

# Participant's Knowledge and Perception of Health Research Methodology before and after a Hands-on Workshop in a Medical College in Lalitpur, Nepal

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## ABSTRACT

### Background

The basic principles of research methodology are very important for the successful conduct of research.

### Objective

To evaluate the knowledge and perceptions before and after a three-day workshop on health research methodologies conducted at a medical college in Lalitpur, Nepal.

### Method

The pre-post study was conducted during the workshop. There were 31 participants comprising of doctors (interns and residents), medical officers and dental surgeons and faculties. A questionnaire containing two sections related to various themes of the workshop was developed to measure the respondents' knowledge and perception of different concepts. Feedback regarding each session was also obtained. The median knowledge and perception scores before and after the workshop were compared using appropriate statistical tests ( $p < 0.05$ ).

### Result

More than half of the participants, [18 (58.1%)] were of 20-30 years of age. The total knowledge scores improved significantly after the workshop. The increase in the perception scores after the workshop was also significant. Feedback was positive. The highest feedback score was for the session on critical analysis of a published article.

### Conclusion

Knowledge and perceptions increased significantly indicating such workshops can be effective and contribute to the capacity building of the early-stage researchers.

## KEY WORDS

*Ethics, Medical research, Publication*

## INTRODUCTION

Health research can bring many benefits to patients and healthcare professionals. However, research skills are not adequately addressed in undergraduate curricula.<sup>1-3</sup> Evidence from different countries shows the effectiveness of educational interventions in research methodologies.<sup>4,5</sup> Healthcare professionals are continuously using research evidence in their practice and improving their patient care services.<sup>6</sup> Evidence based medicine (EBM) can be helpful towards decision-making for patient care.<sup>7,8</sup>

Research is a multistep, teamwork process that passes through a series of stages from research idea, analysis of data, interpretation of results, and dissemination through publication. Therefore training focusing on teaching-learning methodologies, assessment tools, and approaches is fundamental to research methodology.

All national and international ethical guidelines emphasize the need to follow the code of conduct by researchers and other stakeholders in research to safeguard the rights and safety of the research participants.<sup>9</sup> However, reviewing and constant monitoring of the research activities to ensure adherence to these guidelines is the main concern of the Institutional Review Committees (IRCs), whether institutional or independent, which are entrusted with the responsibility of protecting the rights and safety of the research participants.<sup>9</sup> In addition to do the research ethically, the researchers should also be well versed in the technical aspects of research too.

The objective of this study was to study the participant's knowledge and perception about different topics/areas related to research before and after a hands-on workshop on health research.

## METHODS

The study was quasi-experimental, pre- and post-test study design using a questionnaire during a workshop at KIST Medical College and Teaching Hospital (KISTMCTH) from 27<sup>th</sup> to 29<sup>th</sup> June 2022. There were 31 participants attending this workshop. As this workshop was funded by the University Grants Commission (UGC), the total participants number for this workshop was fixed at 30, but we added one more participant based on his interest and enthusiasm towards this training program.

A call for participation was made and the participants registered their interest from different institutions. The participants were selected based on the number of publications in the peer reviewed journals as this would reflect their understanding of the basics of research methods. The participants were further grouped based on their academic backgrounds including residents from different specialties on clinical and basic science background, interns, medical and dental interns along with

some faculties from dental departments also participated. The resource persons, observers and the volunteers were excluded from the study.

The facilitators were from various institutes including KISTMCTH. The first facilitator facilitated two sessions - one for the concepts of research and research design and another as a hands-on session for the components of a research proposal and writing a research proposal on a given clinical scenario. The resource person for the session was from the Department of Neurosurgery and Chair, Research Department, Institute of Medicine.

There was a hands-on session on literature search. The resource person was the chief librarian from Nepal Health Research Council (NHRC). He elaborated on the various methods for searching the literature. The last session was for the critical appraisal of papers selected randomly from selected journals. The facilitator for this session was the chief editor of the Journal of KIST Medical College and Teaching Hospital. He talked about the various processes to identify the weakness and strengths of the published studies.

