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Live and Learn

Presentation of scientific poster information: Lessons learned from evaluating the impact of content arrangement and use of infographics



James Young, Mary Barna Bridgeman*, Evelyn R. Hermes-DeSantis

Department of Pharmacy Practice and Administration, Ernest Mario School of Pharmacy, Rutgers, The State University of New Jersey, 160 Frelinghuysen Road, Piscataway, NJ 08854, United States

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ABSTRACT

Background: Scientific poster content and delivery methodology have evolved in recent years. The objective of this observational cross-sectional survey-based study was to evaluate pharmacists' preferences of two different scientific poster formats conducted at a conference in May 2017. Two posters on the same topic were developed and presented utilizing different formatting; one in the traditional, text-based format and the other in an infographic-based format. Study participants ($n = 61$) included 23 (38%) preceptors and 37 (61%) residents. Preceptors and residents scored clarity and comprehensibility similarly for both poster formats respectively, but rated aesthetic appeal higher for the infographic format. Both groups found more detailed information to be missing from the infographic poster format. Overall, residents did not prefer one poster format to another, while preceptors overwhelmingly preferred the infographic poster format over the traditional poster format.

Impact: Several key confounders limit the interpretations of the study results. These confounders include lack of large and well-distributed sample size, inability to control for the effect of preference on comprehension scores, and differences between resident and preceptor experience that may ultimately influence preferences and results.

Recommendations: In repeating this study, investigators should consider capturing a national and larger sample size to increase applicability of results, design questions to assess comprehension, and collect participant baseline characteristics.

Discussion: Variations in preferences and perceptions for optimal scientific poster content and design among pharmacists exist. The findings of this study suggest infographic poster formats are more aesthetically appealing, but demonstrate similar clarity and comprehensibility as a traditional poster format.

Background

Pharmacists and other healthcare practitioners routinely present findings from their clinical practice as scientific posters at various local, regional, national, and international conferences. Dissemination of research in this format serves a multitude of purposes, from garnering regional to international attention for a specific topic or case to allowing researchers and clinicians to network and discuss pertinent discoveries or best practices. Importantly, scientific poster content and delivery methodologies have evolved,

* Corresponding author.

E-mail address: mary.bridgeman@pharmacy.rutgers.edu (M.B. Bridgeman).

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along with technology, over recent years. Research posters have traditionally followed the Introduction, Methods, Results, and Discussion (IMRAD) flow while clinical vignettes typically include an introduction, case description, and discussion.¹ In 1996, poster style and delivery best practices included creating posters in a large number of separate sections of similar size, with each section printed and mounted on colored boards.² By 2007, the standard was to be able to print the poster on a single oversized sheet to match the size of the poster board.³ A 2018 study investigated the use of infographic-based as a way to lessen the time and retention difficulties readers may experience.⁴ This study found no difference in retention, but increased reader preference and decreased cognitive load, with infographic compared to text-only summaries. The authors cited the need for additional studies to assess these implications.⁴ Overall, there is agreement that the information provided on a scientific poster should be short, to the point, and visually pleasing. Persky⁵ published an opinion piece challenging the status quo of scientific poster content and delivery, arguing that posters should be less potential manuscript and more illustrated abstract in order provide better opportunity for meaningful discussion between the presenter and various viewers. Persky⁵ described the poster as an initial point of contact that occurs via the “10–10 rule” in which viewers scan the poster for 10 s from 10 ft away before deciding to engage the presenter. Miller³ includes these same sentiments in a review of literature regarding research communication and poster design, emphasizing the importance of adapting poster content arrangement and design by understanding the interest of the audience.

Crick and Hartling⁶ developed a survey instrument to assess clarity, comprehensibility, and aesthetic appeal by different professionals of two-different posters types (infographics and critical appraisals) summarizing systematic reviews. They found divided preferences between infographics and text-heavy critical appraisals, with 51% of clinicians preferring infographics.⁶ Interestingly, preference tended to follow professional roles; physicians preferred the text-heavy critical appraisal (68%) and nurses preferred infographics (67%).⁶ Crick and Hartling⁶ concluded that knowledge dissemination and translation depended on a specific audience. However, this study was not focused specifically on the inclusion of infographics on scientific poster presentations nor were the perspectives of pharmacists included.

