

Delivering Effective Presentations at Scientific Conferences: A Quasi-Experimental Study among Health Science Faculty

Nitin Joseph^{1*}, Shreekanth D. Karnad²

¹Community Medicine, Post Graduate Diploma in Family Medicine, Associate Professor, Department of Community Medicine, and Faculty Member of Department of Medical Education, Kasturba Medical College Mangalore, Manipal Academy of Higher Education, Manipal, India

²Neurosciences, Assistant Professor-Selection Grade, Department of Physiotherapy, and Faculty Member of Department of Medical Education, Kasturba Medical College Mangalore, Manipal Academy of Higher Education, Manipal, India

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***Corresponding author:**

Department of Community Medicine,
Kasturba Medical College Mangalore,
Manipal Academy of Higher Education,
Manipal, India.

Email: nitin.josep@manipal.edu

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Abstract

Background: Essential conference practices may not be known to faculty members.

Objectives: This study aimed to assess the knowledge of pre-, during-, and post-conference best practices, as well as the perceptions of faculty members before and after attending a workshop on delivering effective presentations at scientific conferences.

Methods: This quasi-experimental study included 31 faculty members from the health sciences who attended a workshop in April 2023. The data were collected in Microsoft Forms. Nonparametric tests were applied as appropriate for the data distribution. A p value < 0.05 was considered statistically significant.

Results: The mean age of the participants was 39.7±8.2 years. The majority were female [17 (54.8%)]. Most participants felt that attending a conference onsite was better than attending online because interaction with the audience was better. The majority of participants preferred oral presentations over poster presentations to reach a wider audience. Hardly 10% of the participants engaged in post-conference activities. Self-perceived knowledge regarding preparations to be made before attending conferences, recommendations to be practiced during conference presentations, activities to be accomplished after attending conferences, and self-perceived confidence levels in attending conferences were reported to have improved significantly (p<0.001) among the participants after attending the workshop. The median knowledge score on the pre-test was 12 (IQR (11, 16)), and that on the post-test was 15 (IQR (14, 18)), (Z=3.422, p=0.001).

Conclusion: The workshop increased the participants' knowledge and confidence levels in essential aspects of the conference presentations. Hence, more such training programs are needed for health science faculty members.

Keywords: Effective Conference Presentations; Health Science Faculty Members; Knowledge; Perception; Workshop

Background

Scientific conferences are popular platforms for presenting research work to large audiences. They are often the first opportunity to disclose potential and novel findings of their research work to relevant delegates (1). It facilitates earlier communication of information long before it is published as a full manuscript in any reputed journal (1). In addition, it allows rapid feedback from experts in the same field, thereby opening the door for further collaborative work (2).

To achieve a successful conference presentation experience, certain key strategies need to be

accomplished by presenters. These include planning preparatory activities prior to attending a conference, meticulously designing the presentation material and sharing information and finally providing takeaways to the audience to create an opportunity for further networking with them in the future (3). However, many scientific presentations fail to provide productive experiences for presenters because of failure to accomplish any of these steps effectively (4, 5). Networking at conferences is also not as easy as it is in other settings. This is because social interactions at conferences often take place outside known social

structures, and the ties between attendees are often weak; therefore, most interaction processes at conferences are uncertain with respect to their outcomes (6). The experiences of early career researchers in conference presentations have been reported not to improve appreciably (7). In a study conducted in Germany, only 18.4% and 31.3% of the conference attendees of a previously held international conference were found to establish a research collaboration and exchange study materials or devices with other persons or institutions, respectively. Information on tips on funding opportunities and funding organizations was received from others by only 15.9% and 12.4% of delegates, respectively (6).

Presenting scientific work flawlessly is one of the most fundamental skills for a researcher (8). Unfortunately, this skill has not been effectively taught in medical education (9).

In addition, several ethical aspects related to scientific presentations at conferences are unknown to presenters. For example, teaching faculty have been observed to refrain from acknowledging the sources of the scientific matter presented at conferences, as they are ignorant of its importance and necessity (10). Therefore, there is a need to train faculty members in identifying suitable conferences, improving their presentation skills, providing information on funding agencies that support conference registration fees and travel, addressing various ethical issues related to conference presentations and providing tips to improve networking with other delegates.

