



Effectiveness of Health Research Proposal Development Trainings and Workshops - An Interventional Study

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ABSTRACT

Background

Research methodology and proposal development are essential for advancing health research. Educational interventions can enhance competencies of the researchers. This study aimed to assess the effectiveness of such educational interventions in improving knowledge of health research among health care professionals.

Methods

A pre and post interventional study was conducted among 99 health care professionals at a tertiary health care center in Bharatpur, Chitwan, Nepal from February to April 2025. Data were collected from pre and post-test evaluations records of the trainings and workshops on health research proposal development. Knowledge levels before and after the intervention were analyzed and compared.

Results

Knowledge levels improved significantly after the intervention. Before training, 81.8% (95% CI: 72.8-88.85) of participants had low knowledge, 16.2% (95% CI: 9.53-24.91) had moderate knowledge, and 2.0% (95% CI: 0.25-7.11) had high knowledge. Post-intervention, moderate knowledge increased to 50.5% (95% CI: 40.27-60.71) and high knowledge increased to 9.1% (95% CI: 4.24-16.56), while low knowledge decreased to 40.4% (95% CI: 30.66-50.74). The mean post-test score (11.77 ± 2.68) was significantly higher than the pre-test score (9.10 ± 2.86) ($p < 0.001$).

Conclusions

Significant overall improvement in knowledge of the health care professionals on research methodology was observed after receiving the educational intervention. Hence, structured trainings and workshops on health research methodology and proposal development were found to be effective. Regular implementation of such interventions is recommended to strengthen research capacity and promote evidence-based practice.

Keywords: Education; Health Care Professionals; Intervention; Research Methodology; Research Proposal.

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INTRODUCTION

Research methodology and proposal development are essential for academic and professional advancement in health research, providing a structured framework for defining research questions, methodologies, and anticipated outcomes. Effective research proposals are critical for securing funding, institutional support, and contributing to scientific knowledge. Educational interventions like trainings and workshops enhance research competencies and improve the quality and relevance of proposals.^{1,2} These programs strengthen research skills and promote inter-professional collaboration, which is important for addressing complex health challenges.^{3,5} However, gaps remain in their implementation, as many healthcare professionals lack adequate training and resources to develop robust research proposals.^{2,6} This often results in poorly designed studies and limited alignment with community health needs.⁷ This study aimed to evaluate the effectiveness of training and workshops in improving research methodology and proposal development, thereby strengthening research capacity and promoting evidence-based practice among the health care professionals.

METHODS

A pre and post interventional study was conducted among health care professionals (HCPs) at College of Medical Sciences and Teaching Hospital, a tertiary health care centre located at Bharatpur Metropolitan City of Chitwan District, Nepal from February to April 2025. An interventional education program on health research proposal development was given to the health care professionals of various disciplines through trainings and workshops during July 2023 and June 2024 for about 5 hours per day consecutively for 3 days by qualified and experienced research experts of the research department of the institute. The trainers and facilitators had administered evaluation sheets based on knowledge regarding health research proposal development to the participants to fill out just before the beginning and immediately after completion of both the trainings and workshops in order to assess im-

provement in their level of knowledge after receiving the intervention i.e., the training and workshop. Data was collected retrospectively of all 99 participants by using the complete enumeration method from the recorded evaluation sheets of the two training cum workshop sessions for further analysis. The topics covered under the trainings were introduction to health research, research proposal development steps, formulation of research title, introduction, literature review, research questions and objectives, hypothesis formulation, variable, conceptual framework, research design, study population, study area, study based sample size calculation, sampling techniques, inclusion & exclusion criteria, data collection tools and techniques, data management and analysis plan, ethics in health research, work plan, budgeting, citation and referencing. The workshops were conducted by assigning group work to the participants. Each group was provided with a problem statement based on which they had to develop a research proposal, which was critically appraised by the trainers and facilitators of the training. The level of knowledge of participants regarding health research proposal development was measured using a 20-item multiple-choice structured questionnaire. Each correct response was scored as 1 making the total possible score 20 for all correct responses. The level of knowledge possessed by participants regarding health research proposal development was categorized as high (total score is 16-20, $\geq 80\%$), moderate (total score is 12-15, 60-79%) and low (total score is <12 , $<60\%$) according to Bloom's cut off categories for the total knowledge scores.⁸ Ethical approval was taken from the Institutional Review Committee of College of Medical Sciences Teaching Hospital (Ref. no. COMSTH-IRC/2025-022). The data was collected retrospectively from the pre and post evaluation records of the health research trainings and workshops from the research department. However, permissions were taken from the concerned authorities. Confidentiality of all data and information was maintained throughout the research. The collected data were entered, cleaned, checked for completeness