In this study, the authors sought to assess the preferences of pharmacy preceptors and residents for poster content arrangement and design at a regional conference. As Persky⁵ and Miller³ had described, the interests of the viewers must be understood to ultimately understand how to encourage dialog between presenters and viewers. In conducting this research, it was the author's intent to provide recommendations to pharmacy preceptors and residents on how to develop a more engaging poster that would meet the educational needs and preferences of a pharmacy professional audience. By adapting a previous survey instrument, the results would also provide further validation of tool. The objective of this study was to evaluate pharmacists' preferences of two different scientific poster formats. Authors hypothesized that a streamlined, infographic-heavy, scientific poster format would be more acceptable and more aesthetically pleasing to pharmacists than traditional text-heavy scientific poster presentation formats.

To evaluate the differences in pharmacists' preferences on scientific poster formatting, an observational cross-sectional survey-based study was conducted at the annual Eastern States Pharmacy Residents and Preceptors Conference held in May 2017. At this conference, investigators displayed two scientific posters next to each other for evaluation by attendees (Figs. 1 and 2); one poster in the traditional, text-based format and the other in an infographic-based format. Both posters covered the same topic but varied in format of delivery.

Post-doctoral pharmacy residents, practicing pharmacist preceptors, and residency program directors in attendance were invited to participate in this survey-based study. A paper-based survey instrument was distributed over a two-day period during the

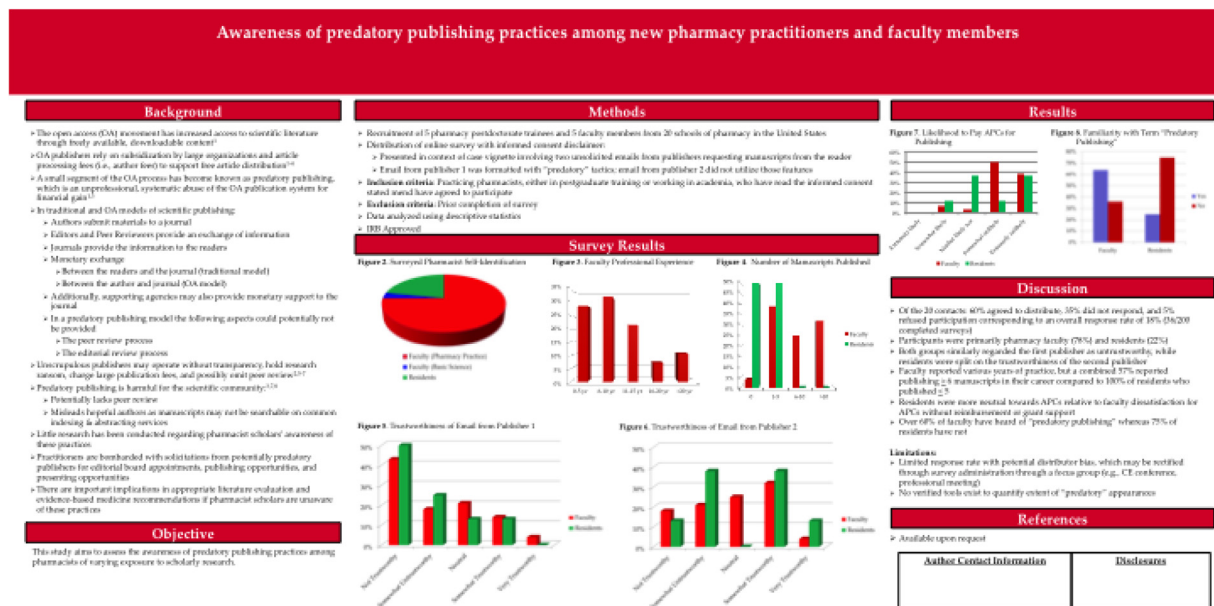


Fig. 1. Traditional poster format.