Objectives

This study was therefore performed to assess the knowledge of pre-, during-, and post-conference best practices and perceptions of faculty members before and after attending a workshop on delivering an effective presentation at scientific conferences.

Methods

Study design: This was a quasi-experimental study with an intervention in the form of a three-hour onsite workshop on “Making effective presentations at scientific conferences” held on 24th April 2023.

Participants: A total of 32 participants had registered for this workshop. However, one person could not attend this workshop. All the 31 participants who had attended this workshop also provided consent to participate in this research study. Hence these 31 participants constituted the sample size. The sampling method used was therefore universal sampling involving the inclusion of all participants enrolled in the workshop

provided they gave consent to participate. The use of universal sampling from a single workshop cohort is a significant limitation of this study. Additionally, as a non-random sampling method was used, the generalizability of the findings is limited.

Both the facilitators of the workshop were members of the Department of Medical Education at this institution. They also monitored and mentored the participants during the hands-on activities during the workshop. Approval to conduct this research study as a part of the workshop was obtained from the Institutional Ethics Committee. The approval number was IECKMCMLR-03/2023/74 dated 15th March 2023.

Data collection tools: The pre- and post-test questionnaires used in this study were designed as Microsoft forms. Content validation of these tools was performed by two faculty members from the Department of Medical Education of this institution. One was a Professor in Forensic Medicine, and the other was an Associate Professor in Internal Medicine. Both had presented research papers at several national and international conferences in the past. They were asked to rate each item in the questionnaire on a four-point Likert scale, with the options “not relevant,” “somewhat relevant,” “quite relevant,” and “highly relevant.” The items selected as “quite relevant” and “highly relevant” by both these experts during the content validation process were retained in the questionnaire by the investigators. The content validity index and content validity ratio for the items in the pre-test questionnaire were calculated as 0.93 and 0.89, respectively, via the Lawshe’s method.

Pilot testing was performed among three faculty members who were not participants in the workshop. The pre-test questionnaire took approximately 15 minutes to complete. The Cronbach’s alpha value of reliability of the pre-test questionnaire based on the responses of the 31 participants was 0.727. The construct validity of the questionnaire was determined via factor analysis. Criterion validity of the questionnaire could not be assessed, as there was no gold standard instrument for comparison. Both the pre- and post-test questionnaires were anonymous, and the links were shared through email to the participants before and after the workshop, respectively.

The information sheet and the consent form were included in the initial part of the pre-test questionnaire.

Details of the pre-test questionnaire, the post-test questionnaire, and the feedback form and the scoring system used are available in the figshare data repository: <https://doi.org/10.6084/m9.figshare.30444488>

To link the pre- and post-test questionnaires, each participant was instructed to fill in a five-digit Arabic numeral of their choice, using the same number in both forms. To minimize the chances of repetition of the numbers chosen by the participants, they were instructed to use a numeric sequence without repetition of the same digit throughout or to avoid sequential numbers.

Procedure: The details of the conduct of this workshop and the preworkshop is available in the figshare data repository: <https://doi.org/10.6084/m9.figshare.30444464>

Data analysis: Data entry and analysis were performed via IBM SPSS for Windows version 25.0 (Armonk, New York). The normality of the participants' scores was assessed using the Shapiro-Wilk test. All the continuous variables, except for the age of the participants, did not follow the normal probability distribution. The descriptive statistics were expressed as mean, proportions, medians, standard deviation, and interquartile ranges. The Kruskal-Wallis test, Wilcoxon signed-rank test, and Mann-Whitney U test was used to test associations. A p value less than 0.05 indicated a statistically significant association.

Results

The mean age of the 31 participants was 39.7 ± 8.2 years. Their age ranged from 28 to 57 years. The median teaching experience was 11 years (IQR 4, 15). The duration ranged from six months to 30 years (Table 1).

A total of 26(83.9%) participants had presented research papers at various scientific conferences (Table 2).

The majority of participants [21(67.7%)] felt that attending a conference onsite was more beneficial than attending it online. The majority [21 (67.7%)] of them preferred oral mode of presentation over posters (Table 3).

