



Original article

An electronic survey of preferred podcast format and content requirements among trainee emergency medicine specialists in four Southern African universities



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ABSTRACT

Introduction: Global usage of educational Emergency Medicine (EM) podcasts is popular and ever-increasing. This study aims to explore the desired content, format and delivery characteristics of a potential educational, context-specific Southern African EM podcast, by investigating current podcast usages, trends and preferences among Southern African EM registrars of varying seniority.

Methods: We developed an electronic survey - using a combination of existing literature, context-specific specialist-training guidance, and input from local experts - exploring preferred podcast characteristics among EM registrars from four Southern African universities.

Results: The study's response rate was 75%, with 24 of the 39 respondents being junior registrars. Ninety-four percent (94%) of respondents used EM podcasts as an educational medium: 64% predominantly using podcasts to supplement a personal EM study program. The primary mode of accessing podcasts was via personal mobile devices (84%). Additionally, respondents preferred a shorter podcast duration (5–15 min), favoured multimedia podcasts (56%) and showed an apparent aversion toward recorded faculty lectures (5%). Eighty-two percent (82%) of respondents preferred context-specific podcast content, with popular topics including toxicology (95%), cardiovascular emergencies (79%) and medico-legal matters (74%). Just-in-Time learning proved an unpopular learning strategy in our study population, despite its substantial educational value.

Conclusion: Podcast-usage proved to be near-ubiquitous among the studied Southern African EM registrars. Quintessentially, future context-specific podcast design should cater for mobile device-use, shorter duration podcasts, more video content, context-specific topics, and content optimised for both Just-in-Time learning.

African relevance

- Educational Emergency Medicine (EM) podcasts are widely available and increasing in popularity globally.
- Many global EM podcasts lack the content and delivery characteristics specific to the Southern African EM context.
- User-uptake, usage, access trends, and preferred podcast characteristics in Southern Africa remained unexplored.
- This study demonstrated the desirability of educational, context-specific Southern African EM podcasts.
- There were several noteworthy observations for prospective podcast developers and educationalists in creating such podcasts.

Introduction

For the current generation of training emergency medicine (EM) specialists, the popularity of traditional teaching platforms – such as overhead projector slides, didactic PowerPoint lectures and seminars – is diminishing [1]. Social media, and the Free Open-Access Medical education (FOAMed) movement, has brought life to various methods of asynchronous online-learning [2]. Blog sites, Twitter feeds, YouTube channels, Facebook pages and Podcast shows are a few examples of online multimedia platforms where medical education is consumed and actively participated in.

Podcasts are recorded digital-audio segments, made available

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episodically for download or live streaming [3]. Their benefits in medical education have been documented [4,5]. Podcasts also provide an excellent source of asynchronous and self-directed learning [6]. There is a significant and growing body of emergency medicine (EM) podcasts available [7].

At least 88% of EM registrars, in a survey of training programs across the United States of America (USA), reported listening to podcasts at least once a month [8]. The two most popular reasons for podcast consumption were to keep up with current literature and review core EM knowledge. Importantly, 70% reported changing their clinical practice based on their exposure to podcast content.

Podcasts – as an e-learning tool – may prove to be well-suited to the current Southern African Generation Y EM trainees [9]. Podcasts' effectiveness as an educational medium is associated with how well the content aligns with the perceived needs of its listeners [10]. Additionally, She et al. [11] suggested that the creation of an asynchronous curriculum is both feasible and effective for EM trainees. Therefore, a context-specific podcast, developed for the educational needs of Southern African EM trainees, could both directly engage and benefit its audience.

Contrary to popular belief, Matt Brown Media [12] demonstrated that, of the 15,682 South African citizens surveyed, only 10.2% cited a lack of access as a barrier to podcast consumption. Likewise, Thurtle et al. [13] showed that it is not a lack of access, but rather a lack of awareness, that is the primary barrier to medical podcast-usage in other African countries.

Currently, there is limited data on the use and benefits of educational podcasts in Southern Africa. After surveying the use of online-educational multimedia in the division of Emergency Medicine in Cape Town (EMCT), Kleynhans et al. [14] reported that only 21% used educational podcasts, despite >50% accessing some form of online educational resource at least once a month.

