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Contents

Foreword

Welcome to the latest edition of the International Journal of Clinical Skills (IJOCs), Volume 7, Issue 5, September 2013.

Self-assessment is an essential component of the lifelong learning expected of physicians. There are limited data on the relationship between medical students' self-assessments and their self-directed learning goals. Researchers at The Warren Alpert Medical School of Brown University, Massachusetts General Hospital and MAHEC Family Medicine Residence Program, USA, present some interesting findings when evaluating medical students' self-assessment of both clinical and professional competencies as well as self-directed learning goals.

Empathy is a key attribute for providing quality health care, lying at the heart of patient-doctor relationships and many medical schools employ Peer Physical Examination (PPE) to improve empathy and clinical skills. However, student empathy often declines over the medical course. Academics at James Cook University, Australia, evaluate participation in PPE and its impact on both students' clinical skills and empathy levels. The results of this study have implications for medical school policy makers.

The skill of hand-tying knots in open surgery is typically passed down from residents to medical students early in training – there is no formal education and thus incorrect assumptions about knots are often perpetuated. While achieving absolute maximal knot security may not matter clinically with routine wound closures, it can be important in other situations. Dr David Flanigan and Dr Vincent Ng at The Ohio State University, USA, discuss the proper methods for tying basic surgical knots - an essential article for all medical schools and trainees.

As always, your feedback is invaluable for the continued development of the International Journal of Clinical Skills – the only peer reviewed international journal devoted to clinical skills (e-mail: feedback@ijocs.org)

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Enhancing medical student professionalism through Peer Physical Examination: preliminary results of a longitudinal study

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Keywords

Peer examination
Medical students
Clinical skills
Empathy

Abstract

Objectives:

Empathy and clinical skills (CS) are important domains of medical professionalism. Many medical schools employ Peer Physical Examination (PPE) to improve CS. Empathy is a key attribute for providing quality health care, lying at the heart of patient-doctor relationships. Student empathy often declines over the medical course. This study evaluated if participation in PPE improved both students' CS and empathy levels.

Methods:

A quasi-experimental design measured CS competency and changes in empathy levels of Year 2 students who participated in PPE in 2011, compared with those who did not ($n = 213$). Empathy was measured using the validated student version of the Jefferson Scale of Patient Empathy (JSPE), while CS competency was measured by end-of-year Multiple Station Assessment Task (MSAT) exam performance across communication and examination skills.

Results:

Regular engagement by students in PPE during CS sessions throughout the year as an examinee was associated with less reduction in patient empathy scores during Year 2 ($p = 0.033$). Also, students who regularly engaged in PPE as an examiner after hours scored higher in the end of year MSAT exam for both the examination and communication skills component ($p = 0.014$ and $p = 0.028$, respectively) for the system tested in the MSAT exam.

Conclusion:

Patient empathy and competency in clinical examination and communication skills were higher in Year 2 medical students who regularly participated in PPE as examinees and examiners, respectively. Thus, educational experiences can influence empathic attitudes as well as clinical competencies. These results have implications for medical school policy makers.

Introduction

Empathy and Clinical Skills (CS) are important domains of medical professionalism. Empathy in the context of health care is defined as a cognitive attribute involving an understanding of the inner experiences and perspectives of the patient, combined with a capability to communicate this understanding to the patient [1, 2]. Empathy lies at the heart of any patient-doctor relationship and is a key attribute in providing quality health care. However, despite empathy being an important attribute, numerous studies have shown a decline in empathy at the end of the third year of medical school [3] and among medical students and residents [4]. This decline in empathy has been attributed to a lack of role models, the emphasis of medical education on detachment and the changing focus of educational experiences from the humanistic to the technological [4].

Many medical schools use Peer Physical Examination (PPE) – also called peer examination – among undergraduate medical students while teaching clinical skills [5, 6]. PPE is an educational method whereby students learn by using each other as models. PPE offers numerous benefits in CS teaching at medical schools: students are readily available as models for practicing clinical skills before examining a patient; PPE has a high level of acceptability among students when certain body areas are excluded [6, 7]; and PPE also helps supplement classroom instruction for students as they are able to practice it amongst themselves in their own time [7].

