



Original Article

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# Enhancing paediatric and congenital cardiology e-learning postgraduate education: insights from the Association for European Paediatric and Congenital Cardiology directed webinar series

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**Abstract**

*Objective:* A series of webinars covering widespread knowledge on paediatric cardiology and cardiac surgery topics was initiated by Association for European Paediatric and Congenital Cardiology, serving towards preparation for the Association for European Paediatric and Congenital Cardiology certification in paediatric and congenital cardiology. This study investigated the impact of webinars as educational tools for junior paediatric cardiologists in the post-COVID-19 pandemic era. *Materials and methods:* A cross-sectional survey design study using an online survey as a tool for the assessment of trainees. An open and closed-ended SurveyMonkey questionnaire was used to document the learners’ opinions on webinars. Results were reported using descriptive statistical analyses. *Results:* Twenty-seven Association for European Paediatric and Congenital Cardiology junior members participated in the online survey from twelve different countries. Most of the participants were trainees in paediatric cardiology (56%), and the remainder were junior consultants in paediatric cardiology. Approximately 70% found no difficulties in participating in the webinars. The webinars were appreciated by participants, who found the webinars interactive and highly educational with contents highly applicable to everyday clinical practice. Significant heterogeneity emerged in training programmes across Europe and worldwide in terms of programme duration, number of fellows, teaching approach, and assessments. Training opportunities such as courses, grants, and more webinars were suggested as tools to support continuous learning by the Association for European Paediatric and Congenital Cardiology. *Conclusion:* The Association for European Paediatric and Congenital Cardiology webinar series has confirmed the crucial role of online-based learning resources in the new generation of junior paediatric cardiologists. Association for European Paediatric and Congenital Cardiology webinars and the examination in paediatric cardiology may help standardise training across Europe, promoting the highest standards in patient care.

**Introduction**

The Association for European Paediatric and Congenital Cardiology, in collaboration with the European Reference Network for Rare and Low Prevalence Complex Diseases of the Heart, initiated a series of teaching webinars covering widespread knowledge on paediatric cardiology and cardiac surgery topics, serving towards preparation for the Association for European Paediatric and Congenital Cardiology exam. Twenty-eight webinars were organised at the time of the survey covering the majority of topics summarised in the “Association for European Paediatric and Congenital Cardiology Recommendations for Training in Paediatric and Congenital Cardiology”.<sup>1</sup> These webinars, planned through the Educational Committee and

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junior member representative of Association for European Paediatric and Congenital Cardiology with the support from Association for European Paediatric and Congenital Cardiology Working Groups, take place on a bi-weekly basis and started on 7 December 2022. Zoom, a cloud-based video conferencing platform, was used to host the webinars. The format of the webinars generally consists of a clinical case presentation, followed by two lectures, with sufficient time for Q&A and interaction with the speakers.

This study aims to investigate the impact of webinars as educational tools for junior paediatric cardiologists in the post-COVID-19 pandemic era.

## Methods

We designed a cross-sectional observational survey using a web-based questionnaire. The tool to assess the trainees was an online survey of 38 questions (Appendix A). All Association for European Paediatric and Congenital Cardiology junior members who registered and participated at least in one webinar were eligible for inclusion and were invited by an e-mail from the Association for European Paediatric and Congenital Cardiology office to participate in the online survey. The link to participate in the survey was also attached at the end of each webinar. At the time of this survey, 28 webinars were displayed (Table 1). General data to assess the junior members' characteristics were collected. A Likert 5-point scale was used to assess learners' opinions on various points regarding the webinars. The last ten questions investigated the strengths and weaknesses of different training programmes. Open questions using SurveyMonkey were also used to document the learners' opinions on webinars. Descriptive statistical analyses were used to report the results.

## Results

Of a population of 318 Association for European Paediatric and Congenital Cardiology junior members from 45 countries, on average 100 participants attended each webinar. Twenty-seven Association for European Paediatric and Congenital Cardiology junior members agreed to participate in the online survey. Most of the participants were trainees in paediatric cardiology (56%), and the remainder were junior consultants in paediatric cardiology, from twelve different countries worldwide. The majority of trainees were in their last three years of training (71%).