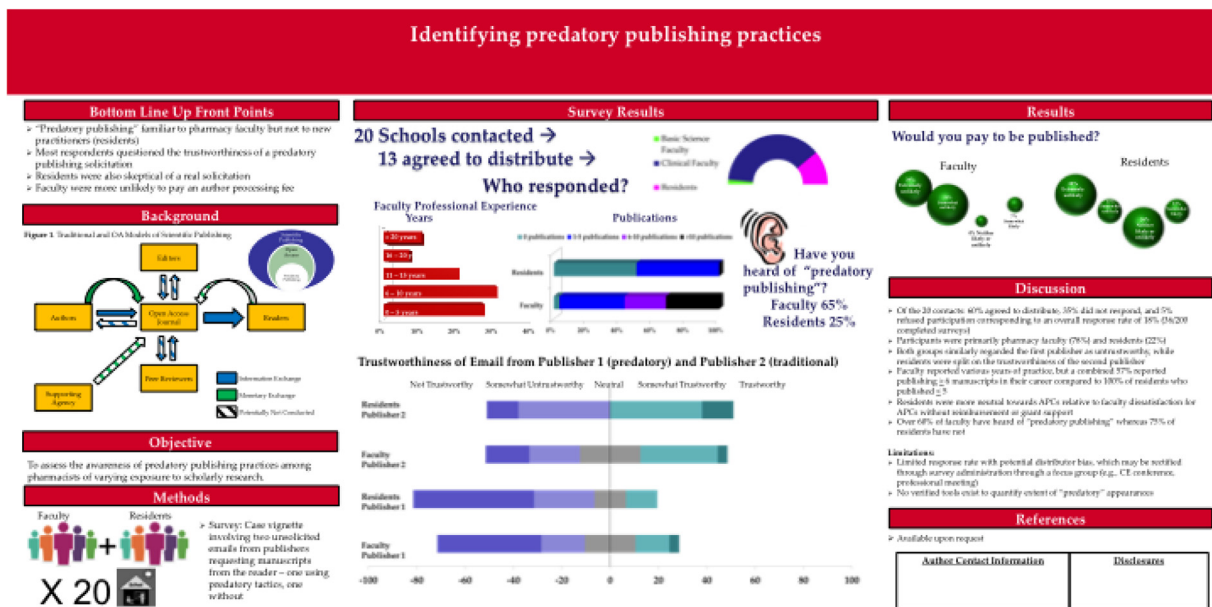


Fig. 2. Infographic poster format.

conference. Based on the estimated conference attendance of 800 practitioners and trainees, a sample size of 10% was deemed feasible given the other constraints on conference attendee time and the resources available for data collection. Individuals who were not pharmacists or who did not attend the conference were ineligible for study participation. This study was granted exempt status by the Rutgers University Institutional Review Board prior to data collection. The survey instrument utilized by investigators had been adapted from the work of Crick and Hartling⁶ (Table 1). The variables of interest included: the perception of clarity, comprehensibility, and aesthetic appeal of the poster; utility of the format; comments on the like and dislike of each format; and identification of a format of preference. A 10-point Likert scale (where 1 = poor and 10 = excellent) was utilized to evaluate perceptions of clarity, comprehensibility, and aesthetic appeal, whereas other items were evaluated utilizing yes/no or free response. Data collected utilizing the 10-point Likert scale were evaluated using a Wilcoxon Signed Rank Test if the data were paired or a Mann–Whitney Rank Sum Test if the data were unpaired. Nominal data were evaluated utilizing a Fisher Exact Test. A One-Sample Test for Binomial Proportion was used for evaluating preferences among residents or preceptors. The median and interquartile range (IQR) values were reported for ordinal data. The number of affirmative responses were reported for nominal data. Lastly, *p*-values were reported as non-statistically significant (NS) or statistically significant (<0.05) for all data comparisons.