While the main object of PPE is to help the student learn the examination technique accurately in order to be competent, anecdotal evidence also suggests participation in PPE improves student empathy [8, 9, 10]. Students have likened the examinee role (one being examined) to that of the patient, and the examiner role to that of a doctor [8], and have stated that being involved in PPE as an examinee provides them with an insight into the patient experience and thereby helps them empathise better [9, 10]. Studies have also shown that medical students with higher empathy scores obtain higher ratings of clinical competence in their core clinical clerkships as observed by physicians during their interactions with patients [11], though this is not reflected by better performances in objective examinations; i.e. those assessed by multiple choice or written questions. To date, however, there is no evidence in the literature to show whether participation in PPE increases student empathy or proficiency in examination skills.

The James Cook University (JCU) School of Medicine and Dentistry (SMD), Townsville, Australia, recognised that students already undertake PPE in informal settings to increase their exposure and opportunities for learning. JCU introduced a non-compulsory PPE policy for the Year 2 CS sessions in 2011 to provide opportunities for students to practice, experience and enhance familiarity with “normal” before encountering volunteer simulated patients. The purpose of this study was to evaluate if regular participation in PPE, both during class and after hours, improved the empathy levels and clinical skills of the Year 2 students.

Methods

Study design

This study used a quasi-experimental design involving 213 JCU Year 2 medical students over a 10 month period from the start to end of the 2011 academic year. The research question was to determine if students who regularly engaged in PPE over this period, either as an examiner and/or as an examinee, and participated in PPE either during class and/or in their own time, significantly increased their clinical examination skills and patient empathy, compared to students who did not regularly engage in PPE. Ethical approval for the study was granted by the JCU Human Research Ethics Committee (H4066).

Prior to their first CS session in 2011, Year 2 JCU medical students received information about the new voluntary PPE policy and the aims of the present study. PPE during the CS sessions would be undertaken in a safe and supervised small group environment, and involve exposing non-intimate parts of the body, such as the head and neck, arms and legs, and sometimes the chest and abdomen in males, as dictated by the 6 systems under study (Cardiovascular, Neurology, Abdominal, Respiratory, Endocrine and Musculoskeletal). Students were verbally encouraged to engage in PPE during the year both as ‘examiners’ and as ‘examinees’ in CS sessions and also after hours, but made aware that no penalties would be incurred for non-participation during CS sessions.

Survey tools and data collection

Empathy was measured using the Student Version of the Jefferson Scale of Physician Empathy (JSPE) [12, 13, 14]. The JSPE s-version is a validated 20-question tool

with acceptable psychometric properties used to measure medical student empathy in patient care situations, utilizing a 7-point Likert-type scale [15 – 18]. The JSPE was administered at the beginning of 2011 to all Year 2 medical students, prior to the start of their clinical skills sessions and then again at 10 months after completion of all Year 2 clinical skills sessions.

A JCU designed audit tool was developed to record student's classroom and out-of-hours participation in PPE. This was completed by students after every 6-week system had been completed. The systems taught were Cardiovascular, Neurology, Abdominal, Respiratory, Endocrine and Musculoskeletal examinations. The information gathered in the audit tool included: Student ID (to link student responses over time); participation in PPE during the previous clinical skills session (yes/no response); if participation was as an examiner or an examinee during the session; and, whether students participated in out-of-hours PPE during the last month (yes/no; if yes, number of times).

Competency in communication and examination skills was measured by student scores (from 0 to 10) obtained in the end-of-year Multiple Station Assessment Task (MSAT) exam. The MSAT exam assessed student competency in performing a Neurological examination on a volunteer simulated patient. All empathy, PPE participation, and MSAT data was linked via student number. Student names were not obtained in order to protect student identity. All the data collected were linked only by the student number, and the data was available only to the authors.

Analysis

Data were coded numerically and entered into the computerized statistical package for social sciences, SPSS Release 12 for Windows. Students participation in PPE during class and after hours ('yes' or 'no' response) as either examiners or examinees for individual clinical systems was further categorized into whether or not students regularly participated in PPE across all 6 systems; into either 'not in any system', 'for less than half the systems' or 'for half the systems or more'. Participation in PPE out of hours was categorized with respect to how regularly students engaged in PPE as either examiners or examinees in each clinical system; into either 'never', '1 or 2 times' or '3 or more times'.

