RESEARCH

Student Perceptions of and Confidence in Self-Care Course Concepts Using Team-based Learning

Tracy R. Frame, PharmD,^{a,b} Rebecca Gryka, PharmD, PhD,^b Mary E. Kiersma, PharmD, PhD,^{c,d} Abby L. Todt, PharmD,^{c,d} Stephanie M. Cailor, BSPS,^b Aleda M. H. Chen, PharmD, PhD^b

^a Belmont University College of Pharmacy, Nashville, Tennessee

^b Cedarville University School of Pharmacy, Cedarville, Ohio

^c Accreditation Council for Pharmacy Education, Chicago, Illinois

^d Manchester University College of Pharmacy, Fort Wayne, Indiana

^e Parkview Health, Fort Wayne, Indiana

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Objective. To evaluate changes in student perceptions of and confidence in self-care concepts after completing a team-based learning (TBL) self-care course.

Methods. Team-based learning was used at two universities in first professional year, semester-long self-care courses. Two instruments were created and administered before and after the semester. The instruments were designed to assess changes in student perceptions of self-care using the theory of planned behavior (TPB) domains and confidence in learning self-care concepts using Bandura's Social Cognitive Theory. Wilcoxon signed rank tests were used to evaluate pre/post changes, and Mann Whitney U tests were used to evaluate university differences.

Results. Fifty-three Cedarville University and 58 Manchester University students completed both instruments (100% and 92% response rates, respectively). Student self-care perceptions with TPB decreased significantly on nine of 13 items for Cedarville and decreased for one of 13 items for Manchester. Student confidence in self-care concepts improved significantly on all questions for both universities.

Conclusion. Data indicate TBL self-care courses were effective in improving student confidence about self-care concepts. Establishing students' skill sets prior to entering the profession is beneficial because pharmacists will use self-directed learning to expand their knowledge and adapt to problem-solving situations.

Keywords: team-based learning, self-care, pharmacy students, confidence

INTRODUCTION

Millions of Americans use nonprescription medications to treat self-diagnosable medical conditions.¹ On average, consumers visit primary care providers three times per year but make approximately 26 trips a year to purchase nonprescription products.¹ The availability of nonprescription medications provides \$102 billion in value to the United States health care system annually.² As accessible health care professionals, pharmacists have an opportunity to provide education and guidance directly to consumers regarding appropriate nonprescription medication selection.³⁻⁶

Accreditation Standards set by the Accreditation Council for Pharmacy Education (ACPE) reflect the

importance of training pharmacy students to provide patient-centered care. According to ACPE Standards 2016, the graduating pharmacist should be prepared to assess, triage, counsel, and communicate a plan of action for a patient seeking self-care therapy.⁷ To effectively prepare students to assist patients seeking self-care options, pharmacy education incorporates active-learning techniques. Team-based learning (TBL) has been used more often in higher education because it employs interactive methods such as active learning to promote self-directed learning and develops adaptability in problem-solving situations.^{8,9} Medical education literature examines whether TBL results in better outcomes than a traditional lecture format with mixed results. Fatmi et al's systematic review, which was designed to assess the effectiveness of TBL on improving learning outcomes in health professions education, found approximately half of the 14

Corresponding Author: Tracy R. Frame, Belmont University, 1900 Belmont Blvd., Nashville, TN 37212. Tel: 615-460-6983. Fax: 615-460-6741. E-mail: tracy.frame@belmont.edu

included studies showed significant improvement in knowledge scores for the groups using TBL.¹⁰ Three of those 14 did not comment on significance but did demonstrate trends toward improvement in knowledge scores for the TBL group.

Regarding self-care, studies show that using interactive methods to teach student pharmacists about nonprescription drugs results in an improvement of students' confidence in their ability to provide nonprescription medication advice.^{11,12} However, the impact that TBL can have on the change in confidence in self-care concepts is not addressed in the literature. Multiple studies examined how other parameters are impacted with the use of TBL pedagogy.¹³⁻¹⁶ These studies, including one by Elmore et al, which was completed in the context of a self-care course, assessed the impact of TBL on professionalism, team learning attitudes, and broad-based skills (eg, verbal and written communication skills, problem solving, and working as part of a team), but did not examine the impact on confidence in self-care concepts.

