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Comparison of students' performance and attitude between collaboration testing and written examination of ethics course

Background: There is little evidence for the effective assessment of the ethical skills and behaviors of health professional students. Therefore, this study was aimed to compare students' performance and attitude about ethics exam between collaboration testing and written assessment.

Method: In this Quasi-experimental interventional study, thirty-six fourth-year undergraduate students of physiotherapy and occupational therapy were recruited. The ethical content of the course was educated in the first semester 2021-2022. At the end of the semester, participants took the examination in a two-stage process of a descriptive question based on a clinical case. The first stage was held individually (written examination). Immediately after it, the students in groups of five discussed about the question and final responses were written on the question sheet (collaboration testing). Before beginning the examinations, three student attributes associated to the examinations were assessed using the survey, including self-efficacy, anxiety, and preparedness. **Results:** Self-efficacy and preparedness, and testing scores were significantly greater in collaboration testing compared to written examination. In contrast, the anxiety level was significantly lower in the collaboration testing compared to written examination.

Conclusion: The present findings showed better performance and positive attitudes of students about ethics exam using collaboration testing.

Keywords: Collaboration testing, Ethics, Attitude, Performance

مقایسه آداء الطلاب واتجاهاتهم بين اختبار التعاون والفحص الكتابي لمادة الأخلاق

الخلفية: هناك القليل من الأدلة على التقييم الفعال للمهارات الأخلاقية والسلوكيات للطلاب المهنيين الصحيين. ولذلك، تهدف هذه الدراسة إلى مقارنة أداء الطلاب واتجاهاتهم حول اختبار الأخلاق بين اختبار التعاون والتقييم الكتابي. **الطريقة:** في هذه الدراسة التداخلية شبه التجريبية، تم تجنيد ستة وثلاثين طالباً جامعياً في السنة الرابعة للعلاج الطبيعي والعلاج المهني. تم تدريس المحتوى الأخلاقي للمقرر في الفصل الدراسي الأول ١٤٠٠-١٤٠١. وفي نهاية الفصل الدراسي، أجرى المشاركون الامتحان في عملية مكونة من مرحلتين عبارة عن سؤال وصفي يعتمد على حالة سريرية. أقيمت المرحلة الأولى بشكل فردي (الاختبار التحريري). وبعد ذلك مباشرة، ناقش الطلاب في مجموعات مكونة من خمسة طلاب حول السؤال وتم كتابة الإجابات النهائية على ورقة الأسئلة (اختبار التعاون). قبل البدء بالامتحانات، تم تقييم ثلاث سمات للطلاب مرتبطة بالامتحانات باستخدام الاستطلاع، بما في ذلك الكفاءة الذاتية والقلق والاستعداد. **النتائج:** كانت الكفاءة الذاتية والاستعداد ودرجات الاختبار أكبر بكثير في الاختبار التعاوني مقارنة بالامتحان الكتابي. في المقابل، كان مستوى القلق أقل بشكل ملحوظ في اختبار التعاون مقارنة بالاختبار الكتابي.

الاستنتاج: أظهرت النتائج الحالية أداء أفضل واتجاهات إيجابية للطلاب حول اختبار الأخلاق باستخدام اختبار التعاون. **الكلمات المفتاحية:** اختبار التعاون، الأخلاق، التوجه، الأداء

مقایسه عملکرد و نگرش دانشجویان بین دو روش ارزیابی گروهی و آزمون انفرادی در واحد درسی اخلاق

زمینه و هدف: شواهد کمی برای ارزیابی مؤثر مهارت‌ها و رفتارهای اخلاقی دانشجویان پزشکی و پیراپزشکی وجود دارد. بنابراین، هدف از این پژوهش مقایسه عملکرد و نگرش دانشجویان نسبت به آزمون اخلاق بین روش های ارزیابی آزمون مشارکتی و ارزشیابی کتبی بود.