The majority of the participants [21(67.7%)] felt that the presentation skills of presenters generally improved during virtual conference presentations using online platforms. (Table 4) Prior to the start of the workshop, only 11 participants (35.5%) knew what a predatory conference was and how to identify the same. Only 7 participants (22.6%) knew that the validity of yellow fever vaccination starts 10 days after vaccination and lasts for a lifetime. Only 7 participants (22.6%) knew that ePosters can also be displayed in asynchronous mode.

Table 1. Sociodemographic distribution of the participants (n=31)

Characteristics	Category	n (%)
Age group (years)	26-35	10 (32.2)
	36-45	14 (45.2)
	46-55	5 (16.1)
	>55	2 (6.5)
Gender	Males	14 (45.2)
	Females	17 (54.8)
Specialty	Preclinical subjects*	11 (35.4)
	Para clinical subjects**	2 (6.5)
	Clinical subjects***	16 (51.6)
	Allied health sciences****	2 (6.5)
Designation	Professor	4 (12.9)
	Additional Professor	1 (3.2)
	Associate Professor	13 (41.9)
	Assistant Professor	5 (16.1)
	Senior Resident	6 (19.4)
	Tutor	2 (6.5)
Teaching experience as a faculty member (years)	≤5	9 (29.0)
	6-10	6 (19.4)
	11-15	10 (32.2)
	>15	6 (19.4)

*Departments of Physiology (7), Anatomy (3), Biochemistry (1)

**Departments of Pharmacology (1), Forensic Medicine (1)

***Departments of Surgery (6), Anaesthesiology (3), Orthopaedics (2), Internal Medicine (1), Dermatology (1), Emergency Medicine (1), Psychiatry (1), Radio Diagnosis (1)

****Department of Audiology and Speech Language Pathology (2)

Table 2. Prior experiences of the participants in relation to scientific conferences (n=31)

Characteristics	Category	n (%)
Attended scientific conferences (n=31)		31 (100.0)
Presented research papers at conferences (n=31)		26 (83.9)
Type of the conferences where the papers were presented (n=26)*	International	15 (57.7)
	National	22 (84.6)
	State	13 (50.0)
	Regional	5 (19.2)
	Virtual	6 (23.1)
Number of papers presented (n=26)	1-5	15 (57.7)
	6-10	5 (19.2)
	>10	6 (23.1)
Delivered online presentation in virtual conferences after the onset of COVID-19 (n=26)		6 (23.1)
Skills acquired while presenting papers in virtual conferences (n=6)*	Learnt usage of online presentation platforms	6 (100.0)
	Learnt about techniques to design an e-poster	3 (50.0)
	Bettered online presentation skills	1 (16.7)
Availed financial support for meeting conference registration fees (n=31) [#]		12 (38.7)
Availed travel grants for attending conferences (n=31) [@]		6 (19.3)
Practice of carrying first aid kits while attending conferences (n=31) [*]		18 (58.1)
Practice of carrying electronic devices while attending conferences (n=31) [†]		31 (100)

*Multiple responses

[#]Source of fund: University fund (12), The Centre for International Cooperation in Science, Government of India (1), International Association of Forensic Sciences (1).[@]Source of travel grant: University fund (2), Association of Clinical Biochemists of India (1), World Congress of Dermatology (1), Indian Association of Dermatologists, Venereologists and Leprologists (1), Center for International Co-operation in Science, Government of India (1), International Association of Forensic Sciences (1)^{*}Contents of first aid kit: Paracetamol (18), Hand sanitizer (18), Medications for pain relief (16), Antihistamines (13), Antibiotics (12), Dressing bandages (9), Antiseptic cream 8, Paper soap (7), Analgesic ointment (6)[†]Types of electronic devices: Pen drives (23), Laptops (19), Power banks (8), Tablets (6)**Table 3.** Perception of the participants regarding the preferred type of conference and mode of scientific paper presentation (n=31)

