What Are the Real-World Podcast-Listening Habits of Medical Professionals?

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Abstract

Introduction

Educational podcasts are increasingly being utilized by health professionals for continuing education, but how they are being used remains poorly understood. Given their extensive reach, they represent a phenomenal opportunity for researchers to engage in knowledge translation of their scholarly works. The design, study, and effectiveness of these resources should be informed by a deeper understanding of their pragmatic usage. We aimed to prospectively determine the pragmatic, real-world listening habits of health professionals.

Methods

We performed a prospective observational study of a broad, interprofessional sample of participants (medical students, residents, physicians, nurses, physician assistants, and paramedics) recruited through a multimodal social media (Twitter and Facebook) campaign. Recruitment materials included an infographic and study website. Participants listened to eight podcasts and described their use of each in subsequent questionnaires.

Results

A total of 393 participants enrolled in the study, and 241 completed the survey for all eight podcasts. Listening behaviors were consistent across the podcasts with the majority selecting a normal speed of playback and engaging in concomitant activities such as driving. One-third of participants paused the podcasts due to interruption.

Conclusion

We describe the prospective use of medical podcasts by a cohort of health professionals. This work should inform the role of podcasts in the communication of medical research.

Categories: Emergency Medicine, Medical Education, Healthcare Technology

Keywords: podcasts, medical education, listening habits, playback speed, multitasking

Introduction

There is increasing evidence that methods for engaging in knowledge translation and, hence, education of frontline health professionals are changing [1]. Podcasts are playing an increasing role in the post-publication discussion of medical research and as a source of asynchronous learning for clinicians, who use them to both facilitate and supplement learning [2-4]. However, relatively little is known about how they are being used. Previous literature has found that many clinicians report listening while conducting other tasks [5]. This “multitasking” may result in only partial attention to the podcast, suggesting that clinicians’ listening habits may not be fully aligned with their stated goals of learning [6,7]. The disconnect between reported listened habits and optimal learning behaviors may be significant, given the reported impact of podcasts on clinical decisions, and may decrease their potential as knowledge translation vehicles [4].

The literature on podcast-listening habits is largely retrospective and provides little granular detail to guide podcast utilization or further study [4,6,7]. Further, because podcasts are complexly interwoven [6] with individual learners and their habits; literature on other media may not translate to podcasts. We sought to provide a richer understanding of how listeners use podcast technology by investigating the pragmatic, real-world listening habits of health professionals.

Materials And Methods
We performed a prospective survey-based study of the listening habits of an interprofessional sample of emergency medicine and critical care clinicians. Study participants listened to eight emergency medicine and critical care podcasts and completed podcast-specific surveys after each. The study was deemed exempt from ethical review (Research Ethics Board at the University of Saskatchewan, BEH 17-170).

**Participant recruitment**

We recruited participants through the METRIQ (Medical Education Translational Resources: Impact and Quality) methodology as described in a previous publication [7]. Briefly, we shared information, predominately via Facebook and Twitter, about the study to a targeted virtual community of practice that utilizes Free Open Access Medical education resources such as podcasts [7]. We also reached out via email to our personal networks and collaborators from previous studies [8-10]. Interested participants submitted an intake form requesting further information and were considered formally enrolled after completing an initial survey containing a standard consent form [7]. To incentivize participation and acknowledge the extensive time commitment of this study, we recognized participants who completed all surveys as contributors.

**Survey design and podcast selection**

We selected podcasts listed on the Social Media Index [10-12] for inclusion in the study. Eight were selected because we felt that this was the maximum number that participants would be willing to complete. To increase the generalizability of our results, we ensured variety in podcaster accent and geographic origins (two each with native speakers from Canada, the United States, the United Kingdom, and Australia) as well as a number of podcasters (four with a single podcaster and four with multiple). In keeping with previous research about ideal podcast episode length [4], all selected podcasts were 17-23 minutes in length (Table 1). Preference was given to recently published podcasts to ensure relevance and decrease the likelihood of being previously heard by the participants. The owners of the eight podcasts provided consent for their use in the study. To encourage the participants to listen to the podcasts in their usual fashion, a dedicated podcast channel was created via Soundcloud.com that could be added to any podcast application or accessed via any web browser.

