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Finding Positive Takeaways for Resident Education from the COVID-19 Pandemic: A Qualitative Approach

Background: The COVID-19 pandemic impacted learning environments across the continuum of medical education. While several recent studies have highlighted educational innovations arising from the pandemic, limited literature exists describing beneficial changes that may have occurred from residents' perspectives. The present study explored perceptions of post-graduate trainees from several specialties and highlighted educational 'wins' from pandemic innovations that should inform post-pandemic practices.

Methods: A qualitative instrument was developed through input from Emergency Medicine (EM) residents, faculty, and the University of Wisconsin EM Education Research and Research committees. It was disseminated via email to EM, Internal Medicine, and Surgery residents who were PGY-2 or higher at a single academic institution. The data were analyzed using thematic analysis; two raters independently coded the responses of residents and arrived at consensus.

Results: Advantages of clinical reassignments included novel clinical experiences as well as the perception of contributing to a greater good. Residents noted a greater sense of meaning in their studying related to the pandemic, while also reporting greater flexibility in their options. Positive changes to didactic lectures included ease, efficiency, and comfort associated with remote lectures as well high-quality visiting expert and resident presentations. Finally, key elements of the support provided by residency programs were consistent communications, provision of relevant resources, acknowledging difficulties, and replacing lost clinical experiences.

Conclusions: Many innovative elements of residencies' response to COVID-19, such as flexible scheduling and offering more opportunities for individualized learning, were well-received by trainees.

Keywords: Didactics, Study habits, Clinical

یافتن نکات مثبت جهت آموزش دستیاران تخصصی پس از همه گیری کووید 19: یک رویکرد کیفی

زمینه و هدف: همه گیری کووید 19 بر محیط های آموزشی در کلیه رشته های مرتبط با آموزش پزشکی تأثیرگذار بوده است. شواهد محدودی وجود دارد که تغییرات مفید احتمالی رخ داده و نوآوری های آموزشی ناشی از همه گیری کرونا را از دیدگاه دستیاران تخصصی توصیف کند. ما در این مطالعه، استنباط کارآموزان دانش آموخته از چندین تخصص مختلف را بررسی کرده و به «موفقیت های» آموزشی ناشی از نوآوری های حاصله در دوران همه گیری کووید که می توانند سبب ارتقاء روش های آموزشی پس از این دوران گردند، پرداخته ایم. **روش:** یک ابزار کیفی از طریق ورودی از دستیاران تخصصی، اساتید و کمیته های آموزشی و پژوهشی طب اورژانس دانشگاه ویسکانسین ساخته شد و از طریق ایمیل در اختیار دستیاران تخصصی طب اورژانس، داخلی و جراحی که سال دوم یا بالاتر در همان دانشگاه بودند، قرار داده شد. داده ها با استفاده از تحلیل موضوعی تجزیه و تحلیل شدند. دو ارزیاب به طور مستقل پاسخ های دستیاران را کدگذاری کردند و به اجماع رسیدند.

یافته ها: مزایای ایجاد تغییر در وظایف بالینی دستیاران، شکل گیری تجربیات بالینی جدید در آنها و ایجاد حس مشارکت در کاری بزرگ تر بود. دستیاران تخصصی به حس منادار بیشتری در مطالعات خود در رابطه با بیماری کووید اشاره داشتند، ضمن این که انعطاف پذیری بیشتری را نیز در انتخاب های خود گزارش کردند. تغییرات مثبت در سخنرانی های آموزشی شامل سهولت، کارآمدی و راحتی سخنرانی های از راه دور و همچنین کیفیت بالای ارائه های دستیاران و متخصصین بود. عناصر اصلی حاصل از این برنامه های رزیدنتی عبارت بودند از ارتباطات مداوم، ارائه منابع مرتبط، تأیید مشکلات موجود و جایگزینی برخی تجارب بالینی از دست رفته.