### Webinar participation

An average of 22 webinars were attended by survey participants and when they could not attend this was mainly due to overlapping work duties, such as on call or prolonged outpatient clinic. However, about 70% found no difficulties in participating in the webinars. When attendance was not possible approximately half of them accessed recordings available on the Association for European Paediatric and Congenital Cardiology website. A small percentage of participants in the survey expressed some degree of fatigue due to the large number of webinars available (12%), while 58% disagreed, expressing also positive feedback regarding the availability of information (topics and speakers) before the webinar (73%). However, 26% voiced the need for better advertisement prior to webinars occurring. The Association for European Paediatric and Congenital Cardiology office provided excellent assistance with high technical resources/quality during the

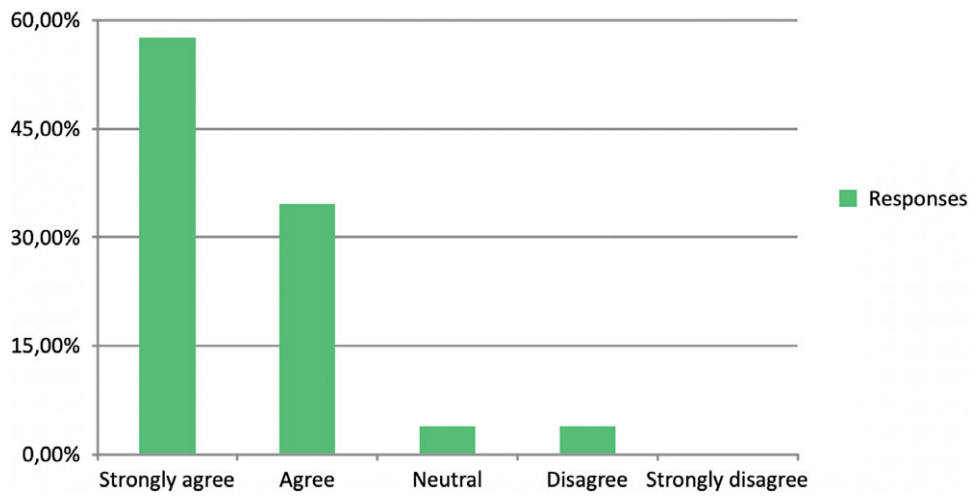
**Table 1.** AEPC webinar participation

	Webinar	N° of live participants	Recording views
1	Arrhythmia	162	127
2	Coarctation of the aorta	120	96
3	Mis-c and Kawasaki disease	162	70
4	Fetal cardiology I	176	55
5	Double outlet right ventricle	139	66
6	Transposition of the great arteries	146	81
7	Foetal cardiology II	105	59
8	Congenitally corrected transposition of the great arteries	103	52
9	Paediatric heart failure	129	93
10	Intensive care	104	56
11	Ebstein	95	78
12	Managing your own career	63	33
13	Hypoplastic left heart syndrome	99	68
14	Tetralogy of fallot	90	74
15	Rare cardiomyopathies in children	116	68
16	Fontan circulation	109	94
17	Rheumatic heart disease	59	53
18	Coronary arteries anomalies	94	67
19	Cardiopulmonary interactions	105	69
20	Sport cardiology	134	73
21	Fetal cardiology III	89	14
22	Treating the whole child	73	11
23	Long QT syndrome	151	46
24	Paediatric heart transplantation	101	43
25	Home monitoring and cardiac devices	86	26
26	Aortic valve	69	30
27	Paediatric pulmonary hypertension	66	42
28	Basic haemodynamics	111	87

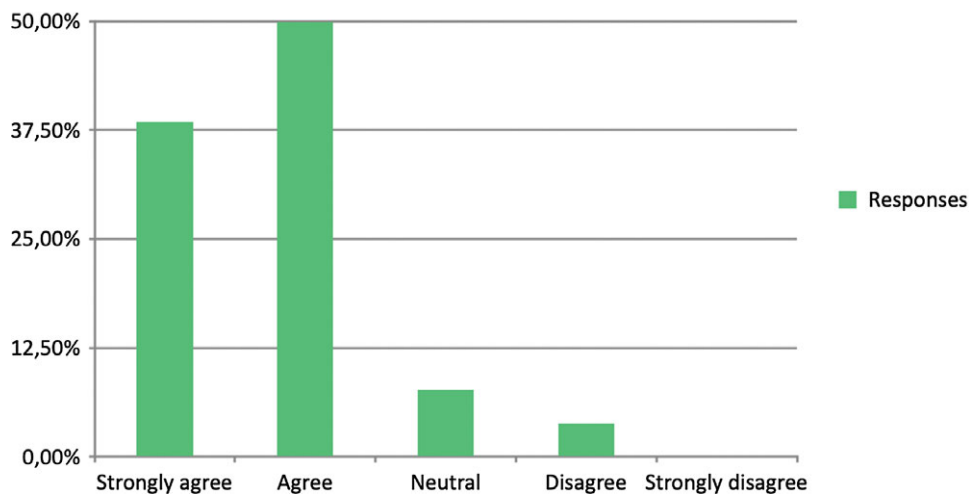
webinars according to the vast majority of members (>75%), with the others being neutral.