This study aims to explore the optimal content, format, and delivery characteristics of a potential educational, context-specific Southern African EM podcast, by investigating current podcast usage, trends and preferences among Southern African EM registrars of varying seniority.

Methods

The study used a cross-sectional electronic survey to explore current podcast usages, trends and preferences of EM registrars from four Southern African universities.

Study population

The study population includes registrars from EM specialist training programmes who were officially registered for the four-year Master of Medicine (MMed) offered by the following Southern African universities during the 2019 and 2020 academic years:

- The University of Botswana (UB) ($n = 5$),
- The University of Cape Town (UCT) ($n = 18$),
- The University of Pretoria (UP) ($n = 12$), and
- The University of Stellenbosch (SU) ($n = 17$).

We define EM registrars as doctors currently working in a specialist training post in EM; junior registrars as first or second year of training, and senior registrars as years three or above.

Survey development

Matava et al. [10] conducted a similar study on Canadian Anaesthesia registrars. We obtained permission to adapt their questionnaire to the Southern African EM context by using the syllabus of the Faculty of the College of Emergency Medicine South Africa (FCEM-SA) [15,16]. The blueprint of this syllabus guides training at the universities

surveyed.

From this, identified potential podcast-topics were separated into four groups: practical, basic-science, clinical and professional. Additional professional topics were proposed by the investigators, who were lecturers in the universities' MMed programs.

The survey was reviewed for content and face validity by an educationalist and EM specialist from SU and UCT, respectively. The final survey (Appendix) explored the following:

- Current podcast-use characteristics,
- Preferred podcast topics (listed above),
- Desired podcast format (including content-delivery and length preference), and
- The willingness to consume a context-specific Southern African EM podcast.

Survey testing

The survey instrument required no alteration after pilot testing on two EM registrars from UCT who assessed for clarity and user-friendliness. While we excluded the results of the pilot survey from the final data analysis, both EM registrars were sent the final survey for completion.

Survey administration, distribution and data collection

We obtained approvals from the SU Health Research Ethical Committee (Ref no: S19/09/194) and the included institutions. A hyperlink to the online survey was provided to the relevant MMed division heads, who distributed it to their EM registrars.

After consenting, respondents were directed to the electronic survey administered via the personal, password-protected Google Forms (Google Inc.) account of the primary author.

Responses were collected anonymously and without potentially identifiable information. Collected demographic information included only the year of study and current university affiliation. We collected responses from February to April 2020; sending regular one-monthly reminders to increase response rates. Data analysis included incomplete responses.

Data analysis

Survey data was exported to Microsoft Excel (Microsoft Co.) for analysis. Descriptive statistics were used to summarise categorical data and the two-tailed Fishers exact test to analyse nominal data. A p -value < 0.05 was regarded as statistically significant.

The response rate calculation was based on total eligible responders and included partially completed survey responses.

Results

Thirty-nine registrars responded (75% response rate), with the most ($n = 14$) from UCT (Fig. 1).

The prevalence of medical podcast-usage was 95%, with 65% of respondents devoting 1–4 h a week to podcast consumption. Eighty-two percent of respondents accessed content from a mobile device. Desktop/laptop use (both streaming and downloading) was less preferred (Table 1).

Sixty-four percent of the respondents used podcasts as a part of their EM study plan, and 41% used podcasts to revise for formal assessments. Only 15% used podcasts immediately before a case or procedure while on a clinical shift.