The Theory of Planned Behavior (TBP) is used to predict and explain human behavior in specific circumstances.¹⁷ In this theory, the relationship between attitudes, subjective norm, and perceived behavioral control are described as the underlying foundational beliefs about the intention to perform specific behaviors. In this study, self-care was the specific foundational behavior. The theory uses three independent determinants of intention: (1) attitude, which is the favorable/unfavorable evaluation of the behavior; (2) subjective norm, the perceived social pressure to perform/not perform a behavior; and (3) perceived behavioral control, an individual's perception of the ease or difficulty of performing a behavior. Essentially, the theory of planned behavior suggests that behavior is a function of beliefs relevant to the behavior. For example, Siragusa and Dixon (2009) surveyed undergraduates to investigate the influence of attitude, subjective norm, and perceived behavioral control on the intention to use technology, which would lead to actual use.¹⁸ Cheon et al also found that the theory was valuable in explaining college students' acceptance of learning to use mobile devices.¹⁹

Self-efficacy, a student's perceived ability to learn or perform a specific task, as conceptualized by Bandura's Social Cognitive Theory, can have a vital role in the individual's self-perception of success or failure of the task.^{20,21} The concept of self-efficacy is useful in educational research, as self-efficacy influences the decisions students make, including their future actions, by electing to engage in tasks about which they feel confident and avoiding tasks about which they do not.^{22,23} For example, Multon et al examined a growing body of research relating self-efficacy beliefs to academic outcomes using

a meta-analysis. Their results indicated that self-efficacy beliefs could explain about 14% of the variance in students' academic performance.²⁴

Little information is available regarding student confidence and perceptions of their self-care knowledge when it is taught in a TBL format. Additionally, the literature does not address the impact that TBL has on students' perceptions of self-care concepts and self-efficacy that may, by way of Bandura's theory,^{25,26} influence whether students elect to engage in tasks because they feel confident about them or avoid tasks because they do not. The objective of this study was to evaluate student perceptions and confidence of self-care concepts using a TBL format at two universities.

METHODS

The self-care course in the pharmacy programs at Cedarville University and at Manchester University is the only required self-care course in each curriculum and is delivered during the first professional year in a 2-credit hour course using TBL. Cedarville University delivers the course during the fall semester, while Manchester University offers the course in the spring. In addition, each program encourages self-care topics to be reemphasized and built upon throughout other courses to maximize learning of self-care concepts.

At Cedarville University, the course objectives were for students to be able to recognize the scope of self-care, design a patient-specific treatment plan using nonprescription products, identify appropriate use of nonprescription therapies and products, and utilize social media in self-care pharmacy practice. A different set of disorders (ie, gastrointestinal disorders, dermatological disorders) was delivered every week for 14 weeks using TBL pedagogy. Students were given learning objectives, reading assignments, and reading objectives to complete prior to coming to class for each week's session. Each week consisted of an individual readiness assurance test (iRAT), team readiness assurance test (tRAT) and mini-lecture on the first day, and an application activity on the second day of class, which were typically small case-based examples. The TBL teams, consisting of 5-6 students, were designed by faculty members and included at least two males and both introverted and extroverted personalities (students completed the Myers-Briggs M form [The Myers Briggs Foundation, Gainesville, FL] to determine their individual "Type Indicator"). This was done to stratify gender and personality among each team. Heterogeneous teams tend to be more successful than homogeneous teams, and a variety of extroversion and introversion will also benefit the team's attitude.²⁷⁻²⁹ The contribution to the final course grade for each of

the components of TBL was as follows: 17% for the iRATs (students were able to drop their lowest iRAT), 18.7% for the tRAT, and 10.7% for the application exercise (only eight out of the 14 were graded throughout the semester). Faculty members provided readings and objectives for each session that attempted to standardize the preparation time at about 3-4 hours.