Patient empathy scores at baseline and 10 months were calculated for students as described by Hojat and colleagues [13], and the difference calculated by

subtracting the baseline score from the 10-month score. Bivariate relationships between PPE participation either during class or after hours with the independent variables 'communication score in MSAT exam', 'clinical skills station score in MSAT exam' and 'patient empathy' were assessed using unpaired ANOVA and Kruskal-Wallis tests, as appropriate. Mean values and standard deviation (SD) describe numerical values. The potential confounding factor of gender was also investigated in the analysis.

Results

All 213 JCU Year 2 MBBS students participated in the study. However, not all students provided the correct student identification number across all systems to link data sources; therefore, data from only 143 (response rate 67%) students were involved in calculations to determine if regular PPE participation during class or after hours lead to an increase in MSAT exam scores, and data from only 113 (response rate 53%) students were involved in calculations to determine if regular PPE participation led to increased patient empathy.

PPE participation during sessions across all the 6 clinical skills systems taught showed 13% of students chose not to be an examiner for any system, 47% chose to be an examiner 'for a few systems', while 40% engaged in PPE as an examiner for half or more of the 6 systems. In contrast, 32% of students chose not to be an examinee during any system, 46% choose to be an examinee 'for a few systems', and 22% engaged in PPE as an examinee during half or more of the 6 systems.

There was less participation in after hours PPE. As examiners, 30% never undertook PPE after hours for any system, while 34% chose to be an examiner 'for a few systems' after hours, and 36% engaged in PPE as an examiner after hours for half or more of the 6 systems. As examinees, 72% never undertook PPE after hours for any system, 17% chose to be an examinee 'for a few systems' after hours, and only 10% engaged in PPE as an examinee after hours for half or more of the 6 systems.

Overall, a drop in patient empathy from baseline (beginning of Year 2) to end of Year 2 was seen in 52% of the medical students, with 9% self-reporting no difference between the two scores and 39% showing an increase in patient empathy. Bivariate results (Table 1) show that regular engagement by students in PPE during clinical skills classes throughout the year as an examinee was significantly associated with less reduction in patient

empathy scores during Year 2 ($p = 0.033$). In fact, students who often engaged in PPE as an examinee during clinical skills sessions (during half the systems or more) had a mean increase of 1.7 patient empathy points, while patient empathy scores dropped in those students whom only infrequently engaged in PPE as an examinee (-2.2), and especially in students who did not ever engage in PPE as an examinee (-4.1 patient empathy points).

Table 1: Change in empathy (as measured by student version of Jefferson Scale of Physician Empathy) in JCU medical students from beginning to end of Year 2, in association with whether or not they undertook Peer Physical Examination as an examinee in Clinical Skills sessions across the six clinical systems

| Patient empathy score | Other medical students performed Peer Physical Examinations on me during class (examinee) | | | |
|---|--|--|--|----------|
| | 'Not in any system' (n = 29) | 'For less than half of the 6 systems' (n = 50) | 'For half or more of the 6 systems' (n = 34) | p-value# |
| Mean change (Post-Pre) in JSPE total empathy score (mean \pm SD*) | -4.10 (\pm 10.3) | -2.2 (\pm 8.5) | +1.7 (\pm 12.1) | 0.033 |

unpaired ANOVA test (2-tailed significance)

* SD = Standard Deviation

Bivariate analysis also show that students who regularly engaged in PPE as an examiner during class or after hours had higher scores in the MSAT exam for the examination skills station and the communication component; however, this was only statistically significant ($p = 0.014$ and $p = 0.028$, respectively) for when students practised examining other students after hours in the system actually tested in the MSAT exam – Neurology (Table 2). For example, in other analyses, students who were examiners in class for 'half the systems or more' throughout the year had examination skills scores and communication scores of 7.3 and 3.2 respectively, compared to 6.8 and 3.0, respectively, for students who were examiners in class for 'less than half of the systems' throughout the year ($p = 0.098$ and $p = 0.127$, respectively). Similarly, students whom often engaged in PPE as an examiner after hours obtained higher scores for examination and communication skills (though non-significantly).