The second day started with a session on national ethical guidelines and the basics of ethics in medical research with some relevant examples of ethical issues. This was facilitated by the ex-chair of the ethical review board and a senior research officer from NHRC. They talked about the national ethical guidelines for research by NHRC. They also provided some examples of ethical issues in clinical research. Two sessions were facilitated by resource persons from the Patan Academy of Health Sciences and the host institute KISTMCTH on medical statistics. They described the various types of data, the variables, and commonly used statistical tests based on the types of data. Another important topic of their discussion was the sample size calculation for common health research designs. The last session was on the functioning of the IRCs. This was facilitated by the member secretary of the (IRC) of KISTMCTH.

The first session on day 3 was on the importance of ethics in research and scientific publications. The facilitator described the important aspects of ethics in research, the issues of plagiarism, and also about scientific misconduct. This was facilitated by the chief of ethical section of NHRC. The second session was on the components of a scientific paper and the third session was about writing a paper from hypothetical data. This was facilitated by the editor-in-chief of the Journal of the Institute of Medicine and the chair, Department of Neurosurgery, Institute of Medicine. The facilitator highlighted about the parts of a scientific paper, and the IMRAD format and also allowed the participants to write an abstract from hypothetical data. The last session was a hands-on session for the critical appraisal of the literature and was facilitated by the chair of the department of pediatrics and a member of the ethical review board of the NHRC. The session focused on emphasized the various scales used to critically analyze the published literature.

A questionnaire was used to measure the perceptions of knowledge and about the selected subject areas in the sessions from the before and after the workshop. The questions in questionnaire were designed based on published literature and the content of the questionnaire was reviewed by experts to achieve the objective of the study. The content and face validity were ensured by sending the questionnaire to the content experts for their comments and suggestions.

The knowledge was measured regarding the subject areas. For each subject area participants were asked whether they had no idea, have a vague idea, or had a clear idea. 'No idea' was given the score 1, 'Have a vague idea' the score 2, and 'Clear idea' the score 3. The total number of knowledge questions were 8 and the maximum total knowledge score was 24. Perceptions were measured by noting the respondents' agreement with a set of statements using a Likert-type scale. The scoring system adopted was: 5 – strongly agree with the statement, 4 – agree, 3 – neutral, 2 – disagree and 1 – strongly disagree with the statement. The total number of perception questions were 10 and the maximum total perception score was 50.

The questionnaire was distributed at the time of registration on the first day the agreement of the participants after obtaining a written informed consent. After the completion of each session, a feedback questionnaire was again provided. KAP scores were again measured using the same questionnaire after the workshop.

The effectiveness of the session was noted according to the following scale: not effective was scored 1, somewhat effective as 2, effective as 3, and very effective as 4. The median effectiveness score for different topics and the total median effectiveness scores were calculated. The participants were asked to mention two strengths and two suggestions for further improvement.

The feedback was scored from 1 to 5 using a Likert scale with 1 indicating "Strongly agree" and 5 as "Strongly disagree". The feedback was taken for the areas clarity of the session objectives, the relevance of the examples used, the relevance of the clinical case scenarios, facilitators fulfilling their roles effectively, the importance of the sessions in the future practice of the participants, the ability of the facilitators to create a friendly environment and the group dynamics. The overall feedback of each session was rated on a scale of 1 to 10.

The ethical approval was obtained from the (IRC) of KIST Medical College and Teaching Hospital dated 20<sup>th</sup> June 2022 with a reference number 2078/79/06.

The total knowledge and perception scores were calculated both before and immediately after the workshop by adding the scores of individual statements. The normality of distribution of the pre and post workshop scores was noted using the one-sample Kolmogorov-Smirnov test ( $p < 0.05$ ). The distribution was not normal and hence

median was used as the measure of central tendency. The median knowledge and perceptions scores (both pre and post workshop) were also calculated and compared among the various subgroups of the respondents using the independent samples median test ( $p < 0.05$ ). Independent samples median test was used for the comparisons. The total median knowledge score and the score of individual areas and the total perception scores before and after the module were compared using related samples Wilcoxon signed rank test. A p-value less than 0.05 were taken as statistically significant. The effectiveness of particular sessions was also noted. The software used was Statistical Package for Social Sciences (SPSS) version 28 for Windows.

