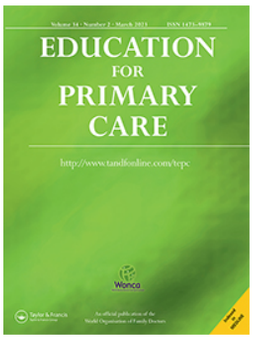

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EVALUATION AND INNOVATIONS

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Comparison of the effectiveness of exclusively facilitated clinical teaching as an alternative to traditional practice-based primary care placements

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ABSTRACT

Introduction: COVID-19 presented major challenges to undergraduate GP placement capacity and there was an increased reliance on clinical training using facilitated simulation. The authors present a novel comparison of the effectiveness and cost-effectiveness of delivering a one-week primary care course using entirely GP-facilitated clinical teaching outside the GP setting against traditional practice-based GP clinical education.

Methods: A one-week GP placement was redeveloped from a traditional teaching model (TT-M) to an exclusively facilitated teaching model (FT-M) delivered outside the GP practice setting, using principles of blended learning, flipped classroom methods, e-learning and simulation. Both teaching models, delivered in different locations during 2022 to pre-clinical students, were evaluated using student feedback surveys for attainment of learning outcomes and course satisfaction.

Results: The students reported their consultation skills and clinical knowledge (amalgamated mean score 4.36 for FT-M versus 4.63 for TT-M; $P = 0.05$), as well as preparation for the clinical phases (mean scores 4.35 for FT-M versus 4.41 for TT-M; $P = 0.68$), were well developed and similar for both courses. Students reported similar enjoyment across both teaching models (FT-M mean score 4.31 versus 4.41 for TT-M; $P = 0.49$). The costs for delivering teaching per 4-h session for 100 students were £1,379 and £5,551 for FT-M and TT-M, respectively.

Conclusion: Delivery of a one-week primary care attachment to third year medical students using an FT-M was similarly effective and more cost effective than delivering it by a TT-M. FT-M potentially offers an important adjunct to clinical learning and resilience to capacity challenges for GP placements.

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primary care education; medical education; facilitated teaching; clinical teaching; undergraduate teaching

Introduction

There have been increasing pressures on capacity for training healthcare professionals in primary care. These were exacerbated by the COVID pandemic through restricting access to learning in clinical environments and prioritising core clinical activities over medical training [1]. In 2021, General Practice (GP) Specialty Training in England and Wales was reconfigured, increasing the training time in GP practices from 18 to 24 months [2] in parallel to increased trainee numbers [3], further straining training capacity.

A new clinical curriculum was introduced at Nottingham Medical School (NMS) in February 2022, which increased medical student exposure in primary care. This included Early Primary Care (EPC), a new one-week clinical placement in primary care for third-year medical students, to bridge the transition from pre-clinical training into a new clinical curriculum. Students' clinical experiences to this point, during pre-clinical training at NMS, would normally have included five single days in general practice and seven half-day hospital visits. For the cohort of students in question however, this clinical experience had unfortunately been limited to 1 day in general practice and two short hospital visits, due to the impact of the COVID pandemic. EPC aimed to further develop clinical skills in GP practice settings, in particular history taking, before students entered full-time clinical training.

Undergraduate GP placement capacity challenges, linked to the above, peaked prior to implementation of the new clinical curriculum at NMS. Therefore, an alternative method for clinical training of third-year medical students was developed for EPC using an exclusively GP-facilitated teaching model. This contrasted with the traditional approach of learning primarily within GP practices.

This teaching evaluation describes how this novel course was re-developed and delivered to

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undergraduate medical students, and provides a comparison of the effectiveness and cost-effectiveness of using this exclusively GP-facilitated model of clinical training to traditional practice-based GP education.

Methods

The Early Primary Care (EPC) course

Learning outcomes

EPC aimed to help students refresh and further develop clinical skills of consulting, in particular history taking and basic diagnostic reasoning. Secondary aims were to enable students to recognise non-medical factors influencing health and patient responses to illness and develop greater awareness of the roles of non-GP multidisciplinary team members.

