What Is the Utility of Posters? Qualitative Study of Participants at a Regional Primary Healthcare Conference in Asia

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Abstract

Background Posters are used extensively as a mode of presentation at scientific conferences, but little is documented about their value to presenters or viewers. The study aimed to explore conference delegates’ views and experiences of poster presentations, and their perceptions of the strengths and weaknesses of posters compared with oral presentations, and also to identify ways to enhance the educational value of posters.

Method This was a qualitative study using brief, semi-structured, face-to-face interviews amongst delegates at a 3-day Asia Pacific regional academic primary care conference in Singapore. Interviews were digitally recorded, transcribed verbatim, and their contents analysed thematically.

Results Eighty-nine interviews were analysed. Respondents were mainly early career researchers (58%), and a third were presenting (poster or oral) at the conference. Many positive attributes of posters were identified. For the viewers, these included the ability to gain a rapid overview of research activity (for "benchmarking", “updating”, and “inspiration”); the ability to choose who to engage with and when, in contrast to the tightly scheduled oral sessions; and opportunity to discuss content in a leisurely and detailed fashion with the presenter. Presenters considered posters “less threatening” than oral presentations and valued posters for the networking opportunities they created. However, posters were reported to be more demanding on the skills of précis and their preparation was considered arduous and more expensive than an oral presentation. Posters were also perceived to have lower academic status and dominate the presenter’s time at the conference, reducing the opportunities for them to see the work of others. Suggestions for incorporating technologies to enhance the impact of posters included QR codes to access more detailed information, pre-recorded presentations, and online interactive clarification sessions with poster authors.

Conclusion Posters are perceived as a valuable mode of presentation at scientific conferences by presenters and viewers. Their unique strengths challenge the perception that posters are somehow inferior to oral presentations, suggesting a need for their advantages to be promoted by researchers and conference organisers. The incorporation of technology within the traditional display may enhance poster utility. Given the time and money spent on academic conferences there is an urgent need to evaluate the different styles of presentation used at conferences and how they differ in their ability to impact on medical science knowledge and evidence-based clinical practice.

Keywords Academic conferences · Poster presentations · Oral presentations

Background

Conferences play a major part in the professional activities of academics, scientists, and healthcare professionals. Conferences are recognised as providing opportunities for knowledge exchange and networking, characteristics that are supported by long established educational theories such as experiential learning, legitimate peripheral participation, and communities of practice. Traditionally, presentations at conferences divide broadly into oral and posters. An oral podium presentation is often followed by a brief question-and-answer
These oral presentations can be of different lengths, from just several minutes up to an hour, and they can happen concurrently or consecutively. Since the 1980s, posters have become increasingly used as a mode of presentation at scientific conferences, a trend which began with the advent of computer-based graphics. Posters are displayed on boards or stands and viewed from a distance. Posters are displayed simultaneously over the course of the conference and attendees are free to browse and study at their own convenience. The conference schedule may allocate time during which the poster presenters are available at their posters to engage in discussion. Poster displays are sometimes augmented with other activities, such as a guided tour and discussion led by an expert in the field, or a very short presentation at the poster site or in another location. Abstracts selected for presentation are usually collated as conference proceedings, but rarely found in the published literature.

There is significant opinion-based literature on how to prepare an effective poster (examples include [1–3]). There is also growing literature on the characteristics of research abstracts presented at conferences and the proportion subsequently published; 551 such articles have been systematically reviewed in a recent Cochrane initiative [4]. In contrast, there is very little in the published literature about the value of posters at healthcare and medical meetings to presenters or to delegates [5, 6].

Anecdotally, dissatisfaction is frequently expressed about poster presentations, but rarely is it written about [7, 8]. As academics committed to improving the quality of Family Medicine and developing research capacity in the discipline, we wanted to better understand and cater for the needs of our conference delegates. In this study, we explored conference delegates’ views of poster presentations, and their perceptions of their strengths and weaknesses when compared with oral presentations.

