

Research article

Australian medical students have fewer opportunities to do physical examination of peers of the opposite gender

Silas Taylor, Boaz Shulruf*

Office of Medical Education, Faculty of Medicine, University of New South Wales, Sydney, NSW Australia

Abstract

Purpose: Peer physical examination (PPE), by which junior medical students learn physical examination skills before practicing on patients, is a widely implemented and accepted part of medical curricula. However, the ethical implications of PPE have been debated, since issues including student gender impact on its acceptability. Research has previously demonstrated the phenomenon of 'attitude-behavior inconsistency' showing that students' predictions about their participation in PPE differ from what they actually do in practice. This study asks whether gender and student self-ratings of outlook affect engagement in PPE. **Methods:** This study gathered data from students who had completed PPE with the objective of determining what factors have the greatest impact on the actual practice of PPE by students. Data were used to derive the number of opportunities students had to examine a peer, for various body parts. Respondent gender and self-ratings of outlook were recorded. **Results:** Responses from 130 students were analysed: 74 female (57%) and 56 male (43%). Students have fewer opportunities to examine peers of the opposite gender; this is statistically significant for all body parts when male students examine female peers. **Conclusion:** Gender is the factor of overriding importance on whether these peer interactions actually occur, such that students have fewer opportunities to examine peers of the opposite gender, particularly male students examining female peers. Student outlook has little impact. We speculate that the more acceptable PPE is to participants, paradoxically, the more complicated these interactions become, possibly with implications for future practice.

Keywords: Attitude; Australia; Peer group; Medical students; Physical examination

Introduction

Peer physical examination (PPE) is a learning activity whereby medical students examine each other to learn physical examination skills [1] and PPE is now a common part of medical curricula [2,3] and other health science programs [4]. This has occurred as large student cohorts have created pressure on health systems, and patients in hospital are less willing or able to assist junior medical students in practicing examination skills [5]. Thus PPE presents a straightforward, inexpensive means by which students learn early examination skills, with

advantages including saving patients the potential distress of being examined by early learners [2]; allowing discrete parts of the physical examination to be taught in a controlled manner; permitting repetition and prompting feedback from tutor and examinee [5,6]. From the student perspective, PPE encourages learning about normality and students find peers less challenging to examine than real patients [7]. However, it is an activity which may challenge student beliefs and two broad factors documented in the literature which impact on student engagement with PPE are gender and what we describe here as student outlook [2,3,6,8]. Whilst the overall acceptability of non-intimate PPE is high, often above 90% [9,10], gender has a strong effect on acceptability of PPE, with male medical students being more comfortable with PPE than their female counterparts [2]. In addition, same gender pairing for examination is more acceptable than mixed gender pairings [2,10] and the

*Corresponding email: b.shulruf@unsw.edu.au

Received: August 10, 2016; Accepted: November 23, 2016,

Published online: November 23, 2016

This article is available from: <http://jeehp.org/>

preference for same gender pairing was greater in female students [5,6,9]. The literature also suggests that individual perspectives on intra- and inter-gender interaction (henceforth: 'outlook') may impact the way health professionals interact with their patients [11]. Student outlook is a self-referenced personal estimation, on a spectrum of liberalism to conservatism, based on their attitudes and beliefs and arising from their personal attributes and experiences. A variety of aspects of outlook have been studied, including religious and cultural issues. Groups broadly identified as non-white found PPE to be less acceptable [2,10] and students of faith or with certain cultural expectations are less comfortable with PPE [5,9,10]. However, much data gathered have reflected a hypothetical willingness to participate rather than ratings of willingness based on actual participation [10]. Aspects of a student's outlook appear to influence the student's willingness to participate in PPE in a highly personal and individualized manner [9,10]. Thus, it seems reasonable to question whether overall student outlook and actual student action during specific examinations may be at variance. In this regard, fewer students (of either gender) actually performed PPE despite claiming to be willing to do so for all body regions, on both genders, whether examining or being examined by a peer: authors termed this phenomenon 'attitude-behaviour inconsistency' [2]. In light of this data, this study focuses on what impacts on the actual practice of PPE by students. Thus, it is about experience, not prior expectations. First, we ask whether gender affects engagement in PPE? And second, do student self-ratings of outlook affect engagement in PPE?

Methods

Study design

It is a cross sectional study.