نتیجه گیری: عناصر نوآورانه زیادی مانند برنامه ریزی انعطاف پذیرتر و ارائه فرصت های بیشتر برای یادگیری فردی در عکس العمل رزیدنت ها به کووید 19، توسط کارآموزان مورد استقبال قرار گرفت.

واژه های کلیدی: آموزشی، عادات مطالعه، بالینی

یجاد طرق إيجابية لتعليم المقيمين من جائحة COVID-19: نهج نوعي

الخلفية: أثر جائحة COVID-19 على بيئات التعلم عبر سلسلة التعليم الطبي. في حين أن العديد من الدراسات الحديثة قد سلطت الضوء على الابتكارات التعليمية الناشئة عن الوباء، توجد أدلة محدودة تصف التغييرات المفيدة التي قد تكون حدثت من وجهة نظر السكان. استكشفت الدراسة الحالية تصورات المتدربين بعد التخرج من عدة تخصصات و سلطت الضوء على "المكاسب" التعليمية من الابتكارات الوبائية التي ينبغي أن توجه ممارسات ما بعد الوباء. **الطريقة:** تم تطوير أداة نوعية من خلال مدخلات من مساعدين متخصصين و أساتذة و لجان تدريس و بحث في مجال طب الطوارئ في جامعة ويسكونسن. تم توفير أداة الجودة هذه عبر البريد الإلكتروني لمساعدين متخصصين في الطوارئ و الطب الباطني و الجراحة الذين كانوا في نفس الجامعة لمدة عام ثانٍ أو أعلى. تم تحليل البيانات باستخدام التحليل الموضوعي. قام المقيمان بترميز ردود المساعدين بشكل مستقل و توصلوا إلى توافق في الآراء.

النتائج: تضمنت مزايا عمليات إعادة التخصيص السريرية التجارب السريرية الجديدة بالإضافة إلى تصور المساهمة في مصلحة أكبر. لاحظ السكان إحساساً أكبر بالمعنى في دراستهم المتعلقة بالوباء، بينما أبلغوا أيضاً عن مرونة أكبر في خياراتهم. تضمنت التغييرات الإيجابية في المحاضرات التعليمية السهولة و الكفاءة و الراحة المرتبطة بالمحاضرات عن بعد بالإضافة إلى العروض التقديمية عالية الجودة من الخبراء الزائرين والمقيمين. أخيراً، كانت العناصر الرئيسية للدعم المقدم من برامج الإقامة هي الاتصالات المنتسقة، توفير الموارد ذات الصلة، الاعتراف بالصعوبات و استبدال التجارب السريرية المفقودة.

الاستنتاجات: استقبل المتدربون العديد من العناصر المبتكرة لاستجابة الإقامة ل COVID-19، مثل الجدولة المرنة و تقديم المزيد من الفرص للتعلم الفردي.

الكلمات المفتاحية: التعليم، عادات الدراسة، السريرية

وفا کے بعد تربیتی ماہرین کے لیے کوئیڈ 19 مثبت تجاویز تلاش کرنا: ایک قابلیت کا نقطہ نظر

پس منظر اور مقصد: کوئیڈ 19 کی وبا نے طبی تعلیم سے متعلق تمام شعبوں میں تعلیمی ماحول کو متاثر کیا ہے۔ اگرچہ کئی حالیہ مطالعات میں کورونا وائی امراض کے نتیجے میں پیدا ہونے والی تعلیمی اختراعات پر غور کیا گیا ہے، تاہم ماہرین کے معاونین کے نقطہ نظر سے ہونے والی ممکنہ طور پر فائدہ مند تبدیلیوں کو بیان کر سکیں۔ اس مطالعے میں، ہم متعدد مختلف خصوصیات سے تعلق رکھنے والے تربیت یافتہ افراد کے نتائج اور تاثرات کا جائزہ لیتے ہیں اور کوئیڈ کی وبا کے دوران حاصل کردہ اختراعات سے حاصل ہونے والی تعلیمی "کامیابیوں" پر گفتگو کرتے ہیں جو اس عرصے کے بعد تعلیمی طریقوں کو بہتر بنا سکتی ہیں۔ **طریقہ:** یونیورسٹی آف ویسکونسن میں ایمرجنسی میڈیسن کے شعبے میں ماہر معاونین، پروفیسرز، اور تدریسی اور تحقیقی کمیٹیوں کے ان پٹ کے ذریعے ایک کوالٹیو آلہ تیار کیا گیا۔ یہ کوالٹی ٹول ای میل کے ذریعے ایمرجنسی، انٹرنل میڈیسن اور سرجری کے ماہر معاونین کو فراہم کیا گیا تھا جو اسی یونیورسٹی میں دوسرے سال یا اس سے زیادہ کے لیے تھے۔ موضوعاتی تجزیہ کا استعمال کرتے ہوئے ڈیٹا کا تجزیہ کیا گیا۔ دونوں تجزیہ کاروں نے معاونین کے جوابات کو آزادانہ طور پر کوڈ کیا اور اتفاق رائے پر پہنچ گئے۔