### Method

Participants were recruited at the three-day 6th Asia Pacific Primary Care Research Conference (APPCRC) in Singapore in 2017 [9]. Oral consent was obtained prior to commencing a brief, semi-structured individual interview about the strengths and weaknesses of poster presentation and ways that it could be enhanced (for interview schedule, please see Appendix). Data were also collected on participant’s role, level of research skill, and if they were presenting at the conference. The interviews were conducted by nine active researchers, with at least a research degree at master’s level, who were attending the conference as delegates and/or presenters. All had previous interviewing experience, and were individually briefed on the study background and interview schedule prior to the conference. We used convenience sampling, approaching delegates who were available to be interviewed during the refreshment breaks. The audio-recorded interviews were transcribed verbatim by a transcriber familiar with local accents. Two co-authors (CS, HES) independently analysed the transcripts using a highly structured approach to thematic content analysis [10]. They compared and discussed the themes derived from the data before proceeding with the final analysis using the agreed coding framework. No data analysis software was used. Details are presented using illustrative quotations, unique identifiers consist of participant number, role, self-reported research skill, and whether presenting at this conference. Our findings are reported in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ) [11].

### Results

We recruited 89 conference delegates, almost a quarter of attendees at this approximately 400 strong conference. The characteristics of the respondents are shown in Table 1. There was a spectrum of research experience with the majority describing their level of research skill as either none or novice (n=52, 58%), and only a minority self-reported as “an expert” in research (n=7, 7.9%). One-third of those interviewed were presenting at the conference and the most frequent mode of

| Respondents’ characteristics (n=89) |
|-------------------------------------|
| **Job title**                       | Number | Percentage |
| Academic                            | 24     | 27.0       |
| Administrator                       | 3      | 3.4        |
| Allied health professional          | 2      | 2.2        |
| Doctor                              | 39     | 43.8       |
| Nurse                               | 9      | 10.1       |
| Researcher                          | 3      | 3.4        |
| Undergraduate student               | 3      | 3.4        |
| Postgraduate student                | 2      | 2.2        |
| Others                              | 4      | 4.5        |

| Research skill                      | Number | Percentage |
|-------------------------------------|--------|------------|
| No experience                       | 2      | 2.2        |
| Novice                              | 48     | 53.9       |
| Intermediate                        | 32     | 35.9       |
| Expert                              | 7      | 7.9        |

| Presenting at this conference       | Number | Percentage |
|-------------------------------------|--------|------------|
| Yes                                 | 30     | 33.7       |

*Type of presentation (n=32)

| Presentation                        | Number |
|-------------------------------------|--------|
| Keynote presentation                | 3      |
| Oral presentation                   | 11     |
| Poster presentation                 | 18     |

*Two respondents had two presentations
presentation was poster. Two respondents had more than one presentation.

From analysis of the transcribed interviews, we identified ten subthemes which could be grouped into two themes, the pros of posters (six subthemes) and the cons of posters (four subthemes). The pros of posters were rapid updating, sources of inspiration, flexibility, enabling personalization of the conference program, facilitation of networking, and good for early career presenters. The cons were too little information, less prestigious than oral presentations, challenging to prepare, and monopolizing presenter’s time at conference. These themes are discussed below with illustrative quotes.

**Pros of Posters**

There were six attributes that participants valued about poster presentation:

**Rapid Updating**

Conference delegates identified the poster display at a conference as valuable opportunity to rapidly update on research initiatives locally and regionally, whilst also helping to benchmarking their own research endeavours.

“It’s to just have a snapshot across the board … to see what sort of topics they’re doing, which organisation is doing good work, and whether there are any new methodologies” (#49, Academic, intermediate, oral presentation)

“You get to rate it [your work] against other people’s work and see if it sort of stands up.” (#03, Nurse, intermediate, not presenting)

**Sources of Inspiration**

Posters were identified as a source of inspiration for future research.

“When you’re looking at other researchers’ posters, you can gain more idea of what you can do. These posters can give some ideas ... both research questions and how to communicate research, you know.” (#61, Doctor, intermediate, poster presentation)

Some clinicians recognised how some posters also impacted on clinical practice, the presentation of new evidence “…can also benefit my patients” (#23, Doctor, naïve, poster presenter), by inspiring service development.

**Flexibility of Poster Viewing**

The word “static” was sometimes used to describe posters, reflecting their availability for viewing throughout the conference. By being “always there”, participants described how posters could be viewed at their convenience and at their pace, in contrast to oral presentations that were scheduled at a specific time, and sometimes in venues with limited seating capacity. A poster was perceived as having greater potential to reach a larger audience as compared to oral presentation.