Table 2: Association between Year 2 medical student MSAT scores for communication and clinical examination skills with frequency a student examined peers after hours on the system being tested in the MSAT exam (Neurology).

| MSAT exam component | I performed Peer Physical Examinations on other medical students after hours (examiner) for the Neurology system | | | |
|---|---|-------------------------|----------------------------|----------|
| | 'never' (n = 102) | '1 or 2 times' (n = 28) | '3 or more times' (n = 13) | p-value# |
| Clinical skills station score in the MSAT exam (mean \pm SD*) | 6.7 (\pm 2.0) | 6.9 (\pm 1.8) | 8.1 (\pm 1.3) | 0.014 |
| Communication score in the MSAT exam (mean \pm SD*) | 3.0 (\pm 0.9) | 3.2 (\pm 0.6) | 3.5 (\pm 0.7) | 0.028 |

Non-parametric Kruskal-Wallis test (2-tailed significance)

* SD = Standard Deviation

A non-significant trend was also seen between regularly engaging in PPE as an examinee and higher scores in the communication component of the MSAT exam. For example, students who were examinees after hours for 'half the systems or more' throughout the year had communication scores of 3.4 compared to 3.0 for students who were examinees after hours for 'less than half of the systems' throughout the year ($p = 0.115$). A similar non-significant trend for higher communication scores was seen for students whom often engaged in PPE as an examinee during class.

Discussion

While the literature quotes anecdotal evidence suggesting that participation in PPE improves empathy [6, 7, 10], to our knowledge this is the first study that shows participation in PPE can increase (or prevent less of a drop) in empathy in early year medical students using a previously validated tool. The difference in empathy scores (-4.1 empathy points) between students who were involved in PPE as an examinee compared to those who did not is significant. This is very encouraging, as teaching empathy is a very difficult task. Although a clear association between empathy scores and PPE participation as an examinee can be demonstrated from this study, it is not possible to attribute this increase solely to PPE but it is most likely to have had an impact. It is likely that when students participate in PPE as an examinee, they become patients themselves; promoting personal growth by gaining an insight into the patient experience. The more often they role play, the more 'personal growth' occurs.

A previous study by Winseman and colleagues [19] used a concept mapping approach to look at factors medical students felt affected their empathy with patients; with the students reporting that experiences that promote personal and professional growth being the most important, including *“becoming a patient myself”*. Wilkes and colleagues [20] also noticed an increase in medical student empathy following hospitalisation experiences. Both of these examples could be likened to being examinees in PPE. Given this data and student experiences detailed in previous studies, it may be appropriate for medical school program directors to consider developing PPE policies and enforcing compulsory participation in PPE as an examinee by all students during clinical skills sessions.

Furthermore, the increase or less of a drop in empathy in medical students is at odds with the long-standing belief that empathy levels decline as the student progresses through their medical career [3, 4]. Since PPE was introduced as a policy in 2011 at JCU, PPE is actively encouraged during all CS sessions. We wondered if regular participation in PPE as an examinee could be protective of empathy. As our study was limited to the Year 2 cohort, we cannot on the basis of this data be certain that empathy levels will not decline or be maintained in the higher years even if the students regularly engaged in PPE as an examinee. It is anticipated that the cohort will be further studied through their course to see whether any changes in empathy levels are noted.

While the finding that regular participation in PPE as an examiner is associated with enhanced clinical competencies in communication and examination skills is intuitive, there was no correlation between higher empathy and higher MSAT scores in either the examination or communication components. This study also showed that regular participation in PPE as an examiner can be associated with greater clinical competencies in communication and examination skills. However, these results were only significant for those students who were involved in PPE as examiners after hours, and not for students who were involved in PPE as examiners during class. This follows common sense as student examiners in class were performing the examination for the very first time and consolidated their newly acquired skills learning further by after hours participation as examiners.

Limitations

The study has a number of limitations. Actual response rates for the analyses were only 53% and 63% because of difficulties in linking all the data sources via the student number. Thus, it is possible that students who left off their student number or recorded it incorrectly were different to students whom recorded their student number correctly.

This study is also limited by its gender skewed sample, with fewer males included in the analysis than in the general Year 2 student population. In addition, clinical competency in examination technique and communication was assessed using a standardised checklist, which has its own limitations and can lead to unfair evaluations. Furthermore, only performance at a single MSAT station was assessed on examination technique and communication.

Finally, there may be an element of recall bias when students self-reported their participation in PPE in the previous system both during class and after hours; however, this bias should be minimal as information on PPE participation was gathered within 6-7 weeks. Further research is thus required to help understand the benefits of PPE participation on empathy.