| Podcast                                    | Country of origin | Number of speakers | Length (minutes) |
|--------------------------------------------|-------------------|--------------------|------------------|
| Broomedocs                                 | Australia         | Multiple           | 23               |
| Royal College of Emergency Medicine        | United Kingdom    | Single             | 23               |
| CRACKCast                                  | Canada            | Multiple           | 22               |
| EMCrit                                     | United States     | Single             | 23               |
| FOAMcast                                   | United States     | Multiple           | 23               |
| PHARM Podcast                              | Australia         | Single             | 21               |
| Skeptic’s Guide to Emergency Medicine      | Canada            | Single             | 17               |
| Resus Room                                 | United Kingdom    | Multiple           | 21               |

**TABLE 1: Characteristics of the selected podcasts**

Each podcast-specific survey questionnaire investigated the real-world habits of the participants. Questions explored when the listening occurred, at what speed, whether simultaneous activities were performed, whether notes were taken, if (and why) the podcast was paused, whether an accent affected listening, and the audio quality. These were based on known effective learning techniques [13], previous podcast research [5-7], and the real-world experiences of the authors.

**Protocol**

Participants were directed to a dedicated podcast channel and asked to listen to a podcast and respond to a brief questionnaire after listening (Appendix A). Participants were instructed to complete each of the eight podcast surveys immediately after listening to their respective podcasts. They could choose any order in which to listen to the eight podcasts. Participants then received reminder emails for each follow-up survey every one to two weeks up to a maximum of four times.

**Analysis**

Raw survey data was exported from FluidSurveys in a spreadsheet format, and descriptive statistics were calculated using Microsoft Excel (Microsoft Corp., Redmond, WA, USA).
**Results**

Recruitment occurred between September 10, 2017, and December 9, 2017. The study surveys were accessible until March 8, 2018 (a minimum of three months). A total of 390 healthcare professionals formally enrolled in the study, and 241 completed all eight podcast surveys (61.8% study completion rate). Table 2 contrasts the demographics of the participant group that enrolled in the study and the group that completed all surveys. The groups’ demographics were grossly similar.

| Variable                              | Enrolled in the study, n (%) | Completed the study, n (%) |
|---------------------------------------|------------------------------|----------------------------|
| **Age**                               |                              |                            |
| 18-24                                 | 41 (10.5)                    | 23 (9.5)                   |
| 25-34                                 | 204 (52.3)                   | 133 (55.2)                 |
| 35-44                                 | 111 (28.5)                   | 65 (27.0)                  |
| 45-54                                 | 25 (6.4)                     | 16 (6.6)                   |
| 55-65                                 | 9 (2.3)                      | 4 (1.6)                    |
| >65                                   | 0 (0%)                       | 0                          |
| **Gender**                            |                              |                            |
| Female                                | 175 (44.5)                   | 105 (43.6)                 |
| Male                                  | 215 (54.7)                   | 135 (56.0)                 |
| Decline to state/other                | 3 (0.8)                      | 1 (0.4)                    |
| **Modality of recruitment**           |                              |                            |
| Twitter                               | 144 (36.9)                   | 78 (32.4)                  |
| Email or in-person by a study author  | 99 (25.4)                    | 73 (30.3)                  |
| Facebook                              | 69 (17.7)                    | 47 (19.5)                  |
| METRIQ Blog Study participant         | 59 (15.1)                    | 44 (18.3)                  |
| Peer referral                         | 35 (9.0)                     | 18 (7.5)                   |
| Medical website or podcast            | 19 (4.9)                     | 12 (5.0)                   |
| WhatsApp                              | 15 (3.8)                     | 6 (2.5)                    |
| **Background/level of training**      |                              |                            |
| Practicing Physician, Attending, Consultant | 111 (27.7)               | 73 (30.2)                  |
| Resident, House Officer, or Graduate Trainee | 79 (19.7)                 | 40 (16.5)                  |
| Medical Student                       | 81 (20.2)                    | 66 (27.3)                  |
| Nurse, Physician Assistant, or Paramedic | 121 (30.2)                 | 58 (24.0)                  |
| Nurse, Physician Assistant, or Paramedic Student | 4 (1.0)                  | 3 (1.2)                    |
| >1 category                           | 3 (0.7)                      | 2 (0.8)                    |
| Other (Infection Control Practitioner)| 2 (0.5)                      | 0 (0)                      |
| **Home country**                      |                              |                            |
| Canada                                | 150 (38.5)                   | 122 (50.6)                 |
| United States                         | 118 (30.3)                   | 59 (24.5)                  |
| Europe                                | 67 (17.2)                    | 32 (13.3)                  |
| Australia/New Zealand                 | 23 (5.9)                     | 14 (5.8)                   |
| Africa                                | 19 (4.9)                     | 9 (3.7)                    |
| South America                         | 7 (1.8)                      | 4 (1.7)                    |
| Asia                                  | 6 (1.5)                      | 1 (0.4)                    |
| To review new literature              | 298 (75.8)                   | 181 (75.1)                 |
| To learn core material                | 295 (75.1)                   | 190 (78.8)                 |
| To refresh memory                     | 282 (71.8)                   | 185 (76.8)                 |
TABLE 2: Demographics of the METRIQ podcast study participants who enrolled in and completed the study