At Manchester University, the course objectives included determining the need for self-care or referral for additional medical care, determining appropriate non-prescription medications and products for patients, formulating effective, evidence-based recommendations, and demonstrating professional written communication skills. Both an iRAT and tRAT were given every class period (with the exception of examination days and spring break) throughout the semester for a total of 24 RATs. Even though some of the disorders were delivered over more than one class period (eg, cough and cold, internal/external analgesics, nicotine cessation), the students still completed a RAT during each class period for the material covered. After the tests, students performed case-based application exercises as a team, and after, faculty members clarified confusing issues. Teams were designed by faculty members, had 5-6 students each, and were distributed based on only gender and ethnicity, not on personality. Each team had at least two males and students with differing ethnicities to promote diversification. With slight differences at Manchester, the contribution to the final course grade for each of the components of TBL was as follows: 24% for the iRAT (more than Cedarville), 16% for the tRAT (less than Cedarville), and 15% for the application exercise (more than Cedarville). Faculty members provided reading materials and objectives for each session in an attempt to standardize the preparation time to about 2-3 hours.

The students completed the Self-Care Questionnaire (consisting of the Self-Care Confidence Assessment and the Perceptions of Self-care Assessment) at the beginning and end of the semester to assess confidence in self-care concepts, as well as perceptions of self-care. The literature was reviewed to identify previous studies using surveys to assess these two parameters, and when none were found, new surveys were developed. To measure confidence in learning self-care concepts, Bandura's Social Cognitive Theory was used to create 19 items (5-point, Likert-type scale, 1=not at all confident to 5=extremely confident). To assess student perceptions of self-care, the TBP domains were utilized to create 13 items (7-point, Likert-type, 1=strongly disagree to 7=strongly agree) designed to measure perceived behavioral control, subjective norm, and attitude regarding self-care concepts. The surveys underwent student review (a student read for

clarity and understanding), peer review (faculty members at both institutions) and expert review (an assessment expert). Demographic data such as gender, ethnicity, age, cumulative grade point average (GPA), and previous work as pharmacy technician or intern were collected. These survey instruments were administered manually during a designated time. The students were required to complete the survey, but were informed that completing the survey would not impact their grade.

All data was entered into Microsoft Excel. An a priori level of $\alpha=0.05$ was used for determining significance. Analyses were performed utilizing SPSS, v21.0 (IBM, Armonk, NY), unless otherwise specified. Demographic information was analyzed using descriptive statistics. Since the data was ordinal in nature and did not pass the Shapiro-Wilk test for normality, Wilcoxon signed rank tests were used to analyze the differences between pre/postsemester questionnaires. Mann-Whitney U tests were run to analyze the differences between the universities. Subscale summated scores for the TPB were combined to facilitate statistical analysis. Paired *t* tests were used to assess subscale changes from pretest to posttest. One way analysis of variance (ANOVA) was performed to determine whether student demographics influenced students' responses to TPB subscales. For these analyses, demographic categories (ethnicity and age) were collapsed to improve statistical inferences because frequencies were too small to allow for data analyses for all categories. For ethnicity, African American, Hispanic, and Other categories were combined. Age groups were combined into two groups: those students 21 years and younger and those 22 years and older.

Since the instruments were constructed for the purposes of this project, reliability was analyzed using Cronbach alpha (α). The Self-Care Confidence instrument had good reliability, with a Cronbach α of 0.956. The Perceptions of Self-Care instrument also had good reliability, with a Cronbach α of 0.911. Confirmatory factor analysis (CFA) was performed to model and examine the relationship between the items and their corresponding factor (perceived behavioral control, attitude, and subjective norm) for the Perceptions of Self-Care Instrument, because it was created using a theoretical framework. Analyses were performed in SAS, v 9.3 (SAS, Inc., Cary, NC) using the PROC CALIS procedure on the pretest data. Model fit was assessed using the root mean square error of approximation (RMSEA; ≤ 0.08 indicates a reasonable fit, ≤ 0.06 indicates a good fit) and the standardized root mean square residual (SRMSR; ≤ 0.10 reasonable fit, ≤ 0.05 good fit).³⁰ One hundred fourteen complete responses were used. The RMSEA did not meet the criteria for acceptable fit (RMSEA=0.127), but the SRMSR did

