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Original Research Article

Evaluating the impact of a research methodology workshop on medical postgraduates and faculty: A pretest-post-test analysis

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Abstract

Introduction: Research methodology is pivotal in medical practice, providing a structured framework for investigating health phenomena and advancing medical knowledge. However, many medical practitioners lack participation in research activities, and postgraduate training often lacks comprehensive research methodology education. This study addresses this gap by evaluating the efficacy of a research methodology workshop for medical postgraduates (PGs) and faculty members.

Materials and Methods: An educational intervention study with a pretest-post-test design was conducted. Participants, including medical PGs and faculty from a tertiary care hospital, were recruited using convenience sampling. The workshop spanned two days, covering study design, data collection, statistical analysis, and research ethics through lectures, discussions, and hands-on activities. Pretest and post-test assessments, consisting of 20 multiple-choice questions, evaluated participants' knowledge before and after the workshop. Data were analyzed using paired-sample t-tests with significance set at $p < 0.05$.

Results: The study included 29 participants, with 28 analyzed. A significant improvement in post-test scores ($p<0.05$) highlighted the workshop's effectiveness. Comparisons with similar studies, such as Prabhu et al.'s research in Tirupati, reinforced these findings, showing substantial enhancement in research skills among healthcare professionals.

Conclusion: This study underscores the importance of structured educational interventions in enhancing research competencies among medical professionals. Continued investment in research methodology training and exploration of innovative educational approaches are essential for fostering research excellence and improving patient outcomes.

Keywords: Research methodology, Postgraduate education, Faculty development, Evidence-based practice, Medical Education.

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1. Introduction

Research methodology plays a pivotal role as the cornerstone for producing credible evidence in medical practice. It provides a structured framework that guides clinicians and researchers in methodically investigating health-related phenomena. Additionally, fostering research has been identified as a primary catalyst for progress in the field of medicine. This recognition extends to the integration of innovative curricular approaches in medical education, highlighting the indispensable role of research in advancing medical knowledge and educational practices. Nonetheless, substantial apprehensions have arisen regarding the lack of participation among numerous medical practitioners in both clinical and fundamental research endeavors and a persistent downward trend in the involvement of medical doctors in activities related to research.[1]

Despite its critical importance, medical professionals often lack comprehensive training in research methodologies, particularly at the postgraduate level. It is essential to acknowledge that most graduating undergraduate medical students pursue postgraduate courses in their chosen specialties. However, this trend has inadvertently resulted in a decline in acquiring the necessary knowledge and skills for conducting research.[2,3] This deficiency can impede the generation of high-quality evidence and hinder advancements in medical knowledge and practice.

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Overall, proficient medical practitioners must possess research skills, underscoring the urgent necessity to incorporate comprehensive research training into the curriculum. It is imperative for medical students to cultivate these essential research competencies throughout their training period. The workshop on research methodology focuses on specific domain of how to conduct research on scholarly article or data which are reliable and valid as well as aims at enhancing critical thinking.[4,5] Hence, faculty members bear the responsibility of providing enough learning opportunities to enhance students' proficiency in research.[6-9] To facilitate this, educational interventions such as workshops targeting research methodology may play a prominent role. These workshops should aim to equip medical postgraduates (PGs) and faculty members with essential knowledge and skills to conduct rigorous research. While the proliferation of such initiatives is encouraging, their efficacy remains underexplored, particularly within the context of medical education.

Previous literature has highlighted the need for structured training programs to enhance research competencies among medical professionals.[4,10] However, empirical evidence regarding the effectiveness of these interventions, especially in improving participants' understanding and application of research methodologies, is limited. Therefore, there is a pressing need to assess the impact of research methodology workshops on medical PGs and faculty members to inform educational practices and promote evidence-based medical education. This study seeks to address this gap by evaluating the efficacy of a research methodology workshop for medical PGs and faculty members using a pretest-post-test. By examining changes in participants' knowledge and skills before and after the workshop, this study aims to provide insights into the effectiveness of such interventions in enhancing research competencies among medical professionals.

2. Material and Methods

2.1. Study design

This study was an educational intervention study that employed pretest-posttest method to evaluate the efficacy of a research methodology workshop for medical postgraduates (PGs) and faculty members. This study design allowed for the assessment of changes in participants' knowledge and skills before and after attending the workshop.

2.2. Study population

The study participants consisted of medical PGs and faculty members from a tertiary care hospital and associated medical college.

2.3. Sampling

Convenience sampling was utilized to recruit participants for the workshop.

