



ORIGINAL ARTICLE

Does self-reflection and peer-assessment improve Saudi pharmacy students' academic performance and metacognitive skills?



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Abstract *Background:* The patient-centered focus of clinical pharmacy practice which demands nuanced application of specialized knowledge and skills targeted to meeting patient-specific therapeutic needs warrant that the training strategy used for PharmD graduates must empower with the ability to use the higher level cognitive processes and critical thinking effectively in service delivery. However, the historical disposition to learning in the Middle East and among Saudi students appeared heavily focused on rote memorization and recall of memorized facts. *Objectives:* To assess the impact of active pedagogic strategies such as self-reflection and peer assessment on pharmacy students' academic performance and metacognitive skills, and evaluate students' feedback on the impact of these active pedagogic strategies on their overall learning experience. *Method:* An exploratory prospective cohort study was conducted among 4th year students at the College of Clinical Pharmacy, King Faisal University, Saudi Arabia to assess the impact of self-reflection and peer-assessment in a semester-wide assessment tasks in two compulsory first semester 4th year courses (Therapeutics-3 and Pharmacoeconomics). An end-of-course evaluation survey with a pre-tested 5-item open-ended questionnaire was also conducted to evaluate students' feedback on the impact of active pedagogic strategies on their overall learning experience. *Result:* Male students (study group) constituted 40.7% of the cohort while 59.3% were females (control group) with mean \pm SD age of 23.2 ± 5.6 and 22.1 ± 4.9 years respectively. The mean \pm SD scores for quizzes, mid-term and final exams, and the overall percentage pass were significantly higher in the study group for both courses ($P < 0.001$). The majority of the students in the study group opined that the exposure to active pedagogic strategies enabled them to improve their use of critical thinking, facilitated

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deeper engagement with their learning and improved their clinical decision-making and discussion skills. *Conclusion:* The use of active pedagogic strategies such as self-reflection and peer-assessment appeared to significantly improve examination performance, facilitate deep and constructive engagement with learning and fostered students' confidence in the use of critical thinking and clinical decision-making.

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1. Introduction

The momentous shift of the practice paradigm from a product-oriented to patient-centered focus that emphasizes pharmacists' direct involvement in the provision, monitoring and assessment of outcomes of pharmacotherapy in a multidisciplinary setting was a critical factor in the adoption of the doctor of pharmacy (PharmD) curricular for the training of clinical pharmacists (Blouin et al., 2009). Graduates of PharmD program are expected to be highly skilled at the provision of effective and efficient direct patient care services in collaboration with other healthcare professionals (CAPE, 2013). The American College of Clinical Pharmacists affirmed that direct patient care provision by pharmacists include direct observation of patients and active participation in the selection, modification and monitoring of patient-specific drug therapy (Murphy et al., 2006). The patient-centered focus of PharmD training requires nuanced application of varieties of specialized knowledge and skills targeted to identifying and meeting patient-specific therapeutic needs. This warrant that the training strategy used for PharmD students must empower with the ability to use in an effective manner the higher level cognitive processes and critical thinking in service delivery (Jungnickel et al., 2009; Stewart et al., 2011). Critical thinking harnesses the in-built brain power to have a deep understanding of a concept, identify and analyze the relationship between the various components or units within a concept, apply the concept and assess the impact of the application in the real world of practice (CAPE, 2013; Peeters, 2011; Oderda et al., 2010). Furthermore, critical thinking also enables pharmacists to contribute to knowledge through the process of linking theory with practice within a reflexive framework. It is therefore clear that for students to develop critical thinking skills, the learning process must move from the surface, reproductive and regurgitative realm to a deep, constructive and transformative level (Linnenbrink and Pintrich, 2004; Prince, 2004; Gleason et al., 2011). This will enable PharmD graduates to adopt an intellectually rigorous paradigm as practice template for direct patient care services such as pharmaceutical care, clinical pharmacokinetic service, medication management, evidence-based pharmacotherapy services and patient counseling/drug information services at the individual and societal levels.

The routine or regular use of the higher level cognitive processes is strongly associated with a strong metacognitive skill (Taylor, 1991). Metacognition is rooted in rigorous self-analysis of the learning process (by students) with a view to ensuring that learning is deep, constructive and outcomes-focused (Gourgey, 1997). Hence, there is a constant on-going reflexive process of self-reflection on the progress made with learning, self-identification of probable gaps impeding the achievement of the defined learning outcomes and self-driven effort to fill

the identified gaps with appropriate intervention to ensure achievement of the learning outcomes. The metacognitive process thus broadly consists of self-reflection, self-regulation and subsequent achievement of self-efficacy by learners (Taylor, 1991). The development of metacognitive skills by learners can be facilitated through varieties of classroom-based student-centered strategies such as self-reflective session and peer assessment. Self-reflective sessions especially among peers in a classroom setting provides learners opportunities to develop the soft skills of self-identification of gaps which must be filled to make progress in the zone of proximal development (ZPD). The ZPD is an individual clear path in the learning zone which provides an audit trail of learner's progress toward the goal of learning (Vigotsky, 1978). Hence, learners become cognizant of the gaps they must close between where they are (current situation) and where they want to get to (learning outcomes) in their learning journey. The use of peer assessment and self-reflection sessions is a good combination of learning strategies that quicken the process of development of metacognitive skills among learners (Oderda et al., 2010; Kasiar and Lanfear, 2003). This is because peer assessment often leverage on social pressure associated with learners not wanting to lose face in front of their peers. Learners are thus motivated to focus on the process of self-reflection and self-regulation to avoid the embarrassment of having their colleagues openly identify the probable gaps in their learning among their peers. Hence, ab initio the combination of self-reflection and peer assessment of the students' self-reflections may goad learners to continuously engage with their learning with a view to avoid losing face among their peers (Weimer, 2003).

The disposition to learning in the Middle East and especially among Saudi students appeared heavily influenced by historical and cultural attitude that is rooted in rote memorization and recall or regurgitation of memorized facts (Rugh, 2002; Cassidy, 2003). Hence, attitude to learning is generally superficial and reproductive. This historical attitude to learning appeared to have contributed to the inadequate skills at self-monitoring and management of learning and lack of commitment to life-long self-directed reflective practices (Allison, 2006). In addition, this may also be underlining the perceived inadequate study habits, complacency with doing the minimum just to get by, and a general lassie faire attitude to deep and constructive learning among Saudi students (Cassidy, 2003; Yousif et al., 2014). Furthermore, the increasing affluence among Saudis appears to generally affect student commitment and drive to learn in a constructive manner (Al-Wazaify et al., 2006). However, we opine that this attitude to learning can be changed with the use of teaching and assessment strategies that is focused on deep and constructive learning and, facilitate the culture of self-reflection, self-regulation and subsequent self-efficacy among learners. This is

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