Fifty-six percent of respondents preferred podcasts with multimedia content – audio with accompanying still images or slideshows. Podcasts with show-notes (portable document format (PDF) or blog posts) interested 49% of respondents, while recorded didactic lectures were the

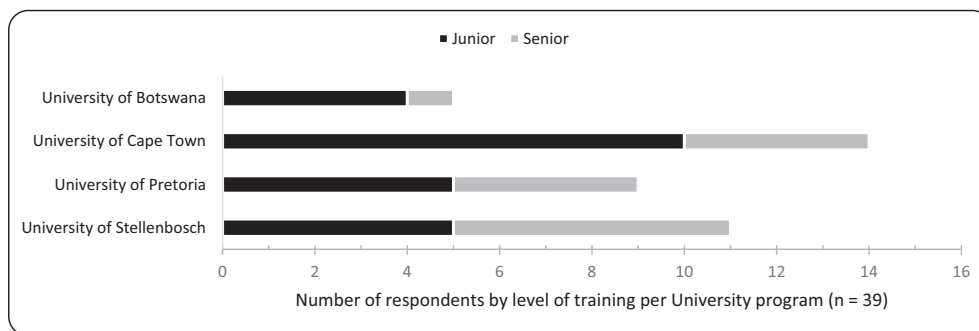


Fig. 1. Respondents by University and Level of training.

Table 1

Podcast use characteristics by the level of training.

		Junior Registrars (n = 24)	Senior Registrars (n = 15)	Total Respondents (n = 39)	p values
Methods used to view podcasts	Stream directly via a portable device	13 (54%)	7 (47%)	20 (51%)	0.23
	Download on a portable device	11 (46%)	8 (53%)	19 (49%)	0.23
	Stream directly via desktop/laptop online	3 (13%)	4 (27%)	7 (18%)	0.18
	Download on desktop/laptop for offline use	3 (13%)	4 (27%)	7 (18%)	0.18
	I do not review podcast material	1 (4%)	1 (7%)	2 (5%)	0.49
Manner in which podcasts are used	As part of your personal EM study program	18 (75%)	7 (47%)	25 (64%)	0.06
	Revision for assessments	8 (33%)	8 (53%)	16 (41%)	0.13
	Introduction of new EM curriculum topic	11 (46%)	4 (27%)	15 (38%)	0.14
	Post clinical shift review	8 (33%)	2 (13%)	10 (26%)	0.12
	Pre-procedural or real-time case review during clinical shift	4 (17%)	2 (13%)	6 (15%)	0.34
Favoured podcast type by learning preference	I do not use medical podcasts	1 (4%)	1 (7%)	2 (5%)	0.49
	Multimedia podcasts (audio with still images or slideshow)	13 (54%)	9 (60%)	22 (56%)	0.24
	Podcast with accompanying PDF/Blog posts	13 (54%)	6 (40%)	19 (49%)	0.18
	Audio only podcasts	10 (42%)	7 (47%)	17 (44%)	0.25
	Video podcasts	13 (54%)	1 (7%)	14 (36%)	0.002
	Recorded faculty lectures	1 (4%)	1 (7%)	2 (5%)	0.49
	I am not interested in medical podcasts	0 (0%)	1 (7%)	1 (3%)	0.38

least popular (5%).

Junior registrars, when compared to senior registrars, preferred video podcasts (54% v. 7%, $p = 0.002$). A higher proportion of junior registrars also preferred to use podcasts as a part of their EM study program (75% v. 47%, $p = 0.057$), while senior registrars preferred to use podcasts to revise for assessments (53% v. 33%, $p = 0.125$).

Reasons for failure to regularly use podcasts included a lack of available time (38%, 3/8) and a lack of familiarity with accessing course content via podcasts (25%, 2/8). A solitary respondent reported having no access to a listening or viewing device.

The ranking of respondents' preferred podcast topics is reflected in Table 2.

When compared to junior registrars, a significantly higher proportion of senior registrars requested topics on procedural sedation (73% v. 42%, $p = 0.04$), medico-legal matters (93% v. 63%, $p = 0.03$) (Table 2) and a combination of both (67% v. 33%, $p = 0.04$). Conversely, junior registrars preferred pharmacology (71% v. 47%, $p = 0.09$) and ventilator management (93% v. 75%, $p = 0.13$).

There was a distinct preference for a duration of 5–15 min for all podcast content-delivery type categories (Fig. 2a).

Practice oral exams were the most desired content-delivery type (Fig. 2b), with 62% responding that they would be 'extremely likely' – and a further 28% 'likely' – to consume this. Procedural skills showed a similar distribution, while recorded didactic lectures – together with debates or discussions – were least popular.