نتائج: معاونین کے طبی کاموں میں تبدیلیاں اور ان میں نئے طبی تجربات کی تشکیل اور کسی بڑے کام میں شرکت کرنا شامل ہے۔ معاونین نے کوئیڈ کی وبا کے بارے میں اپنے مطالعے میں کامیابی کے زیادہ احساس کو نوٹ کیا، جبکہ اپنے انتخاب میں زیادہ لچک کی اطلاع بھی دی۔ تربیتی لیکچرز میں مثبت تبدیلیوں میں فاصلاتی لیکچرز کی آسانی، کارکردگی اور سہولت کے ساتھ ساتھ معاونین اور ماہرین کی پیشکشوں کا اعلیٰ معیار بھی شامل تھا۔ آخر میں، ان ریزیدنسی پروگراموں سے حاصل ہونے والے کلیدی عناصر جاری تھے، متعلقہ وسائل فراہم کرنا، موجودہ مسائل کو تسلیم کرنا اور، اور کچھ کھوئے ہوئے طبی تجربات کو تبدیل واپس لانا

نتیجہ: کوئیڈ 19 پر رہائشیوں کے رد عمل میں بہت سے اختراعی عناصر، جیسے لچکدار منصوبہ بندی اور انفرادی سیکھنے کے مزید مواقع فراہم کرنے کو تربیت حاصل کرنے والوں نے خوب اہمیت بخشی۔

مطلوبہ الفاظ: تعلیمی، مطالعہ کی عادات، طبی

INTRODUCTION

The COVID-19 pandemic has had an enormous impact on learning environments across the continuum of medical education over the last 18 months. In addition to obvious effects on the clinical experiences of medical students and residents, restrictions on physical gatherings forced educators to reimagine everything from the structure of didactics to trainee assessment (1).

Several recent publications have focused on describing educational innovations in response to challenges posed by the pandemic (2,3). Understandably, most institutions moved to virtual didactics utilizing online platforms, including virtual simulation (4) and social media (5), though several also discovered renewed value in more traditional, low-tech learning modalities, such as bedside rounds (6). Safe, practical solutions became essential in the clinical arena, such as reassigning residents to the busiest areas and separating teams (7). Additionally, the pandemic has provided a unique opportunity to reimagine standard components of educational curricula, such as journal club, where the focus could be shifted from the assessment of landmark papers to the appraisal of emerging, pre-publication data (6).

Despite the relative abundance of ‘educational innovation reports,’ there has been a paucity of literature exploring learner perceptions around the impact of changes in the educational environment associated with COVID-19. In exploring these perceptions, the present researchers postulated that learners would identify advantages in the adaptations necessary for COVID-19 that may be useful as programs chart a new course post-pandemic.

METHODS

Setting

This study was conducted at the University of Wisconsin, a large tertiary care academic medical center.