Perception	Category	n (%)
Participating in a conference onsite is more beneficial than attending it online (n=31)	Yes	21 (67.7)
Reasons stated (n=21)	Interaction is better	13 (61.9)
	Better participation of the audience in discussions	5 (23.8)
	Attention span of the audience will be better	2 (9.5)
	Presentation skills can be better showcased by the presenter	1 (4.8)
Participating in a conference online is more beneficial than attending it onsite (n=31)	Yes	10 (32.3)
Reason stated (n=10)	Easier to ask questions to the presenter through online platforms	3 (30.0)
Preferred mode of presentation in conferences (n=31)	Oral presentation	21 (67.7)
	Poster presentation	10 (32.3)
Reasons stated for preference of oral presentation (n=21)**	Better scope for reaching a wider audience	17 (80.9)
	Adds more weightage to Curriculum Vitae	9 (42.9)
	Requires less preparation to arrange presentation materials	5 (23.8)
Reasons stated for preference of poster presentation (n=10)*	Less stressful way of presenting	7 (70.0)
	Better platform for discussion with the audience	4 (40.0)

*Multiple responses

Table 4. Perceptions of the participants regarding virtual conferences, international conferences and credit hours (n=31)

Perception	Category	n (%)
Perceptions regarding virtual conferences (n=31)*	The presentation skills of presenters have improved during presentations in virtual conferences using online platforms	21 (67.7)
	It has reduced information exchange between delegates	18 (58.1)
	Delegates have become more familiar with the usage of online platforms	7 (22.6)
	Presenters learnt ways of preparing e-presentation materials	2 (6.4)
Physically attending conferences overseas has more academic benefits than the ones conducted within the country (n=31)	Yes	5 (16.1)
	No	12 (38.7)
	Not sure	14 (45.2)
Reasons stated in favour (n=5)	Opportunity to interact and share information with multinational delegates	5 (100.0)
Reasons stated for not in favour (n=12)*	The amount of information acquired depends on the attitude of the attendee and not on the level of the conference	7 (58.3)
	Academic benefits can be obtained by participating in a well-conducted regional conference too	6 (50.0)
Regarding usefulness of credit hours awarded for attending conferences	Useful	6 (19.4)
	Neutral	20 (64.5)
	Not useful	5 (16.1)
Reasons stated for the usefulness of credit hours (n=6)	Encourages delegates to attend conferences	3 (50.0)
	Adds more weightage to Curriculum Vitae	3 (50.0)
Reasons stated for non-usefulness of credit hours (n=5)	Not mandated by regulatory bodies/Not relevant	5 (100.0)
The reason stated for neutrality regarding credit hours (n=20)	Not aware of its benefits	9 (45.0)

*Multiple responses

Only 4 participants (12.9%) knew at least one software to design an ePoster. Seven participants (22.6%) had the misconception that the presenters should be fully dependent on PowerPoint slides to deliver their oral presentations at the conferences. Only 2 participants (6.4%) knew all ten recommendations of making a PowerPoint slide for an oral presentation that was enquired from them. None of the participants knew all ten ethical issues concerning presentations at scientific conferences enquired from them. Only 1 participant (3.2%) answered five out of these ten questions correctly.

Table 5. Self-perceived knowledge of pre-, during-, and post-conference best practices and self-perceived confidence level in attending conferences among the participants before and after the workshop (n=31)

Characteristics	Before the workshop Median score IQR (Q1,Q3)	Minimum score, Maximum score	After the workshop Median score IQR (Q1,Q3)	Minimum score, Maximum score	Z value	p value
Self-perceived knowledge regarding preparations to be made before attending conferences	7(5,8)	3,10	9(8,9)	5,10	3.768	<0.001
Self-perceived knowledge regarding recommendations to be practiced during the conference presentations	7(6,8)	4,10	9(8,9)	6,10	3.799	<0.001
Self-perceived knowledge regarding activities to be accomplished after attending conferences	7(5,8)	4,10	9(8,9)	7,10	3.635	<0.001
Self-perceived confidence level in attending conferences	7(6,8)	3,9	9(8,9)	7,10	4.023	<0.001

IQR: Interquartile range

After presenting their research papers, conference presentation experiences were shared on Facebook, Zoom, and Google Slides by 2, 1, and 1 participant, respectively. Changes in departmental activities, such as introducing newer teaching-learning methods and conducting research in previously unexplored areas, after attending conferences were accomplished by only 3 and 1 participant, respectively.