Learning outcomes were for students to be able to:

- Demonstrate appropriate professional attitudes and behaviours
- Build on basic skills of communication to communicate effectively with patients in primary care and begin to use targeted history taking to aid diagnosis and clinical decision making
- Witness and be able to evaluate the psychological and sociological considerations that can affect patients' health and their responses to illness and its management
- Experience and analyse the different roles and consulting practices of other health care professionals working in the primary care team and how these contribute to the overall care of patients

Original EPC course

EPC was originally developed using a 'traditional-teaching' model (TT-M), with students mostly spending time within GP practices as part of a one-week placement (5 days/10 sessions/half days – Figure 1b), comprising mostly of clinical learning in GP practices (patient encounters to develop consultation/history-taking skills) supplemented by up to 2 days of GP-facilitated small group teaching (SGT).

EPC was designed in a backward process [4,5], beginning with focus groups exploring perceived student learning needs prior to clinical phase training and a modified Delphi exercise [6] exploring GP educator views of student learning needs, to develop course aims and learning outcomes. An assessment strategy, using constructive alignment [7], was developed which then informed learning and teaching methods.

Redesign to exclusively facilitated teaching course

Due to the aforementioned capacity pressures on GP medical student placements, EPC was redesigned to be delivered using an exclusively GP-facilitated teaching model (FT-M) delivered outside the practice setting. New teaching sessions were developed to replace the planned clinical learning within GP practices, drawing on previous faculty experiences of virtual clinical training [8–13] and using principles of blended learning [14,15], flipped classroom methods [16,17], e-learning [9,12,18] and simulation [19,20]. Teaching sessions were balanced for face-to-face and virtual interactions with educators and included GP-facilitated SGT (6–12 students), lectures and self-directed interactive e-learning (Figure 1a).

Students received two lectures (totalling one teaching session) given by GPs, three self-directed e-learning sessions and six GP-facilitated SGT sessions (Table 1). Clinical educators were Royal College of General Practitioners (RCGP) accredited GPs. Professional actors, used for simulated surgeries, and experienced patient volunteers were recruited from existing education networks.

Evaluation of EPC

Survey methods

Student feedback, using surveys comprising closed Likert-scale and free-text open questions about perceived experiences, was used as a proxy measure for course effectiveness to attain learning outcomes. Questions asked students to rate their achievement of core learning outcomes/aims, enjoyment of EPC and its impact on preparing students for subsequent clinical training.

The Likert Scale questions, scored 1–5 (5=Excellent; 4=Good; 3=Neutral; 2=Poor; 1=Very Poor), were:

(1) The [course] has helped me develop my consultation skills
(2) The [course] has helped me develop my clinical knowledge
(3) I have enjoyed the [course]
(4) I feel better prepared to start [the clinical phase] as a result of the experiences I have had this week

The free-text open questions were:

- Please state the aspects of the [course] you have found the most useful and enjoyable

a. Exclusive facilitated teaching (FT-M) EPC Timetable

	Monday	Tuesday	Wednesday	Thursday	Friday
am	Introductory lecture* Small group seminar* - Introducing targeted history taking	Small group seminar† - Targeted history taking in specific scenarios	Self-directed learning - Patient centred care/ Watch recorded GP consultations and reflect on them with structured questions	Simulated Surgery 2*	Plenary session* (lecture)
pm	Self-directed learning - Peer recording of a history	Simulated Surgery 1†	Small group session* - Meeting a long term condition patient (GP facilitated)	Small group seminar† - debrief of recorded GP consultations	Self-directed learning - The primary/ secondary care interface

*Online session
†In person session

b. Traditional Teaching (TT-M) EPC course timetable

		Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	**am**	Introductory lecture*	Small group seminar* - Targeted history taking in specific scenarios	Practice placement day	Practice placement day	
	pm	Small group seminar* - Introducing targeted history taking		Practice placement day	Practice placement day	
Week 2	**am**		Simulated Surgery 1*	Practice placement day	Practice placement day	
	pm			Practice placement day	Practice placement day	

*Online session
†In person session

Figure 1. Timetables for delivery of facilitated teaching model (A) and traditional-teaching model (B).