Instrument

The qualitative instrument was developed by the authors: a PGY-1 resident, a Program Director, and an Associate Program Director, all from Emergency Medicine (EM). Topics which were explored included the experience of being reassigned, changes in clinical duties, personal study habits and didactic lectures, and support provided by their residency program. The EM Education Research and Research committees provided feedback and revisions. Additionally, response process validity evidence was gathered by asking recent residency graduates who were similar to the study population but ineligible for the study to answer the proposed questions and give feedback to ensure that the questions were understandable and elicited appropriate responses; further improvements were made based on their feedback.

Target population

The target population for the study was current residents who were PGY-2 or greater from emergency medicine, internal medicine, and general surgery. A total of 23 emergency medicine residents, 54 internal medicine residents and 40 general surgery residents were eligible to

participate (117 total). PGY-1 residents were excluded as they had not yet started residency at the start of the pandemic and may have missed relevant changes.

Distribution

Participation was requested of a convenience sample of residents by email in Fall 2020. Responses were collected via Qualtrics over a three-week period, with two reminder emails being sent one-week apart until thematic saturation was reached (8).

Data analysis

The researchers analyzed data through thematic analysis, as a grounded theory approach was not feasible given researchers’ pre-existing content area knowledge. Two of the authors (MS and BS) coded the responses independently, grouping the answers into themes. These investigators then met to reconcile the themes identified and developed a consensus set of themes. No formal response rate was calculated, as qualitative research is hypothesis generating and does not rely on a comprehensive assessment of the entire population.

Approval

This project was deemed exempt quality improvement by the University of Wisconsin Institutional Review Board.

RESULTS

There were 16 respondents from emergency medicine, 8 respondents from internal medicine, and 13 respondents from surgery, for a total of 37 responses. Not every respondent answered every question. Themes identified are shown in Table 1.

Table 1. Themes identified in residents’ responses across 4 domains: changes in clinical duties, changes in study habits, changes in didactics, and changes in residency support

Changes in clinical duties
Additional time for nonclinical learning
Novel clinical experiences
Rest and recovery
Learning adaptability
Contribute to greater good
Changes in study habits
Increased availability of learning opportunities
Greater sense of meaning in studying (COVID-19, ICU)
More time to read
Additional flexibility
Changes in didactics
Easy to attend (e.g. even when on away rotations)
Comfort with viewing at home
More flexibility (e.g. schedule, content, location)
Efficient use of time (e.g., less commute, more sleep)
Improved quality of interaction (e.g. Zoom chat, more small-group learning)
Allowed for increased number of lectures
More opportunities for resident presentations

Table 1. Continued.
Spurred innovation (e.g. a new COVID-19 lecture series)
Allowed more visiting lectures
Ability to multitask (e.g. complete laundry during conference)
Increased relevance of didactics (e.g. focused on important COVID-19 clinical updates)
Changes in residency support
Providing practical support (e.g. providing food, ensuring safety)
Supporting virtual learning
Consistent communication
Providing timely/relevant resources
Acknowledging difficulties
Flexibility with requirements
Replacing missed clinical experiences

Changes in clinical duties

One benefit identified by residents was novel clinical experiences. For example, one resident stated, “It is actually quite helpful to learn how others make decisions.” Residents also voiced appreciation for contributing to the greater good, with one stating, “I continued to help with patient care. This was important to me, especially during a time in our world and country when . . . being healthy enough to take care of patients is a blessing.” The opportunity to rest and recover was also identified as an important factor, with one resident stating, “More time off = more rest = less burnout.”

Changes in study habits

Residents noted a greater sense of flexibility regarding their personal studying, with one respondent reporting, “much more...self-guided learning.” The direct applicability of COVID/ICU studying on their daily patient care was appreciated by residents, with one resident reporting that their studying was, “more purposeful.”

Changes in residency didactics

The ease of attending remote lectures was applauded by residents, with one stating that, “[it’s] easier to attend conference while getting adequate amounts of sleep.” Similarly, they appreciated the opportunity to avoid time commuting to attend conferences; as one resident stated: “[I don’t] hav[e] to get up an hour earlier than normal to get to conference.” The ability to attend lectures that residents would have otherwise had to miss while on off-site rotations was identified as an additional benefit, with one respondent stating, “online didactics facilitate remote attendance.” Residents also observed increased opportunities for “high quality conference speakers” from virtually visiting experts. An increase in resident-driven presentations was also welcomed. One resident shared: “Our residency organized resident-led talks . . . which were extremely helpful and educational.”