Subjects

Total 538 University of New South Wales (UNSW) Medicine preclinical undergraduate students completing their exposure to PPE in November 2012 were invited to participate in the research. In PPE sessions, students were free to choose their partner of either gender, and worked in these pairs within small groups. An online questionnaire was delivered immediately after the sessions, and there were 130 valid responses (24.2%). This response rate allows for descriptive statistics mainly focusing on chi-square statistics for measuring differences in distributions across groups [12]. Of the respondents, 74 were female (56.9%) and 56 (43.1%) male; 21 reported their outlook to be conservative (16.2%), 35 (26.9%) liberal, and 74 (56.9%) average.

Instrument

Participants used our tool, the Student Peer Physical Examination Experience Questionnaire (SPPEEQ), to rate by how much they perceived their examination skills improved through participation, as well as their comfort when participating for 12 body parts (Supplement 1). The SPPEEQ also elicited students' self-perception of their 'outlook' on a scale of conservatism to liberalism to capture students' personal perspective of socio-cultural factors which may shape their attitude generally and influence their actions and behaviour. It is important that this was a measure of self-perception in comparison to others, that is, it is deliberately subjective, referencing self against peers. Reliability for the tool could not be measured, since no internal consistency across items was anticipated. Generating ≥ 5 items per attitude measured was not feasible thus we rely upon face validity, supported by similar items used in the literature [13]. Variables employed in analysis were derived, thus: **Outlook:** Responses to the question 'In relation to the average student (whatever you consider that to be) do you think your outlook is...' were:

- More conservative than average, referred to here as conservative
- Within the range of average of conservative/liberal outlook, referred to here as average
- More liberal than average, referred to here as liberal

Cross tabs [12] were performed between gender and the students' outlook in order to check for significant gender variation in the outlook groups.

No opportunity to examine: This novel variable was derived from perception of improvement data, since initial analysis revealed no findings relating to perceptions of improvement in skills. Data recorded for responses to the questions 'How much did examining a (male/female) peer improve your physical examination skills for the following regions of the body or body systems?' was recoded, such that responses 'a lot', 'some', 'a little', and 'none' were taken as the student had had an opportunity to examine a peer. Responses 'refused' and 'no opportunity' were taken as the student had no opportunity to examine a peer.

Procedure

A pilot study run in order to test feasibility of this questionnaire as an online survey instrument, elicited responses from eight students. These were not recorded and are not part of the data analysed. Minor changes to wording of some items were made in response to feedback during piloting.

Statistical analysis

Analysis was conducted using IBM SPSS Statistics ver. 23.0 (IBM Co., Armonk, NY, USA). Descriptive statistics [14] were

Table 1. Body part of male peer not examined by both gender preclinical undergraduate students of University of New South Wales, Australia in 2012

	Body part of male peer not examined											
	Head	Ears	Eyes	Neck	Front of chest	Back of chest	Abdomen	Groin	Arms	Knees	Legs	Skin
Male examiner student	0	2 (3.6)	0	0	0	0	0	27 (48.2)	0	0	0	1 (1.8)
Female examiner student	6 (8.1)	5 (6.8)	6 (8.1)	3 (4.1)	6 (8.1)	7 (9.5)	7 (9.5)	48 (64.9)	4 (5.4)	8 (10.8)	6 (8.1)	7 (9.5)
Significance (Pearson chi-square)	0.029	0.426	0.029	0.127	0.029	0.018	0.018	0.057	0.077	0.011	0.029	0.071

Values are presented as number of students (%).

Table 2. Body part of female peer not examined by both gender preclinical undergraduate students of University of New South Wales, Australia in 2012

	Body part of female peer not examined (%)											
	Head	Ears	Eyes	Neck	Front of chest	Back of chest	Abdomen	Groin	Arms	Knees	Legs	Skin
Male examiner student	14 (25.0)	17 (30.4)	14 (25.0)	17 (30.4)	36 (64.3)	33 (58.9)	31 (55.4)	44 (78.6)	17 (30.4)	19 (33.9)	20 (35.7)	19 (33.9)
Female examiner student	0	0	0	0	0	0	0	24 (32.4)	0	0	0	1 (1.4)
Significance (Pearson chi-square)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Values are presented as number of students (% of respondents of same gender as examiner). No. of examiner: 56 male, 74 female. By Pearson chi-square.

derived for the population sampled and the variables employed in analysis, namely, gender, outlook, and frequency of 'no opportunity to examine'. The latter was derived from perception of improvement data, since initial analysis revealed no findings relating to perceptions of improvement in skills. Cross tabs [12] were performed between gender and the students' outlook in order to check for significant gender variation in the outlook groups.