Self-perceived knowledge and self-perceived confidence levels in attending conferences were reported by participants to have improved significantly after attending this workshop (Table 5).

The median knowledge score on the pre-test was 12, the IQR (Q1, Q3) was 11, 16, the minimum score was 0, and the maximum score was 18. The median knowledge score on the post-test was 15, the IQR (Q1, Q3) was 14 and 18, the minimum score was 3, and the maximum score was 21.

These differences in scores among the 31 participants were significant according to the Wilcoxon signed-rank test ($Z=3.422$, $p=0.001$). The Cohen's d

Table 6. Feedback regarding the workshop among the participants (n=31)

Characteristics	Minimum score, Maximum score	Average feedback score \pm SD
Content of the talk	3,5	3.7 \pm 0.9
Delivery of the talk	3,5	3.6 \pm 0.8
Explanations provided	3,5	3.8 \pm 0.9
Use of audio-visual aids	3,5	3.8 \pm 0.8
Interactivity with the audience	2,5	3.6 \pm 1.0
The usefulness of resource materials shared before the start of the workshop	2,5	4.3 \pm 0.7
The usefulness of hands-on exercises during the workshop	4,5	4.4 \pm 0.5
Characteristics	Category	Number (%)
Interactivity with the audience	Excellent/Very good/Good	29 (93.5)
	Average	2 (6.5)
Usefulness of the resource materials shared before the start of the workshop	Very useful/useful	28 (90.3)
	Somewhat useful	2 (6.5)
	Less useful	1 (3.2)
Usefulness of the hands-on exercises during the workshop	Very useful/useful	31 (100.0)
Time allotted for the hands-on exercises during the workshop	Adequate	29 (93.5)
	Less adequate	2 (6.5)
Time allotted for discussion at the end of each session	Adequate	29 (93.5)
	Less adequate	2 (6.5)
The overall pacing of the workshop	Just right	30 (96.8)
	Too fast	1 (3.2)
Total		31 (100.0)

There was no association between the participants (n=26) of their prior experience in presenting research papers at conferences and their knowledge scores obtained in the pre-test ($p=0.341$) or their perceived confidence level in attending conferences prior to attending this workshop ($p=0.237$) according to the Mann-Whitney U test.

There was no association between the number of research papers presented at conferences (categorized as 1-5, 6-10, >10 papers) and the participants' (n=26) knowledge scores obtained in the pre-test ($p=0.64$) or their perceived confidence level in attending conferences prior to attending this workshop ($p=0.6$) according to the Kruskal-Wallis test.

Discussion

Addressing the knowledge gaps among the participants

The baseline knowledge deficit was widespread among the participants of this study, regardless of their

effect size was 1.18 (95% CI 0.71-1.63). The Rank biserial correlation was 0.883, indicating a good magnitude of the intervention effect.

The feedback given by all the participants was rated as good or above for parameters such as content and delivery of the talk, explanations provided, and the use of audiovisual aids (Table 6).

prior experience in presenting research papers at various conferences.

About one-third of the participants were aware of predatory conferences and their identification. Only two participants knew all ten recommendations correctly for making a good PowerPoint slide for an oral presentation. None of the participants were aware of all ten ethical issues concerning presentations at scientific conferences. These findings support the need for this workshop to enhance health science faculty members knowledge of best practices related to scientific conferences.

Discussion of the preferences for conference types and modes of scientific paper presentation among participants

More than two-thirds of the participants felt that attending conferences onsite was more beneficial than attending them online, mainly because of better interaction with other delegates. In another study

performed in France, better concentration and time dedication for conference meetings were reported more frequently among onsite attendees than among online attendees (11).

