

The Role of Prescribing Safety Assessment on Prescribing Readiness of Medical Students in Malaysia

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Abstract

Introduction: Many interventions in terms of training and curriculum enhancement have been introduced to reduce prescribing errors among doctors. One such initiative is the introduction of Prescribing Safety Assessment (PSA) which is a learning module that enhances pharmacological and therapeutics knowledge. However, the benefits of PSA have not been evaluated in Malaysian context before. This study aimed to determine the role of the PSA module on self-perceived prescribing knowledge and competency among medical students.

Methods: A cross-sectional comparative study design was used in which two groups of medical students from different cohorts were asked to fill in an online questionnaire regarding their competency and confidence in the area of prescribing. These groups consisted of 5th year medical students who had undergone the PSA module (n=52) and who did not have any exposure to PSA module (n=54). Independent T-test was used to compare the mean values of answers for each of the questions from both cohorts to determine significance.

Results: The mean data showed that the respondents from both groups tended to 'agree' to have sufficient prescribing knowledge in drugs. Respondents from both groups generally agreed to be confident in prescribing skills.

Conclusion: The respondents in our study generally perceive themselves to be both competent and confident in their prescribing skills. There was no obvious distinction between those who had undergone the PSA module and those who had not.

Key words: Prescribing competency and confidence, Medical doctors

Introduction

Several studies have shown that prescribing errors among doctors are multifactorial but can be grouped into two main aspects which are patient-related and work environment related (Dean, 2002; Ryan *et al.*, 2014).

The above studies also report that the majority of prescribing errors were due to the working environment and extensive workload followed by individual factors. Among the key individual factors are lack of pharmacology knowledge, prescribing knowledge and experience (Hansen *et al.*, 2016; Coombes *et al.*, 2008). These findings are of major concern as they indicate that there is an issue in the overall prescribing preparedness of students as they graduate from medical school. Although it is agreeable that most experience can only be attained during clinical practice as a doctor, simulated prescribing scenarios introduced throughout the medical course can be helpful in improving students' prescribing preparedness.

Prescribing errors have become a global issue (Van Doormaal *et al.*, 2009; Dean *et al.*, 2002; Tully, 2012) and they are increasingly evident

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in Malaysian hospitals and clinics as well (Kuan *et al.*, 2002; Rahman *et al.*, 1994; Abdullah *et al.*, 2004). A study done to determine medication errors among geriatrics found that 25% of the prescriptions had medication errors (Abdullah *et al.*, 2004). To corroborate, 60.4% of hospital pharmacists perceive that prescribing errors by doctors are common and 25.6% of them thought that the prescribing errors were due to lack of knowledge and carelessness (Rahman *et al.*, 1994). Another study on paediatric in-patient prescribing errors in Malaysia identified lack of supervision and lack of knowledge as most common contributing factors (Khoo *et al.*, 2017). These are significant findings which should be given due consideration as medication errors could lead to increased morbidity and mortality in patients. Apart from the disease burden, these errors would also contribute towards an increase in healthcare costs for patients as well as healthcare professionals. It is clear that these iatrogenic complications could be easily prevented if the doctors were more self-equipped with the necessary skills and knowledge required to safely prescribe drugs.

As a remedy for the increasing prevalence of prescribing errors among doctors, the British Pharmacological Society together with the Medical Schools Council Assessment (MSCA) developed the Prescribing Safety Assessment (PSA) (Maxwell *et al.*, 2015). PSA assesses the prescribing skills of final-year medical students and is based on competencies identified by the General Medical Council. Those competencies are writing new prescriptions, reviewing existing prescriptions, calculating drug doses, identifying and avoiding both adverse drug reactions and medication errors and amending prescribing to suit individual patient circumstances. The PSA is an online open-book assessment that encompasses eight different sections which reflect on different aspects of the prescribing process; 1. Prescribing; 2. Prescription review; 3. Planning management; 4. Providing information about medicines; 5. Calculation skills; 6. Adverse drug reactions; 7. Drug monitoring and 8. Data interpretation.

Overall, the PSA serves as an assessment of skills and knowledge in prescribing which allows medical students to showcase their confidence and competence to prescribe medication. There is evidence to show that the reliability of the assessment and performance in the assessment is improving (Maxwell *et al.*, 2017), however research in this area is limited. Thus, the aim of this study was to examine the

role of a PSA module on self-perceived competency and confidence to prescribe among final year medical students at Perdana University-Royal College of Surgeons in Ireland (PU-RCSI).

Methods

The objective of the study was to determine the effect of prescribing module content towards medical students' perception towards prescribing competently and confidently.