Ethical approval

This study was granted by the UNSW Human Research Ethics Committee (HREC Ref: # HC13017).

Results

Gender

Tables 1 and 2 illustrate that students have opportunities to examine peers of the same gender. However, students have fewer opportunities to examine peers of the opposite gender and this is statistically significant for all body parts when male students examine female peers. There are body parts that show significant lack of opportunity for female students examining male peers.

Outlook

Cross tabs performed between gender and the students' outlook demonstrated that there is a female predominance in all groups reasonably consistent with the total respondent population (Table 3). Student distribution by outlook was not statistically different across genders.

Table 3. Characteristics of preclinical undergraduate students of University of New South Wales, Australia in 2012 by outlook and gender

Outlook	Male	Female	Total
Conservative	10 (17.8)	11 (14.9)	21 (16.2)
Average range	30 (53.6)	44 (59.4)	74 (56.9)
Liberal	16 (28.6)	19 (25.7)	35 (26.9)
Total	56 (100.0)	74 (100.0)	130 (100.0)

Values are presented as number of students (% of respondents of same outlook).

Tables 4 and 5 illustrate that students who describe themselves as more conservative in outlook have more opportunities for examination, across both genders and despite body parts involved. However, differences between outlook groups do not reach statistical significance. Raw data of the results of SPPEEQ is available from Supplement 2.

Discussion

Gender in peer physical examination

Results show a gender discrepancy in the opportunities students have to examine each other, particularly marked with regard to male students examining female peers. Table 2 illustrates clearly that male students are disadvantaged in terms of opportunities to examine female peers, such that for each body part at least 25% of male students miss out on an opportunity to examine a female peer. This is consistent with the literature showing that same gender pairing of students for examination is more acceptable than mixed gender pairing. Indeed, we suggest that such has been the evidence for this preference that

Table 4. Body part of male peer not examined by preclinical undergraduate students of University of New South Wales, Australia in 2012 according to their outlook

	Body part of male peer not examined											
	Head	Ears	Eyes	Neck	Front of chest	Back of chest	Abdomen	Groin	Arms	Knees	Legs	Skin
Outlook of examiner student												
Conservative	2 (9.5)	3 (14.3)	0	0	1 (4.8)	1 (4.8)	1 (4.8)	10 (47.6)	2 (9.5)	2 (9.5)	2 (9.5)	1 (4.8)
Average range	3 (4.1)	4 (5.4)	5 (6.8)	3 (4.1)	3 (4.1)	4 (5.4)	4 (5.4)	46 (62.2)	2 (2.7)	5 (6.8)	3 (4.1)	6 (8.1)
Liberal	1 (2.9)	0	1 (2.9)	0	2 (5.7)	2 (5.7)	2 (5.7)	19 (54.3)	0	1 (2.9)	1 (2.9)	1 (2.9)
Significance (Pearson chi-square)	0.485	0.072	0.362	0.313	0.928	0.988	0.988	0.439	0.131	0.572	0.485	0.544

Values are presented as number of students (%).

Table 5. Body part of female peer not examined by preclinical undergraduate students of University of New South Wales, Australia in 2012 according to their outlook

	Body part of female peer not examined											
	Head	Ears	Eyes	Neck	Front of chest	Back of chest	Abdomen	Groin	Arms	Knees	Legs	Skin
Outlook of examiner student												
Conservative (n = 21)	0	1 (4.8)	0	0	3 (14.3)	3 (14.3)	2 (9.5)	8 (38.1)	1 (4.8)	1 (4.8)	1 (4.8)	1 (4.8)
Average range (n = 74)	8 (10.8)	9 (12.2)	8 (10.8)	11 (14.9)	22 (29.7)	20 (27.0)	20 (27.0)	42 (56.8)	11 (14.9)	13 (17.6)	14 (18.9)	12 (16.2)
Liberal (n = 35)	6 (17.1)	7 (20.0)	6 (17.1)	6 (17.1)	11 (31.4)	10 (28.6)	9 (25.7)	18 (51.4)	5 (14.3)	5 (14.3)	5 (14.3)	7 (20.0)
Significance (Pearson chi-square)	0.134	0.246	0.134	0.144	0.319	0.436	0.240	0.317	0.465	0.341	0.278	0.296

Values are presented as number of students (% of students who identify as outlook group). Pearson chi-square significance of difference follows.

supervisors and tutors of PPE may acquiesce to student preference with the result that same gender pairing is the de facto rule, and mixed gender pairing the increasingly infrequent exception. This may occur despite 'best practice' recommendations that PPE should be 'voluntary and non-coercive, practised in groups of two to five, with students able to choose their own groups or partner' [5], advice that neither calls for, nor implies, same gender pairing of students.

