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Evaluating a research methodology workshop among postgraduate students using Kirkpatrick's model

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Abstract:

BACKGROUND: In this era of evidence-based medicine, only systematic research can help in providing judicious and precise healthcare to individual patients based on updated knowledge and skills. However, many medical professionals do not feel competent and confident enough to conduct research. One of the reasons could be the lack of a research-based curriculum in undergraduate courses. The National Medical Council has also stressed the need for formal training in research methodology for healthcare professionals. The research methodology workshops help to familiarize the participants with basic, clinical, and translational research required to impart optimum patient care. The objective of our study was to evaluate a research methodology workshop conducted for postgraduate students by assessing the participant's knowledge, feedback, and expected impact using Kirkpatrick's evaluation model.

MATERIALS AND METHODS: A quasi-experimental, single-group study was conducted among 132 first-year postgraduate students. The four levels of Kirkpatrick's model were applied for evaluation. Feedback forms, scores of the pretest and posttest, quality of the research proposal drafted by the postgraduates for their thesis, and finally successful submission of the research proposal were the components used to evaluate the four levels of outcome of Kirkpatrick's model.

STATISTICAL ANALYSIS: Data collected were compiled and tabulated into MS Excel. Proportions were calculated for categorical variables and mean and standard deviation (SD) for scores. A comparison of means between pre- and postworkshop scores was made with paired *t*-test. A value of $P < 0.05$ was considered statistically significant. Statistical analysis was done using IBM SPSS Statistics version 20.0 software.

RESULTS: Out of 132 participants, 29% (38) were males and 71% (94) were females. The mean \pm SD pretest and posttest scores at a 95% confidence interval were 10.55 ± 2.537 and 12.43 ± 2.484 , respectively. The difference was found to be statistically significant by paired sample *t*-test ($P < 0.001$).

CONCLUSION: Participant feedback is vital for improving research methodology workshops. The workshop met the overall requirements of the participants. There was a significant improvement in the knowledge of participants after the workshop completion.

Keywords:

Kirkpatrick's model, medical professional, posttest, pretest, research methodology

Introduction

In this era of evidence-based medicine, only systematic research can help in providing judicious and precise healthcare to individual patients based on updated

knowledge and skills.^[1,2] The National Medical Council (NMC) has also stressed the need for formal training in research methodology for healthcare professionals. The systematic procedure followed by a medical professional through research work is known as research methodology.^[3]

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The researchers need to gain an understanding of the various techniques and criteria that can be employed to conduct research specific to the presenting problem and thus devise a feasible solution.^[4]

However, many medical professionals do not feel competent and confident enough to conduct research. One of the reasons could be the lack of a research-based curriculum in undergraduate courses.^[5-7] The objective of research methodology workshops is helpful not only for novice researchers, with minimum or no prior research experience, to formulate a research question but also for those conducting real-time research.^[8] Evaluating the effectiveness and efficiency of such workshops is crucial to determine whether the desired objectives have been fulfilled with a successful outcome.^[9]

There are many evaluation models for the evaluation of academic workshops. One such model is the Donald Kirkpatrick model which has been in use for evaluations of training programs for 30 years.^[10] This model consists of four evaluation levels which are interdependent, shown in Figure 1. The model evaluates the educational process and the outcomes of the workshops.^[11] A comprehensive qualitative and quantitative analysis of a research methodology workshop not only evaluates the learning outcomes but also provides further insights into the desired modifications necessary for improving the quality and effectiveness of the workshops. The objective of our study was to evaluate a research methodology workshop conducted for first-year postgraduate students by assessing the participant's knowledge, feedback, and expected impact using Kirkpatrick's evaluation model.

Materials and Methods

Study setting and design

This study was done at Kalinga Institute of Medical Sciences, a tertiary care hospital, and research institute

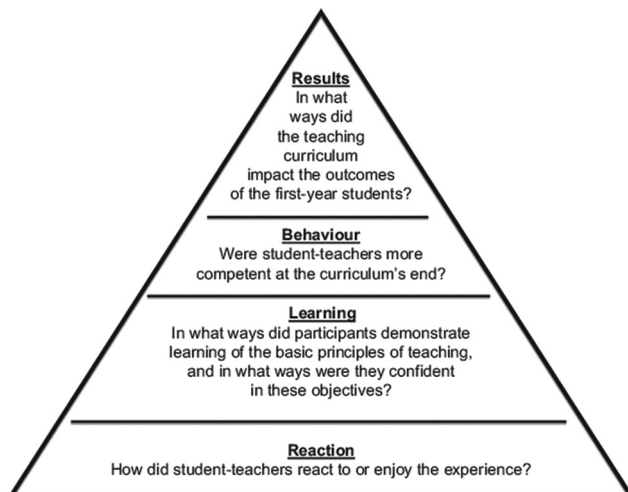


Figure 1: Kirkpatrick model for program evaluation

in Bhubaneswar, Odisha. It was a quasi-experimental, single-group study with a pre- and posttest component.