and accuracy before subsequent analysis in SPSS version 17 software. For continuous variables mean and standard deviation were calculated while categorical variables were analyzed in terms of frequency and percentage. To compare the pre and post-test scores paired t-test was used. A p-value of <0.05 was considered statistically significant.

RESULTS

Out of the total 99 health care professionals, 77(77.8%) had knowledge about the core elements of a dissertation pre intervention which increased to 85(85.9%) after receiving the intervention. Pre-intervention, only 28(28.3%) of them knew about the research question but later post intervention, 60(60.6%) of them became aware of it. Knowledge on different aspects of research designs was found among 16(16.2%), 63(63.6%), 36(36.4%) and 46(46.5%) HCPs pre intervention which increased to 23(23.2%), 76(76.8%), 45(45.5%) and 62(62.6%) HCPs respectively post intervention. Initially, about 46(46.5%) and 68(68.7%) HCPs had knowledge on research ethics and consent whereas post intervention, 72(72.7%) and 91(91.9%) of them learned about it. Knowledge about hypothesis, outcome variable and conceptual framework have all increased post intervention among the HCPs. The knowledge on referencing, study population, sampling technique, statistical tools and data analysis software was found among 48(48.5%), 36(36.4%), 21(21.2%), 48(48.5%), 14(14.1%), 76(76.8%) HCPs before intervention. After receiving intervention this knowledge increased among 68(68.7%), 35(35.4%), 39(39.4%), 74(74.7%), 16(16.2%) and 92(92.9%) HCPs respectively (Table 1).

The box plot represents the distribution of pre-test and post-test scores among the participants. It can be observed that the median score in the post-test is higher than that in the pre-test, indicating an overall improvement in participant's performance post intervention i.e. trainings and workshops. The post-test scores also showed a slightly wider spread compared to the pre-test scores, suggesting some variation in the level of improvement of knowledge

Table 1. Knowledge of the participants pre intervention (pre-test) and post intervention (post-test) (n=99).

Knowledge assessment questions	Pre-test (%)	Post-test (%)
Core elements of a dissertation	77 (77.8)	85 (85.9)
Research design types	15 (15.2)	9 (9.1)
Research question	28 (28.3)	60 (60.6)
Research problem selection	42 (42.4)	34 (34.3)
Research design that provides the strongest evidence	16 (16.2)	23 (23.2)
Analytical research design types	63 (63.6)	76 (76.8)
Randomized and non-randomized research design difference	36 (36.4)	45 (45.5)
Experimental study population types	46 (46.5)	62 (62.6)
Principles of health research ethics	46 (46.5)	72 (72.7)
Consent in research	68 (68.7)	91 (91.9)
Types of statistical hypothesis	64 (64.6)	83 (83.8)
Significance of hypothesis in research	35 (35.4)	42 (42.4)
Outcome variable	53 (53.5)	73 (73.7)
Conceptual framework	63 (63.6)	83 (83.8)
Referencing style types	48 (48.5)	68 (68.7)
Purpose of references	36 (36.4)	35 (35.4)
Purpose of defining study population in research	21 (21.2)	39 (39.4)
Sampling techniques	48 (48.5)	74 (74.7)
Statistical tool selection	14 (14.1)	16 (16.2)
Software for data analysis	76 (76.8)	92 (92.9)

among the participants (Figure 1).