In total, 61 conference attendees completed the survey instrument. Study participants included 23 (38%) preceptors and 37 (61%) residents. One survey did not indicate participant type and was excluded. All aggregated responses are depicted in Table 2. Comparisons between resident and preceptors opinions for traditional and infographic poster formats are shown in Tables 3 and 4. Resident participants scored clarity, comprehensibility, and aesthetic appeal similarly between both poster formats, as depicted in Table 5. Preceptor participants scored clarity and comprehensibility similarly between poster formats, but rated aesthetic appeal more preferable for the infographic poster as depicted in Table 6. Resident participants identified more information to be missing from the infographic poster format than with the traditional poster format. On the other hand, preceptors found the infographic poster formats to be more aesthetically appealing. Overall, residents' preference between traditional and infographic poster formats was similar. However, preceptors preferred the infographic poster to the traditional poster format.

Impact

While this is an interesting and pertinent research question, the impact of this study is limited by multiple confounding factors that influence the generalizability of the outcomes. First, a small sample size of participants at a regional pharmacy conference where there is inherent interest in scholarship and dissemination of scholarly work was evaluated; more responses came from post-doctoral resident participants than preceptors or other pharmacy practitioners. The small sample size and limited geographical area of participants decreases the generalizability of the results to pharmacy practitioner's opinions from diverse geographic areas around the country or world. Furthermore, a power analysis was not performed, and this study may not have been adequately powered to detect differences in preceptor or resident preferences for either poster format, given the small sample.

Other limitations include incorporation of data which were aggregated based on the available responses since not all surveys were complete. Most missing data came from the open-ended questions that required participants to include a written response. Furthermore, a participant's inherent preference of either poster format may have influenced overall comprehension of poster content. However, this study did not directly measure the participant's comprehension of the content presented to assess if the

Table 1
Survey instrument utilized.

Poster Format Survey		On a scale of 1 to 10, where 1 is poor and 10 is excellent:									
I am a <input type="checkbox"/> Preceptor <input type="checkbox"/> Resident											
Traditional Poster Format: (please circle your response)											
How would you rate the <u>clarity</u> of the poster?	1	2	3	4	5	6	7	8	9	10	
How would you rate the <u>understandability</u> of the poster?	1	2	3	4	5	6	7	8	9	10	
How would you rate the <u>aesthetic appeal</u> of the poster?	1	2	3	4	5	6	7	8	9	10	
Do you find this format useful for you in your professional role?	<input type="checkbox"/> Yes <input type="checkbox"/> No										
What do you <u>like</u> about this poster format? _____											
What do you <u>not like</u> about this poster format? _____											
Do you feel that there is information missing in this format? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, please specify: _____											
Infographic Poster Format: (please circle your response)											
How would you rate the <u>clarity</u> of the poster?	1	2	3	4	5	6	7	8	9	10	
How would you rate the <u>understandability</u> of the poster?	1	2	3	4	5	6	7	8	9	10	
How would you rate the <u>aesthetic appeal</u> of the poster?	1	2	3	4	5	6	7	8	9	10	
Do you find this format useful for you in your professional role?	<input type="checkbox"/> Yes <input type="checkbox"/> No										
What do you <u>like</u> about this poster format? _____											
What do you <u>not like</u> about this poster format? _____											
Do you feel that there is information missing in this format? <input type="checkbox"/> Yes <input type="checkbox"/> No, If yes, please specify: _____											
Overall, which poster format did you prefer? <input type="checkbox"/> Traditional format <input type="checkbox"/> Infographic format, Other comments or feedback on poster formats _____											

Table 2
Comparison of traditional and infographic poster formats.