meet the criteria for reasonable fit (SRMSR=0.066). None of the perceived behavior control items (1, 6, 7, 9, 11) had a significant relationship with their factor ($p>0.05$). One attitude item (10, $p=0.07$) and two subjective norm items (5 and 13, $p=0.066$ and $p=0.076$, respectively) did not have a significant relationship with their factor. Perceived behavioral control, attitude, and subjective norm factors significantly covaried with one another ($p<0.05$). This cross-sectional study was approved, with exempt status, by the institutional review boards at both Manchester University and Cedarville University.

RESULTS

At Cedarville, students demonstrated significantly more confidence on all 19 items of the Self-Care Confidence survey from presemester to postsemester (Table 1). Students demonstrated a significant decrease in their perceptions of self-care (nine of the perceived behavioral control, subjective norm, and attitude items) from presemester to postsemester (Table 2). Manchester students also exhibited significantly more confidence on all 19 confidence items (Table 1) but only demonstrated one significant decrease in their perceptions of self-care (perceived behavioral control, subjective norm, and attitude) from presemester to postsemester (Table 2).

There were seven significant differences between the universities on their confidence on the Self-care survey and one significant difference between universities on their perceived behavioral control, subjective norm, and attitude at the end of the semester (Table 3). Manchester students had a higher significant increase in confidence than their Cedarville University counterparts on seven of 19 survey items in their self-care skills to identify conditions appropriate for self-care and identify disorder factors that may influence selection of nonprescription products, identify recommended and maximum dosages as well as frequency of dosing for common nonprescription medications, explain adverse drug events associated with nonprescription medications, and identify government regulations associated with nonprescription medications (Table 3).

The universities exhibited a high level of divergence with respect to self-care perceptions in terms of perceived behavioral control, subjective norm, and attitudes related to the self-care course. Cedarville students had significant decreases in agreement with nine out of the 13 survey items across the course of the semester, whereas Manchester students exhibited only one significant change, which was a decrease in the agreement that they would receive a high grade (an A) in the self-care course. This item was significantly different between universities in

that both universities had a significant decrease in agreement with this item from presemester to postsemester (Table 3), but Cedarville students demonstrated significantly more decrease than Manchester students in agreement with that statement at the end of the semester (Table 4).

The study also examined the association between students' perceptions of self-care concepts and student demographics. In the instrument, students were asked for 10 types of demographic information. (Table 5). By combining the items for each of the domains (perceived behavioral control, subjective norm, and attitude) in the perceptions of self-care instrument, the analysis provided an estimate of students' overall perceptions of self-care concepts. The three TBP subscales were examined (Table 2), and there were significant decreases on all three subscales from pretest to posttest. There were no significant differences in perceived behavioral control, subjective norm, and attitude for gender or GPA.

There were significant differences identified when examining ethnicity and age. Results indicated there was a difference between white and Asian/Pacific Islander students for the preperceived behavioral control subscale ($p=0.050$). Overall, white students had a more positive score than Asian/Pacific Islander students [31.6 (2.3) vs 29.2 (2.9)]. Students aged 22 and older had a more positive score than students 21 and younger [30.7 (2.9) vs 29.5 (3.0); $p=0.003$].

Significant differences between universities were identified in the preattitude ($p=0.009$), presubjective norm ($p=0.025$), and preperceived behavioral control ($p=0.010$) subscales. Students from Cedarville had a more positive preattitude score than students from Manchester [26.6 (1.5) vs 25.5 (2.5)]. This pattern also was noted for the presubjective norm subscale [26.6 (1.9) vs 25.5 (2.9)]. Students from Cedarville had a more positive score on the preperceived behavioral control subscale than Manchester students [31.7 (2.5) vs 30.4 (2.9)].

