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BRIEF REPORT

Educational Podcast Impact on Student Study Habits and Exam Performance

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ABSTRACT

Background : Emerging technologies, trainees' proficiency with digital resources, and the COVID-19 pandemic have increased the role of mobile and asynchronous learning methods in medical education. Educational podcasts have gained popularity in both formal curricula and independent learning, but their impact on educational outcomes has not been well studied.

Methods: We conducted a prospective cohort study of third-year medical students during pediatrics clerkship. An educational podcast series titled "Peds Soup" was introduced to students as a voluntary study resource. We surveyed students at the end of the rotation to assess study habits and perceptions of the podcast. We compared survey responses from podcast users and nonusers, and used standardized pediatrics subject examination scores to measure knowledge differences between groups.

Results: Eighty-three students participated in the study. Peds Soup listeners (n=43) reported spending significantly more time studying during clerkship (M=16.5, SD=9.0 vs M=12.4, SD=9.2 hours/week, *P*=.009) than nonlisteners. Users expressed positive views toward the podcast's impact on introducing, reinforcing, and helping apply knowledge, and endorsed that Peds Soup made it easier to find time to study. Examination scores did not differ between the two groups.

Discussion: The podcast demonstrated a reaction-level impact, with users reporting positive attitudes toward the podcast's impact and spending more time studying during pediatrics clerkship. Podcasts have strong potential as a supplement to existing curricula, where they can fill a need for interested learners. Future research should focus on the relationship between time spent and knowledge gain or utilize alternative measures of knowledge.

INTRODUCTION

By offering on-demand access to educational content, podcasts have featured more prominently in curricula as mobile and asynchronous learning grow in medical education.[1–7] Podcasts are well suited for self-directed learning (SDL), with learners independently selecting resources to meet their needs.8 Research suggests podcast listeners feel connected to the larger professional community, creating a social context that is often lacking in SDL and providing an environment for the informal lessons at the core of sociocultural learning theory.[8–10]

The literature on podcasts in medical education has grown in recent years, but several gaps remain.[11,12] Studies consistently find that podcasts are widely used, engaging, and preferable to text resources because of ease of use and ability to multitask while listening.[10–15] Knowledge retention from podcasts appears comparable to traditional tools, but these studies were performed in controlled settings that may not correspond to real-world podcast use.[15–17] Few reports on podcasts in pediatrics have been published and none have evaluated educational outcomes.[18–21]

We examined how typical use of an educational podcast impacted students' learning during pediatrics clerkship. We surveyed students' study habits, assessed perceptions of the podcast, and compared users' and nonusers' scores on the National Board of Medical Examiners (NBME) pediatrics examination.

METHODS

We conducted a nonrandomized prospective study of the impact of an educational podcast during pediatrics clerkship. All third-year medical students at our institution in the 2019-2020 academic year were eligible. The Medical College of Wisconsin Institutional Review Board approved the study.

We developed a podcast titled "Peds Soup," drawing topics from the American Board of Pediatrics content outline.[22,23]

Scripts were based on relevant literature then recorded and edited using Audacity software.[24] Episodes were 10-20 minutes long and met widely-accepted quality criteria for educational podcasts.[25]

The study was introduced during clerkship orientation with instructions for accessing the podcast. The podcast was freely available to students regardless of their participation in the study and all faculty were blinded to students' participation status. We distributed surveys via email during the last week of the clerkship.

We collected data using a Qualtrics survey adapted from previous studies of podcast utility and medical students' study habits.[21,26] We asked all participants whether they used Peds Soup during the clerkship, their likelihood of pursuing a pediatrics career, their perceived utility of common study resources, and the average number of hours they spent studying each week. Listeners rated the podcast's overall quality and impact on their knowledge and clinical performance and answered questions about their perceptions of Peds Soup and where and when they listened to the podcast. Participants provided their United States Medical Licensing Examination numbers, which were used to locate exam scores and demographic information. We mapped survey data to evaluate a Kirkpatrick Level 1 reaction impact and exam scores to evaluate a Kirkpatrick Level 2 knowledge gain impact.[27]

We classified participants as podcast users and nonusers by their self-reported use of Peds Soup and conducted χ^2 tests for demographic analysis. We calculated free-response answers for common themes and refined into categories by the authors until consensus was reached. All analyses were performed with R software version 4.0.0 (Vienna, Austria) and IBM SPSS 24.0 (Armonk, NY) with a significance threshold of P<.05.

RESULTS

Out of 204 eligible students, 83 (41%) participated in the study. Forty-three students (52%) reported using the Peds Soup podcast. There were no significant differences between users and nonusers in the available demographic data (Table 1).

There was no significant difference in mean NBME examination scores between the groups with podcast users recording a mean score of 78.0 and standard deviation of 7.6 compared to a mean of 77.1 and standard deviation of 8.8 among nonusers (*P*=.609). Podcast users rated podcasts as the second most useful study resource and rated podcasts significantly higher than nonusers (Table 2). The two groups rated all other resources similarly.

Users were more interested in pediatrics careers than nonusers (Table 3). Median interest ratings corresponded to "Neutral" for users and "Somewhat Unlikely" for nonusers. Users also reported significantly more independent study hours per week (M=16.5, SD=9.0 vs M=12.4, SD=9.2, *P*=.009).