More than half of the respondents (24/39) felt that, in addition to links to supplementary FOAMed resources, rapid review flashcards (24/39) and multiple-choice question (MCQ) quizzes (23/39) would aid in knowledge retention. One respondent reported that podcasts alone were

adequate.

Eighty-two percent (32/39) of registrars stated that they would be either 'likely' (18/39) or 'extremely likely' (18/39) to consume a context-specific Southern African emergency medicine podcast (Table 3).

Discussion

Our study demonstrated a near-ubiquitous use of educational podcasts among the studied EM registrars. The high prevalence (95%) of podcast-use in our study corresponds with EM registrar podcast-usage in the USA; a 2014 study reporting that 70.3% of EM registrars endorsed the use of educational podcasts, and a 2017 study reporting a podcast-usage prevalence of 88.8%, among the respective EM registrars studied [6,8]. This implication of a global trend toward increased podcast usage proves encouraging for a locally produced educational EM podcast.

Respondents in our study reported a preponderance of mobile device use for accessing podcast material. This correlates with a study by Riddell et al. [8], who found that 91.4% of USA-based EM registrars accessed podcasts via their smartphones.

Antithetically, a study of Canadian anaesthesia registrars reported that only 38% of respondents downloaded podcasts onto their mobile devices [10]. A similar study of Canadian undergraduate medical students reported they often co-browsed other desktop applications and websites while simultaneously consuming podcasts [17]. Conceivably, the unique – and often unpredictable – context of EM training programs requires an easily accessible podcast solution, available for asynchronous consumption, above a more structured, and possibly more

Table 2
Preferred podcast topics by level of training.

		Junior Registrars (n = 24)	Senior Registrars (n = 15)	Total Respondents (n = 39)	p values
Practical topics	Ventilator management	18 (75%)	14 (93%)	32 (82%)	0.13
	Basic critical care and resuscitation skills (e.g. Rapid sequence induction; airway management)	18 (75%)	11 (73%)	29 (74%)	0.29
	Ultrasound-guided procedures	18 (75%)	11 (73%)	29 (74%)	0.29
	Basic orthopaedic skills (e.g. Fracture/dislocation management)	15 (63%)	12 (80%)	27 (69%)	0.15
	Trauma resuscitation (e.g. Resuscitative thoracotomy; lateral canthotomy)	15 (63%)	11 (73%)	26 (67%)	0.22
	Procedural analgesia sedation	10 (42%)	11 (73%)	21 (54%)	0.04
	None of the above	0 (0%)	1 (7%)	1 (3%)	0.38
Basic science topics	Research Methods / Biostatistics	16 (67%)	10 (67%)	26 (67%)	0.27
	Physiology	16 (67%)	9 (60%)	25 (64%)	0.24
	Pharmacology	17 (71%)	7 (47%)	24 (62%)	0.09
	Pathology	14 (58%)	8 (53%)	22 (56%)	0.25
	Clinical Anatomy	11 (46%)	5 (33%)	16 (41%)	0.20
Professional topics	Emergency Medicine in Resource-limited settings	19 (79%)	12 (80%)	31 (79%)	0.31
	Medico-legal issues	15 (63%)	14 (93%)	29 (74%)	0.03
	Crisis Management	16 (67%)	11 (73%)	27 (69%)	0.26
	Professionalism and ethics	17 (71%)	7 (47%)	24 (62%)	0.09
	Time Management	11 (46%)	9 (60%)	20 (51%)	0.18
	Morbidity and Mortality in the Emergency Department	12 (50%)	8 (53%)	20 (51%)	0.25
	Finance and wellbeing for Emergency Physicians	14 (58%)	6 (40%)	20 (51%)	0.14
	Organ Donation in the Emergency Department	10 (42%)	9 (60%)	19 (49%)	0.14
	Patient safety in the Emergency Department	10 (42%)	6 (40%)	16 (41%)	0.26
	Clinical topics	Toxicology	24 (100%)	13 (87%)	37 (95%)
Cardiovascular emergencies		18 (75%)	13 (87%)	31 (79%)	0.23
Pulmonary emergencies		17 (71%)	13 (87%)	30 (77%)	0.17
Resuscitative problems and techniques		18 (75%)	10 (67%)	28 (72%)	0.24
Acute signs and symptoms in children		16 (67%)	12 (80%)	28 (72%)	0.20
Renal and genito-urinary emergencies		16 (67%)	11 (73%)	27 (69%)	0.26
Gastrointestinal emergencies		14 (58%)	11 (73%)	25 (64%)	0.18
Acute signs and symptoms in adults		14 (58%)	10 (67%)	24 (62%)	0.23
Infectious disease and allergy		15 (63%)	9 (60%)	24 (62%)	0.26
Gynaecological and obstetrical emergencies		12 (50%)	10 (67%)	22 (56%)	0.18
Pre-hospital emergency		11 (46%)	9 (60%)	20 (51%)	0.18
Emergency wound management		11 (46%)	7 (47%)	18 (46%)	0.26