DISCUSSION

This study was initiated to assess the changes in student confidence in learning self-care concepts using Bandura's Social Cognitive Theory and perceptions of self-care using TPB after completing a TBL self-care course during the first professional year at two universities. While no literature compares self-care courses taught in a traditional lecture format vs TBL, previous work by Ferreri and O'Connor did explore the impact of active learning on student learning by redesigning a lecture-based self-care course into a small-group learning course.³¹ This redesign used the "flipped classroom" approach where students had to prepare outside of class with prereadings and then work through case studies in small groups during

Table 1. Changes in Self-Care Confidence for all Students and at Each University

I am able to...	Combined		Cedarville		Manchester	
	Premeans (SD)	Postmeans (SD)	Premeans (SD)	Postmeans (SD)	Premeans (SD)	Postmeans (SD)
Interview a patient regarding a self-care subject at a community pharmacy.	3.0 (0.9)	3.9 (0.8)	2.8 (0.9)	3.8 (0.8)*	3.1 (0.8)	4.1 (0.7)*
Collect information from patients needed for a self-care assessment.	3.4 (0.9)	4.2 (0.7)*	3.3 (0.9)	4.1 (0.7)*	3.5 (0.8)	4.2 (0.7)*
Identify conditions that are appropriate for self-treatment.	2.9 (0.7)	3.9 (0.8)*	2.8 (0.9)	3.7 (0.8)*	3.0 (0.7)	4.0 (0.7)*
Determine patient factors that may influence the selection of a nonprescription medication.	2.7 (0.8)	3.9 (0.7)*	2.6 (0.9)	3.9 (0.8)*	2.8 (0.8)	4.0 (0.7)*
Determine disease state factors that may influence the selection of a nonprescription medication.	2.4 (0.8)	3.7 (0.8)*	2.2 (0.8)	3.6 (0.8)*	2.6 (0.7)	3.9 (0.8)*
List the indications for common nonprescription medications.	2.8 (0.9)	4.1 (0.8)*	2.5 (1.0)	4.0 (0.9)*	3.1 (0.7)	4.1 (0.7)*
Identify common non-prescribed medications' recommended dosages.	2.6 (0.9)	3.4 (0.9)*	2.4 (0.9)	3.2 (0.9)*	2.8 (0.8)	3.7 (0.8)*
Identify common nonprescription medications' maximum recommended dosages.	2.5 (0.9)	3.4 (0.9)*	2.3 (0.8)	3.2 (0.9)*	2.7 (0.8)	3.6 (0.8)*
Identify frequency of administration for common nonprescription medications.	2.7 (0.9)	3.6 (0.8)*	2.4 (0.8)	3.4 (0.9)*	3.0 (0.8)	3.8 (0.8)*
Explain the side effects of common nonprescribed medications.	2.5 (0.8)	3.5 (0.8)*	2.4 (0.9)	3.4 (0.9)*	2.6 (0.9)	3.7 (0.8)*
Discuss the risks associated with nonprescription medications use.	2.6 (0.8)	3.8 (0.8)*	2.5 (0.8)	3.6 (0.8)*	2.7 (0.9)	3.9 (0.8)*
Discuss the benefits association with the use on nonprescription medication.	2.8 (0.8)	4.0 (0.7)*	2.7 (0.8)	3.9 (0.7)*	2.9 (0.8)	4.0 (0.7)*
Identify potential interactions with nonprescription medications.	2.2 (0.8)	3.2 (0.8)*	1.9 (0.9)	3.1 (0.9)*	2.5 (0.7)	3.3 (0.7)*
Advise a patient on nonprescription medication use.	2.7 (0.8)	4.0 (0.7)*	2.5 (0.9)	3.9 (0.8)*	2.8 (0.7)	4.1 (0.6)*
Advise a patient on complementary and alternative medicine.	2.2 (0.8)	3.3 (0.8)*	2.0 (0.9)	3.2 (0.8)*	2.5 (0.7)	3.4 (0.9)*
Counsel a patient on appropriate use of nonpharmacologic self-care items.	2.5 (0.9)	4.0 (0.7)*	2.3 (0.9)	4.0 (0.8)*	2.7 (0.8)	4.0 (0.7)*
Counsel a patient on appropriate use of home diagnostic kits.	2.3 (0.9)	3.8 (0.8)*	2.1 (1.0)	3.7 (0.9)*	2.5 (0.8)	3.9 (0.7)*
Identify government regulations associated with nonprescription medications.	2.2 (0.8)	3.5 (0.8)*	2.0 (0.8)	3.2 (0.7)*	2.4 (0.8)	3.7 (0.8)*
Apply a patient specific knowledge when making a recommendation for self-care in a patient.	2.5 (0.9)	3.9 (0.7)*	2.3 (0.9)	3.8 (0.8)*	2.6 (0.8)	4.0 (0.6)*

