Short Report

Blood safety training: Can virtual training replace in-person training?

PARMATMA PRASAD TRIPATHI, VIJAY KUMAWAT

ABSTRACT

Background. Healthcare professionals require continuous professional development and training to improve their knowledge and skills to prevent or minimize errors in blood transfusion. The novel Coronavirus-19 (Covid-19) pandemic affected face-to-face medical education and resulted in a shift from traditional education methods to online or virtual methods. We analysed the effect of virtual blood safety training on participant's knowledge and perception.

Methods. A prospective analysis of pre-test and post-test responses to a 25-item multiple choice questionnaire and feedback received for the training programme were analysed. The training feedback was obtained using a Google form link.

Results. The mean pre-test score of 131 analyzed participants was 16.02, which increased to 18.06 after the training. The difference was not statistically significant. The mean pre-test and post-test scores for doctors ($n=45$) were 17.91 and 19.33, respectively which was statistically significant. There was no statistically significant difference between the mean pre-test (15.03) and post-test (17.39) scores of technical staff ($n=86$). The majority (54%) preferred in-person physical training during feedback.

Conclusion. Virtual training can be conducted as a temporary measure. We did not find a difference in participants' knowledge except for doctors. The majority of participants preferred in-person training.

Natl Med J India 2024:37:322–4

INTRODUCTION

The WHO recommends providing safe and adequate blood and human resource training for blood safety and availability.[1] The National Blood Policy of India also incorporated training programmes for all health professionals to strengthen transfusion services.[2] Continuous professional development (CPD) and training are required to improve current knowledge and performance[3] to prevent or minimize blood transfusion errors. The United Kingdom (UK) annual serious hazards of transfusion (SHOT) 2020, reported 81.6% all preventable and 6.1% possibly preventable events.[4] The SHOT 2020 reported 19.9% of preventable errors from the laboratory including 2 preventable deaths and 35.9% of preventable morbidities and recommended clinical and laboratory staff training to achieve better patient safety.[4] The novel Coronavirus-19 (Covid-19) pandemic resulted in a nationwide lockdown, which affected in person medical education worldwide[5,6] and resulted in a shift from traditional education methods to online or virtual methods.[7]

Our department is one of 26 training centres identified to provide training to strengthen transfusion services in India involving doctors, technicians, counsellors, nurses, and donor motivational organizations.[8] We were providing in-person training to Karnataka state's blood centre staff, which was halted due to the Covid-19 pandemic in India in March 2020. The subsequent second and third waves of Covid-19 infection in India necessitated us to plan a virtual blood safety training programme. We analysed the effectiveness and perception of participants towards the virtual training programme on blood safety at our centre.

METHODS

We did an analysis of pre-test and post-test responses to a 25-item multiple choice questionnaire and the feedback received about the training. A 5-day training programme was scheduled for all blood centres across Karnataka for all categories of staff in March 2022. During the training period, 20 procedural videos were created for all sections of transfusion services. The training programme presentations (PPTs) and demonstration videos were based on the National Blood Transfusion Council (NBTC) training modules, Government of India. The trainers had 15 years of association with the NBTC blood safety training programme.

Registration of participants and training programme

An email was sent to all blood centres in Karnataka state to nominate one person for this training from each staff category (doctor, technical, nursing staff and counsellors). A registration link to provide primary participants' details was provided. Each day's training programme was focused on a particular section of transfusion services.

Assessment of the training programme

A structured questionnaire (25 multiple choice questions in 30 minutes) was used to assess trainees. The questionnaire was sent to each participant via a Google form link before starting the training on day 1 and at the end of training on day 5. The results were recorded in the form of a google spreadsheet.

Feedback of participants

The training feedback was obtained using a Google form link sent to all participants after the post-training assessment, and asked to submit responses in the next 7 days.

Statistical analysis

The results obtained as a Google spreadsheet were converted into Microsoft Excel and analysed. The pre-test and post-test assessment scores' data was checked for normalcy by calcu-

National Institute of Mental Health and Neurosciences (NIMHANS), Transfusion Medicine Centre, Bengaluru, Karnataka, India
PARMATMA PRASAD TRIPATHI, VIJAY KUMAWAT
Department of Transfusion Medicine and Haematology

Correspondence to VIJAY KUMAWAT;
kumawatdrvijay@gmail.com

[**To cite:** Tripathi PP, Kumawat V. Blood safety training: Can virtual training replace in-person training? *Natl Med J India* 2024;**37:**322–4. DOI:10.25259/NMJI_142_2024]

lating the z score in Microsoft Excel. The data were presented as mean and variance, and paired t-test was performed.

The Institute ethics committee granted an ethical waiver for this study.

RESULTS

The Karnataka state has 230 licensed blood centres, including 43 government, 8 Indian red cross society, 108 private hospital-based and 71 standalone charitable blood centres.[9] A total of 293 participants registered for this training programme, including 82 doctors, 183 technicians, 12 nurses and 6 counsellors. The participation varied between 150 and 243 for various sessions and for both the tests (Table I). A total of 131 participants who had attempted both pre-test and post-test assessments were evaluated.