Despite several limitations, virtual conferences gained popularity during the COVID-19 pandemic. This platform was used extensively to sustain conference presentations during these unprecedented times. Some virtual conferences offer more focused research areas, as they are easier to organize and manage than larger meetings (12). Presentation in the cozy home or a familiar workplace environment makes the presenters feel more comfortable during virtual conferences (13). All six presenters in the present study who had presented at virtual conferences reported that they learned to use online presentation platforms through this experience. In a study performed in South Korea, delegates attending a virtual conference were surveyed regarding their perceptions of their presentation experiences. Over the three days of this conference, 31.9% attended more than 80% of the sessions. Positive perceptions were expressed by the delegates regarding convenience and accessibility, the quality of planning and organization of the virtual conference, social exchanges and the use of information technology. As a result, 49.8% preferred virtual conferences over conventional conferences, and 59.2% felt that the popularity of virtual conferences would continue even after the COVID-19 pandemic was brought under control. Additionally, 53% of the respondents agreed that technical barriers need to be addressed for the successful delivery of virtual conferences (14). To overcome internet related barriers encountered during virtual conference presentations, the organizers often advise presenters to share a prerecorded video of their presentation with subtitles of the talk to make it easier for international audiences to comprehend the presentation. These aspects were covered in this workshop through hands-on exercises. One drawback of presenting at virtual conferences is the inability to see the audience during the presentation (13).

Presentations at any conferences are given either in an oral or poster format. Owing to the limited number of slots, oral presentations are usually reserved for robust research studies. In the short period of time allotted for the paper presentation, this mode of presentation ensures that the study findings reach a larger number of delegates. The effectiveness of an oral presentation largely depends on the quality of the slides prepared by the presenter. In the present study, nearly one-fourth of the participants had the misconception

that the presenters should be fully dependent on PowerPoint slides to complete their oral presentations at conferences. Over dependence on the slides often occurs due to inadequate preparation by the presenter and may lead to prolonged presentation time. It is recommended to spend no more than 1 minute per slide so that the entire presentation does not exceed 10 minutes (2). Appropriate timing for presentation can be achieved by performing mock presentations in front of guides, mentors, and peer groups (2). The use of a PowerPoint timer or other timing tools can help presenters keep track of the duration of the presentation (15). Mentors may be encouraged to ask some questions toward the end of the presentation to obtain constructive feedback and build confidence in their answers (2, 16). Rehearsal is a key strategy to deliver a clear presentation (17). Organizing thought tools such as mind mapping help provide a clear structure for the flow of a presentation (17). Becoming familiar with the audience by interacting with them prior to the presentation helps one feel more comfortable during the presentation (18).

The use of multiple methods, such as embedding relevant audio and video clips in the PowerPoint presentation, helps prolong attention span which will keep the audience engaged throughout the presentation (3).

Presenters are advised to avoid becoming a “paper reader”, “PowerPoint abuser”, “unprepared (non-practicer and repeater)”, “numbers freak”, “feedback artist”, “technophobic resistor”, or “pointless blatherer” during the oral presentations (13). These aspects were emphasized, and hands-on training on adding timers, videos, and audio clips to PowerPoint slides was provided to the participants as a part of this workshop.

In this study, more than two-thirds of the participants preferred oral presentation over poster presentation mainly to reach a wider audience. The disadvantages of poster presentations were highlighted in a study performed in the United Kingdom (UK), where just 5% of delegates were reported to have read any of the posters (19). Very few questions were asked of ePoster presenters, and among them, only 7% of the questions were relevant and useful to the presenters. The factors that increased posters’ visual appeal, as stated by the delegates in the UK based study, were the pictures/graphs, the scientific content, and the limited use of words in the poster (19). Fonts in the poster should be of a size that can be read from a distance of 1 meter (2). To provide additional details not included on the poster, a handout or a citation to the pertinent research can be given to the delegates (20). Several

software tools are currently available to make attractive ePosters appealing to delegates. However, more than 80% of the participants in this study were unaware of the names of any software used to design an ePoster. The use of different software to design one was covered in this workshop through hands-on exercises.

Hardly one-third of the participants in this study preferred poster presentations over oral presentations. Poster presentations have certain advantages, such as delegates can read through the posters at their own pace and they have the opportunity for interpersonal communication with presenters to clarify doubts (20).