- Please state the aspects of the [course] that you would like to see changed or improved

Comparator for evaluation

The EPC course was delivered to students at Lincoln Medical School (LMS) at the same time. LMS is a geographically separate and new medical school but with curricula mapped to the NMS. At the time of EPC implementation, LMS did not experience placement capacity issues as NMS did. Therefore, EPC was delivered at LMS using the TT-M, allowing for comparative evaluation between TT-M and FT-M across two medical schools. The same feedback survey was used at both sites, apart from the first two questions being amalgamated into one at LMS ('The course has helped me develop my consultation skills and clinical knowledge'). Surveys were disseminated in person for the TT-M and online for the FT-M, after each block of education.

Cost of education provision

The costs of delivering each education model considered how centralised health education funding,

Table 1. Comparison of teaching resources used in facilitated teaching (FT-M) and traditional teaching (TT-M) models for the delivery of Early Primary Care (EPC).

	Facilitated Teaching Model (FT-M)		Traditional Teaching Model (TT-M)	
	Total number	Number per 100 students	Total number	Number per 100 students
Students taught	300		76	
Facilitated teaching for EPC				
Taught activities delivered	249	83	34	44.7
Face to face taught activities delivered	138	47	34	44.7
Online taught activities delivered	111	36	0	0
Teaching activities delivered using simulated patients/patient volunteers	162	54	16	
Plenary teaching delivered	3	1	n/a	n/a
Self-directed learning activities (not included in total number of teaching sessions delivered)	9	3	2	2.6
Teaching activities cancelled	0	0	0	0
GP educators used	33	11	6	7.9
Actors used	14	4.7	2	2.6
Patient volunteers used	16	5.3	n/a	n/a
GP practice-based education for EPC				
GP practices used	n/a	n/a	35	46.1
Placements delivered in GP practices	n/a	n/a	76	100
Overall education delivery for EPC				
Sessions* of GP facilitated teaching per student	7		3	
Sessions* of self-directed learning	3		1	
Sessions* of GP practice activity	0		8	
Total sessions of learning*	10		11.5	
Costs of delivering EPC				
Cost to deliver	£41,355		£48,520	
Cost per session* per 100 students	£1379		£5551	

NOTE: *A session denotes 4 hours (half-day) of time of education activity.

provided to English medical schools for student placement activities, were used to meet placement-based learning outcomes. These were calculated using local tariffs for the days students were placed in GP practices (£140 per student-day) compared to remuneration for clinical teaching staff which were £400 per day for GP educators and £95 per half-day for actors. Volunteer patients were not remunerated.

All face-to-face facilitated teaching was delivered in medical schools, thus not attracting room hire costs. The costs of developing and/or administering EPC were not calculated and assumed an academic operating cost funded by Higher Education Institutes. Therefore, the economic evaluation only includes costs of delivering the EPC courses.

Analyses

Survey response rates were calculated and summarised as numbers and percentages. Likert questions were summarised using means and standard deviations (SDs). Differences in response at Nottingham (FT-M) and Lincoln (TT-M) were compared using t-tests. The data were analysed using Stata SE v16. Free-text open questions were transcribed verbatim and thematically analysed [21] for both education models.

Total costs of delivering EPC were calculated for both models. As the number of students and education methods were different, the costs of delivering education were standardised by calculating cost per teaching session (half-day) per 100 students, enabling meaningful comparisons.

Results

EPC delivery

Details of the resources used to deliver both courses are provided in Table 2. The FT-M and TT-M courses were delivered to 300 and 76 students, respectively. The FT-M utilised nearly double the taught activities than the TT-M model (83 per 100 students versus 44.7 per 100 students, respectively). Delivery of face-to-face education across both courses was similar (47 per 100 students versus 44.7 per 100 students for FT-M and TT-M, respectively). The FT-M supplemented education with 36 online taught activities per 100 students, whereas the TT-M used no online learning.