2.4. Sample size

All participants of the workshop.

2.5. Inclusion criteria

PGs and faculties of TRIHMS.

2.6. Exclusion criteria

Participants not giving consent or providing incomplete data.

2.7. Educational intervention

The research methodology workshop was conducted over 2 days, covering essential topics such as study design, data collection methods, statistical analysis, and research ethics. The workshop utilized a combination of didactic lectures, interactive discussions, and hands-on activities to engage participants and facilitate learning.

2.8. Pretest and post-test measures

Prior to the workshop, participants completed a pretest assessment to evaluate their baseline knowledge of research methodology concepts. The pretest consisted of 20 multiple-choice questions covering key areas of research methodology. Following the workshop, participants underwent a post-test assessment to measure changes in their understanding and application of research methodologies. The post-test included the same set of multiple-choice questions administered in the pretest to ensure consistency in measurement.

2.9. Statistical analysis

The pre-test and post-test questioner-based data of all the participants were collected and compiled in a Microsoft Excel spread sheet. GraphPad Prism 10.0.2 was employed for statistical analysis. Pretest and post-test scores were compared using paired-sample t-tests. Statistical significance was set at $p < 0.05$. And $p < 0.001$ was highly significant statistically. Continuous data are presented as mean ± Standard Deviation (SD) and categorical data as proportion or percentage.

3. Results

A total of 29 participants took part in the study, out of which 28 were included. One participant was excluded from the study since the participants failed to participate in the post-test. The male-female ratio was 8:7 (1.14:1). The maximum number of participants were post-graduate students (PGT), constituting 18 (64.29%) of the participants as shown in **Figure 1**. The rest of the participants were resident doctors and others including faculties, junior doctors and tutors.

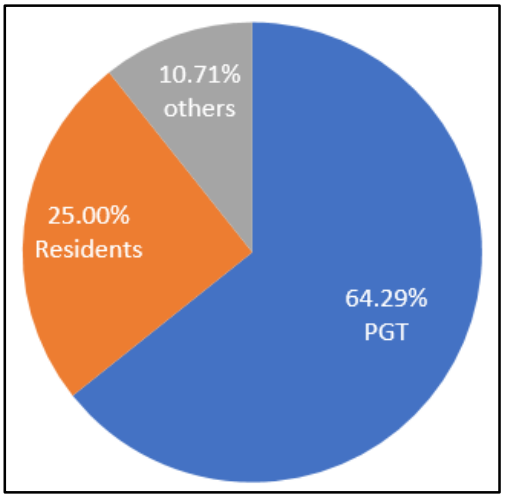

Figure 1: Percentage distribution of 'designation'

The scores of 28 participants were analyzed individually with chi-square and shown in **Table 1**. The post - test results shows very significant (p-value 0.0001) improvement after the workshop in this study.

Table 1: Distribution of correct answers in the Pretest & Post-test

	Correct Answers in Pretest	Correct Answers in Post-test	p-value (Chi-Square)
Yes	246 (40.86%)	356 (59.14%)	0.0001 (Fisher's Exact test)
No	314 (60.62%)	204 (39.38%)	
Total	560	560	

The pretest and posttest for correct answer to the 20-question provided by 28 participants were compared using paired t-test. The mean score for the correct answer to the 20 questionnaires (calculating 1 mark for each correct answer) provided for the pretest and posttest was 12 and 18 ± 4.536 respectively with a confidence interval of 95%. (P value 0.0003) as shown in **Table 2**.

Table 2: Question based results

Question No.	Pretest Score n=28	Post test Score n=28	P value (Paired t test)
Total	246	356	0.0003
Mean value	12	18	
Mean of differences (B - A)			4.450
SD of differences			4.536
SEM of differences			1.014
95% confidence interval			

This study also includes a blinded feedback form for the overall assessment of the work (**Table 3**). 64.3% participants were highly satisfied with organization of such workshop, 42.9% and 57.1% of participant found it as a satisfactory and good respectively for overall performance of the intervention.