Conclusion

These preliminary findings show that competency in clinical examination and communication skills, and patient empathy, was higher in Year 2 medical students who regularly participated in PPE as examiners and examinees, respectively. Thus, educational experiences such as PPE can influence empathic attitudes as well as clinical competencies. As protecting and preserving empathy is important in medical education, these results have implications for both educators and medical school policy makers.

These results are particularly relevant as empathy has been shown to decline as the students' progress along in their medical career [3, 4]. As past reports of improved empathy among students who participate in PPE specifically as examinees has only been anecdotal, further research in this area is necessary. The JCU SMD plans to continue the PPE program, and aims to follow-up this cohort in their third and fourth years to confirm that students who actively participate in PPE continue to increase their empathy and CS competencies.

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Declarations

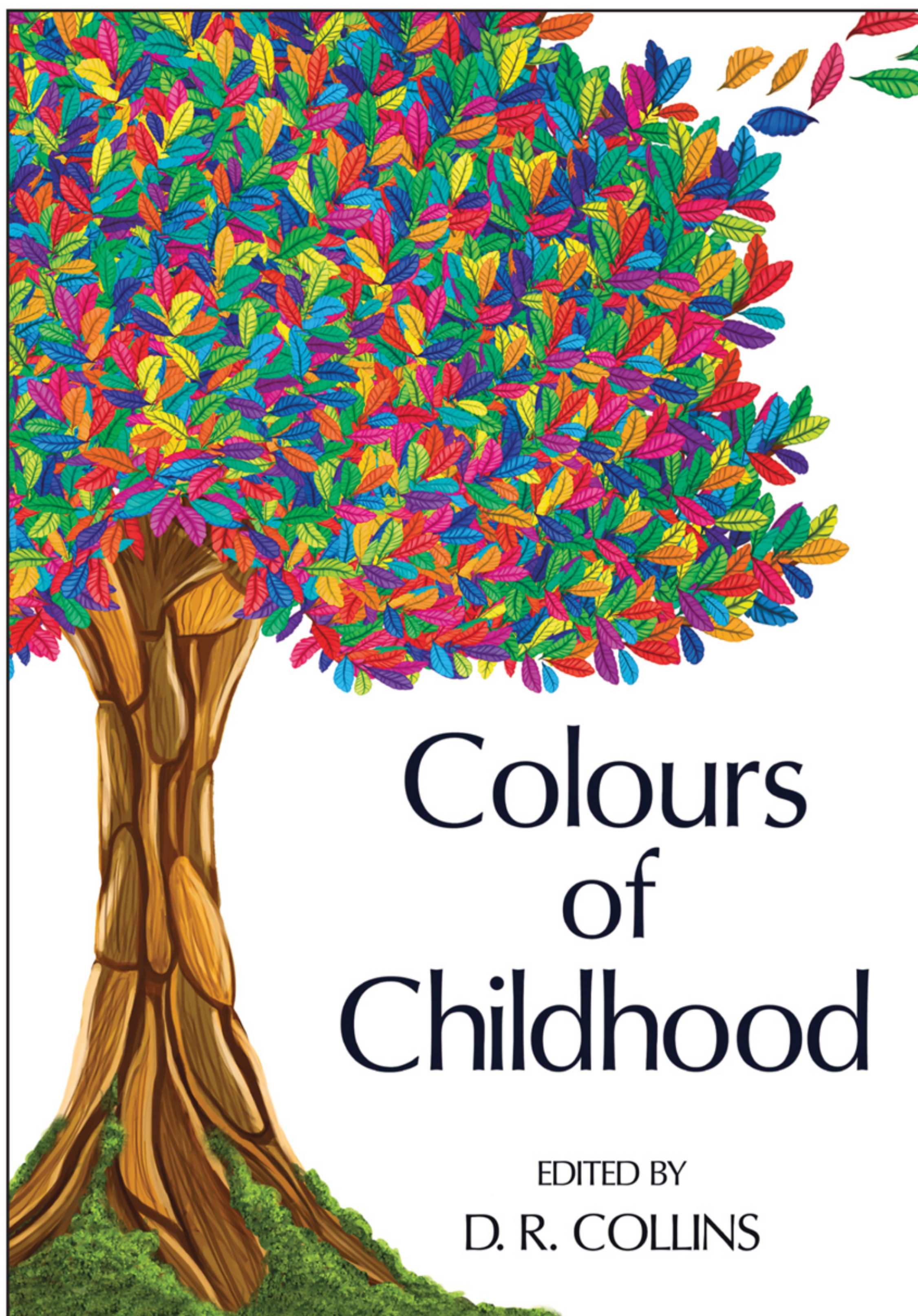
The authors wish to report no declarations of interest, and to state that this study was carried out in accordance with the Declaration of Helsinki, including, but not limited to there being no potential harm to participants, the guarantee of participant anonymity, and the collection of their informed consent.