## RESULTS

Demographics of the participants: More than half of the participants, 18 (59%) were in the 20-30 years of age group. Eighteen (58.1%) were females. The majority of the participants were doctors 14 (45.2%) and 15 (48.4%) participants were having less than one-year working experience. The majority of Most participants, 14 (45.2%) did not have any publications (table 1).

**Table 1. Demographic characteristics of the study participants**

Variables	Number (%)
<b>Age (years)</b>	
20-30	18 (58.1)
31-40	11 (35.4)
41-50	2 (6.5)
<b>Gender</b>	
Male	13 (41.9)
Female	18 (58.1)
<b>Profession</b>	
Medical Doctors (Medical Interns and Post Graduate Residents)	14 (45.2)
Medical Officer	4 (12.9)
Dental Interns	2 (6.5)
Faculties (Medical and Dental)	11 (35.5)
<b>Working experience</b>	
No experience	1 (3.2)
Less than one year	15 (48.4)
One to five years	12 (38.7)
More than five years	3 (9.7)
<b>Number of published papers</b>	
0	14 (45.2)
1	3 (9.7)
2	8 (25.8)
3	3 (9.7)
More than 4	3 (9.7)

The median total knowledge scores improved after the workshop for all the subgroups of age, gender, profession, working experience, and the number of published papers.

The median (IQR) knowledge score pre-workshop was 14 (5) and this increased to 22 (2) after the workshop. The increase was statistically significant ( $p < 0.001$ ). The median (IQR) preworkshop perception score was 45 (7) and it increased significantly to 49 (4) after the workshop ( $p = 0.038$ ). The subgroup analysis showed that the scores before the workshop were significantly different according to age, profession and number of published papers (table 2).

**Table 2. Median knowledge scores that were significantly different according to demographic characteristics**

Demographic Characteristics	Total knowledge score pre Median (IQR)	p value
<b>Age</b>		
21-30 years	12 (4)	0.01
31-40 years	16 (3)	
41-50 years	13 (0)	
<b>Profession</b>		
Medical Doctors (Medical Interns and Post Graduate Residents)	13 (5.5)	0.021
Medical Officer	12.5 (0)	
Dental interns	9.5 (1.75)	
Faculties (Medical and Dental)	16 (3)	
<b>Number of published papers</b>		
0	12 (3.5)	0.017
1	10 (0)	
2	15.5 (3.75)	
3	16 (0)	
5	15 (0)	

Topic-wise analysis based on the participant’s responses showed the total individual knowledge scores for different sessions like functions of the IRCs, scientific misconduct, ethical issues, research methodologies, national ethical guidelines, critical appraisal of scientific literature, concepts of research and research designs and writing the title and abstract sessions had an improved score after the workshop and were found to be statistically significant and the scores for the sessions of components of a research proposal, literature search, sample size calculation and writing a research proposal did not improve as shown in table 3.

Table 4 shows the total median perception scores of the participants according to their demographic characteristics. The scores were not found to be statistically significant.

Feedback regarding each session was also obtained. The highest feedback score was for the session on critical analysis of a published article.

The feedback scores were taken on a Likert scale with a scoring of 1 to 5. 1 indicating “Strongly agree” and 5 as “Strongly disagree”. The feedback was taken for the areas like the clarity of the session objectives, the relevance

**Table 3. Comparison of total and individual knowledge scores pre and post-workshop**

Median scores	Pre	Post	P value
Median Total knowledge score	14	22	<0.001
Functions of the Institutional Review Committee	2	3	<0.001
Scientific misconduct	2	3	<0.001
Ethical issues	2	3	<0.001
Research methodologies	2	3	<0.001
National ethical guidelines	1	3	<0.001
Critical appraisal of scientific literature	1	2	<0.001
Concepts of research and research designs	2	3	<0.001
Writing title and abstract	2	3	<0.001