Table 3:

Questionnaire	Excellent (%)	Good (%)	Fair (%)	Poor (%)
1) Organization of workshop	64.3	35.7	0	0
2) Effectiveness of workshop	26.5	64.3	7.1	0
3) Content of workshop	7.1	76.6	14.3	0
4) Satisfaction from workshop	42.9	57.1	0	0
5) Overall feedback given by participants	• Good workshop • Need of few more activity and another discussion			

4. Discussion

The present study investigated the effect of a research methodology workshop on medical postgraduates and faculty members. This study included 29 participants, out of which 28 were analyzed and one participant was excluded from the evaluation due to participant's failure to submit the post-test answer. The participant demographic was predominantly medical post-graduate students (64.29%), with a male-to-female ratio of 1.14:1, unlike other studies where female participants predominated.[10,11]

The analysis of pre-test and post-test scores using chi-squared tests revealed a significant improvement in participants' knowledge ($p<0.05$), highlighting the effectiveness of the workshop. Comparing these findings with similar studies, an evaluation study of the research methodology workshop held at Tirupati by Prabhu et al. found significant improvement where the mean score of the pre-test was 3.42 and the post-test was 10.53.[12] Furthermore, an evaluation study by Chellaiyan and Suliankatchi on a health research methodology workshop using the Kirkpatrick model also reported significant improvements in participants' knowledge and skills, supporting the findings of the present study.[11] The interactive and practical components of these workshops likely contribute to their effectiveness, as they engage participants actively in the learning process, thereby improving retention and application of research concepts. This further supports the results from the current study, indicating that educational interventions like workshops can substantially enhance research skills among healthcare professionals. The results of these studies collectively underscore the positive impact of structured educational workshops on improving research knowledge and skills among medical and allied health students. The significant improvement in post-test scores in the present study aligns well with these findings, suggesting that such workshops effectively enhance research capabilities among medical professionals. The significant increase in post-test scores compared to pretest scores indicates that the workshop effectively addressed the educational needs of participants in the research methodology. These findings are consistent with

previous research demonstrating the benefits of similar interventions in medical education contexts.[12,13] By providing participants with a comprehensive overview of research design, data collection methods, statistical analysis, and research ethics, the workshop equipped them with essential tools to critically appraise and conduct research studies in their respective fields. The interactive nature of the workshop, which included a combination of didactic lectures, interactive discussions, and hands-on activities, likely contributed to its effectiveness. Engaging participants actively in the learning process not only enhanced their retention of key concepts but also facilitated the application of theoretical knowledge to practical research scenarios. Furthermore, the inclusion of faculty members as participants in the workshop fostered a collaborative learning environment, allowing for the exchange of ideas and experiences among peers.

At Shri Sathya Sai Medical College and Research Institute, a constituent unit of Sri Balaji Vidyapeeth, Puducherry, a dedicated unit in the name of the Institute Research Council has been established. The ultimate aim of the Institute Research Council is to foster, encourage, and support research activities among all the stakeholders (viz., undergraduate medical students, postgraduate medical students, M.Phil scholars, Ph.D. scholars, and faculty members). Concerning developing research skills among medical undergraduate students, a series of initiatives have been taken, namely organizing a 1-day workshop for the students to expose them to research methodology.[14]

The high satisfaction rates reported in the feedback further underscore the value of such workshops. Participants' positive responses regarding the organization and effectiveness of the workshop indicate a strong acceptance and perceived benefit of this educational intervention. This aligns with the editorial suggestion of Gogtay,[15] where the author suggest need of mentors who are trained faculties with comprehensive outlook to fulfill the need of gap in knowledge and enhancing knowledge in the research capabilities.

5. Limitations

Despite the positive outcomes observed in this study, several limitations should be acknowledged. Firstly, the study utilized convenience sampling, which may limit the generalizability of the findings to other populations or settings. Future research employing random or stratified sampling methods could provide a more representative sample of medical PGs and faculty members. Secondly, lack of long-term follow-up to assess sustained impact. Lastly, the limited duration of the workshop may impact the depth of learning.

6. Conclusion

In conclusion, the findings of this study provide valuable insights into the efficacy of a research methodology workshop for medical postgraduates (PGs) and faculty members. The significant improvements observed in participants' knowledge and skills following the workshop underscore the importance of structured educational interventions in enhancing research competencies among medical professionals.

Moving forward, there is a need for continued investment in educational initiatives aimed at improving research competencies among medical professionals. Longitudinal studies assessing the long-term outcomes of such interventions could provide valuable insights into their sustained impact on participants' research practices. Furthermore, exploring innovative approaches, such as online workshops or blended learning models, may enhance the accessibility and effectiveness of research methodology training in diverse educational settings. By equipping medical PGs and faculty members with essential research skills, workshops like the one evaluated in this study contribute to the advancement of evidence-based medical practice. Ultimately, fostering a culture of research excellence within medical education is crucial for addressing the complex challenges facing healthcare delivery and improving patient outcomes.

7. Source of Funding

None.

8. Conflict of Interest

None.

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