Discussion on pre- and post-conference activities among the participants

Preparedness on the essential pre-conference practices was inadequate among the participants in this study. Not all the participants in this study carried all the essential electronic devices required for the conference presentation. For conference participants who are presenting a paper, the presentation materials should be safe. The presentation slides to be used for the oral presentation can be saved on a thumb drive or in cloud as a backup in case of computer malfunction (12).

Only about 60% of the participants in the present study had carried first-aid kits while attending conferences in the past. These are essential items during travel. The contents of the kit vary based on the conference location. For example, in a sunny place, sunscreen is beneficial. Medications, both prescription and over-the-counter medications, should be taken according to individual requirements (21). Hence, it is important for conference participants to be aware of the various logistics required while attending conferences (12). This finding highlights the need for logistical preparedness training as a part of such workshops.

It is advisable to check out the presentation room and the facilities to be used well before the presentation to become familiar with the setting (18). These include standing at the podium, examining the slide advance and laser pointer devices, setting up the microphone, becoming familiar with the electronic timer or time-warning lights, and any other controls (22). Personal laptop should be connected into the system, and any audio or video files intended to be played during the presentation needs to be checked for volume and clarity well before the session begins (23). It may also be beneficial to carry a multiprong adapter compatible with any socket particularly during international travel (21). Additionally, carrying business cards can facilitate the networking process (21).

Less than 40% and less than 20% of the participants in this study, had received financial support from various funding agencies to meet the conference registration fees and had utilized travel grants, respectively. Undeniably, attending reputed conferences, particularly international ones, can be financially burdensome. Therefore, it is essential to explore funding opportunities such as scholarships or travel grants. Funding sources are often available, and researchers need to be familiar with the appropriate sources that are compatible with their area of research and apply early to take advantages of these funding opportunities (12). Therefore, information on various funding agencies was shared with the participants of this workshop.

Similar to pre-conference practices, post-conference essential practices were very minimal among the participants in this study. Although the conference has concluded, the post-conference phase is as important as the previous phases of the conference. This is when efforts for networking for the expansion of professional communities for fostering idea exchange and exploring further avenues of research should be actively pursued (24). To begin with, presentation assessment soon after the conference is to be done as “feed-up” which evaluates whether the presentation goal was achieved from a presenter’s perspective, then “feed-back” is to be obtained from the audience who attended the presentation; and “feed-forward” on the activities to be undertaken soon after the presentation (24, 25).

Merely presenting research work at a reputed conference does not ensure recognition among the wider scholarly community, as many researchers may not have attended the presentation. Hence, publishing research in academic journals has become imperative after a conference presentation as a “feed-forward” measure to reach a global audience (26). However, a systematic review and meta-analysis reported that only 41.8% of papers presented at conferences reached full publication in journals (27). Therefore, it is essential to encourage researchers to publish their work soon after the conference presentations. As another “feedforward” measure, contacting conference acquaintances through email or social media platforms within 3 days after the conference is advisable (12, 26). In this regard, including one’s email address or social media addresses on the poster or PowerPoint slide and sharing business cards with delegates will make it easy for the people to contact the presenter (17). Business cards with photographs of the presenter help in remembering the person and the interaction, thereby increasing the likelihood of

establishing successful networks (26). Communication during this phase also need to be personalized and impactful, highlighting specific aspects of their research that align with the interests of the recipient. This approach shows the seriousness of the communication by the presenter and ensures that it is not perceived as a mere formality (26).

In the present study, post-conference activities such as sharing presentation materials on social media platforms, initiating changes in departmental activities and pursuing new avenues of research related to the conference topic were very minimal among the participants. Posting the summaries of the presentations on online platforms and writing blogs to share the experiences at the conference will help establish more contact and foster collaboration with like-minded researchers (8). However, one needs to be very careful regarding ethical aspects while sharing research content on social media platforms. In an online survey conducted in the UK, 22.3% of the delegates at a conference posted other presenters' slides on various social media platforms (28). The most common reason for posting slides as stated by more than one-third of them was the dissemination of information (28). The drawbacks of posting speakers' slides on social media, as stated by these participants, included violations of intellectual property rights (52.4%), unauthorized distribution of content (48.6%), political sensitivity (24.9%), legal concerns (13%), and malicious use or criticism (11.3%) (28). Although it is a good practice to share conference slides for the benefit of all delegates, it is essential to obtain appropriate licences and consent from presenters before conference organizers share their slides on open domain platforms such as social media (28). Similarly, soon after the Computer-Based Presentations, slides should not be accessed without the consent of the presenter (29). If conference organizers wish to host presentation files of all speakers on the conference website, then they must seek their prior consent (29). Other ethical aspects, such as funding sources of the research study and any assistance utilized for manuscript writing, should be acknowledged in the presentation, and conflicts of interest, if any, should be disclosed (1). Similarly, the presentation of photographs of patients at conferences requires their consent, and the patient's identity should be concealed as much as possible (30). Several of these ethical aspects, along with others were unknown to the participants of this study and hence were covered extensively in this workshop.