Outlook and gender

Tables 4 and 5 illustrate results with regard to student outlook, and with reference to the gender of the student being examined. These were unexpected by the authors. Most notably, students who rate themselves as conservative have had the most opportunities to examine all body parts, including those body regions which students of average range and liberal outlook frequently did not have an opportunity to examine (e.g., front of chest, back of chest, abdomen, and groin). Such findings appear to be at odds with the existing literature on student religiosity and ethnicity [2,5,9,10], and the reason is uncertain. Perhaps more conservative students feel more compelled to be diligent in their approach to PPE as an instructional method and are thus simply 'doing as they are told', or are more likely to provide the most desired responses (in their perception) to research questionnaires, or they are simply better at

differentiating between physical examination learning, and gender issues.

However, the main conclusion that can be drawn from these results is, again, that the 'gender of the examinee' is most significant in determining whether the examiner student has an opportunity to examine. Importantly, this is true across all body parts, even those that might be assumed to pose little emotional/social discomfort, since these areas are often exposed socially. For example, Table 5 shows that, taken together, 19 students (average outlook plus liberal) did not have an opportunity to examine the legs of a female peer (as compared with one of conservative outlook). In contrast, Table 4 shows that only 4 students (average outlook plus liberal) did not have an opportunity to examine the legs of a male peer (compared with two conservative outlook students). Therefore, while the outlook of the students produces some interesting results, it is the gender of the examinee that has the major bearing on how many opportunities there are to examine.

Gender interaction in peer physical examination and implications for examination of patients

Perhaps it is timely to recall the ultimate purpose of PPE: to prepare students for the physical examination of patients. Commentary has stated that students may realize through mixed gender PPE that the doctor-patient relationship is 'sexless' [9].

What then is the consequence when students choose to form same gender pairings for non-intimate PPE? It appears that we may have created an activity that has an unfortunate paradoxical effect, whereby mixed gender PPE becomes excessively complex, and thus avoided. With a group of young undergraduate medical students, relationships of any kind with the opposite sex (with apologies for the hetero-normativity) may be cause for them to be mixed up with concerns around sex and sexuality, and perhaps this is inevitable. Or more widely, it is possible that this phenomenon is a consequence of changing social mores and concerns around contact between people of opposite gender throughout society, where what is appropriate or inappropriate is no longer clear, even in the setting of the medical encounter. Importantly, the ultimate outcome might be that male medical students who felt ill at ease examining female peers feel more comfortable examining female patients. Yet this is not a given and they may feel even more conflicted when faced with examining female patients.

Such considerations are of serious concern. Clinical skills are developed using a staged didactic approach, involving the introduction of increasingly complex skills in a variety of settings, starting in simulated environments, including with peers, and ultimately in the real environment with patients. Yet, it is not clear how students could be trained to apply 'sexless' physical examination [14] when unintended gender segregation occurs in peer simulation activities, such as PPE. It may be that certain undesirable beliefs and practices about interaction are learned early on and prove difficult to unlearn at the later stages of practice with real patients. The worst possible outcome for all is that physical examination of patients is avoided.

Students employ a range of other learning activities and resources, apart from PPE, to learn the skills of physical examination, both within and without the curriculum, incentivised not only by assessment tasks but also by real or simulated patient contact [14]. Consequently, their experiences in PPE may not ultimately significantly impact on their clinical practice. However, the results of this study suggest that it is appropriate to challenge the assumption that PPE is in some way uncomplicated and straightforward (and the inherent hetero-normativity with which it, and the preceding discussion, is laden). Here, we warn against some of the potential consequences of such an assumption, because the purpose of clinical training is to prepare doctors for professional practice with all future patients, of either gender.

Limitations to the study include utilising students' rating of 'outlook': findings may be considered contentious because the single measure is based on multiple subjective perceptions at one point in time. In addition, an individual's perspective may not influence actions and behaviour in the manner expected, and/or may be entirely or partially altered by time, place and

other contextual factors. Another possible limitation is that our terminology for outlook is problematic in the specific context of Australian politics, in that the Australian conservative party is named the Liberal Party and so some confusion in the minds of respondents may have occurred with regard to our use of the word 'liberal'.