5-point Likert-type scale: 1 =not at all confident; 5=extremely confident * $p<0.001$

Table 2. Theory of Planned Behavior Subscale Summated Scores

Subscale	Range of Possible Scores		No. of Items	Predata			Postdata			p value
	Low	High		Mean (SD)	Student Scores		Mean (SD)	Student Scores		
					Low	High		Low	High	
Attitude	4	28	4	26 (2.1)	16	28	24.8 (2.4)	16	28	<0.01
Subjective Norm	4	28	4	26 (2.5)	14	28	25.4 (2.2)	18	28	0.02
Perceived Behavioral Control	5	35	5	31 (2.8)	20	35	30.3 (3.1)	21	35	0.049

7-point Likert-type scale: 1=strongly disagree to 7=strongly agree

class. This resulted in improved course grades in the small-group learning course as well as student-reported improvement in verbal communication skills, problem-solving skills, and ability to work together as a team.³¹

Our study undertook the task of assessing the impact of TBL on confidence relative to 19 self-care concepts in a self-care course at two universities. At both universities, there was a significant increase in agreement for all 19 items on the survey indicating that TBL is an effective pedagogy by which to deliver self-care concepts. Since both schools are relatively new schools of pharmacy (first incoming class in fall of 2012) and both began using TBL at the outset of the programs, we do not have a historical comparison for the results. Consequently, we cannot state that TBL results in a higher confidence level than a traditional lecture-based pedagogy. However, based on Bandura's theory, students who feel more confident with respect to the self-care concepts will be more likely to engage in tasks that draw from those concepts.

When comparing the results of the self-care confidence survey at each university, the starting point mean for Manchester University students was higher for all 19 items. Manchester University students had a greater increase in confidence than their Cedarville University counterparts on seven items. This may be explained by the fact that the course at Cedarville University was delivered during the first semester of the professional program, while the course at Manchester University was delivered in the second semester.

Anecdotally, the first year of pharmacy education appears to be a difficult year of transition for many students. Manchester students took the course later in the first year, which may have resulted in the higher initial mean and a significant improvement in their perception of skills related to nonprescription concepts. Cedarville students may have started off the year more optimistic about how they would perform, encountered a challenging course at the outset of their pharmacy program, and may have become discouraged, which resulted in both

higher precourse means as well as lower postcourse means. On the other hand, Manchester students, taking the course a semester later in their program, had begun to make significant strides in transitioning to a demanding program. However, the pharmacy literature does not seem to support this perception and indicates stress levels (measured by the Health-Related Quality of Life Instrument) are highest in the third professional year rather than the first professional year.³²

Alternatively, another possible explanation is that Manchester students had more experience working in a pharmacy, but the demographic data (Table 5) demonstrated there was no significant difference between the universities with respect to students who had previously worked in a pharmacy. However, Manchester University had their first-year students complete a 2-week introductory pharmacy practice experience (IPPE) between the first and second semester. Manchester students had the benefit of having that structured time in a pharmacy prior to taking the self-care course, which may have resulted in higher scores on the presurvey items. Cedarville students, on the other hand, had a longitudinal IPPE over the course of both semesters and would have completed the presurvey prior to starting this IPPE, which may have resulted in Cedarville students feeling less confident on the presurvey, resulting in the lower scores. Ultimately, delivering the self-care course with TBL pedagogy proved to be effective at both universities as demonstrated by a significant increase in agreement to all 19 survey items by students at both schools.