comprehensive, desktop-based consumption schedule.

However, mobile connectivity is firmly considered the primary and preferred method of internet access across Southern Africa, thereby supporting its use for podcast consumption [18]. Additionally, smart devices are continually gaining in storage capacity and processing power, improving their capability for multimedia consumption. Furthermore, mobile devices outnumber their desktop counterparts due to their relatively lower cost and operational requirements. Consequently, we recommend that Southern African context-specific podcasts should be optimised for both mobile connectivity and mobile device use.

Junior registrars were significantly more likely to consume video podcasts, in comparison to senior registrars (54% v. 7%, $p = 0.002$). Purdy et al. [19] noted a similar finding when comparing video podcast-usage between Canadian EM residents and EM Program Directors (71% v. 27%, $p < 0.01$). Correspondingly, Kleynhans et al. [14] found that at least 35% of the surveyed division of EMCT reported the use of YouTube as an educational medium. These findings suggest that younger learners may be more inclined to engage with video content. In her book, *Gen Y: Who They Are and How They Learn*, Alison Black [20] suggested that fast-paced video games and access to online video sharing since childhood have made Generation Y learners more receptive to educational media with higher subjective entertainment value. Likewise, by conducting a series of semi-structured interviews of EM registrars, Riddell et al. [21] found that both entertainment and engagement are substantial driving factors that positively affect podcast use. This possible development in learning styles requires further exploration in subsequent generations of EM registrars as, presently, there is no evidence to claim that EM registrars learn more effectively in one perceptual mode versus another [9,22].

Although clinical toxicology was by far the most popular podcast topic in our study, a direct comparison with international literature

proved problematic due to different context-specific educational needs and EM topic category groupings. Nevertheless, *The Dantastic Mr Tox and Howard Show* is an international podcast dedicated to toxicology, which ranks among the most popular of all listed Apple Podcasts [23]. The show has an average user rating of 4.8/5, with reviewers crediting it as being both 'high-yield' and 'entertaining'. This alludes to a general appreciation of toxicology as a popular podcast topic throughout the global EM community. Local factors may also contribute to the popularity of toxicology as a podcast topic in our study. One such factor may be the significant burden of deliberate self-poisoning presentations placed on local emergency departments (ED), as demonstrated by van Hoving et al. [24].

Our study demonstrates that a significant proportion of junior registrars preferred to use podcasts as part of their EM study program (75% v. 47%, $p = 0.06$) and as an introduction to new curriculum topics (46% v. 27%, $p = 0.14$). Conversely, their senior counterparts favoured podcast-use as a tool for revision for assessments (53% v. 33%, $p = 0.13$). These differing preferences likely reflect the diverging educational needs specific to the respondents' level of training.

Interestingly, the level of training of respondents did not appear to have a considerable influence on the overall preferences of podcast topics in our study (Table 2). However, senior registrars were more inclined to request a combination of both procedural sedation and medico-legal matters (67% v. 33%, $p = 0.04$), plausibly reflecting the increased clinical exposure to these topics during the senior years of EM registrar training.