Tips for writing effective conference reports, suggestions for expanding professional networking,

strategies to bring about changes in departmental activities, and encouragement for the publication of the research paper after its successful conference presentation were provided to the participants during this workshop.

Discussion on the effectiveness of this workshop in improving knowledge and perceptions of best practices in conference presentations among the participants

The knowledge of the participants in this study regarding conferences significantly improved after attending this workshop, as evidenced by higher post-test scores over pre-test scores. The effect size was high indicating a good magnitude of the intervention. The self-perceived knowledge regarding pre-, during-, and post-conference best practices as well as self-perceived confidence levels in attending conferences, improved significantly among the participants after attending this workshop. This was possibly due to the comprehensive nature of this workshop, which covered best practices to be followed during the pre-, during-, and post-conference phases. However, the small sample size of the participants recruited via the non-random sampling method limits the generalizability of the findings. Additionally, as this study was conducted without a separate control group, it has limitations in establishing a causal inference. Similar observations were made in another randomized control trial conducted in Finland (8) where the intervention arm delegates received presentation advice and virtual presentation tips from experts along with information packages about conferences, whereas the control arm received only information packages. The treated presenters were found to perform significantly better by a standard deviation of 0.22 of the win rate, and they gave more effective presentations ($d=0.21$) and used more effective slides ($d=0.19$) than their nontreated peers (8). These observations underscore the importance of providing periodic training to conference presenters to enhance their presentation skills.

In a study performed in the USA, the self-perceived effectiveness of conference presentations was significantly influenced by a greater number of conference presentations of the participants. In the same study, participants reported that a lack of confidence was associated with a higher risk of process anxiety during the preparation of the talk. This, in turn, was associated with a greater risk of performance anxiety related to the delivery of the talk (31). In the present study, the number of conference presentations was not associated with the participants' knowledge regarding

recommendations for conference presentations or their self-perceived confidence levels in attending conferences prior to attending this workshop. However, after attending this workshop, these parameters improved significantly. Hence, recommended best practices related to conferences should be periodically reinforced among faculty members with the help of training programs such as workshops.

Limitations: The sample size was not based on statistical power calculations and was insufficient for robust statistical analysis. The study was conducted without a separate control group, which limits causal inference. This was a single-center study involving a small group of participants attending a workshop. Therefore, a non-random sampling method was used for participant recruitment.

Consequently, the findings of this study may not be generalizable to other settings. Certain outcome variables were self-reported by the participants based on their perceptions and hence may not be accurate reflections of actual scores. There was no follow-up among the participants to check whether the knowledge and skills acquired by the participants after participation in this workshop had benefited participants during subsequent research paper presentations at any conferences attended thereafter.

Conclusion

This workshop successfully improved knowledge among the participants in critical areas, such as identifying predatory conferences, ethical presentation practices, and preparing a good PowerPoint presentation slide.

Pre-conference activities were found to be inadequate, and post-conference activities were found to be very minimal among the participants. Information on these aspects was provided comprehensively to the participants as a part of this workshop. Most participants preferred onsite conferences and oral presentation modes for better interaction with a larger audience. The self-perceived confidence levels and knowledge of the participants regarding pre-, during, and post-conference best practices improved significantly after the workshop. Future workshops should emphasize hands-on exercises and include longitudinal follow-up to assess the long-term retention of skills and their application by the participants in actual conference settings.

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