### Satisfaction level and interaction

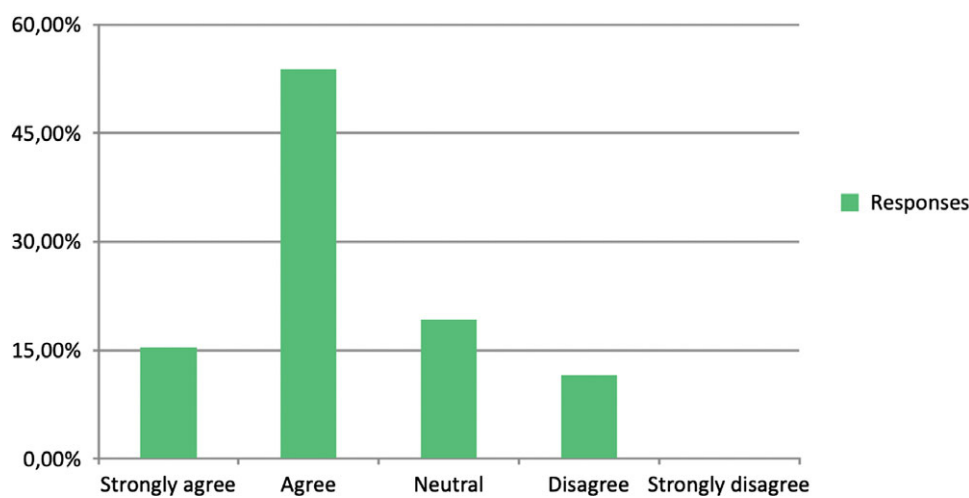
The webinars were generally appreciated by Association for European Paediatric and Congenital Cardiology junior members, with more than 90% finding the webinars highly educational with excellent quality of teaching and speakers (Figure 1). Most of the participants stated the contents were highly applicable to their everyday clinical practice (88%), especially the basic and haemodynamic-based webinars (Figure 2). Nearly 70% of participants found the webinar question and answer session to be highly interactive (Figure 3), with effective participation of juniors in the case presentations and moderation. The topic choice, the length of the webinars, the interaction, and the knowledge of the international speakers were considered the strengths of the



**Figure 1.** High educational value of webinars.



**Figure 2.** Participants who believed the webinar contents were highly applicable to everyday cardiology practice.



**Figure 3.** Participants who believed the level of interaction was high during the webinar's Q&A session.

webinars. Some weaknesses were highlighted by the interviewees including excessive use of abbreviations and the use of factual knowledge of some talks.

### *Trainee views on their training programmes*

Several paediatric cardiology trainees appreciated the excellent teaching offered by their training programmes and the large volume of cases in their departments. On the contrary, excessive workload, poor organisation, and limited access to some paediatric cardiology sub-specialities were considered weaknesses of their respective programmes. The duration of paediatric cardiology training programmes was highly variable, ranging from 2 to 6 years. The number of fellows in each department was also very variable (range 2–10) with roughly half of them receiving regular scheduled teaching, assessments, or feedback (52%, 55%, and 52%, respectively). Increased responsibility, work-life balance, and excessive bureaucracy were perceived as the main concerns about graduation to attending. Despite bedside teaching still being considered the best way to learn, alternative online-based resources such as webinars and podcasts are judged a valid surrogate, together with textbooks and medical journals. These tools were considered crucial in improving the training programme. Training opportunities such as courses, grants, and more webinars were suggested as tools to support continuous learning by the Association for European Paediatric and Congenital Cardiology.

### **Discussion**

Online webinars have emerged as an important learning tool during the COVID-19 pandemic. They allowed, in the absence of in-person medical conferences, to facilitate the training process of young paediatric cardiologists worldwide.<sup>2,3</sup> The Association for European Paediatric and Congenital Cardiology has favoured this process with the creation of a webinar series dedicated to paediatric cardiology and cardiac surgery topics, serving towards preparation for the Association for European Paediatric and Congenital Cardiology exam, as part of the Association for European Paediatric and Congenital Cardiology certification as paediatric cardiologist. The principle was covering all the basic paediatric cardiology topics for junior paediatric cardiologists, trying to standardise knowledge throughout European Countries. This series has obtained considerable success among the junior members of the society. This article highlights the impact of webinars as e-online learning educational tools in the post-pandemic era. Most of the interviewed junior members appreciated the high level of interaction and inclusivity of this web-based platform, highlighting the possibility of worldwide participation, breaking down the logistical and economic barriers resulting from an in-person international conference.<sup>4,5</sup>