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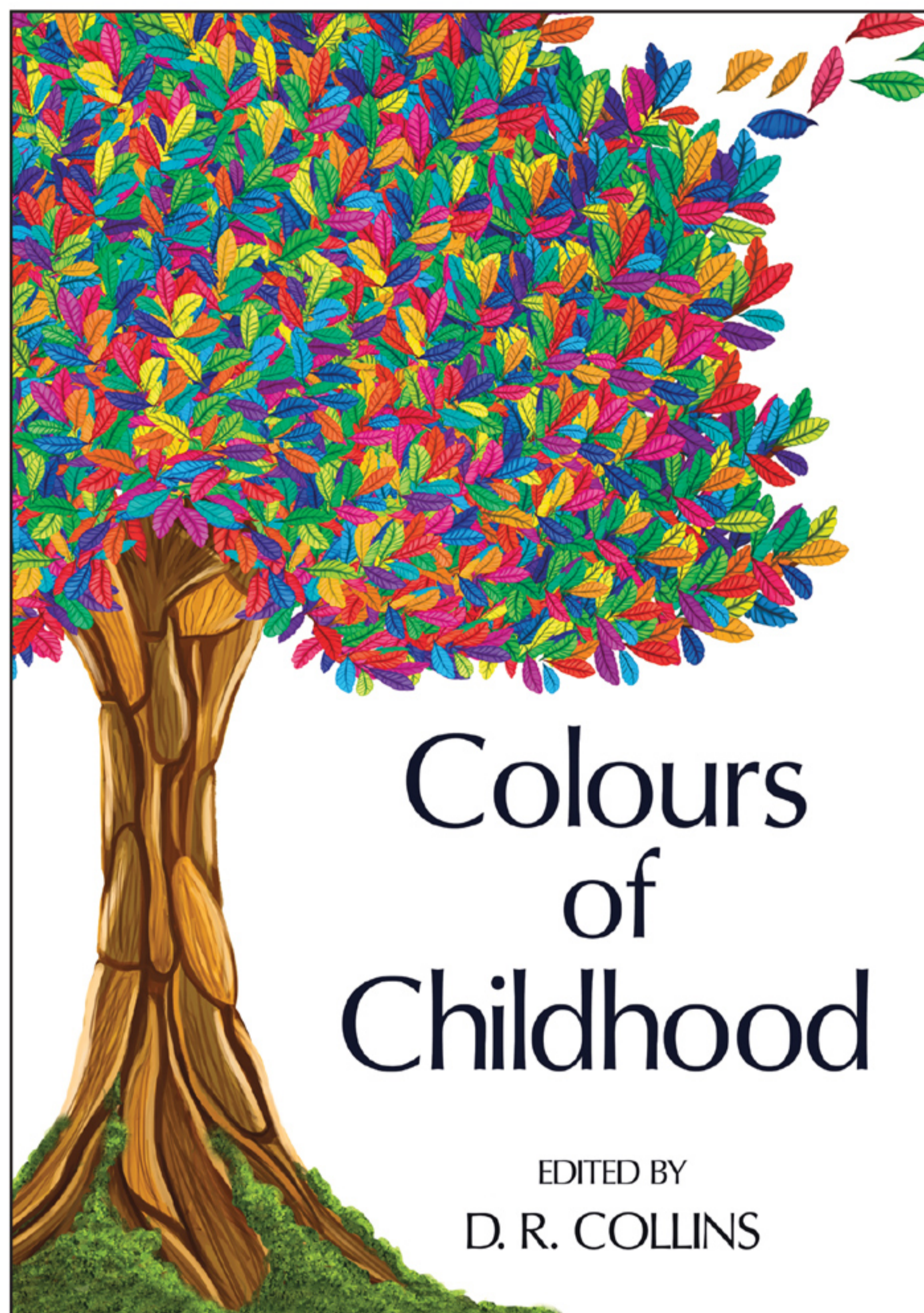
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