Study Design and Population

A cross sectional comparative study was designed to meet the study objectives. The study population comprised of final year medical students from Perdana University-Royal College of Surgeons in Ireland (PU-RCSI). The respondents were included based on the inclusion criteria for two specific groups, being year 5 medical students from graduating cohort 2019 who have had a compulsory PSA module and the year 5 medical students from graduating cohort 2018 who did not undergo the PSA module. The PU-RCSI curriculum used the same PSA module but did not use the same form of assessment as per the British Pharmacological Society. The assessment had a list of questions which were designed to suit the healthcare practice in Malaysia. However it still encompassed the eight different aspects of the prescribing process which is in line with the standards of the British Pharmacological Society and the Medical Schools Council Assessment.

Study Instrument

The study instrument was developed based on an existing questionnaire to obtain students' views on their personal prescribing skills and competencies (Heaton *et al.*, 2008). The questionnaire consisted of 28 questions in total with 12 being multiple choice questions and 16 being Likert scale questions (Supplementary Table 1). The questions revolved around three main areas; basic pharmacology and therapeutics, prescribing skills and competencies and prescribing confidence.

Data Collection Procedure

The web links of the questionnaires were sent via email to each of the cohorts. The responses were kept anonymous and inferred consent was obtained before respondents began answering the questionnaire.

Data Analysis

The data was analysed using SPSS version 22 and was expressed as mean values. Independent t-test was used to determine the significance of difference between the mean

values. Statistical analysis was performed at a 95% confidence interval and significance was determined at $p < 0.05$.

This study was approved by Perdana University Institutional Review Board (PU IRBHR0179).

Table 1: Mean values of responses from pre-PSA and post-PSA 5th year medical students for questions regarding drug prescribing knowledge

Drugs	Mean (\pm SEM) values		p-value
	pre-PSA	post-PSA	
Analgesia/NSAID	4.09 \pm 0.09	4.00 \pm 0.10	0.478
Opiates	3.83 \pm 0.10	3.75 \pm 0.10	0.550
Laxatives	3.64 \pm 0.11	3.73 \pm 0.10	0.573
Antibiotics	3.81 \pm 0.10	3.61 \pm 0.11	0.162
Anti-Emetics	3.89 \pm 0.10	3.86 \pm 0.10	0.860
Anti-Hypertensives	4.17 \pm 0.06	4.12 \pm 0.11	0.691
Anti-Diabetes	4.19 \pm 0.07	4.20 \pm 0.10	0.929
Anti-Coagulants	3.92 \pm 0.11	3.78 \pm 0.10	0.337
Anti-Histamines	3.78 \pm 0.11	3.74 \pm 0.11	0.843
Anti-Asthmatics	4.17 \pm 0.07	4.08 \pm 0.10	0.454
Peptic ulcer medication	4.17 \pm 0.09	4.10 \pm 0.10	0.615

Statistical procedure: independent t-Test (significant level at $p < 0.05$)
Pre-PSA ($n=54$) and Post PSA ($n=52$)

Results

A total of 106 responses were obtained which gave a response rate of 77%. Of the 106 respondents, 54 comprised of 5th year medical students who did not undergo the PSA module while the other 52 were 5th year medical students who underwent the PSA module. All 106 respondents described their medical course as 'integrated'. Here on, the 5th year medical students who did not undergo PSA will be referred as Pre-PSA while the 5th year

medical students who did undergo PSA will be referred to as Post-PSA.

Validity and Reliability

The questionnaire was tested for internal consistency using Cronbach alpha where a score of 0.897 was recorded, indicating a good reliability. In terms of validity, authors conducted a face validity test to ensure the items were measuring the desired objectives. To measure construct validity, the instrument had undergone factor analysis where it was

observed that 26 of the 28 items correlated at least 0.3 with at least one other item, suggesting reasonable factorability. Secondly, the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.81, above the commonly recommended value of 0.6, and the Bartlett's test of sphericity was significant. The diagonals of the anti-image correlation matrix were all over 0.5. Finally, the communalities were all above 0.4, further confirming that each item shared some common variance with other items. Given these overall indicators, factor analysis was deemed to be suitable for all items concerned.

Learning of Basic Pharmacology and Clinical Pharmacology and Therapeutics

The respondents identified their learning style in Basic Pharmacology as well as Clinical Pharmacology and Therapeutics to be 'mainly integrated learning system-based modules'. When asked about the professionals that have played a significant role in teaching them about drug prescribing, a majority (57%) of pre-PSA 5th year medical students responded as clinicians and 24% answered as general practitioners. As for the post-PSA 5th year medical students, clinicians have played a greater role in teaching them about drug

prescribing than general practitioners with 70% indicating the former and only 16% indicating the latter.