Moreover, the introduction of the online version of the Association for European Paediatric and Congenital Cardiology exam in paediatric and congenital cardiology for trainees in paediatric cardiology and trained paediatric cardiologists has the potential to attract and increase international participation. These activities may play a role in reducing the educational inequalities among different training programmes throughout the world. Indeed, the majority of participants emphasised the benefit of this series, probably due to the high quality of the speakers providing the current state-of-the-art knowledge, the accurate topic choice by

the Association for European Paediatric and Congenital Cardiology Education Committee and Association for European Paediatric and Congenital Cardiology Working Groups and the high interaction. The last was possibly feasible due to the online format and the active participation of junior members as case presenters and/or moderators, which reduced the social and emotional barriers possible during the live medical talks. Indeed, the Association for European Paediatric and Congenital Cardiology junior members played a crucial role in this initiative, actively organising the webinars and taking the responsibility for presenting cases and moderate sessions. Furthermore, e-/online learning platforms have a significant impact on the environment by reducing the environmental costs of conferences such as travel, accommodation and conference venue.<sup>6</sup> This aspect is acquiring a crucial role in terms of promoting “sustainable academia” and rationalisation of carbon footprint during conference attendance.<sup>3,7,8</sup> Finally, junior members expressed their satisfaction with the availability of recordings on the Association for European Paediatric and Congenital Cardiology website, which allowed full resource access for those who were unable to participate in the live events.

However, interviewed Association for European Paediatric and Congenital Cardiology junior members highlighted also several drawbacks of online webinars. Surprisingly, none of them pointed out the limited chance of networking in comparison to in-person conferences or the more impersonal teaching method. On the contrary, they focused on the excessive use of abbreviations and the use of factual knowledge in some talks, which is reasonably not different from in-person meetings. Some expressed doubts about the timing, duration, and format of the webinars, which depend on personal preferences and are often overcome by the possibility of reviewing website recordings. Finally, only 12% expressed fatigue due to a large number of available webinars, probably due to a confirmation bias towards webinar participation and the restarting of in-person meetings after the COVID-19 pandemic.

With regard to the training programmes, an enormous heterogeneity emerged across Europe and worldwide. Most of the programmes appeared department-dependent with wide variability in the duration, teaching approach, assessments, or feedback. Also, the number of fellows and access to different paediatric cardiology sub-specialities varied extensively. These data could be explained by the different provenance of junior members, with some of them coming from tertiary care centres and others from local hospitals. Therefore, it is essential to standardise training programmes throughout Europe to guarantee the highest standards in patient care. The role of the Association for European Paediatric and Congenital Cardiology should be crucial in this process, aided by appropriate tools such as the webinar series and the Association for European Paediatric and Congenital Cardiology exam in paediatric and congenital cardiology. However, these resources cannot replace in-person meetings and training courses, which remain fundamental activities for our association. This study confirmed the role of webinars and E-learning in supporting learning in a small community such as paediatric cardiology with heterogeneous backgrounds and centre-dependent clinical and surgical management. We believe that junior paediatric cardiologists can benefit from these E-learning platforms as an integration of the traditional learning approach, to standardise knowledge as training programmes appeared highly variables.

### Future directions

Online-based learning resources such as webinars and podcasts are judged valid pedagogical methods in addition to textbooks, medical journals, and bedside learning. E-learning appeared to have a dramatic impact on stimulating deep learning for the participants involved in webinars, even more than a more traditional textbook or medical journal methods of learning.<sup>3</sup> The role that webinars have played in times of pandemic is undeniable, allowing continuous education despite the impossibility of attending in-person meetings. Even after the COVID-19 pandemic webinars are well attended and considered of high value, however, their definitive space will be defined over the next years. Certainly, webinars cannot replace the benefits of networking at a (traditional) in-person conference. Finally, artificial intelligence algorithms might impact even more on the traditional ways of learning, opening new scenarios that should be further explored in the future.

### Limitations

Only 27 Association for European Paediatric and Congenital Cardiology junior members completed the survey despite repeated invitations for webinar participants to join the study. The study population was also heterogeneous, consisting of both trainees in paediatric cardiology and junior consultants. Confirmation bias towards webinar participation may be possible in this setting and the results of this study should be considered carefully. The effectiveness of the webinars was tested just by the feedback and satisfaction level of participants. Better learning outcome was not assessed as beyond the scope of this article.

### Conclusion

The Association for European Paediatric and Congenital Cardiology webinar series has confirmed the crucial role of online-based learning resources in the current generation of junior paediatric cardiologists. The high level of knowledge and clinical experience transmitted within 90 minutes and the high satisfaction level expressed by international junior paediatric cardiologists highlight how webinars can be considered an interesting pedagogical strategy for the future. Association for European Paediatric and Congenital Cardiology webinars and the examination in paediatric cardiology may help in standardising training throughout Europe, promoting the highest standards in patient care. The role of webinars in the post-COVID-19 pandemic needs to be defined in the following years, given the carbon-reduction

implications compared to in-person conferencing. However, careful consideration of altering the current paradigm must be considered given the myriad of advantages in person attendance at medical conferences.

**Supplementary material.** The supplementary material for this article can be found at <https://doi.org/10.1017/S1047951124036448>.

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**Competing interests.** None.

**Ethical standard.** The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national guidelines and with the Helsinki Declaration of 1975, as revised in 2008.

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