A 2009 study by Hodkinson et al. [25] noted that a significant medico-legal risk existed among Cape Town's EDs, where procedural sedation-analgesia (PSA) was performed. Remarkably, they found that only 15.3% of the EDs had written protocols to guide practitioners. Moreover, Meyer et al. [26] demonstrated that none of the PSA

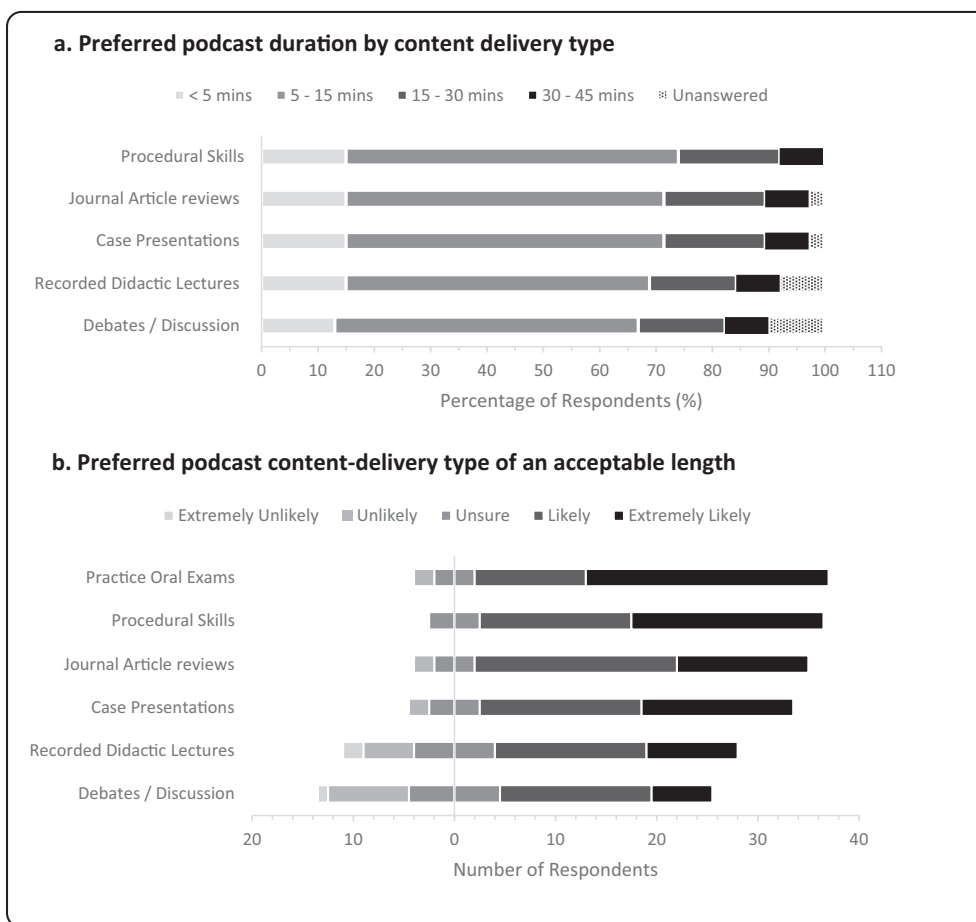


Fig. 2. Ranking of desired podcast format. a. Ranking of preferred length for given podcast content delivery type by percentage of respondents. b. Ranking of respondents' likelihood of listening to a podcast delivery type of an acceptable length.

Table 3
Respondents' likelihood of watching a context-specific Southern African emergency medicine podcast.

	Junior registrars (n = 24)	Senior registrars (n = 15)	Total respondents (n = 39)
Extremely likely	9 (38%)	7 (47%)	16 (41%)
Likely	11 (46%)	5 (33%)	16 (41%)
Neutral	4 (17%)	1 (7%)	5 (13%)
Unlikely	0 (0%)	1 (7%)	1 (3%)
Extremely unlikely	0 (0%)	1 (7%)	1 (3%)

administered at Steve Biko Hospital in Pretoria had documented informed consent. In a study in Southern Gauteng, Delecia et al. [27] concluded that, apart from institutional risk-management, structured, formal training is vital to mitigate the medico-legal risks associated with PSA. These findings highlight the importance of the perceived need for further asynchronous context-specific educational support on these topics by respondents in our study.

