the applicability of the regression analysis in their studies and thesis. Many discerned that the use of regression analysis has a high value and the will go back and find the issues in their papers. One of the associate professors explained "I will go through all my previous projects to check for errors and will be publishing my thesis paper by the end of this year, including in it all that I learnt in the workshop. The applicability is immense as most journals prefer RA (Regression analysis) and it increases your credibility as a researcher". A 46 years old professor who previously used regression analysis with the help of statisticians in her studies expressed that "…apply regression but now this will be with better understanding without just relying on the statistician".
On the contrary, a junior resident mentioned about not being able to gain from the workshop. He said "Workshop was not of much help, as I was hopeful of applying regression in my forthcoming articles, but could not learn it".

Lack of time for Logistic Regression Session, practical Examples/activities needed and Infrastructural Issue
When asked about what can be improved in the future workshops. Participants felt need of inclusion of more practical examples, increasing time for hands-on experience, and lack of time for logistic regression session. They boldly mentioned that presenters should have kept the speed conducive. In addition, they had issues with group formation during sessions, sitting arrangements along with other infrastructural problems.

A 40 years old professor summed it all in her transcript. She wrote that "Formation of groups was not required as there were no group activities that were done. Seating arrangement in small groups of 5-6 heterogeneous people would have been better for more interaction among the participants. A bit more of hands on exercise and a less of theoretical sessions would have been helpful. The theoretical sessions can be taken in a retrograde fashion after obtaining the output. A pre-testing of display of the SPSS output on the LCD screen and its visibility for audience was required...Washroom and dining area required more cleaning specially the washbasins etc…"

Lack of time for Hands-on Experience, Epi-Info not discussed
All the participants mentioned that hands-on training on SPSS was satisfactory but also emphasized on time constraints due to which complex topics were difficult to understand. In addition, most of them remarked that they expected a session on Epi-info which was mentioned before. A 35 years old assistant professor mentioned "More time should be given… practical aspects to be covered. Epi info was not talked in the workshop". One of the professors appreciated the hard work of the team for arranging workshop on regression analysis. She wrote "… a difficult topic, it requires the nerves of steel to select the regression in your first workshop". An insightful message was given by three participants regarding setting the prerequisite for the workshop to have the basic knowledge about SPSS beforehand. One of the junior residents wrote "The hands on training were quite useful. A pre-requisite of the workshop should have been that the participants be aware about basic analysis on SPSS as few of the participants were struggling with the drop down menus of SPSS..."

Discussion
Very few workshops have been conducted on regression analysis in North India and this was conducted by the community medicine department of medical colleges in Uttarakhand. This workshop was one of its kinds which mainly focused on providing an overview of regression analysis, its basic applications in medical research and hands-on training in SPSS.

Most of the participants felt motivated to use regression analysis further in their studies but few junior residents could not understand the topic well. It can be due to lack of basic knowledge about regression which is consistent with other study findings which also elicited that the differences exist between the knowledge of senior doctor versus trainee doctors.[12] Participants specified that using the regression in their analysis increases the credibility of their research work but they also expressed that two days workshop was not enough for the vast topic. Considering the complexity of regression analysis participants mentioned that it was explained in the comprehensive manner by the presenters. In addition, participants expected more practical examples/activities in the workshop and also found logistic regression session tiring. The query of adding more practical examples and activities was similar to a study done in medical students' perception. They found that after finishing the practical activities, students' potential to understand statistics and epidemiology increased significantly.[13] Another study revealed that statistics lectures in the medical college should be based on clinical work and real time research studies.[14] One of the professor revealed that now she will use regression analysis without completely relying on statistician and this is similar to a study which explains involvement of statisticians during the data analysis of the study.[15] The participants needed more time to practice hands-on training for SPSS because most of them wanted to perform the analysis on their own for their studies. Participants view matched with another workshop conducted in Karnataka, India on hands-on training for SPSS where they did three day workshop only for hands-on.[16] Participants also emphasized with presenters teaching very fast, technical problems and sitting arrangements which lead to difficulty in understanding and working in SPSS. An important issue mentioned by junior residents regarding having prerequisites before inviting the participants to the workshop, highlighting that some of the participants had issues with basics of SPSS.[17] Also, while conducting such workshops, the needs and expectations of

participants should always be gazed beforehand in order to deliver the required skill and knowledge effectively at such platforms.

Conclusions
The duration of the workshop for such complex topic should be increased. More practical examples/ activities, better sitting arrangements must be included for better understanding. There should always be a prerequisite for having the basic knowledge about the regression before inviting participants for the workshop to avoid the discrepancy in knowledge dissemination.

Limitations
To conduct in-depth interview was not feasible in the workshop thus, internet based approach was used to collect the data.

Ethics approval and consent to participate
Approval from Institutional Ethical Review Committee was taken before conducting the study.

Consent for publication
Not applicable.

Availability of data and materials
The datasets of this study are available with corresponding author and could be attained upon reasonable request.

Competing interests
All the authors declare no competing interests.

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