Study participants and sampling

We included all 132 first-year postgraduate residents, enrolled in different residency courses at our institution for the academic year 2022, for a 5-day research methodology workshop. Universal sampling method was followed. The Research and Development Department conducted the workshop in collaboration with the Department of Community Medicine.

Data collection tool and technique

The Kirkpatrick four-level model was used to assess the workshop. This model has been previously validated as an evaluation tool for educational and academic interventions which also includes research methodology workshops.^[11] The four levels included are reaction, learning, behavior, and results.

Level 1: Participants' level of satisfaction was measured using a 5-point Likert scale. Scores were allotted to assess satisfaction as excellent 5, good 4, average 3, below average 2, and poor 1. The parameters used for the assessment are quality of workshop sessions, the expertise of the resource person in delivering the concepts, teaching media (PowerPoint slides, handouts, etc.), evaluation methods (problem-solving exercises), and the overall organization of the workshop (likes, dislikes, and suggestions for improvement).

Level 2: The pre-workshop knowledge of the participants about research methodology was assessed by using a questionnaire before the beginning of the academic sessions. The assessment questionnaire consisted of 20 multiple-choice questions on topics related to research methodology and was prepared by the subject experts. A postworkshop assessment, consisting of similar 20 multiple-choice questions, was carried out after the last workshop session. The learning gained from the workshop was assessed by comparing the pretest and posttest scores.

Level 3: The behavior component was assessed through the quality of the research proposal drafted by the participants before the final submission of their theses. Assessment of content was done by checklists available for critical appraisal of different study designs.

Level 4: The result and overall impact of the workshop were estimated by the number of successful submissions of research manuscripts within 3 months of the workshop. The quality of the submitted manuscripts was assessed by the research committee of the institute.

Ethical consideration

Institutional ethical clearance (Ethical Approval Number: KIMS/KIIT/1287/2023) was taken before

the evaluation of the workshop. The study was carried out in accordance with the Helsinki Declaration. Informed consent was obtained from every participant. Data were collected anonymously and amicably for feedback.

Data analysis

Data collected were compiled into Excel and analyzed with IBM SPSS Statistics version 20.0 software. Categorical variables were interpreted as proportions and mean scores and standard deviation were calculated for scores. The mean scores of the pre- and posttests were done with paired *t*-tests. A *P* value < 0.05 was considered statistically significant.

Results

Out of total 132 delegates, 101 (76.52%) were males and 31 (23.48%) were females. The disciplines of the participants have been listed in Table 1. None of the participants had exposure to any research methodology workshop before.

Levels 1 and 2

Overall, 82% of the participants scored the workshop sessions as excellent, 15% scored it as good, and 3% scored it as average. The learning gained from the workshop, as assessed through mean scores, showed improvement with scores improving from 10–12 to 11–14 [Figure 2].

The overall mean score, assessed by paired *t*-test, showed a statistically significant improvement [Table 2].

The majority of the participants reported the quality of sessions, the content of the workshop, and hands-on experience as some of the strengths of the workshop. Topics on ethics and literature review search were most liked by the participants. However, some participants felt that the workshop collided with their work hours and the timing and duration of the workshop could have been better.

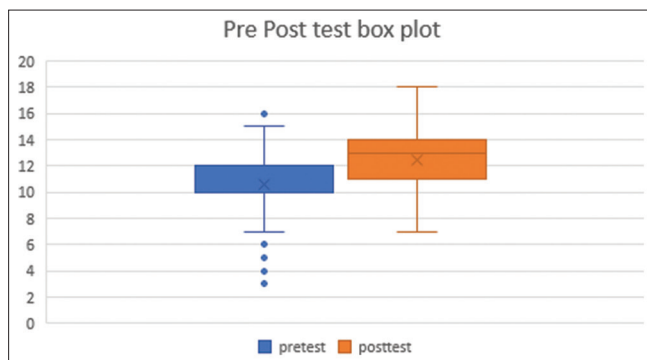


Figure 2: Box plot showing pre- and posttest scores of research methodology workshop

Levels 3 and 4

One hundred and seven (81%) of the participants correctly drafted the research proposal according to the existing research guidelines. Ninety-five (72%) estimated the sample size for various studies correctly. Within 3 months of the workshop, 121 (92%) of the participants successfully submitted their research manuscripts which also fulfilled the checklist of critical appraisal of different study designs. One hundred and twenty-one research projects started, of which 25 were interventional studies and 96 were observational studies.