“…the poster will be available throughout the whole conference so … people can, in their free time, view the poster. Posters also allow distribution of material. For example if I print out a poster, I can leave my contact, so networking might be better, compared to oral presentation. Oral presentation is one-off ... oral presentation only gives you one timeslot, so people tend to miss it.” (#65, Doctor, intermediate, no presentation)

Posters created better opportunities for reflection, unlike oral presentations where the there was only one opportunity, “can listen to it once, whereas posters can be read a couple of times” (#18 Administrator, naïve, no presentation).

**Enables Focussing on Those Topics of Personal Interest**

Poster display provides flexibility and enables delegates to personalise their schedule and engage in prolonged discussion with those who share similar interests. Interviewees frequently described how they would quickly glance at all the posters displayed, before identifying a subsample which they wished to read in detail. Posters allowed more personalisation of activities, with delegates selecting those topics of personal interest, whereas within an oral session, the relevant and irrelevant may be juxtaposed.

It was acknowledged that if there were many posters, the selection of interest becomes difficult and choice may then be influenced by presentation style rather than content.

“…when going through a hall of posters, we pick those really attractive ones. Posters may be chosen for superficial attractiveness rather than quality and then we will miss out on those “pearls in the sea”. I think that’s the pitfall.” (#10, Doctor, intermediate, no presentation)

**Posters Facilitate Networking and Collaborations**

Poster presentations were seen as catalysts for networking and developing collaboration.

“You get you know, to get to meet people who are doing similar work, and possible collaborations can come out of it.” (#03, Nurse, intermediate, no presentation).

Posters attract people with similar interests to engage in in-depth discussions.
“…probably it will trigger some of the interesting discussions… would attract the people who are interested in the topic, and, ah, then you hope to have a deeper discussion on the content of the presentation.” (Researcher, intermediate, poster presentation)

“People who are interested come and stand around the poster, and it’s often a more of an intimate sort of discussion than in an oral presentation session, where... people are sitting there and they’re playing on their mobile phone, you know.” (Nurse, intermediate, no presentation)

Whilst oral presentations often have time allocated at the end of the presentation for questions, they were considered less effective at triggering collaboration, being disadvantaged by the finite time for discussion and a cultural reticence to ask questions in front of a large audience.

“One of the things you find in the Asian culture is we don’t speak up in large crowds. But we can speak very well in a one-to-one basis.” (Academic, novice, no presentation)

“They [conference participants] are a little bit shy to ask questions, in front of a lot of people” (Nurse, novice, no presentation)

Some perceived research presentations as a competition rather than an opportunity for academic sharing, commenting on the dominance of “recognition and award”. (Post graduate student, naïve, poster presentation). In contrast, the interaction around a poster was perceived as being more collegiate, characterised by helpful feedback, an opportunity to meet like-minded people, and initiate future collaboration.

“You get to meet people who are doing similar work, and any possible collaborations can come out of it.” (Nurse, intermediate, no presentation)

Posters Are Preferred for Early Career Researchers and Non-native Speakers

Some presenters recognised their strength was in written rather than oral presentations and thus preferred a poster presentation. This view was echoed by early career researchers and those who found oral presentations intimidating.

“Because sometimes I’m not very comfortable with presenting my subject. My reflexes are not that fast, so I think having a poster there would be easier for me to like spurt it out…” (Nurse, novice, poster presenter)

Participants, who attended conferences where the main media of communication was a foreign language, recognised the advantages to them of posters over oral presentations.

“In China we not very good at English. So, if it’s a poster we can take a picture, and then we can go back and see all what they said. But if it’s oral, if it’s just one time. I can listen, maybe understand some part of their oral in English, [but] I don’t know very clearly.” (Academic, intermediate, oral presentation)

Cons of Posters

There were four themes that related to those attributes of posters that were less desirable and reduced their value.

Too Little Information

The concise information of a poster provides, in an easy-to-comprehend manner, an overview of current research for people who are new to the field. Conversely, being concise has its own pitfalls as posters lack depth, which is frustrating when delegates wanted to find out more about the research methodology.

