



## Research Article

# Adaptation and psychometric validation of a scale to assess student pharmacists' beliefs in simplifying complicated medication regimens



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## ABSTRACT

*Objectives:* To validate a scale in order to identify the most relevant survey constructs to measure student pharmacists' beliefs of providing a novel cognitive service of simplifying complicated medication regimens of community dwelling patients using a pill card.

*Methods:* A pre-existing scale was used to construct an adapted questionnaire in the context of simplifying complicated drug regimens in patients taking > five Rx meds daily. The adapted 14-item questionnaire was administered to 126 student pharmacists immediately after they performed a mandatory community pharmacy advanced pharmacy practice experience (APPE) exercise to simplify complicated drug regimens of patients. All students had rehearsed this service with standardized patients before their APPEs assignment. In this APPE assignment the student pharmacists consolidated the dose timings of the daily medications while attempting to improve their likelihood of efficacy and reduce their risk of adverse events. The psychometric properties of the adapted questionnaire were assessed using parallel analysis and principal component analysis. Internal consistency was established using Cronbach's  $\alpha$ .

*Results:* Out of 126 students, 116 (92%) responded to the questionnaire. Factor analysis produced a 3-factor solution of the 14-item scale which accounted for 56% of the explained variance. The factors relate to self-efficacy ( $\alpha = 0.956$ ), intention to practice ( $\alpha = 0.89$ ) and mattering ( $\alpha = 0.885$ ). The overall internal consistency as measured by Cronbach's  $\alpha$  was 0.936. The mean values obtained using these scales were  $6.01 \pm 0.823$ ,  $4.88 \pm 0.742$ , and  $4.45 \pm 0.556$ , respectively, indicating stronger beliefs in this cognitive service.

*Conclusions:* The adapted 14-question instrument can be used to reliably measure the self-efficacy, intention and mattering of fourth-year student pharmacists who can simplify complicated drug regimens by consolidating routinely prescribed medications.

## Background

The world's population is increasing in life expectancy and the number of chronic diseases per person with the aging population.<sup>1</sup> This phenomenon has led to the increased use of prescription drugs with one out of every 10 Americans taking at least five or more prescription drugs.<sup>2</sup> Management of these medicines can be challenging, as patients struggle with increasing complexity of their medication regimen which includes multiple medications and doses per day.<sup>3</sup> Literature is replete with studies which have

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demonstrated that an increase in regimen complexity is associated with reduced medication adherence and increased medication errors.<sup>4–7</sup> Research has shown that patients having such complex regimens are often not able to schedule their daily regimen appropriately and tend to overcomplicate their schedules.<sup>8</sup> Therefore, there is a need to assist such patients in achieving this goal of simplification.

Pharmacists and pharmacy students are uniquely placed in the health care system as a provider of medicines to patients both before and after they actually start administering them. Because of this unique position, they are often studied and referred to as advocates for the health of patients. With the introduction of medication therapy management (MTM), pharmacists have been widely recognized as delivering key potential services that improve clinical, economic, and humanistic outcomes.<sup>9–11</sup> Given the expanded roles of community pharmacists, it is important to better understand the factors which enable pharmacists to perform their newer roles. Importantly, schools of pharmacy are teaching students to function in the roles that are anticipated for future pharmacists and are not simply their current roles. In addition to building knowledge and skills to assume these expanded roles, there is a need for students to graduate with the confidence and intention to adopt expanded cognitive service roles of pharmacy. Without these components, their knowledge and skills are somewhat hollow achievements, easily ignored and diminished over time. Thus, the criteria for evaluating educational excellence should consider whether students have the confidence and intention to adopt expanded roles deemed a priority.