Effectiveness of EPC

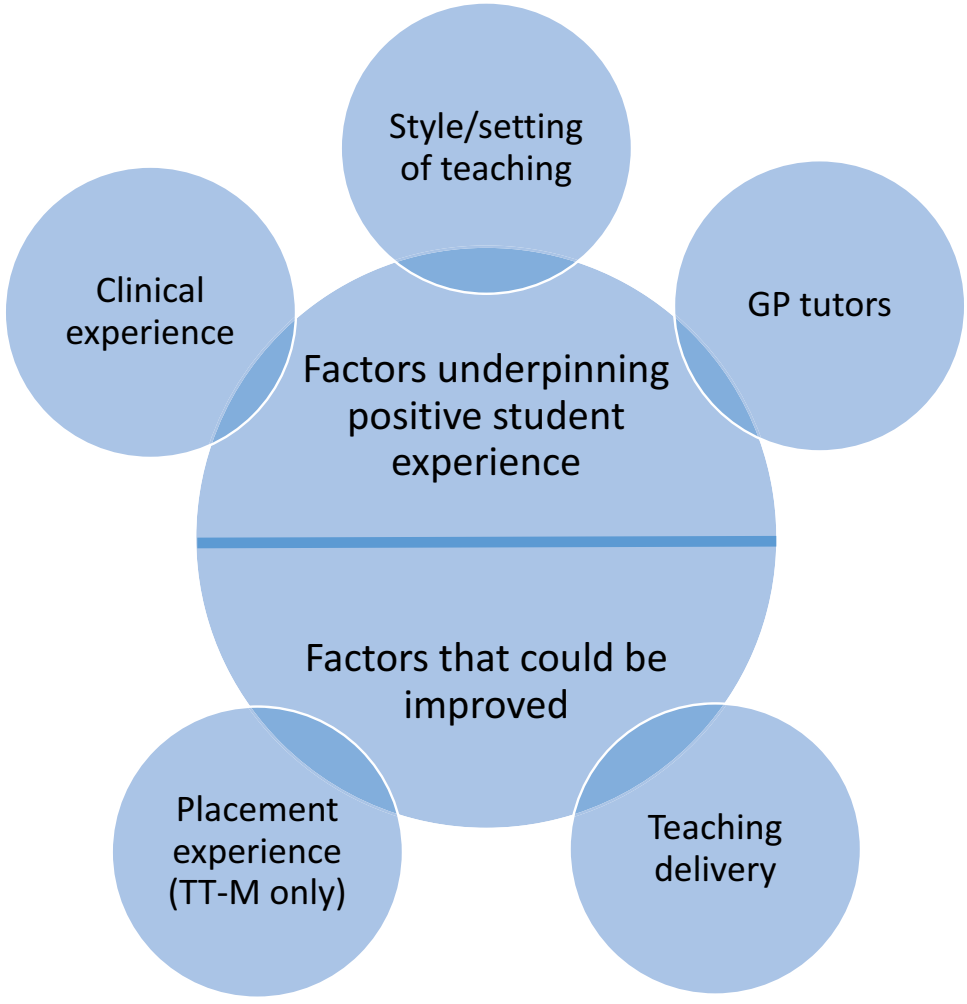
Feedback surveys were completed by 46/76 (61%) of students receiving the TT-M and 55/300 (18%) receiving the FT-M. Of these, 54/55 and 44/46 students gave free-text comments from the FT-M and TT-M, respectively.

Table 2. Likert question feedback results for both teaching models.

Question	Mean score (SD) Facilitated teaching model N = 55 (18%)	Traditional placement model N = 46 (61%)	T-test p value
1. The course has helped me develop my consultation skills	**4.67 (0.67)**		**0.72**
2. The course has helped me develop my clinical knowledge	**4.05 (0.91)**		**0.0002**
Composite score of questions 1 and 2 for Facilitated Teaching group	**4.36 (0.85)**	**4.63 (0.49)**	**0.05**
3. I have enjoyed the course	**4.31 (0.86)**	**4.41 (0.62)**	**0.49**
4. I feel better prepared to start the clinical phase as a result of the experiences I have had this week	**4.35 (0.89)**	**4.41 (0.75)**	**0.68**

Quantitative data for EPC evaluation are summarised in Table 2. The mean scores for student perceived attained learning outcomes were high (better experience) and similar irrespective of delivery method. Students for both courses felt that EPC developed their consultation skills, clinical knowledge and preparation for the clinical phases (mean scores for FT-M and TT-M: developing consultation skills and clinical knowledge (amalgamated) 4.36 versus 4.63; $p = 0.05$; preparation for clinical phases 4.35 versus 4.41; $p = 0.68$). Students reported similar enjoyment across both models (mean score 4.31 (FT-M) versus 4.41 (TT-M); $p = 0.49$).