روش: در این مطالعه مداخله ای نیمه تجربی، ۳۶ نفر از دانشجویان سال چهارم کارشناسی فیزیوتراپی و کاردرمانی انتخاب شدند. محتوای اخلاقی دوره در نیمسال اول ۱۴۰۱-۱۴۰۰ آموزش داده شد. در پایان نیمسال، شرکت کنندگان در آزمون دو مرحله ای برای پاسخ به یک سوال تشریحی بر اساس یک مورد بالینی شرکت کردند. مرحله اول به صورت انفرادی (آزمون کتبی) برگزار شد. بلافاصله پس از آن، دانشجویان در گروه های پنج نفره در مورد سوال بحث کرده و پاسخ نهایی را در برگه سوالات (تست مشارکتی) نوشتند. قبل از شروع دو آزمون، سه ویژگی دانشجویان مربوط به دو امتحان با استفاده از پرسشنامه بررسی شد که شامل خودکارآمدی، اضطراب و آمادگی آنها بود.

یافته‌ها: خودکارآمدی و آمادگی و نمرات آزمون در آزمون مشارکتی در مقایسه با آزمون کتبی به طور معنی داری بیشتر بود. در مقابل، سطح اضطراب در آزمون مشارکتی در مقایسه با آزمون کتبی به طور قابل توجهی کمتر بود.

نتیجه گیری: یافته‌های ما نشان دهنده عملکرد بهتر و نگرش مثبت دانشجویان نسبت به آزمون اخلاق با استفاده از آزمون مشارکتی بود.

واژه های کلیدی: آزمون مشارکتی، اخلاق، نگرش، عملکرد

تعاون کی جانچ اور اخلاقیات کورس کے تحریری امتحان کے درمیان طلباء کی کارکردگی اور رویہ کا موازنہ

پس منظر: صحت سے متعلق پیشہ ور طلباء کی اخلاقی مہارتوں اور طرز عمل کے مؤثر تشخیص کے لیے بہت کم ثبوت موجود ہیں۔ لہذا، اس مطالعہ کا مقصد اخلاقی امتحان کے بارے میں طلباء کی کارکردگی اور رویے کا باہمی تعاون کی جانچ اور تحریری تشخیص کے درمیان موازنہ کرنا تھا۔

طریقہ: اس نیم تجرباتی مداخلتی مطالعہ میں، فزیو تھراپی اور پیشہ ورانہ تھراپی کے چھتیس چوتھے سال کے انڈرگریجویٹ طلباء کو بھرتی کیا گیا تھا۔ کورس کا اخلاقی مواد پہلے سمسٹر ۱۴۰۱-۱۴۰۰ میں پڑھا گیا تھا۔ سمسٹر کے اختتام پر، شرکاء نے کلینیکل کیس پر مبنی وضاحتی سوال کے دو مراحل میں امتحان لیا۔ پہلا مرحلہ انفرادی طور پر منعقد ہوا (تحریری امتحان)۔ اس کے فوراً بعد، پانچ کے گروپوں میں طلباء نے سوال کے بارے میں تبادلہ خیال کیا اور سوالیہ پرچہ (تعاون کی جانچ) پر حتمی جوابات لکھے گئے۔ امتحانات شروع کرنے سے پہلے، سروے کا استعمال کرتے ہوئے امتحانات سے وابستہ طالب علم کی تین صفات کا جائزہ لیا گیا، بشمول خود افادیت، اضطراب اور تیاری۔

نتائج: تحریری امتحان کے مقابلے باہمی تعاون کی جانچ میں خود افادیت اور تیاری، اور جانچ کے اسکور نمایاں طور پر زیادہ تھے۔ اس کے برعکس، تحریری امتحان کے مقابلے تعاون کی جانچ میں بے چینی کی سطح نمایاں طور پر کم تھی۔

نتیجہ: موجودہ نتائج نے تعاون کی جانچ کا استعمال کرتے ہوئے اخلاقیات کے امتحان کے بارے میں طلباء کی بہتر کارکردگی اور مثبت رویوں کو ظاہر کیا۔

مطلوبہ الفاظ: تعاون کی جانچ، اخلاقیات، رویہ، کارکردگی

INTRODUCTION

Written examinations, oral examinations, and direct observation of students' performance were traditionally used to assess clinical competences of medical students (1). However, researchers highlighted limitations in these assessment methods. Written examinations can be used to test students' knowledge of clinical and procedural skills, but over-reliance on this method may lead students to focus on memorizing these skills instead of practicing them (2). In oral examinations, the assessment was performed using a limited number of patient cases that the students encounter and usually have an unstructured process (3). With regard to direct observation, this assessment tool may be unreliable if the instructors are too busy to constantly observe and assess students' performance, or if there are no common standards (4).