Characteristics (10-point Likert scale)	Traditional median (IQR), n = 60	Infographic median (IQR), n = 60	p-value
Clarity ^a	8 (7,9)	8 (7,9)	NS
Comprehensibility ^a	8 (7,9)	8 (6.25,9)	NS
Aesthetic Appeal ^a (Y/N)	7 (6,8) (n = 59) Y/N	9 (8,10) Y/N	<0.05
Usefulness in Professional Role ^b	52/5 (n = 57)	43/12 (n = 55)	NS
Missing Information ^b	7/44 (n = 51)	22/30 (n = 52)	<0.05
Overall Preference ^c	23 (n = 59)	36 (n = 59)	NS

IQR = interquartile range; Y = yes; N = no. NS = not significant.

^a Wilcoxon Signed Rank Test;

^b Fisher Exact Test;

^c One-Sample Test for Binomial Proportion.

Table 3
Comparison of resident and preceptor opinions on traditional poster formats.

Characteristics (10-point Likert scale)	Residents median (IQR), n = 37	Preceptors median (IQR), n = 23	p-value
Clarity ^a	8 (7,9)	8 (7,9)	NS
Comprehensibility ^a	8 (6.5,9)	7 (7,8)	NS
Aesthetic Appeal ^a (Y/N)	7.5 (6,9) (n = 36) Y/N	7 (6,7) Y/N	NS
Usefulness in Professional Role ^b	31/3 (n = 34)	21/2 (n = 23)	NS
Missing Information ^b	3/29 (n = 32)	4/15 (n = 19)	NS
Overall Traditional Preference ^b	18 (n = 36)	5 (n = 23)	NS

IQR = interquartile range; Y = yes; N = no; NS = not significant.

^a Mann–Whitney Rank Sum Test;

^b Fisher Exact Test.

Table 4
Comparison of resident and preceptor opinions on infographic poster formats.

Characteristics (10-point Likert scale)	Residents median (IQR), n = 37	Preceptors median (IQR), n = 23	p-value
Clarity ^a	8 (6.5,9)	8 (7,9)	NS
Comprehensibility ^a	8 (6.5,9)	8 (6,9)	NS
Aesthetic Appeal ^a (Y/N)	9 (6.5,10) Y/N	9 (8,10) Y/N	NS
Usefulness in Professional Role ^b	23/10 (n = 33)	20/2 (n = 22)	NS
Missing Information ^b	13/19 (n = 32)	9/11 (n = 20)	NS
Overall Infographic Preference ^b	18 (n = 36)	18 (n = 23)	NS

IQR = interquartile range; Y = yes; N = no; NS = not significant.

^a Mann–Whitney Rank Sum Test;

^b Fisher Exact Test.

Table 5
Comparison of resident opinions on traditional and infographic poster formats.

Characteristics (10-point Likert scale)	Traditional median (IQR), n = 37	Infographic median (IQR), n = 37	p-value
Clarity ^a	8 (7,9)	8 (6.5,9)	NS
Comprehensibility ^a	8 (6.5,9)	8 (6.5,9)	NS
Aesthetic Appeal ^a (Y/N)	7.5 (6,9) (n = 36) Y/N	9 (6.5,10) Y/N	NS
Usefulness in Professional Role ^b	31/3 (n = 34)	23/10 (n = 33)	NS
Missing Information ^b	3/29 (n = 32)	13/19 (n = 32)	<0.05
Overall Infographic Preference ^c	18 (n = 36)	18 (n = 36)	NS

IQR = interquartile range; Y = yes; N = no. NS = not significant.

^a Wilcoxon Signed Rank Test;

^b Fisher Exact Test;

^c One-Sample Test for Binomial Proportion.

Table 6
Comparison of preceptor opinions on traditional and infographic poster formats.