METRIQ, Medical Education Translational Resources: Impact and Quality.

The participants’ listening habits were relatively consistent across the podcasts (Table 3). The average listening speed varied minimally across podcasts from 1.11 to 1.16. Most listened at normal (1x) speed (range: 73.4%-81.9%), and only a minority listened at ≥1.5x speed (range: 13.9%-21.3%).

Approximately one-quarter of participants (range 19.6%-28.5%) did not participate in concomitant activities while listening. When concomitant activities were performed, driving (25.9%-31.6%), chores (16.9%-22.5%), and exercise (9.1%-12.4%) were the most common (Table 4).
Activity performed | Podcast 1 | Podcast 2 | Podcast 3 | Podcast 4 | Podcast 5 | Podcast 6 | Podcast 7 | Podcast 8
--- | --- | --- | --- | --- | --- | --- | --- | ---
None | 62 (20.1) | 56 (19.6) | 66 (25.1) | 49 (19.1) | 49 (19.6) | 63 (25.8) | 69 (28.5) | 63 (26.1)
Chores | 68 (22.0) | 64 (22.5) | 50 (19.0) | 55 (21.5) | 52 (20.8) | 42 (17.2) | 41 (16.9) | 44 (18.3)
Exercise | 28 (9.1) | 32 (11.2) | 30 (11.4) | 30 (11.7) | 26 (10.4) | 28 (11.5) | 30 (12.4) | 26 (10.8)
Driving | 80 (25.9) | 83 (29.1) | 82 (31.2) | 86 (33.6) | 76 (30.4) | 77 (31.6) | 70 (28.9) | 71 (29.5)
Other | 81 (26.2) | 68 (23.9) | 50 (19.5) | 58 (23.2) | 47 (19.3) | 39 (16.1) | 47 (19.5) | 77 (31.6)
Total | 319 | 303 | 282 | 270 | 261 | 257 | 249 | 251

TABLE 4: Number (percentage) of participants performing concomitant activities while listening to each of the podcasts

Only a small fraction of participants took notes (0.8%-6.1%), but approximately one-third paused the podcast (19.4%-36.6%) with the most common reason being an interruption (13.6%-27.4%) (Table 5). The proportion of listeners that repeated (9.7%-49.3%) a segment of the podcast was quite variable. When portions were repeated, it was most often because the listener felt that they had missed important information (55.0%-68.8%).