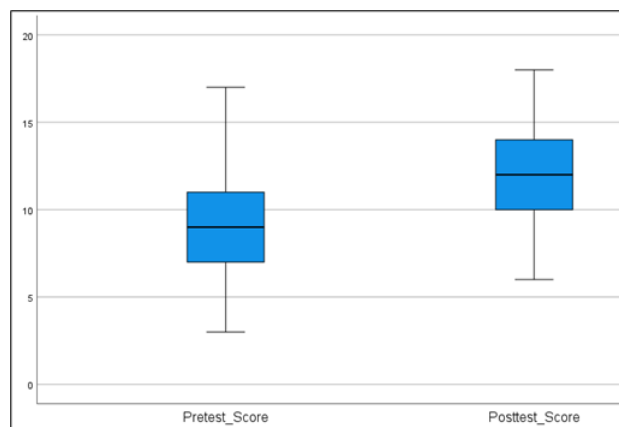


Figure 1. Box plot of pre-test and post-test scores of knowledge of the participants (n=99).

Table 2 represents the distribution of participants according to their level of knowledge in the pre-test and post-test. In the pre-test, the majority of participants (81.8%, 95% CI: 72.8-88.85) had a low level of knowledge, while 16.2% (95% CI: 9.53-24.91) had a moderate level and only 2.0% (95% CI: 0.25-7.11) had a high level of knowledge pre intervention. However, in the post-test, a notable improvement was observed. The proportion of participants with moderate knowledge increased to 50.5% (95% CI: 40.27-60.71), and those with high knowledge increased to 9.1% (95% CI: 4.24-16.56), while the proportion with low knowledge decreased to 40.4% (95% CI: 30.66-50.74) post intervention. This indicates a considerable improvement in participant's knowledge level post intervention.

Table 2. Level of knowledge of the participants pre and post intervention (n=99).

Level of knowledge	n (%)	95% CI	
		Lower	Upper
Pre intervention (Pre-test)			
High ($\geq 80\%$)	2 (2)	0.25	7.11
Moderate (60-79%)	16 (16.2)	9.53	24.91
Low ($< 60\%$)	81 (81.8)	72.8	88.85
Post intervention (Post-test)			
High ($\geq 80\%$)	9 (9.1)	4.24	16.56
Moderate (60-79%)	50 (50.5)	40.27	60.71
Low ($< 60\%$)	40 (40.4)	30.66	50.74

To compare the knowledge of participants, paired t test was used (data of pre and post-test score followed the normal distribution). The mean pre-test score of the participants was 9.10 (SD = 2.86), which increased to 11.77 (SD = 2.68) in the post-test. This increase in the mean score indicates an improvement in the level of knowledge post intervention. The difference between the pre-test and post-test scores was found to be statistically significant ($p < 0.001$), suggesting that the intervention had a significant positive effect on knowledge of the participants (Table 3).

Table 3. Comparison of pre-test and post-test scores of knowledge of the participants (n=99).

Score	Mean	Standard Deviation	t-value	P-value
Pre-test score	9.10	2.86	-10.255	< 0.001
Post-test score	11.77	2.68		

DISCUSSION

The findings of the present study demonstrated a significant improvement in the knowledge of healthcare professionals regarding health research proposal development following structured training workshops. The median score of knowledge in the post-test is higher than the pre-test and mean knowledge score increased from 9.10 before the intervention to 11.77 after the intervention ($p < 0.001$) in this study, indicating that structured educational interventions can effectively enhance research-related competencies among healthcare professionals. These findings are consistent with previous studies evaluating research methodology training programs. A study assessing a research methodology workshop among postgraduate students reported a significant improvement in knowledge scores, with the mean score increasing from 10.55 in the pre-test to 12.43 in the post-test.⁹ The magnitude and direction of improvement in that study are comparable to the findings of the present research, supporting the effectiveness of structured workshops in improving research knowledge.