It is important to note that in the assessment methods previously mentioned, students' performance is examined individually. However, some researchers suggested collaboration testing to examine students' performance. In collaboration testing, discussion was made among students about examination questions to arrive at consensus to test answers (5). One study indicated that in addition to increase the students' success, collaboration testing could lead to the development of critical thinking behaviors, group work, and decrease in anxiety arising from the examination (6). In addition, one of the most important features of this type of testing is facilitating students' learning. Indeed, this method potentially transforms the necessary process of assessment into a greater opportunity for learning (5).

Earlier, ethics education was considered only a part of the "hidden curriculum" and the students were expected to learn through peers and "role models". But in recent years, efforts has been made to incorporate ethics into the medical curriculum, and medical ethics has appeared as a crucial field in undergraduate medical institutions (7). Not only students are expected to acquire, retain, and analyze information, they are also expected to acquire behavioral skills (for example in communicating with patients in a compassionate, empathic and respectful manner) and professional attitudes. Medical ethics is a system of moral principles that apply values and judgments to the practice of medicine (8). Obtaining information about medical ethics would be helpful for clinicians to consider ethical principles during making decisions about the care that they provide (9).

Despite major progress was made in the development of medical ethics courses and their application in medical school curricula, the assessment procedures of students' performance in medical ethics have been less well developed and remain controversial (10). Considering the importance of the assessment as a strong motivator for learning and the effects of assessment's mode on learning behavior, assessment in ethics is important in any medical curriculum with an ethics course (10). The lack of assessment in ethics may indicate to students that teachers attach less importance to this subject as compared with others and therefore students may 'downgrade' this subject in their own minds (10). There are a few literatures investigating how health

professional students can be effectively educated and assessed on their ethical skills and behaviors. Therefore, this study was aimed to compare the performance and attitude of physiotherapy and occupational therapy students regarding ethics exam between collaboration testing and written assessment.

METHODS

The present study was a semi-experimental interventional study. Thirty-six senior undergraduate students of physiotherapy (N=21) and occupational therapy (N=15) were enrolled in this study. The inclusion criteria were senior undergraduate students in the field of Physiotherapy and Occupational Therapy of the Faculty of Rehabilitation Sciences in Ahvaz, who had learned the professional ethics unit in 2021-2022 and were willing to participate in this research project. The ethical content of course was educated in the first semester 1400-1401. The aim of the study was fully explained for the participants. The participants were also completed an informed consent form prior to the exam. The participants performed the examination in a two-stage process at the end of the semester. The first stage was held individually, and took 20 minutes to answer (written examination). Immediately after the first testing, in the second stage, the students participated in a collaboration testing in groups of five people chosen randomly. They answered the question in 20 minutes. In this stage, the students were allowed to discuss together and final responses were written on the question sheet. In two stages of the ethics examination, a descriptive question based on a same clinical case was used to assess student's performance. Two stages were assessed by two examiners according to the scoring checklist. The content validity of the exam question was verified using 10 faculty members of Ahvaz rehabilitation school.

In order to self-assess the students concerning their strengths and weaknesses, they completed a short survey ten minutes before beginning the collaboration testing and written examinations. Three student attributes associated to the collaboration testing and written examinations were assessed using the survey, including self-efficacy, anxiety, and preparedness.

To assess self-efficacy, a one-item scale included: my ability to complete an ethical exam. Students were asked to rate their confidence in their abilities with respect to skill using a six-point scale, which was scored from 1 = no confidence to 6 = complete confidence. To assess students' perceptions of anxiety and preparedness in anticipation of the exam, two six-point scales were included in the survey. To assess anxiety, students should select the item that best represents the degree of anxiety that they feel in anticipation of the exam. A six-point rating scale was used: 1 = no anxiety to 6 = extreme anxiety. Similarly, for preparedness, one item was included: specify the number that best shows how much you feel prepared in anticipation of the exam. Participants rated each item on a 6-point scale, ranging from 1 = not at all prepared to 6 = very well prepared (11).

Questionnaire data and testing scores were analyzed using the descriptive statistics (mean and standard deviation).