| Reason cited | Podcast 1 | Podcast 2 | Podcast 3 | Podcast 4 | Podcast 5 | Podcast 6 | Podcast 7 | Podcast 8 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pausing | | | | | | | | |
| To stop the flow of new content to allow me to process information | 18 (13.3) | 19 (15.8) | 34 (25.0) | 19 (22.9) | 10 (11.9) | 3 (4.8) | 7 (13.2) | 7 (11.9) |
| To facilitate memorization of information before moving on | 5 (3.7) | 7 (5.8) | 20 (14.7) | 5 (6.0) | 6 (7.1) | 3 (4.6) | 4 (7.5) | 7 (11.9) |
| To break up the podcast into more digestible segments | 9 (6.7) | 9 (7.5) | 16 (11.8) | 3 (3.6) | 6 (7.1) | 6 (9.7) | 4 (7.5) | 5 (8.5) |
| I wasn’t able to listen to the entire podcast at once due to interruptions | 80 (59.3) | 78 (65.0) | 58 (42.6) | 51 (61.4) | 56 (66.6) | 41 (66.1) | 33 (62.3) | 35 (22.0) |
| Other | 23 (17.0) | 7 (5.8) | 6 (5.9) | 6 (7.2) | 6 (7.1) | 9 (14.5) | 5 (9.4) | 5 (8.5) |
| Total | 135 | 120 | 136 | 83 | 84 | 62 | 53 | 59 |
| Repeating | | | | | | | | |
| To reinforce information | 10 (14.5) | 18 (22.8) | 37 (30.3) | 16 (27.6) | 15 (24.6) | 3 (8.3) | 4 (11.7) | 15 (21.4) |
| To ensure that I haven’t missed important information | 23 (33.3) | 23 (29.1) | 34 (27.9) | 17 (29.3) | 16 (26.2) | 12 (33.3) | 9 (26.5) | 20 (28.8) |
| Because I know I have missed important information | 32 (46.4) | 34 (43.0) | 43 (35.3) | 22 (37.9) | 27 (44.3) | 16 (44.4) | 17 (50.0) | 33 (47.1) |
| Other | 4 (5.8) | 4 (5.1) | 6 (6.6) | 3 (5.2) | 3 (4.9) | 5 (13.9) | 4 (11.7) | 2 (2.9) |
| Total | 69 | 79 | 122 | 58 | 61 | 36 | 34 | 70 |

TABLE 5: Rationale and number (percentage) of participants pausing or repeating segments while listening to each of the podcasts

Discussion

Scholars interested in the knowledge translation of new findings in the health sciences must consider the limitations of this modality to maximize effective education for end-users. In this exploration of the podcast-listening behaviors of an interprofessional cohort of health professionals, most participants played podcasts at normal speed and participated in another activity (usually driving) while they were listening. Listeners occasionally stopped the podcasts due to interruptions, while a minority repeated segments for...
educational purposes. These behaviors were relatively consistent across a sample of eight podcasts.

Similar to previous studies, our participants reported performing simultaneous tasks (e.g., chores, exercise) while listening [5]. Our finding that approximately three-quarters of participants listen at 1x (normal) speed is in line with the self-reported behavior of emergency medicine (EM) residents and clinicians [6,7]. However, fewer of our participants drove relative to the high proportions described in self-report studies (up to 93%) [6].

Our pragmatic approach gleaned several findings that could not be explored using self-report data. For example, the range of participants who paused and repeated sections of each podcast varied, suggesting that there may be differences between podcasts that make the listener more likely to be interrupted or want to review a segment (e.g., poor sound quality, complex content, speaker accent). A common reason cited for pausing or repeating sections was that information was missed. Podcast producers may consider using this information to modify their recordings to incorporate more repetition of key or complex information [14].

Our results reiterate the finding that clinicians are not listening to educational podcasts in ways that align with their most commonly cited reasons for listening: reviewing new literature, learning core material, and refreshing memory (Table 2). Multitasking and the lack of active learning behaviors (pausing, repeating, note-taking) are not in keeping with behaviors that foster a deep understanding of the material [13]. Multitasking in the form of listening and driving simultaneously may increase the listener’s cognitive load, resulting in decreased driving performance and limited retention of podcast content [13]; however, a recent study found similar retention while driving and sitting in an undistracted setting [16]. The effect of exercise on cognitive performance is generally positive but varies with exercise duration, exercise intensity, and participant fitness [17]. Further, roughly 15% of participants listened at speeds ≥1.5x, a point at which there may be a significant drop-off in comprehension of speech [18]. If clinicians desire to listen - and podcasters desire to create podcasts - with a goal of deep learning and retention of the material, they may consider intentionally limiting distractions [19], pausing to enable connections between new material and existing knowledge, and repeating segments at spaced intervals [20]. Our study design did not allow the exploration of the impact of concurrent activities or listening strategies (e.g., variable listening speeds, interruptions, and repeating difficult segments) on knowledge acquisition but would support the further experimental study of these questions.