In 2008, a scale was developed by Guirguis et al.<sup>12</sup> to assess the beliefs of student pharmacists about monitoring chronic diseases.<sup>12</sup> This scale identified four constructs—self-efficacy, intention, outcome expectancies, and mattering—to measure these monitoring beliefs in student pharmacists. These survey constructs were guided by sociological theory, expert opinion, and pilot work in this field. They were shown to have good validity and reliability in the context of measuring student pharmacist beliefs in monitoring chronic diseases.<sup>12</sup> The authors of this study concluded that the beliefs of student pharmacists can be assessed using this scale and such beliefs are important starting points to be an active part of the evolving role of pharmacists.

Another study by Urmie et al.<sup>13</sup> explored the knowledge and intention of student pharmacists' in providing MTM services to patients; however, their self-efficacy and mattering towards this expanded patient care exercise was not evaluated. This becomes particularly important as literature has shown a positive association among self-efficacy, intention, and the future behavior of these pharmacists.<sup>14,15</sup> Further, in the past, only one study has focused on the aspect of medication simplification as an independent process for helping patients with complicated drug regimens.<sup>16</sup> Importantly, none of the aforementioned scales and studies have examined the impact of student pharmacist counseling on scheduling of medications. Such gaps in the literature served as an impetus to create appropriate fundamentals to help them match the ever evolving role of a community pharmacist.

The objective of this study is to adapt and validate a pre-existing scale in the context of medication simplification by fourth-year student pharmacists. The aim is to accurately and reliably measure the beliefs and attitudes of fourth-year pharmacy students for conducting a novel cognitive service to simplify complicated drug regimens. The adapted scale would be used to measure the student pharmacist beliefs in doing so. Fourth-year pharmacy students in their Advanced Pharmacy Practice Experiences (APPEs) are expected to perform pharmacist duties in various settings such as acute care and ambulatory care. This study aims to identify valid and reliable constructs within a pre-existing scale<sup>12</sup> that can be used to measure the beliefs of student pharmacists in simplifying complicated medical regimens of patients during their community pharmacy APPE rotations.

## Methods

### *Theoretical framework*

In order to arrive at the most relevant constructs, theoretical foundations of the pre-existing survey were evaluated (hereby referred to as the Guirguis survey). The Guirguis survey used three theories used to develop an instrument to assess the beliefs of student pharmacists' in monitoring chronic diseases—social cognitive theory, role theory, and mattering. As per social cognitive theory, "If people are persuaded that they have what it takes to succeed, they exert more effort and avoid focusing on their doubts when problems arise."<sup>17</sup> In pharmaceutical and sociological literature, self-efficacy has been studied extensively in association with health care provision in a myriad of patient populations<sup>15,18–20</sup> Student pharmacists may be more likely to help patients simplify their complicated drug regimens, if their self-efficacy for doing this behavior is high. Several scales have been developed to assess the self-efficacy of pharmacy students.<sup>21–23</sup> Special attention was paid to the scales which assessed the beliefs of student pharmacists toward providing cognitive services. In order to assess the self-efficacy of student pharmacists in simplifying complex regimens, questions pertaining to the self-efficacy construct in the Guirguis scale (2008) were adapted.

The second theory (role theory) suggests that student pharmacists who have perhaps internalized the role of the provider of a cognitive service—simplifying complex regimens in the current context—would be more likely to adopt this in their professional role as a practicing pharmacist. Literature has established the importance of role beliefs in pharmacist–patient interactions in various systematic reviews.<sup>24–26</sup> Learning from the literature, we adapted and designed questions to measure the impact of the student pharmacists' role in simplifying complicated drug regimens during their community pharmacy APPE rotations.

The third theory introduces the concept of "mattering" which can be defined as a belief which explores the relationship between the extent to which the student pharmacist services matter to the patients and how likely are they to adopt the service.<sup>27</sup> Learning from this, questions were created and adapted to understand the mattering of the student pharmacist in the context of simplifying complicated regimens. The mattering scale has been used in previous literature to assess the student pharmacists' beliefs about conducting monitoring activities in their patients, and examining the changes in their professionalism based on their perception of how much patients mattered to them.<sup>27,28</sup>

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