Competency to Prescribe

Table 1 shows the mean values of responses from both the cohorts for questions regarding drug prescribing knowledge. When asked about the students' views on whether they believe that they have sufficient knowledge in prescribing common drugs, the mean values of the cohorts showed no significant difference. Both the cohorts 'agree' that they have sufficient knowledge in prescribing common drugs.

Confidence to Prescribe

Table 2 shows the mean values of responses from pre-PSA and post-PSA 5th year medical students for questions regarding confidence in prescribing skills. With regards to having confidence in prescribing skills, the two cohorts did not show any significant difference as both cohorts tended to 'agree' on being confident in these areas of prescribing except for drug dose calculation (p=0.034). However both cohorts on average responded 'uncertain'.

Table 2: Mean values of responses from pre-PSA and post-PSA 5th year medical students for questions regarding confidence in prescribing skills

Prescribing skills	Mean (± SEM) values		p-value
	pre-PSA	post-PSA	
Drug history taking	4.22 ± 0.08	4.12 ± 0.10	0.418
Prescription writing	3.65 ± 0.09	3.82 ± 0.10	0.203
Reviewing patient medication charts	3.93 ± 0.09	3.66 ± 0.12	0.078
Drug dosage calculation	3.39 ± 0.11	3.02 ± 0.13	0.034*
Accessing drug information	3.84 ± 0.08	3.94 ± 0.09	0.401

Statistical procedure: independent t-Test (significant level at p<0.05), *significantly different Pre-PSA (n=54) and Post-PSA (n=52)

Discussion

The current study aimed to identify the role of PSA on self-perceived competency and confidence to prescribing drugs by final year medical students. Results showed that there were no significant differences between the pre-PSA and post-PSA cohorts. This indicates that both the cohorts had similar degree of self-perceived confidence and competency although one cohort was exposed to PSA training and evaluation.

This finding is interesting as it implies that the graduates perceived that they are provided adequate training within the medical school curriculum with or without PSA. The RCSI curriculum places high emphasis on prescribing competency and pharmacological knowledge. As opposed to other medical curricula (Ramasamy & Osman, 2005; Lim, 2012), the students are exposed to the importance of safe prescribing and dangers of medication errors from Year one. Students are also strenuously trained on the distinct pharmacological and therapeutic properties of each drug category across the curriculum from Year one to Year five. Additionally, the RCSI curriculum engages with both hospital and general practitioner clinics to ensure that students have been exposed to numerous prescriptions in a real world setting that increases confidence and competency. According to a study, teaching methods and educational interventions on prescribing would be able to effectively enhance the students' knowledge and skills in prescribing and consequently produce competent prescribers (Kamaruddin *et al.*, 2013). Similarly, prescribing simulation exercises are important tools in developing prescribing and therapeutics skills (Rothwell *et al.*, 2012; Ross & Maxwell 2012; Maxwell, 2012). Importantly, a previous study by RCSI indicates that the students who had undergone a four week intern-training programme which covered clinical and technical skills as well as a four day shadowing experience showed a rise in prescribing readiness and their readiness on undertaking the internship year (Gouda, 2016). The medical curriculum of PU-RCSI also affords a high exposure to evaluations such as OSCEs which provide them with simulated situations where their prescribing skills can be put to the test. This creates strong impetus for the students to gain the same prescribing skills and competency similar to PSA. This explains the similarities in competency, confidence and knowledge among those with PSA training and non-PSA training.

Limitations

This study has two notable limitations. Firstly, the measures utilized in this study were self-reported as opposed to actual evaluated competencies. It is generally an accepted fact that discrepancies do occur between self-reported data and actual evaluation results (Brinkman *et al.*, 2015). Hence, this result should be interpreted with caution as actual competence of the respondents was not assessed. Nonetheless, such an exploration into the possible role of PSA in medical training in Malaysia has not been attempted before and as such this study contributes to the available body of knowledge. Secondly, the respondents of this study were obtained from a high tier medical school and the role of PSA may be different in other medical schools in Malaysia.

Conclusion and Recommendations

In conclusion, our study showed that there is no difference between pre-PSA and post-PSA cohorts, on self-perceived prescribing competence and confidence, indicating that the existing prescribing education and training in this particular medical school may be adequate to provide confidence and competency for medical students in embarking on their medical career. Nevertheless, further studies that involve multiple schools with varying curricula and an objective assessment to explore prescribing readiness and impact of PSA are required to confirm the above conclusion.

Conflict of Interest

The authors declare no conflict of interest.

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