Assessment of training

The mean pre-test score of 131 participants was 16.02, and increased to 18.06 after the training programme (Fig. 1). The difference was not statistically significant. The mean pre-test and post-test scores for doctors (n=45) were 17.91 and 19.33, respectively. The difference was statistically significant ($p<0.05$). There was no statistically significant difference between the mean pre-test (15.03) and post-test (17.39) assessment scores of technical staff (n=86).

Participant's feedback

The Likert scale rating by participants for utility for knowledge gain, improving participant's techniques and understanding the concept were 4.65 (0.51), 4.55 (0.51) and 4.46 (0.57), respectively. The Likert scale rating for presentation, quality of training videos, faculty competence and knowledge, time management and virtual platform were 4.59 (0.52), 4.5 (0.61), 4.7 (0.5), 4.56 (0.59) and 4.43 (0.66). The majority (106; 54%) preferred in-person physical training, 22% (42) preferred virtual training, and 14% (27) of participants preferred virtual training during the Covid-19 pandemic; 20 participants had no preference.

TABLE I. Number of participants attending the pre-test and post-test

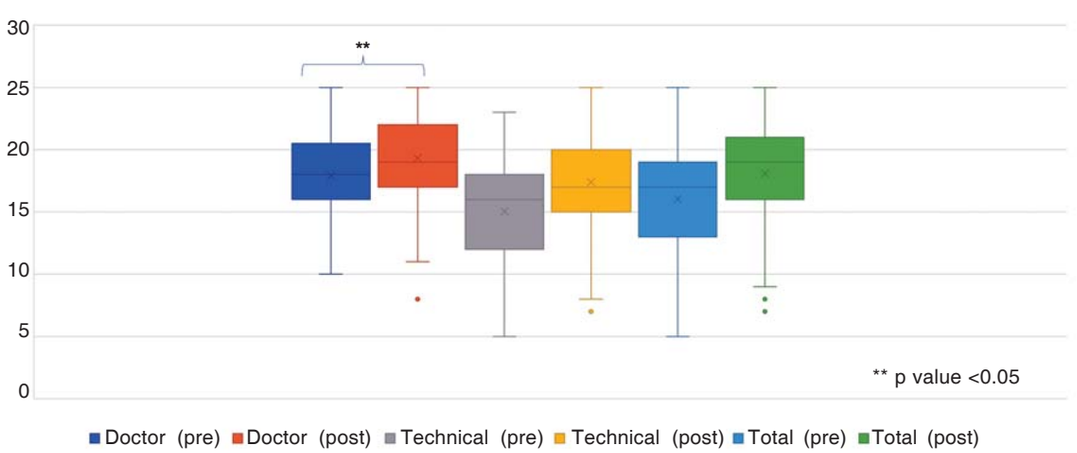
Participant category	Pre-test	Post-test
Doctor	60	45
Technical staff	137	84
Nurses	10	1
Counsellors	2	1

DISCUSSION

Training staff and upgrading them with the latest technology was one of the prerequisites for the WHO action framework in 2020–2023.[10] This training aimed to provide reasonable knowledge about transfusion services.[11] The Covid-19 pandemic necessitated a change from traditional in-person to virtual training.[5,12] This blood safety training was focused on enhancing the participants' laboratory skills through virtual videos. Brief tutorial videos evolved from social media platforms into formal resources to provide detailed training.[13] The virtual training enabled us to involve many participants with minimal cost (total expenditure of US$ 4000) and to reduce training costs and optimize the utilization of limited human resources.[14]

The training evaluation based on pre, and post-test assessment showed improvement in staff scores but was statistically significant only for doctors who can perform better with virtual training compared to novice technical staff.[15] Technical staff's training and skill development are much dependent on the individual institute/hospital training. There are PG training programs (MD/DNB transfusion medicine) for doctors working in transfusion services.[16] which might have helped doctors to discern important information from less important, resulting in more effective learning.[15] Prolonged virtual training session may also be one reason for the poor performance of technical staff and comparable with Cowan *et al*.[12] Previously, the sole dependency on e-learning for practical courses was viewed as inadequate.[5,7,17]

Similarly, approximately 80% of respondents in a survey considered it difficult to acquire clinical skills through distant e-learning.[18] This may also have contributed to the technical staff's performance. A high degree of self-discipline is a must for completing a virtual program.[19] Absence from training



Category	Pre-assessment score (mean)	Post-assessment score (mean)	p value
Doctor	17.91	19.33	0.0004
Technical	15.03	17.39	1.684
Total	16.02	18.06	3.459

FIG 1. Traning assessment of the participants

program and other factors, like simultaneous involvement of blood centre staff for Covid-19-related hospital work and attending outstation blood collection drives, also contributed to the same.

There were limitations to this study. The training was evaluated only for level two of Kirkpatrick's[20] four levels of evaluation. The low participation, multiple-choice questionnaire, and absence of practical exercise-based evaluation are limited options for the competency-based assessment of skills during virtual sessions.[5] Potential biases such as participants' prior knowledge and experience on the topic, their previous exposure to blood centres, and familiarity with similar topics in physical settings can impact the outcome of the study and these limitations were not taken in account while preparing the study design and methodology.