Support from residency programs

Consistent communications regarding COVID-19 changes and disruptions were appreciated, along with “acknowledgement of the difficulty” faced by residents. Residents were pleased by the effort that programs made to

adapt, with one resident commenting, “Our department seems to be willing to adapt and provide education however possible in the ever-shifting COVID rules,” and another noting that their program, “Redesign[ed] the curriculum and provid[ed] the infrastructure for online education.” Given the loss of various educational opportunities, residents thought it was important that programs find ways to replace lost clinical experiences, as one resident stated: “Leadership has been trying to help people get back opportunities that were significantly altered if desired.”

DISCUSSION

COVID-19 pandemic offered instructive lessons for residency design post-pandemic. While other studies have examined what types of changes occurred to education as well as how to manage the effects of pandemic changes on the residency curriculum, this is the first study to focus specifically on positive changes that should continue post-pandemic.

While one major theme that was identified was residents' enjoyment of the ease and comfort of participating in conferences from home via videoconferencing, many employers are currently confronting this issue, as the benefits of telework (9) are now much more widely recognized. Nevertheless, the researchers believe that programs should interpret this enthusiasm with some caution. As one early look at virtual learning showed, decreased attention, participation and collaboration, technology problems, and increased social isolation among residents can mar the quality of the learning experience significantly (10). It may behoove programs to consider the benefits of a hybrid model that includes virtual and in-person didactics, where a virtual option is offered in limited cases to maximize the benefits of both models.

Increased personal time was a major theme reported by residents across the spectrum of COVID-19 educational changes. With the return of high patient volumes to the ED, programs may be unable to offer the same level of time-off and flexibility they were able to offer when volumes in some locations dropped precipitously early in the pandemic (11). However, programs should be mindful of the value that additional time off holds for trainees, as trainees' free time is often limited due to extended work hour obligations or clinical requirements such as documentation. Evidence-based recommendations for maximizing resident wellness during training exist (12) and include circadian scheduling, which can improve wakefulness and the quality of time off. Flexibility was another theme frequently identified, as residents appreciated the opportunity to utilize the educational resources that were most valuable to them. This is in line with a variety of ongoing efforts to make the process of learni more customized during residency, including individualized interactive instruction (13), individual learning plans (14), and competency-based medical education (15).

One unexpected theme was that residents found additional meaning in their work during the pandemic. This contrasts with the high reported rates of healthcare provider burnout reported during the pandemic (16), which generally causes

a decreased sense of purpose in work activities. Finding value in contributing to the greater good (another reported theme) may have been a factor that prevented burnout rates from being even higher. Programs could consider tying more educational content to broader societal health trends, such as the opiate epidemic, to allow learners to better understand the broader impact of their work.

Finally, the findings of this study showed that frequent communication is critical in times of difficulty. This is similar to what was seen at other programs during the COVID-19 pandemic (6), and has been emphasized in other contexts as important for effectively managing teams during crises.

This study included only the perspective from residents at a single institution; soliciting responses by email was necessitated by the pandemic but limited the opportunity to connect with more residents and asked clarifying or follow-up questions to responses.

The COVID-19 pandemic necessitated an enormous amount of educational innovation in a short time. Many innovative elements of residencies' response to COVID-19, such as flexible scheduling and offering more opportunities for individualized learning, were well-received by trainees and

could be considered for continuation post-pandemic. By thinking mindfully about which of these changes can be preserved moving forward and incorporating residents' perspectives, residency education can best prepare for the future.

Ethical considerations

Ethical issues including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been completely observed by the authors.

ACKNOWLEDGEMENTS

Medicine Education Scholarship Committee and the University of Wisconsin Research Committee for their assistance with instrument revisions.