Characteristics (10-point Likert scale)	Traditional Median (IQR), n = 23	Infographic Median (IQR), n = 23	p-value
Clarity ^a	8 (7,9)	8 (7,9)	NS
Comprehensibility ^a	7 (7,8)	8 (6,9)	NS
Aesthetic Appeal ^a (Y/N)	7 (6,7) Y/N	9 (8,10) Y/N	< 0.05
Usefulness in Professional Role ^b	21/2 (n = 23)	20/2 (n = 22)	NS
Missing Information ^b	4/15 (n = 19)	9/11 (n = 20)	NS
Overall Infographic Preference ^c	5 (n = 23)	18 (n = 23)	< 0.05

IQR = interquartile range; Y = yes; N = no. NS = not significant.

^a Wilcoxon Signed Rank Test;

^b Fisher Exact Test;

^c One-Sample Test for Binomial Proportion.

individual had an improved understanding or recall of any of the salient points.

Importantly, the differences between resident and preceptor opinions identified are likely multifactorial. Individuals in a post-graduate training program may be more hesitant to accept or try newer formats compared to what they have recently been taught or exposed to. More established practitioners, on the other hand, may be more willing and accepting of new approaches to content delivery or may be early adopters of new methods for presentation. The limited opinions of the more established practitioners included in our analysis must be considered. It is difficult to identify the influencing factors, which could include age, generation, experience, training, comfort, acceptance and comfort with technology, and many others.

Recommendations

To repeat this study, several study design changes need to occur. The study should be conducted at a national meeting or at multiple regional meetings in order to capture a more well distributed sample size. A larger sample size and improved geographic diversity of participants would allow for greater generalizability of results. To assess comprehension, survey questions could assess content understanding rather than participant's opinion of their own comprehension. Lastly, additional baseline characteristics and factors could be collected so that a correlation between the results and various demographic characteristics could better inform study conclusions.

Discussion

Overall, despite the limitations of this present study, the preferences and perceptions between residents and preceptors were similar between traditional and infographic poster formats. While both groups agreed that clarity and comprehensibility were similar regardless of format, residents felt more information was missing from the infographic poster. Overall, residents did not prefer either poster format and did not find any differences except in terms of the missing information. Preceptors, on the other hand, indicated a preference for the aesthetic appeal of the infographic format and felt the clarity and comprehensibility were similar regardless of format. These perceptions partially align with findings of a previous study by Crick and Hartling⁶ that concluded infographics were more aesthetically appealing, but differed in clarity and comprehensibility.

Residents and preceptors consider traditional poster formats “easy to follow” (n = 10), “familiar” (n = 17), and “detailed and comprehensive” (n = 13), but “wordy” (n = 32), “boring” (n = 5), and “take longer to read” (n = 10). For the infographic poster, residents and preceptors consider it “easy to understand” (n = 18), “less wordy and quick” (n = 13), “attention grabbing” (n = 9) and “visually appealing” (n = 8), but “difficult to follow” (n = 15), “missing information” (n = 7), “too many colors” (n = 5), and “busy” (n = 6). These variations in preferences and perceptions highlight the need to identify the poster's intended audience. This study demonstrated that an infographic poster format could retain the same level of clarity and comprehensibility as a traditional poster format. However, an infographic poster format would increase aesthetic appeal and the potential for the presenter to engage with more viewers. A presenter beside the poster, or ability to present research findings in a mini-platform format, may allow for additional detail when information may be missing from an infographic poster format.

Based on the results of this study, and despite limitations in research methodology, the authors assert that poster presenters may benefit by increasing infographic figures and colors and decreasing text-based content. An increased use of infographics may improve the eye-catching appeal of scientific poster content, allowing for increased engagement with viewers. This may allow the presenter to overcome the perception of missing content compared with a text-based traditional poster format; additional studies are needed to corroborate this assertion. These recommendations further support Persky⁵ and his idea of development of an illustrated abstract.

This study supports the use of infographics in the development of scientific posters to increase aesthetic appeal, while maintaining clarity and comprehensibility. Further studies are needed to evaluate the generalizability and application of infographic use in the design of scientific posters, to assess the comprehension impact of infographic use, and to determine the type of information ideal for infographic use in a dynamic scientific poster design.

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Conflict of Interest

None.

Disclosures

None.

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