The literature does not address the impact that TBL has on a student's perception of self-care that may, through the TBP, impact their behavior relative to self-care. In the TBP, the more one agrees with the three determinants of intention (attitude, subjective norm, and perceived behavioral control), the more one is likely to engage in the specified behaviors.¹⁷ We hypothesized that the level of agreement to the three determinants of intention would improve following the delivery of a self-care course in a TBL format. Improvement would indicate that

Table 3. Changes in Self-Care Perceptions (Perceived Behavioral Control, Subjective Norm and Attitude)

Perception	Combined			Cedarville			Manchester		
	Premeans (SD)	Postmean (SD)	p value	Premeans (SD)	Postmean (SD)	p value	Premeans (SD)	Postmean (SD)	p value
I can improve my understanding of self-care concepts. (Perceived behavioral control)	6.5 (0.8)	6.3 (0.7)	0.05	6.7 (0.7)	6.4 (0.6)	<0.01	6.3 (0.8)	6.3 (0.7)	1.00
I will increase my ability to learn self-care concepts. (Attitude)	6.6 (0.6)	6.4 (0.6)	0.01	6.8 (0.4)	6.4 (0.5)	<0.01	6.5 (0.7)	6.4 (0.6)	0.52
I am expected to actively engage in my self-care course. (Subjective norm)	6.6 (0.6)	6.5 (0.6)	0.17	6.8 (0.4)	6.5 (0.5)	<0.01	6.4 (0.7)	6.5 (0.6)	0.28
I am expected to prepare for class in order to be successful. (Subjective norm)	6.6 ±(0.6)	6.6 (0.6)	0.32	6.8 (0.8)	5.5 (0.5)	0.046	6.5 (0.7)	6.5 (0.6)	0.96
I am expected to complete the required readings to enhance my learning. (Subjective norm)	6.6 (0.9)	6.4 (0.8)	<0.01	6.8 (0.4)	6.5 (0.5)	<0.01	6.40 (1.1)	6.2 (0.9)	0.08
I can do well on tests and other assessments in self-care. (Perceived behavioral control)	6.4 (0.6)	6.1 (1.1)	<0.01	6.6 (0.5)	5.7 (1.4)	<0.01	6.3 (0.7)	6.3 (0.7)	0.86
I can apply self-care knowledge and skills to patient care. (Perceived behavioral control)	6.5 (0.7)	6.4 (0.7)	0.32	6.7 (0.7)	6.4 (0.8)	0.02	5.3 (0.6)	6.4 (0.6)	0.23
I will apply self-care knowledge in my future career. (Attitude)	6.6 (0.7)	6.7 (0.6)	0.54	6.8 (0.4)	6.7 (0.6)	0.15	6.5 (0.8)	6.7 (0.5)	0.07
I can understand self-care better than my peers. (Perceived behavioral control)	5.2 (1.2)	5.2 (1.0)	0.82	5.2 (1.3)	5.1 (1.0)	0.41	5.3 (1.1)	5.4 (1.0)	0.59
I will receive a high grade (an A) in my self-care course. (Attitude)	6.2 (0.8)	5.1 (1.5)	<0.01	6.2 (0.8)	4.6 (1.5)	<0.01	6.2 (0.8)	5.5 (1.3)	<0.01
I can apply self-care concepts to my daily life. (Perceived behavioral control)	6.5 (0.7)	6.3 (0.8)	0.08	6.7 (0.5)	6.2 (0.9)	<0.01	6.2 (0.8)	6.3 (0.8)	0.48
I will understand how self-care will apply to my future pharmacy career. (Attitude)	6.6 (0.6)	6.6 (0.6)	0.77	6.8 (0.4)	6.7 (0.5)	0.07	6.4 (0.7)	6.6 (0.6)	0.13
I am expected to understand the most complex material presented by the instructors. (Subjective norm)	6.2 (0.9)	6.0 (1.0)	0.02	6.2 (1.0)	6.0 (1.0)	0.08	6.2 (0.8)	6.0 (1.0)	0.12