In conclusion, we found that the gender of the students participating in PPE has a strong influence over whether the examiner student will have an opportunity to conduct a physical examination on their peer. Outlook of students as gathered in this study produced some interesting results, suggesting that more conservative students may be more likely to conduct physical examinations of some body parts, but gender is the overriding factor. These findings prompted reflection upon how we conduct PPE sessions, because they suggest that there is a need to consider whether unintentional same gender PPE may paradoxically, if unintentionally, effect an emphasis on issues around sexuality in physical examination, more than mitigate it.

ORCID: Silas Taylor: <http://orcid.org/0000-0003-1992-8485>;
Boaz Shulruf: <http://orcid.org/0000-0003-3644-727X>

Conflict of interest

No potential conflict of interest relevant to this article was reported.

Acknowledgments

The authors wish to acknowledge the contribution of Ms Suzanne Mobbs who took responsibility for the initial collection and collation of the data.

Supplementary materials

Supplement 1. SPPEEQquestionnaire.

Supplement 2. Data of the results of SPPEEQ from 130 University of New South Wales preclinical medical students.

Supplement 3. Audio recording of the abstract.

References

1. Delany C, Frawley H. We need a new model for obtaining students' consent to conduct peer physical examinations. *Acad Med* 2011;86:539. <https://doi.org/10.1097/acm.0b013e318212eb2c>
2. Chen JY, Yip AL, Lam CL, Patil NG. Does medical student willingness to practise peer physical examination translate into action? *Med Teach* 2011;33:e528-e540. <https://doi.org/10.3109/0142159X.2011.599893>
3. McLachlan JC, White P, Donnelly L, Patten D. Student attitudes

- to peer physical examination: a qualitative study of changes in expressed willingness to participate. *Med Teach* 2010;32:e101-e105. <https://doi.org/10.3109/01421590903202504>
4. Hendry GJ. Barriers to undergraduate peer-physical examination of the lower limb in the health sciences and strategies to improve inclusion: a review. *Adv Health Sci Educ Theory Pract* 2013;18: 807-815. <https://doi.org/10.1007/s10459-012-9418-4>
 5. Outram S, Nair BR. Peer physical examination: time to revisit? *Med J Aust* 2008;189:274-276.
 6. Reid KJ, Kgakololo M, Sutherland RM, Elliott SL, Dodds AE. First-year medical students' willingness to participate in peer physical examination. *Teach Learn Med* 2012;24:55-62. <https://doi.org/10.1080/10401334.2012.641489>
 7. Chinnah TI, de Bere SR, Collett T. Students' views on the impact of peer physical examination and palpation as a pedagogic tool for teaching and learning living human anatomy. *Med Teach* 2011; 33:e27-e36. <https://doi.org/10.3109/0142159X.2011.530313>
 8. Rees CE. The influence of gender on student willingness to engage in peer physical examination: the practical implications of feminist theory of body image. *Med Educ* 2007;41:801-807. <https://doi.org/10.1111/j.1365-2923.2007.02779.x>
 9. Rees CE, Wearn AM, Vnuk AK, Bradley PA. Don't want to show fellow students my naughty bits: medical students' anxieties about peer examination of intimate body regions at six schools across UK, Australasia and Far-East Asia. *Med Teach* 2009;31:921-927. <https://doi.org/10.3109/01421590802578244>
 10. Rees CE, Wearn AM, Vnuk AK, Sato TJ. Medical students' attitudes towards peer physical examination: findings from an international cross-sectional and longitudinal study. *Adv Health Sci Educ Theory Pract* 2009;14:103-121. <https://doi.org/10.1007/s10459-007-9094-y>
 11. Dogra N, Bhatti F, Ertubey C, Kelly M, Rowlands A, Singh D, Turner M. Teaching diversity to medical undergraduates: curriculum development, delivery and assessment. AMEE GUIDE No. 103. *Med Teach* 2016;38:323-337. <https://doi.org/10.3109/0142159X.2015.1105944>
 12. Field AP. *Discovering statistics using SPSS*. 3rd ed. London: Sage; 2009.
 13. Schuwirth LW, van der Vleuten CP. Programmatic assessment and Kane's validity perspective. *Med Educ* 2012;46:38-48. <https://doi.org/10.1111/j.1365-2923.2011.04098.x>
 14. Duvivier RJ, van Geel K, van Dalen J, Scherpbier AJ, van der Vleuten CP. Learning physical examination skills outside timetabled training sessions: what happens and why? *Adv Health Sci Educ Theory Pract* 2012;17:339-355. <https://doi.org/10.1007/s10459-011-9312-5>