“It’s good for an introduction, it’s good as a visual for people who are new in this topic.. to have an understanding. But when you go in depth then that’s where the poster is lacking.” (Doctor, novice, no presentation)

Posters Are Less Prestigious

Many presenters and delegates perceived that the standard required for acceptance of an abstract for a poster presentation was less than that required for oral presentation.

“…I think unfortunately, many people still think the oral presentation implies a higher standard.” (Academic, expert, oral presentation)

Such perceptions were at times reinforced by the policies within the delegate’s host institution, as illustrated in this quote about appraisal and key performance indicators:

“Because it [oral presentation] has higher recognition than a poster [name of the organisation] only recognise oral over poster” (Post graduate student, naïve, poster presentation)

Delegates described how submission of a poster abstract was sometimes used to legitimise conference attendance and generate reimbursement of travel and registration, “Unfortunately, a lot of people just want to put up a poster and get a ticket for entry.” (Academic, intermediate, no presentation) Consequently, some delegates, who have leveraged on poster presentation for travel rather than for academic opportunities, may affix their poster in the poster exhibition but then fail to engage further poster-related activities, “…
sometimes people like to leave their posters there, and then they walk away.” (#34, Post graduate student, intermediate, no presentation).

The heterogeneity of research quality within the poster hall was in part attributed to this “meal ticket” mentality and perception that the conference organizer “doesn’t take it [quality or display of posters] seriously” (#49, Academic, intermediate, oral presentation). The acceptance of poster abstracts was perceived to boost delegate registration and conference attendance. From the organizer’s perspectives, respondents perceived a possible tension between a financially viable conference and the quality of the science. In contrast, oral presentations were referred to being “super curated” (#34, Post graduate student, intermediate, no presentation) and therefore considered better use of delegates’ time.

Challenging to Prepare and Present

Poster preparation often requires condensing and précising large amounts of information to retain only that which is important and essential. This process was reported as being time-consuming and far more onerous than the preparation of an oral presentation.

“And sometimes it’s quite difficult trying to, the orientation and stuff like that, .... you spend a lot of time just trying to fit information, quite a few critical ones and you, and it takes a long time just to try to get rid of some things and try .... to squeeze it in.” (#80 Allied Health Professional, novice, no presentation)

Other disadvantages of poster preparation were printing costs and the inconvenience of transportation.

“.... especially when you travel overseas, and you need to carry the posters with you. Sometimes the airplane does not allow you to go to your seats [with the poster]. So, you have to check it in, ... you’re worried that your poster will be crushed, missing, .... when you reach the destination the poster will be not there.” (#27 Academic, intermediate, no presentation)

It was suggested that the requirement for posters to be concise could be compensated for if supplementary information was pre-recorded as a short presentation made available to conference attendees on a handheld tablet or screen panel. Another suggestion that was less resource intensive for both the presenter and conference organisers were QR codes, “Maybe have a website that links to more details, like maybe a QR code that we could just take a picture of and go to the website.” (#02, Other, intermediate, no presentation).

Although participants had little experience of electronic poster (e-poster) presentation, these were mentioned as a format that would enable a more dynamic form of presentation, eliminate the need to transport a poster to the conference venue, and in addition, by being accessible to others beyond those physically at the conference, had greater potential for knowledge exchange and networking.

Posters Monopolise the Presenter’s Time

Whilst poster presentation creates flexibility for viewers to examine the poster at their own pace, it may be disadvantageous to the poster presenters who feel confined to the vicinity of their poster, as “people come at different times, and you have to make quite a few presentations.” (GL019). Thus, poster presenter’s time can be monopolised, leaving little time to participate in other conference activities or to view the posters of others. There were occasions when the time they had invested by their poster was not rewarded with interactions with other delegates.

“…..so, say you safely go to the conference, and you put up the poster.... I’m not sure how many people actually come and read my poster which already I’ve been taking all my effort to prepare it. Then maybe someone reading it, or nobody’s reading it? I’m not sure.” (#27, Academic, intermediate, not presenting)

This interviewee went on to describe how the time for poster display can be very short.

“And sometimes, at certain conferences, especially international, there are so many thousands of participants, they want you to just upload it in the morning, download... pick up the poster by afternoon or evening. It’s, like, one day or sometimes half a day, so I’ve had that experience before.”