Similarly, like the present study, *Shrestha et al.*, reported that healthcare professionals from various disciplines who participated in proposal writing training workshops demonstrated improved understanding of research protocol development, scientific writing, and grant proposal preparation. The authors emphasized that such workshops play an important role in promoting research engagement and strengthening research culture within healthcare institutions.¹⁰

Furthermore, the findings of the present study are supported by broader literature on research capacity development. A systematic review on research education and training among nurses and allied health professionals reported that structured training programs significantly improve research knowledge, confidence, and ability to conduct research among healthcare professionals. Such programs are considered essential for strengthening evidence-based practice and building research capacity within healthcare institutions.¹¹ In addition to enhancing

writing skills, educational interventions have been shown to significantly impact participant's confidence and understanding of the research process. *Gaber et al.*, found that training programs focused on scientific writing significantly improved the writing skills of postgraduate students, enabling them to produce higher-quality research proposals.¹²

The development of research proposals is often fraught with challenges, including a lack of understanding of the components that constitute a strong proposal, insufficient knowledge of research methodologies, and difficulties in articulating research questions and objectives. In the present study the interventional educational programs incorporating these core elements of research methodologies were found to be effective. Likewise, *Ali et al.*, emphasized the importance of clear research questions, comprehensive literature reviews, and appropriate methodologies as essential elements of effective research proposals.¹ *Cole et al.*, also highlighted the integration of grant proposal writing exercises in undergraduate science courses, emphasizing the importance of real-world applications and critical analysis of literature as essential components of effective research proposal development.¹³

The improvement in knowledge related to research ethics and informed consent observed in this study is also consistent with findings reported by *Ghimire et al.*, who demonstrated a significant increase in knowledge of ethical research practices following structured training in Nepal.¹⁴ These findings suggest that educational interventions can effectively enhance awareness and understanding of ethical aspects of research.

The improvement observed in the present study may also be attributed to the interactive and participatory learning approach adopted during the workshops. Participants were involved in group work where they developed research proposals based on problem statements and received feedback from experienced facilitators. Similar participatory models have been used in research capacity-building workshops in different countries to enhance understanding of research methodology, proposal writing, and study design.¹⁵ In addition, mentorship and hands-on learning during research training have been reported to

increase research engagement and foster research culture among healthcare professionals.¹⁶

The role of educational interventions in strengthening research competencies has been well demonstrated in the present study which is also widely recognized in the academic literature. *Kanchan et al.*, reported that structured educational programs significantly improved the knowledge of medical staff across several domains, including research proposal development.¹⁷ Similarly, *Mims et al.*, highlighted the benefits of proposal writing workshops for early-career scientists, noting that such programs provide essential training and practical experience that improve proposal development and funding success rates.¹⁸ This aligns with findings from a study done by *Piryani et al.*, who assessed a training workshop for faculty members and reported positive feedback regarding the usefulness and relevance of the program in enhancing research proposal writing skills.¹⁹ Overall, the findings of the present study are consistent with previous studies demonstrating that structured trainings and workshops significantly improve knowledge related to research methodology and proposal development among healthcare professionals. The results reinforce the importance of implementing regular research training programs in healthcare institutions to strengthen research capacity and promote evidence-based practice.

CONCLUSIONS

A significant overall improvement in knowledge of the health care professionals on research methodology was observed after receiving the intervention. The trainings and workshops had a significant positive effect on improving the level of knowledge of the health care professionals on health research methodology and proposal development. Implementation of such educational interventions is recommended regularly among researchers so that relevant, impactful and quality health research is conducted by incorporating the latest scientific research methodologies.

Limitations

Lack of Control Group: Without a control group, it is challenging to determine whether observed changes are due to the intervention or other external factors. This absence makes it difficult to establish causality, as changes could be influenced by natural progression or other concurrent events unrelated to the intervention.

Confounding Variables: The inability to control for confounding variables in a pre-post design can skew results. Changes in outcomes may be attributed to factors other than the intervention, such as participant characteristics or external influences.

Conflict of interest: The authors declare that they have no conflict of interest.

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Availability of data and materials: All data analysed during this study will be made available upon reasonable request from the corresponding author.

Authors' contributions

Conceptualization: Perna Bansal.

Data curation: Perna Bansal, Binam Acharya.

Formal analysis: Perna Bansal, Hari Prasad Upadhyay.

Investigation: Perna Bansal, Binam Acharya, Hari Prasad Upadhyay.

Methodology: Perna Bansal, Binam Acharya.

Supervision: Perna Bansal.

Writing-original draft: Perna Bansal.

Writing-review & editing: Perna Bansal, Binam Acharya, Hari Prasad Upadhyay.

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