Listeners gave Peds Soup high scores for overall rating (M=8.1, SD=1.4) and impact on knowledge of pediatrics (M=7.3, SD=1.5; Table 4). Ratings on perception questions were generally high, with only "Is something I plan to continue listening to" receiving a median score below "Strongly Agree."

Responses for where and when users listened to podcasts fell primarily into the "driving" category (65%), followed by "exercising" (30%), "doing chores" (23%), and "at home" (9%). Percentages total more than 100% because responses could be counted in multiple groups.

DISCUSSION

Although examination scores did not differ between groups, users viewed podcasts as more useful than most text-based materials, were more interested in pediatrics, and reported spending significantly more time studying. Exam scores did not reflect a Kirkpatrick Level 2 impact in knowledge gain, however the podcast's positive reception demonstrates a Kirkpatrick Level 1 reaction impact.[1,27,28]

We designed our study to evaluate typical podcast use for self-guided review. Participants were not randomized and students who found podcasts unhelpful were not required to use them, which likely contributed to the difference in podcasts' perceived utility between groups. Consistent with previous studies, nearly all users listened to the podcast while multitasking.[10–14] This implies that podcasts supplement rather than replace other study tools, filling an unmet need for interested students and highlighting the principles of self-management and resource selection in SDL. While it is impossible to be certain without baseline interest data, sociocultural learning theory suggests the increased interest in pediatrics among users may have been the result, not the cause, of their podcast use.[10]

Our study has several limitations. The groups were similar based on demographic data collected, but we did not assess many potential differences between users and nonusers such as educational background, age, or prior podcast exposure. Exam scores offered an objective measure of pediatrics knowledge but are not the only outcome that may have been affected. We identified patient care, long-term knowledge retention, and participation in rounds as potential areas of impact but were unable to establish reliable measurements for these domains. Our survey did not distinguish between dedicated study time and time spent studying while multitasking. These approaches are qualitatively different and better understanding how students divided their study time would provide a more complete picture of the podcast's impact. Finally, while the study design suited our purpose, a voluntary, nonrandomized approach exposed our results to bias. In particular, the higher number of hours spent studying may represent recall or observation bias.

This study is one of the first to evaluate typical podcast usage in pediatrics. Students' perceptions of the podcast show a significant reaction-level impact and users reported spending significantly more time studying than nonusers. Our results suggest that podcasts are best suited as supplements to existing curricula, with brief episodes that reiterate key points to account for listeners' divided attention. While further research on outcomes is needed, our study supports an increased role for podcasts in medical education.

TABLE 1. Study Participant Demographics*

Demographics	User, n (%)	Nonuser, n (%)	*P* Value
Sex	**43 (100)**	**40 (100)**	.207
Male	22 (51)	14 (35)	
Female	21 (49)	26 (65)	
Race/Ethnicity	**42 (100)**	**38 (100)**	.842
White	29 (69)	25 (66)	
Black/African-American	3 (7)	5 (13)	
Hispanic Other	6 (14)	5 (13)	
	4 (10)	3 (8)	

*Demographic data were collected using the optional questionnaire included with the National Board of Medical Examiners subject examination. Response options were prepopulated and only one response could be selected.

TABLE 2. Perceived Utility of Study Resources (1=Least Useful, 10=Most Useful)

Study Resources	User Mean (SD)	Nonuser Mean (SD)	P Value
Practice questions	9.6 (0.9) (n=44)	9.4 (1.3) (n=42)	.557[a]
Podcast	6.0 (1.6) (n=44)	3.4 (2.6) (n=18)	.0001[a]
Review books	5.2 (2.3) (n=38)	4.9 (2.8) (n=37)	1.000[a]
Personal notes	4.7 (2.3) (n=26)	5.3 (2.6) (n=29)	.416[b]
Textbooks	2.4 (1.7) (n=22)	2.9 (2.1) (n=17)	.566[a]

Wilcoxon-Mann-Whitney Test
Two sample t test
Ns differ for each item because students were only asked to evaluate study resources they use.

TABLE 3. Pediatrics Career Interest and Extracurricular Study Time During Pediatrics Clerkship

Item	Users	Nonusers	*P* Value (Wilcoxon)
Pediatrics career interest[a] **(Likert Scale 1 to 7)**	4 (4.0) (n = 43)	3 (2.5) (n=40)	.028
Study hours per week [b]	16.5 (9.0) (n=42)	12.4 (9.2) (n=41)	.009

Median (interquartile range)
Mean (standard deviation)

TABLE 4. Users' Perceptions of Peds Soup Podcast (N=43)

General Ratings (Scale: 1 = Lowest to 10 = Highest)	Mean (SD)
Overall rating for the Peds Soup podcast	8.1 (1.4)
Impact on my knowledge of pediatrics	7.3 (1.5)
Impact on my clinical performance	5.9 (1.7)
Specific Ratings (1=Completely Disagree to 7=Completely Agree)	**Median (IQR)**
Introduces me to new topics	6 (1.0)
Reinforces information I have already learned	6 (1.0)
Helps me apply knowledge to clinical cases	6 (1.0)
Is something I would recommend to others to learn topics in pediatrics	6 (1.5)
Helps me learn new information	6 (2.0)
Helps me review important information for the clerkship exam	6 (2.0)
Makes it easier for me to find time to study	6 (2.0)
Is something I plan to continue listening to	5 (2.0)

Abbreviations: SD, standard deviation; IQR, interquartile range.

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