**Table 4. Perceptions according to demographic characteristics**

Demographic Characteristics	Subgroup total median perception score	P value
<b>Age</b>		
21-30 years	48.5	0.319
31-40 years	49	
41-50 years	50	
<b>Gender</b>		
Male	48	0.879
Female	49.5	
<b>Profession</b>		
Medical Doctors (Medical Interns and Post Graduate Residents)	48.5	0.560
Medical Officer	47	
Dental interns	49.5	
Faculties (Medical and Dental)	50	
<b>Working experience</b>		
Less than one year	49	0.206
One to five years	49.5	
More than five years	50	
<b>Number of published papers</b>		
0	48.5	0.237
1	47	
2	50	
3	49	
More than 4	50	

of the examples used, the relevance of the clinical case scenarios, facilitators fulfilling their roles effectively, the importance of the sessions in the future practice of the participants, the ability of the facilitators to create a friendly environment and the group dynamics. The overall feedback of the sessions was rated on a scale of 1 to 10. The overall mean score was 8.07 for session 1 (Concepts of research and research designs), 8.1 for session 2 (component of a research proposal), 8.17 for session 3

(writing a research proposal), 7.79 for session 4, (literature search) 8.33 for session 5 (strength and weakness of papers), 8.41 for session 6 (ethical guidelines and basics of ethics in medical research), 8.29 for session 7 (sample size calculation and appropriateness of the statistical tests on the data), 8.67 for session 8 (functioning of the institutional review committee), 8.8 for session 9 (importance of ethics in research and scientific publications), 8.6 for session 10 (writing title and abstract), 8.75 for session 11 (writing a paper from hypothetical data) and 9.08 for session 12 (critical analysis of the published literature). The number of respondents providing feedback was lower for the later sessions, however. This was collected by using a Ggoogle form from the participants.

## DISCUSSION

Good understanding of research methods and relevant statistics is very important for all healthcare professionals besides providing services to the patients and teaching. The study highlights that there is a significant difference between pre and post-workshop knowledge scores about research methodology. The participants were confident about the functions of the IRCs, national ethical guidelines, and ethical issues in research after completion of the workshop.

The process of searching relevant articles, the search engines, the possible key words, the refinement of search strategies were discussed during the workshop. Critical evaluation of a research article provides an understanding of the strengths and weakness of the studies and study designs. This can also help in reviewing the quality of research articles. Many research articles are published every year, and critical screening is always beneficial for the researchers and academicians.<sup>10-12</sup> Critical appraisal of the published literature allows the healthcare professionals to prepare for patient care and management. Evaluation of the literature helps in providing patients with empathic and effective treatment.<sup>13</sup>

Feedback regarding each session was also obtained. The scores were high, and the overall score was above 7.5 (the maximum score was 10). There was significant difference pre and post workshop among participants regarding scientific misconduct and different aspects of manuscript writing among all groups. This demonstrates the importance of such training sessions to improve knowledge and perception about research and ethics. Research methodology is not taught extensively during undergraduate as well as in post graduate education; therefore, participants found such courses useful.<sup>14,15</sup> Those participants who had published papers previously also had their knowledge improved after the training. The knowledge and the perception scores both increased significantly immediately after the workshop. Another important topic in research methodology is

ethical issues in research. Different aspect of the consent process, privacy of the information, confidentiality of the data, respect, privileged communication was discussed during this workshop similar to that mentioned in prior literature.<sup>16</sup>

A study from Pakistan also shows a significant improvement in the participants knowledge on the research and publication algorithm. This study also shows a need for these types of trainings for the capacity building of the healthcare professionals.<sup>17</sup>

Publications require good practices and have principles of ethics. Participants learned about various requirements, like the requirements for an authorship as per the International Committee of Medical Journal Editors (ICMJE) criteria.<sup>17</sup> Scientific misconduct and publication ethics were also described to the participants. The different types of research misconduct like, data falsification and fabrication, plagiarism and their impact were also discussed. The median knowledge score increased after the workshop for all the areas covered and has been shown in table 3.

Similar type of workshops was also conducted for promoting the rational use of antibiotics in 2020. The pre and post workshop evaluations were done in a similar way to this workshop along with the feedback of the sessions.<sup>18</sup> These types of workshops should be conducted on a regular basis for enhancing and strengthening the concepts of research for enabling the researchers to conduct the research responsibly.

The number of participants was limited and according to the workshop objectives was targeted at respondents with no or few research publications. Their initial knowledge and perception scores may have been lower. The response rate for effectiveness of sessions was lower for the later sessions.

## CONCLUSION

The median knowledge and perception scores increased significantly immediately after the workshop. The median scores were significantly different according to the participants profession and the number of published papers before the workshop. The scores increased among all participants post workshops and differences according to demographics were no longer noted.

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