Just-in-Time (JiT) learning (self-directed, personalised learning at the time of need) has proven to be a successful and productive adult learning strategy in medical education [27,28]. Fascinatingly, our study reports low podcast-use for just-in-time learning during (15%) and immediately after (26%) a clinical shift. This contrasts with the findings of Mallin et al. [6], who showed that 80% of EM registrars in their study used recent patient encounters to guide the podcast content that they reviewed. Furthermore, in a study by Purdy et al. [19], 86% of the Canadian EM registrars surveyed used online resources for answering questions at the point of patient care. The complex educational and

cultural factors, likely responsible for the diversities seen in the uptake of JiT learning in our study population, warrant further study. An essential step toward incorporating JiT learning among Southern African EM registrars would be providing more context-specific and readily accessible educational media.

Respondents in our study exhibited an appreciation for test-enhanced learning in the form of podcast adjuncts: links to supplementary FOAMed resources, accompanying PDF/blog posts and test-orientated resources. The testing-effect is an educational technique proven to improve long-term retention by devoting periods of learning to test and recall [29,30]. The creators of future Southern African EM podcasts should, therefore, strongly consider the use of high-quality multimedia alongside consolidatory test-based resources.

A shorter podcast duration (5–15 min) was preferred for all content delivery-types. This contrasts with USA-based EM registrars who preferred longer podcasts (20–30 min), aligning with the global average EM podcast-length of 36.6 min [7,8]. The preference of our study participants for shorter podcasts may support their relative aversion toward didactic lectures, as the traditional length of faculty lectures is 45 min (Fig. 2a). Additionally, Southern African EM training programs may offer less time for podcast consumption, given the time pressure of service delivery in an overwhelmed public health system [31].

Another key finding for potential content-developers is the overwhelming popularity (90%) of the practice oral-exam format. Not only would these podcasts prove popular, but they would encourage more beneficial exam-focused learning among EM registrars [32,33].

Our study had similar limitations commonly associated with survey-methodology. This includes non-responder bias (respondents not using

podcasts regularly being less likely to respond) and responder bias (respondents who are regular and passionate podcast users being more likely to respond). Additionally, a certain level of computer literacy is required to complete an online survey, which could have resulted in an unmeasured access-barrier among non-responders. However, given our study's exploratory nature, coupled with our high response rate (75%), these limitations should not distract from the study results. Crucially, 74% of the survey responses were received before the implementation of the Covid-19 nationwide lockdowns in South Africa and Botswana [34–36]. While we surmise that the ongoing social-distancing measures may generate bias toward online education (including podcasts), the precise effect of this on our study's results cannot be known. However, this potential bias may inadvertently accentuate the identified significance of educational podcasts in the evolving landscape of medical education – catalysed by the ongoing Covid-19 pandemic.

Based on our study's findings, Southern African EM podcast developers should note the following:

- The preference of mobile devices for podcast-usage
- Using more video podcasts to engage Generation Y learners
- Context-specific podcast content to better align current teaching with clinical practice
- The appreciation of test-enhanced podcast adjuncts
- JiT learning as a useful but underappreciated means of medical education
- The popularity of shorter duration podcasts
- Repeat surveys to calibrate podcast characteristics to evolving contexts, technology and learning requirements

Conclusion

Podcast-usage proved to be near-ubiquitous among the studied Southern African EM registrars. Quintessentially, future context-specific podcast design should cater for mobile device-use, shorter duration podcasts, more video content, context-specific topics, and content optimised for both Just-in-Time Teaching, and test-enhanced learning.

Dissemination of results

Results from this study were shared with the program directors of the included training universities.

Authors' contributions

Authors contributed as follow to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: KE contributed 65%; HL contributed 15%; WJ contributed 10%; and VL, NC and AE contributed 5% each. *All authors approved the version to be published and agree to be accountable for all aspects of the work.*

Declaration of competing interest

The authors declare no conflicts of interest.

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