Interviewees shared many ideas for improving the value of posters at a conference; their suggestions related less to poster content and more to programming, location, and environment. It was suggested that to boost viewing rates, posters needed more prominence. The widespread perception that an oral presentation “automatically means that the research is more interesting” (#34, Post graduate student, intermediate, no presentation) combined with the inconspicuous location of posters (“Posters tend to get relegated to around the corner... I don’t even know they are here” (#03, Nurse, intermediate, no presentation) appears to deter conference delegates engaging with the posters. Other suggestions included:

- Scheduling adequate and dedicated viewing time (“They’ve got to be scheduled when people can go”) (#03, Nurse, intermediate, no presentation) when neither the presenters nor delegates have conflicting commitments. Also valued were the organisation of poster
rounds, where experienced researchers guide delegates around a selection of themed posters, and lead on discussion.

- **Central and prominent location** for the posters, perhaps in the same area where “there’s coffee or something”. (#03, Nurse, intermediate, no presentation)
- ** Provision of an environment conducive to discussion**, by virtue of space to gather around the poster and minimal ambient noise to compete with conversations.
- **Requirement to display contact details** that may be used to contact presenter outside the allotted poster viewing times.
- **Including poster abstracts in the conference handbook** alongside those of the oral abstracts.

**Discussion**

**Project Summary**

This study explored conference attendees’ perception of posters at an Asia Pacific regional conference, focusing on the effectiveness of communicating and discussing research findings in this format. Posters have educational strengths as well as weaknesses which are almost the mirror opposite of oral presentations. Strengths of posters included viewing at one’s own pace, learning from informal and unlimited one-to-one discussion. The value of poster presenting or poster viewing was perceived as rarely favoured or enabled within the organisation or culture of conferences. The impact of posters could be improved by explicitly promoting their strengths as a focus for interaction and exchange, and displaying them in a central and prominent site with protected, scheduled time for viewing and discussion within the conference program.

**Strengths and Limitations**

Our data was collected at a single conference in the Asia Pacific region; however, interviewees often drew on their experiences from previous conferences, attended regionally or internationally. Our sample was large; 89 interviewees, generating 203 pages of data. The transferability of our observations is supported by the similarity to some previous unpublished research conducted at both a local and an international conference of Primary Care and a published paper [6] using an online post conference survey of poster presenters at two conferences focusing on releasing research and enterprise potential in predominantly healthcare audience. All these events were hosted in the UK.

Our study adds to what is currently an under-researched area, the needs, and motivations of conference delegates. This paucity of literature in this area is surprising as conferences are hosted worldwide to facilitate knowledge exchange and networking in science, medicine, and academia. Most attendees are employed in higher education institutions or professional bodies with responsibility for education and training. However, it seems that conferences have largely escaped formal evaluation of both their overall impact and the relative effectiveness of their constituent activities (such as oral presentations, posters, workshops).

A recent study of the needs and motivations of delegates of academic, scientific, and professional conferences found that conferences were generally successful in meeting the delegates’ desires to network, interact, and share their work [8]. However, delegates had mixed perceptions about the longer-term tangible benefits and usefulness of attendance, with some considering a conference as little more than a break from routine and professional socialisation. Interestingly as far back as 1963 United Nations Educational, Scientific and Cultural Organisation (UNESCO) challenged that conferences were being created with the main aim of legitimising conference attendance and not because of intellectual motivation [12]. Nevertheless, this challenge appears to have gone largely unaddressed, perhaps because participation in conferences has become a well-established part of academic and professional life.

Our study focussed on conference attendees, whether presenting or not, but we did not interview the conference organisers, whose priorities may be different. Their agenda extends beyond dissemination and collaboration, and may also include financial viability and achieving geographical and institutional representation. Organisation of conference is a huge industry. It is estimated to have a turnover of 39.9 billion USD and rising [13]. Sharing the delegates’ feedback with our meeting planners’ and discussing how participants’ suggestions can be implemented in future meetings will be a step forward to improve the impact of posters as an effective tool to share new knowledge in the academia.