Since dependent variables (testing scores, self-efficacy, anxiety, and preparedness) were not normally distributed based on the Kolmogorov-Smirnov test, the Wilcoxon test was used to compare the dependent variables between collaboration testing and written examination. SPSS, version 20.0 (SPSS Inc., Chicago, IL) was used for statistical analyses. P value < 0.05 was considered significant statistically.

RESULTS

The statistical analyses indicated significant differences between groups for all studied variables (Table 1). So that, self-efficacy and preparedness, and testing scores were significantly greater in the collaboration testing compared to written examination. In contrast, anxiety level was significantly lower in the collaboration testing compared to written examination.

Variable	Collaboration testing	Written examination	P-value
Self-efficacy	3.87 (1.08)	3.05 (1.16)	0.009
Anxiety	2.87 (1.43)	3.77 (1.60)	0.01
Preparedness	3.80 (1.16)	2.91 (1.15)	0.002
Testing score	5.40 (0.99)	4.52 (1.09)	0.02

Significant P-values are shown in bold

DISCUSSION

The results showed that collaboration testing significantly improved testing performance in ethics exam compared with the written examination. The findings were consistent with the findings of previous studies published in this field. So that, Brian investigated group objective structured clinical evaluation (GOSCE) for the postgraduate assessment of general practitioners in United Kingdom and concluded that the GOSCE was a good method of self-assessment, was popular, and served as a good ice breaker at a residential course (12). Also, Gordon et al reported the team objective structured clinical encounter (TOSCE) (one type of team or group testing) as an acceptable, feasible and effective method at least in terms of enhancing perceived skills, for filling the gap between team working curriculum, outcomes, and skill improvement (13). It is important to note that none of these studies has yet compared student performance and attitude about ethics exam between the collaboration testing and written examination. But it seems that the present results may confirm the results of previous studies that students' performance could increase when instructors create opportunities for students to become actively engaged in content and peers (14).

Furthermore, similar to previous studies (15, 16) , the present results indicated that the amount of self-efficacy was significantly greater in the collaboration testing compared with the written examination. Prior research indicated that higher self-efficacy is correlated with better performance in

clinical skills tests(15). This statement was supported by the results of this study. Prior to commencing collaboration testing, students reported higher confidence about their ability to perform it. Higher self-efficacy may be a potential factor for higher testing score in the collaboration testing (17). Indeed, optimal competent performance in ethics exam needs not only knowledge and skills but also positive beliefs of students about their ability to use both effectively (18). Therefore, students may indicate low performance if they have adequate knowledge and skills but low self-efficacy. On the other hand, in academic settings, self-efficacy is considered as a factor reflecting adaptive behaviors against stress in educational settings, particularly in the context of exam situations (19). It is also suggested as a crucial dispositional resource that can reduce the negative effects of stress on academic performance (16). Furthermore, students reported the calming effect and better self-perceived performance of confidence (18). Therefore, in the current study, higher self-efficacy of students may be a mediating factor for better performance in ethics exam using the collaboration testing.

With regard to anxiety, the current results showed that anxiety level was significantly lower in the collaboration testing compared to written examination. Since, anxiety associated to examination could affect working memory and the retrieval of learned information that closely related to negatively effect on exam performance, decrement of test anxiety may have a critical role in improving performance, therefore it is considered as a major advantage suggested by collaboration testing (16). In the study by Dallmer et al., students stated anxiety decrement during and in preparation for testing as one benefit of collaboration testing (20). Moreover, self-efficacy has been mentioned as a mediating factor with protective effect in negative relationship between anxiety and exam performance. Therefore, in this study, higher self-efficacy of students about ethics exam using the collaboration testing likely resulted in attenuating anxiety and consequently better exam performance.

In addition, the results of the present study exhibited higher preparedness in the collaboration testing compared to written examination. Considering higher self-efficacy and lower anxiety in the collaboration testing, this result is expected.

There are some limitations in this study that should be mentioned in future studies. First, this study was performed in a single institution. This may limit generalizability of results to other institutions. Second, this research only included a small sample of fourth-year students of physiotherapy and occupational therapy. Further studies in greater populations are warranted.

CONCLUSION

The results showed positive attitudes of physiotherapy and occupational therapy students about ethics exam using collaboration testing. These factors may have potential effects on better ethics performance in collaboration testing.

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. The study was approved by ethical committee of Ahvaz Jundishapur University of Medical Sciences (IR.AJUMS.REC.1402.542).

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