Free-text comments triangulated with quantitative analyses, suggesting high-quality student experience for both delivery models (Figure 2, Table 3). For the 'most useful



Abbreviations: TT-M – Traditional teaching model

Figure 2. Themes arising from free-text comments from student feedback for both models of teaching delivery.

and enjoyable aspects' of EPC, three common themes emerged: clinical experience, style and setting of teaching,

Table 3. Themes and free-text comments about student experiences.

	Facilitated teaching model		Traditional placement model	
Theme	Identifier	Comments	Identifier	Comments
What aspects did you find the most useful and enjoyable?				
Clinical experience		70 comments made		52 comments made
	Student 34	'Having doctors give us feedback on our history taking skills was so beneficial'	Student 62	'Practising consultations and forming differential diagnoses'
	Student 13	'The practice consults with feedback from GPs have been so useful'	Student 70	'Practising and speaking to patients, builds confidence'
	Student 15	'Practicing consultations especially in simulated surgery sessions'	Student 75	'Role play and actual history taking in GP as practice is the best way I get better'
	Student 23	'Developing clinical knowledge and awareness of psychosocial factors'	Student 76	' . . . helped with advancing knowledge in history taking from previous years'
	Student 22	' . . . thinking about which conditions present similarly and how to differentiate them (red flags)'	Student 69	'Considering differential diagnoses and working backwards'
Style/setting of teaching		8 comments made		2 comments made
	Student 55	'I really liked the overall structure of the week and the order of the sessions as it felt like they led on from each other and I could build on my skills gradually throughout the week'.	Student 83	'Seeing patients f2f after a long time'
	Student 17	'Nice change in style of teaching and interesting topics and tasks which we completed throughout the week'.	Student 68	'Placement days with patient contact'
	Student 9	' . . . face to face teaching which is so much more engaging than online teaching'.		
GP tutors		7 comments made		1 comment made
	Student 55	'All of the GPs that were leading the sessions I was in were so so helpful! They created a non-judgemental environment and this really helped me to make the most of the sessions!'	Student 91	'Great lecturers'
	Student 37	'Feedback from very kind GP tutors, their advice was invaluable and they were very supportive too'		
	Student 2	'all the GP tutors were really kind and helpful'		
What aspects would you like to see changed or improved?				
Teaching delivery		27 comments made		14 comments made
	Student 15	'Some online seminars were too long'	Student 63	'Perhaps more online case studies. Maybe video consultation'
	Student 41	'More in person activities that makes it more interactive, I found the [online] meetings not as effective as in person class discussions'	Student 66	'More role play'
	Student 31	'The primary care videos could perhaps have more clinical notes to accompany them to suggest areas of poor/good practice because we don't know enough to discern what is/ isn't best practice yet'	Student 82	'Shorter sessions'
	Student 25	'Maybe more simulated surgeries'	Student 99	'Having more simulated surgeries would be great'
	Student 22	'Self-directed learning felt a bit out of place sometimes'		
Placement experience		0 comments made		5 comments made
			Student 84	'I have not done any history taking at my GP practice, mainly due to COVID which is no fault of anyone. Maybe worth asking the practices if we can do phone consultations'.
			Student	'GP not aware of what meant to be doing. Phone calls not on loud speaker, watching GP read letter from hospital for a whole day. Not taking histories or seeing patients'

and GP educators. For aspects that could be 'changed or improved' two common themes emerged about the education provision: teaching delivery and placement experience.

Economic evaluation

The overall costs (Table 1) of delivering the EPC course were £41,355 and £48,520 for the FT-M and TT-M, respectively. The costs for delivering EPC per session for 100 students were £1,379 and £5,551 for FT-M and TT-M, respectively.

Discussion

Exclusively, GP-facilitated clinical teaching outside of practices was successful for attaining student learning outcomes during a short, one-week primary care clinical attachment. Furthermore, an exclusive FT-M was as effective and more cost-effective than TT-M, where students spent time mostly within GP practices.