**Perceived Status of Posters**

Poster presentations were perceived as less prestigious, and of lower ranking compared to oral presentation. However, there was no mention of abstract ranking in the conference’s promotional literature. Perceptions of the low status of posters are perhaps reinforced by the limited time allocated in the conference program for viewing, and their peripheral location. In a study of accepted abstracts at a Trauma meeting in the USA, abstracts selected for poster presentation had equal or higher scores than those selected for oral [14]. Dismissing posters as “second class” may not be well founded, but it is a widespread perception, often reflected in the footfall in the poster area. The number of people visiting the poster exhibitions and reading a poster at two gastroenterological conferences (one national and the other international) was estimated as <5% [5]. In that
study, the researchers asked 26 delegates to scrutinise six posters for scientific merit, originality, and aesthetics, but when the delegates were contacted two weeks later, they recalled little or nothing of the content of the posters they had evaluated, a worrying observation. This study may have underestimated recall as the posters under review were ones to which they were directed, whereas in reality, conference delegates select and view the posters of high interest to themselves and may therefore be more likely to remember their contents. However, in that study, the six posters were selected to reflect the special interest in inflammatory bowel disease of the 26 reviewers.

**Does Technology Offer Any Solutions?**

In the early days of poster presentation, posters were created by producing several separate sections of similar size mounted on coloured board, and then in the 2000s, it became common practice to print the poster on a single oversized sheet. Technology moves on and conference participants referred to emerging methods of presentation, including video presentation and electronic poster (e-poster) presentation [15] particularly to achieve more dynamic forms of presentation as well as reducing the inconveniences of transporting hard copies of posters to the conference venue. Innovative methods potentially impose higher expenditure on the conference organisers, as they require sophisticated equipment (e.g., interactive whiteboards) and IT facilitators on-site to troubleshoot. An article describing the conversion of a conventional poster to an e-poster discussed some of the challenges of preparation, including the time needed for preparation and the amount of file memory used [16]. They discussed how their e-poster was not available continuously but was projected onto a large screen for their 5-min slot allocated for presenting and answering questions, highlighting how the adoption of advanced technology can bring new and unexpected challenges.

E-posters were first described in the literature around the millennium. In 2001, a digital interactive poster presentation (DIPP) was used at the 14th Meeting of the European Association of Cardio-thoracic Surgery [17] with the aim of creating a more interactive presentation and encouraging greater discussion between the audience and presenters than the traditional poster. Posters were projected onto a large screen and presenters were able to magnify selected sections, be it figures, text, or tables, to accompany their 2-minute oral summary. Evaluation of the DIPP found the audience and presenters perceived it to be a more interactive medium than the traditional poster. Whilst the DIPP offered enlargement of data, there was no facility for extending the poster’s content. In contrast, the “MediaPoster” combines information technology (IT) with the “traditional” poster appearance, to liberate greater interactive potential. A “MediaPoster” enables viewers or presenter to select an area of interest on the poster surface and access a full range of linked documents and imagery which can open to the side of the screen to bring depth to the presentation [6].

The introduction of e-posters has been relatively slow and patchy over two decades, but driven by the necessity of social distancing in the context of the COVID-19 pandemic, their utilisation has blossomed [18]. In parallel, there have been increasing concerns about the heavy carbon footprint of international conferences and climate change [19]. Recently, there has been more published about e-posters, but notably in the context of teaching, learning, and assessment (see for example [20, 21]), rather than the more challenging evaluation of knowledge exchange at a scientific meetings.

In the current literature, there is a plethora of publications advising on the design of an effective poster, ways to increase visual appeal, and the fate of conference abstracts (i.e., conversion of abstracts to published papers). In contrast, there is very little exploring the efficacy of academic posters. The paucity of literature regarding the educational value of different presentation formats (lectures, posters, workshops, etc.) used at conferences is disturbing given the time and money invested globally in presenting and attending conferences. We need to design studies to enable us to assess the effectiveness of different styles of presentation commonly used at conferences, be they real or virtual, and assess how their impact differs between disciplines with respect medical science knowledge and evidence-based clinical practice.

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**Availability of Data** The data set analysed during the current study are available from the corresponding author on reasonable request.
Declarations

Ethics Approval and Consent to Participate This study was reviewed and approved by Nanyang Technological University Institutional Review Board (NTU IRB ref: IRB-2017-05-051).

Consent for Publication Not applicable.

Competing Interests The authors declare no competing interests.

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