The strengths of our findings lie in our large and diverse study population and pragmatic approach. The enrolment of a large, diverse population of health professionals to listen to eight different podcasts and complete surveys on each allowed us to describe how podcast listeners utilize medical education podcasts in a real-world context. The results should inform research to determine how podcasts can be maximized for learning.

Limitations

While the number of participants in this study was high, our population was not necessarily representative of the wider body of health professionals. We note that roughly 25% of the cohort completing the study were students. Our goal was not to replicate this population but to recruit clinicians who listen to podcasts regularly as this sample is more relevant to our inquiry than a representative population including those who do not use podcasts. Still, most participants were from developed countries, and a quarter were students. We believe that the discrepancies between self-report and real-world listening habits demonstrate the value of our pragmatic methodology, although it is possible that our results were skewed by participants changing their listening habits to complete the study. Lastly, we lost a significant number of our target population during the study; this was not surprising, given that participation required listening to eight podcasts and completing eight surveys. The drop-off was consistent across the first four podcasts, with fewer participants dropping out on the final four. Fortunately, the demographics of the participants who enrolled in the study were similar to those who completed it, suggesting that this did not have a substantial impact on our results. Finally, a large number of participants did not list their location, restricting any further analysis of the role of the listeners' nationality in listening behavior.

Conclusions

Educational podcasts are increasingly being utilized by health professionals for continuing education, but how they are being used remains poorly understood. We performed a prospective survey-based study of the listening habits of an interprofessional sample of emergency medicine and critical care clinicians to determine the pragmatic, real-world listening habits of health professionals. Most health professionals who listened to medical education podcasts did so at normal playback speeds and engaged in other activities such as driving or exercise while listening. A minority of listeners paused or repeated segments. This work informs our understanding of the utilization of podcasts by end-users and may guide future research on optimizing podcast use for learning and knowledge translation.

Appendices

Appendix A: Usage survey
Please respond to these questions in reference specifically to the [insert podcast name] podcast that you were assigned to this week.

1. When did you listen to the podcast?
   - Morning
   - Afternoon
   - Evening
   - Night

2. What device did you use to listen to the podcast?
   - Computer
   - Tablet
   - Smartphone: Apple
   - Smartphone: Android
   - Smartphone: Other
   - MP3 Player
   - Car Stereo
   - Other

3. What was your listening speed?
   (e.g., 0.5x would mean that you slow the podcast down to 1/2 speed, while 2.0x would mean that you double the speed of the podcast.)

4. Did you perform any simultaneous unrelated activities?
   - No
   - Chores
   - Exercise
   - Driving
   - Other

5. Did you take notes?
   - Yes
   - No

6. Did you ever pause the podcast?
   - Yes
   - No

7. If yes to the previous question, approximately how many times did you pause it?
8. Did you ever repeat segments of the podcast?

Yes

No

9. If yes to the previous question, how many times did you repeat segments of the podcast?

Podcast critique

1. Foreign accents

Did not impede the listening ability

Difficult but understandable

Indecipherable

N/A

2. Recording quality

High quality

Medium quality

Low quality

3. What was your prior knowledge of the content of the podcast?

None

Introductory

Intermediate

Advanced

Short answer questions

1. What was your key takeaway from the podcast?

2. Was the podcast well designed? Why or why not?

3. Was the content of high quality? Why or why not?

4. Was the podcast credible? Why or why not?

Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. Research Ethics Board at the University of Saskatchewan issued approval BEH 17-170. The study was deemed exempt from ethical review. Animal subjects: All authors have confirmed that this study did not involve animal subjects or tissue. Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: Payment/services info: All authors have declared that no financial support was received from any organization for the submitted work. Financial relationships: All authors have declared that they have
no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. Other relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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