Strengths and limitations

To our knowledge, this is the first study directly comparing the effectiveness and cost-effectiveness of a course delivered exclusively using FT-M to a TT-M, for clinical training in primary care. A strength was the direct comparison of courses across two geographically separate medical schools, improving the validity of the findings. Triangulation of quantitative and qualitative data strengthens these findings. However, the lower response rate for FT-M students limits the generalisability of findings from this method of training. The difference in response rates observed likely relates to differing methods of data collection, with TT-M students being invited to complete feedback at the end of their final taught session, but FT-M students being emailed a survey at the end of their final day on the course. While we acknowledge that this is a limitation in itself, we feel this is a more likely explanation for the differing response rates, rather than it indicating a more positive experience in the TT-M group, although this cannot be excluded.

Perceived student experience was the outcome measure for effectiveness, and the study could have been strengthened by using objective measures of attainment. The cross-sectional design, however, did not allow for prospective associations with objective outcomes to be determined. Because of the very limited previous clinical exposure of these students, whilst the FT-M exposed students to a variety of learning, it is likely that the TT-M would encompass a greater richness of learning from exposure to entirely undifferentiated clinical care and other aspects of the 'hidden curriculum' experienced through everyday interactions with clinicians and patients. FT-M students' appreciation of the benefits of this at their respective stages of training may have been lacking, and therefore not factored in to their subjective reporting of meeting the learning outcomes. For similar reasons, whether students would prefer an alternative delivery to the one they experienced was not explored as it was felt to be less relevant to the stage of learning, where students may not have had sufficient exposure to decide preferences. Future work that evaluates the delivery groups against objective measures of student attainment is warranted. Finally, there remains potential for residual confounding, given unadjusted analyses were undertaken.

Findings in broader context

Multiple reports describe how clinical teaching has been adapted in response to COVID with transition to online learning being a frequently adopted approach [8,10–12,22–27]. Most studies, however, were in non-primary care settings. Studies have reported methods of supporting clinical learning, such as virtual ward rounds, to allow students to directly observe clinical encounters [25]. Others included supervised telephone or video calls with facilitated feedback [24,26,27]. This study utilised a range of approaches to support learning and may explain why students receiving the FT-M rated high levels of enjoyment.

Whilst studies have evaluated the effectiveness of specific components of online primary care education [11], there is a lack of comparative evidence evaluating full courses to traditional practice-based placements [12].

Simulation-based education has been shown to be effective in clinical training [20,28], with added benefits of equity in experience across large cohorts of learners, and is consistent with our findings. Furthermore, simulation allows for skills development without compromising patient safety, thus adding value to FT-M delivery [19].

Student perspectives suggest that placement time matters, but key to them is patient interaction supporting the development of interpersonal skills and understanding of patient-centred care [9]. Our FT-M included plentiful opportunity for patient interactions, thus creating positive learning experiences, to some degree similar to those within live-clinical environments. However, we acknowledge that planned patient interactions, involving actors or experienced patient educators, are not a complete substitute for the

complexity and spontaneity of real patient encounters. Additional benefits included standardisation of experiences to ensure attainment of learning outcomes. Given all of the above, delivering primary care education using this type of model of exclusively facilitated teaching outside the clinical environment should be seen as a potential adjunct to support clinical learning, rather than a complete replacement for it.

A recent systematic review found role-modelling by GP-educators to be one of the most influential factors for students choosing to pursue careers within GP [29]. As the FT-M used high contact time with GP-educators, it is plausible that the benefits of role modelling from traditional practice-based placements were retained. This study reported FT-M of learning to be cost-effective. This was driven by the economy of learning in groups, as opposed to TT-M of clinical training in GP practices, which often entails 1:1 supervision.

Conclusion

Delivery of a one-week primary care clinical attachment to third-year medical students using an exclusive FT-M was as effective and more cost-effective than TT-M of clinical learning. An exclusive FT-M of training undergraduates may be an important adjunct to support clinical learning whilst offering resilience to capacity challenges for hosting learners within primary care. Prospective studies investigating different methods of clinical training with summative outcomes and those identifying the optimal volume of the FT-M within curricula are warranted.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Ethical approval

This report presents the findings of an evaluation of education with only anonymous responses. It did not collate personal and/or identifiable data of participants. Therefore, formal ethical approval was not required.

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