Conclusion

Virtual training can facilitate some expectations of medical training but does not have much impact on improving skills where practical skills are important. A blended approach to including traditional in-person and e-learning can be most suitable for medical training.[18]

ACKNOWLEDGEMENT

We acknowledge Karnataka State AIDS Prevention Society (KSAPS) who provided funds to conduct this training programme.

REFERENCES

1 Blood safety and availability. Available at *www.who.int/news-room/fact-sheets/detail/blood-safety-and-availability* (accessed on 22 Dec 2022).
2 National Blood Policy, National Blood Transfusion Council (NBTC), Ministry of Health and Family Welfare, India. Available at *http://nbtc.naco.gov.in/page/policies_guidelines/* (accessed on 22 Dec 2022).
3 O'Brien Pott M, Blanshan AS, Huneke KM, Baasch Thomas BL, Cook DA. Barriers to identifying and obtaining CME: A national survey of physicians, nurse practitioners and physician assistants. *BMC Med Educ* 2021;**21:**168.
4 Annual SHOT report 2020. Available at *www.shotuk.org/shot-reports/* (accessed 22 Dec 2022).
5 Hilburg R, Patel N, Ambruso S, Biewald MA, Farouk SS. Medical education during the coronavirus disease-2019 pandemic: Learning from a distance. *Adv Chronic Kidney Dis* 2020;**27:**412–17.
6 Arain SA, Ali M, Arbili L, Ikram MF, Kashir J, Omair A, *et al*. Medical students and faculty perceptions about online learning during COVID-19 pandemic: Alfaisal University experience. *Front Public Health* 2022;**10:**880835.
7 Hayat AA, Keshavarzi MH, Zare S, Bazrafcan L, Rezaee R, Faghihi SA, *et al*. Challenges and opportunities from the COVID-19 pandemic in medical education: A qualitative study. *BMC Med Educ* 2021;**21:**247.
8 Access to Safe blood, National AIDS Control Organization, Ministry of Health and Family Welfare, Government of India. Available at *www.naco.gov.in/access-safe-blood* (accessed 22 Dec 2022).
9 Blood Transfusion Services, Karnataka State AIDS Prevention Society. Available at *https://ksaps.karnataka.gov.in/info-2/Blood+Transfusion+Services/en* (accessed 22 Dec 2022).
10 WHO Action framework to advance universal access to safe, effective and quality assured blood products 2020–2023. Available at *www.who.int/news/item/19-02-2020-who-action-framework-to-advance-universal-access-to-safe-effective-and-quality-assured-blood-products-2020—2023* (accessed 22 Dec 2022).
11 Damanhouri GA. The impact of training in transfusion medicine. *ISBT Sci Series* 2009;**4:**95–8.
12 Cowan E, Altschafl B, Foertsch J, Barnes D, Lasarev M, Pelley E. A new normal: Assessment outcomes and recommendations for virtual versus in-person curricula in post-COVID-19 times. *Med Sci Educ* 2022;**32:**379–87.
13 Zoghbi V, Caskey RC, Dumon KR, Soegaard Ballester JM, Brooks AD, Morris JB, *et al*. 'How To' videos improve residents performance of essential perioperative electronic medical records and clinical tasks. *J Surg Educ* 2018;**75:**489–96.
14 Rambiritch V, Vermeulen M, Bell H, Knox P, Nedelcu E, Al-Riyami AZ, *et al*. Education Subcommittee of the AABB Global Transfusion Forum. Transfusion medicine and blood banking education and training for blood establishment laboratory staff: A review of selected countries in Africa. *Transfusion* 2021;**61:**1955–65.
15 Konia MR, Richtsfeld M, Johnson AD, Lougee M, Cohn C, Morgan S. An observational study of 3 different transfusion medicine teaching methods for medical students. *Transfus Med Rev* 2018;**32:**117–22.
16 Kumawat V, Tripathi PP, Patidar GK. Therapeutic apheresis and non-blood donor related apheresis current practices at various blood centres of healthcare organizations of India: A brief online survey. *Transfus Med* 2022;**32:**45–52.
17 Schlenz MA, Schmidt A, Wöstmann B, Krämer N, Schulz-Weidner N. Students' and lecturers' perspective on the implementation of online learning in dental education due to SARS-CoV-2 (COVID-19): A cross-sectional study. *BMC Med Educ* 2020;**20:**354.
18 Al-Balas M, Al-Balas HI, Jaber HM, Obeidat K, Al-Balas H, Aborajooh EA, *et al*. Distance learning in clinical medical education amid COVID-19 pandemic in Jordan: Current situation, challenges, and perspectives. *BMC Med Educ* 2020;**20:**341.
19 Keis O, Grab C, Schneider A, Öchsner W. Online or face-to-face instruction? A qualitative study on the electrocardiogram course at the University of Ulm to examine why students choose a particular format. *BMC Med Educ* 2017;**17:**194.
20 Kirkpatrick JD, Kirkpatrick WK. *Kirkpatrick's four levels of training evaluation*. USA:Association for Talent Development; 2016.