Financial Support: There was no financial support for this project.

Conflict of Interest: There is no conflict of interest.

REFERENCES

- Gordon M, Patricio M, Horne L, Muston A, Alston SR, Pammi M, et al. Developments in medical education in response to the COVID-19 pandemic: A rapid BEME systematic review: BEME Guide No. 63. *Med Teach*. 2020;42(11):1202-15.
- Austin A, Rudolf F, Fernandez J, Ishimine P, Murray M, Suresh P, et al. COVID-19 Educational Innovation: Hybrid In-Person and Virtual Simulation for Emergency Medicine Trainees. *AEM Educ Train*. 2021:e10593.
- Singh K, Srivastav S, Bhardwaj A, Dixit A, Misra S, et al. Medical Education During the COVID-19 Pandemic: A Single Institution Experience. *Indian Pediatr*. 2020;57(7):678-79.
- Mufti A, Maliyar K, Sachdeva M, Doiron P. Modifications to dermatology residency education during the COVID-19 pandemic. *J Am Acad Dermatol*. 2020;83(3):e235-6.
- Coleman CG, Law KL, Spicer JO. Education in The Time of COVID: Leveraging Social Media to Teach during Pandemic Pandemonium. *Med Educ*. 2020;54(9):852-53.
- Rabin E, Willis J, Alexander D, Steinberg E, Chung A, Kulkarni M, et al. Residency Leadership Lessons From the Epicenter of the COVID-19 Surge. *AEM Educ Train*. 2020;4(4):340-346.
- Johnson J, Chung MT, Carron MA, Chan EY, Lin HS, Hotaling J. Novel changes in resident education during a pandemic: strategies and approaches to maximize residency education and safety. *Int Arch Otorhinolaryngol*. 2020;24(3):e267-e271.
- Safdar N, Abbo LM, Knobloch MJ, Seo SK. Research methods in healthcare epidemiology: survey and qualitative research. *Infect Control Hosp Epidemiol*. 2016;37(11):1272-7.
- Bosua R, Kurnia S, Gloet M, Mendoza A. Telework Impact on Productivity and Well-Being. Social Inclusion and Usability of ICT-Enabled Services. 2017;201.
- Weygandt PL, Jordan J, Caretta-Weyer H, Osborne A, Moore KG. Impact of the COVID-19 pandemic on emergency medicine education: Insights from faculty and residents. *AEM Educ Train*. 2021;5:e10603.
- Nourazari S, Davis SR, Granovsky R, Austin R, Straff DJ, Joseph JW, et al. Decreased hospital admissions through emergency departments during the COVID-19 pandemic. *Am J Emerg Med*. 2021;42:203-10.
- Perina DG, Marco CA, Smith-Coggins R, Kowalenko T, Johnson MM, Harvey A. Well-Being among emergency medicine resident physicians: results from the ABEM longitudinal study of emergency medicine residents. *The Journal of emergency medicine*. 2018;55(1):101-109. e102.
- Estes M, Gopal P, Siegelman JN, Bailitz J, Gottlieb M. Individualized interactive instruction: a guide to best practices from the Council of Emergency Medicine Residency Directors. *West J Emerg Med*. 2019;20(2):363.
- Della-Giustina D, Kamran A, Wood DB, Goldflam K. Resident Self-Assessment and the Deficiency of Individualized Learning Plans in Our Residencies. *West J Emerg Med*. 2021;22(1):33.
- Chan T, Sebok-Syer S, Thoma B, Wise A, Sherbino J, Pusic M. Learning Analytics in Medical Education Assessment: The Past, the Present, and the Future. *AEM Educ Train*. 2018;2(2):178-87.
- Denning M, Goh ET, Tan B, Kanneganti A, Almonte M, Scott A, et al. Determinants of burnout and other aspects of psychological well-being in healthcare workers during the COVID-19 pandemic: a multinational cross-sectional study. *PLoS One*. 2021;16(4):e0238666.