Discussion

The majority of the study participants rated the research methodology workshop as excellent (82%). Only 3% rated it as average. A study by Singh also reported similar positive results among medical students after a research methodology workshop.^[12] Assessing the participants' satisfaction through a Likert scale rating provides guidance toward improving the quality and objectives of future workshops. The majority of the participants reported the quality of sessions, the content of the workshop, and hands-on experience as some of the strengths of the workshop. Topics on ethics and literature review search were most liked by the participants. However, some participants felt that the workshop collided with their work hours and the timing and duration of the workshop could have been better. This feedback opposed the feedback given by the participants in a study done by Bidwe *et al.*^[13] who felt that the duration of sessions needed to be curtailed.

Table 1: Distribution of participants according to disciplines

Discipline	Frequency [n (%)]
Anesthesia	20 (15.15)
General surgery	20 (15.15)
General medicine	20 (15.15)
Pediatrics	11 (8.33)
Obstetrics and gynecology	10 (7.57)
Pathology	10 (7.57)
Orthopedics	8 (6.06)
ENT	8 (6.06)
Psychiatry	6 (4.54)
Community medicine	6 (4.54)
Ophthalmology	6 (4.54)
Dermatology	5 (3.78)
Microbiology	2 (1.51)

Table 2: Mean (SD) scores of participants before and after research methodology workshop using paired *t*-test

Pretest		Posttest		<i>P</i>
Mean	Standard deviation	Mean	Standard deviation	
10.55	2.537	12.43	2.484	<0.001

Some participants also suggested more sessions on statistics were necessary. These suggestions could be implemented while planning future workshops. Such positive feedback was also reported in a study by Chellaiyan, where the majority of the participants also scored the workshop as excellent.^[14] Other studies have also reported a high level of satisfaction.^[15,16] The knowledge gained by the participants showed a significant improvement ($P < 0.001$) with a 17.82% rise in the postworkshop assessment scores. A study by Dimple *et al.*^[17] also found a significant difference between pre- and postworkshop scores using paired *t*-test. Several other studies also reported similar findings in the improvement of knowledge between pre- and postworkshop test scores.^[18,19] This improvement in knowledge could be ascribed to hands-on interactive sessions with quality teaching by experienced faculty. The third and fourth levels of Kirkpatrick should always be evaluated only after completing the evaluation of the first two levels. The overall impact of our research methodology workshop with respect to the participants successfully submitting their research manuscripts within 3 months was substantial. One hundred and twenty-one (92%) of the participants successfully submitted their research manuscripts which also fulfilled the checklist of critical appraisal of different study designs. Around 81% of participants drafted the research proposal appropriately. This finding was higher than that reported by Abdulghani *et al.*^[11] where 57% of the participants started research projects' postworkshop completion. Well-designed and planned research methodology workshops for healthcare professionals are the imminent need to improve the research knowledge and skills for providing evidence-based optimum healthcare.^[20] The NMC mandates the submission of a research project as a dissertation toward partial fulfillment of completion of a postgraduate course. Such organized research methodology workshops can sensitize the students and provide a foundation to equip these students with basic knowledge and skills for conducting research.^[21]

Limitation and recommendation

The limitation of our study was the limited evaluation of levels 3 and 4 due to restricted study duration. Following up with the participants until the completion of their residency courses would have yielded a better analysis and conclusion.

Conclusion

There was an improvement in the knowledge and performance of participants attending the research methodology workshop. The queries of the participants were addressed and the knowledge gained was implemented into practice as evidenced by the successful

submission of research manuscripts. Feedback from the participants is crucial for improving the quality of a research methodology workshop. The workshop met the needs of the learners and assisted them in becoming competent and confident. As the famous banter goes, "Rome was not built in a day," similarly hand holding and mentoring by experienced teachers are required for shaping a future researcher.^[22]

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Conflicts of interest

There are no conflicts of interest.

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