Table 4. Pretest and Posttest Differences in Self-Care Confidence Between the Universities

	Pretest		Posttest	
	Z	p value	Z	p value
Confidence				
1	-1.72	0.09	-1.81	0.07
2	-1.17	0.24	-1.17	0.24
3	-1.65	0.10	-2.12	0.03
4	-1.78	0.08	-1.19	0.23
5	-2.40	0.02	-2.35	0.02
6	-3.41	<0.01	-0.82	0.41
7	-2.07	0.04	-2.87	<0.01
8	-2.16	0.03	-2.41	0.02
9	-3.19	<0.01	-2.10	0.04
10	-1.11	0.26	-1.63	0.10
11	-1.35	0.18	-2.23	0.03
12	-1.28	0.20	-1.28	0.20
13	-4.00	<0.01	-1.30	0.19
14	-2.26	0.02	-1.24	0.22
15	-3.11	<0.01	-1.04	0.30
16	-2.82	<0.01	-0.02	0.99
17	-2.52	0.01	-0.98	0.33
18	-2.57	0.01	-3.46	<0.01
19	-2.17	0.03	-1.18	0.24
Perception				
1	-2.73	<0.01	-0.48	0.64
2	-2.89	<0.01	-0.11	0.92
3	-3.29	<0.01	-0.37	0.71
4	-2.32	0.02	-0.59	0.56
5	-2.41	0.02	-1.52	0.13
6	-2.38	0.02	-1.93	0.05
7	-3.65	<0.01	-0.14	0.89
8	-2.83	<0.01	-0.13	0.90
9	-0.47	0.64	-1.50	0.13
10	-0.20	0.85	-3.12	<0.01
11	-3.44	<0.01	-0.43	0.67
12	-3.42	<0.01	-0.66	0.51
13	-0.61	0.54	-0.31	0.75

students would be more likely to appropriately engage patients who have self-care questions. However, the results did not support this hypothesis. In fact, the pre/post change was significant for a decreased agreement in all three domains (Table 2). When the individual statements were examined, it was determined that the Cedarville students demonstrated a significant decrease in perception on nine of the 13 survey items, while Manchester students demonstrated significant decrease in perception on only one of the survey items following completion of the course. For both universities, the remaining items did not demonstrate a significant difference. When comparing the results obtained between universities, only one item (I will receive a high grade (an A)

in my self-care course) was statistically different with Cedarville students demonstrating a significantly larger decrease in agreement with that statement on the post-survey. The fact that Cedarville students had a significant decrease in agreement with nine of the items while Manchester students only had a significant decrease in one item may again be explained by the fact that the self-care course at Cedarville was delivered during the first semester of the professional program while at Manchester, it was delivered in the second semester. As a result, Manchester students were also less optimistic in their initial perceptions regarding self-care, and, with the exception of the one item (item 10, see Table 3), a significant change in their perceptions of self-care did not occur over the semester.

There are several limitations to this study. First, this study may not be generalizable to other institutions as it was completed at new private schools of pharmacy. However, this study has potential implications in understanding the impact of TBL for other schools as they seek appropriate pedagogies that incorporate active learning. Also, there were different course outcomes for Manchester and Cedarville. We tried to minimize this limitation by creating questions that incorporated both schools' course outcomes, and internal consistency, as measured by Cronbach alpha was good (>0.9 for each subscale). However, the perceptions of self-care instrument, which utilized TPB, did not have the best fit with the data according to the CFA. Only five items had a significant relationship with their respective factor. Additionally, the perceived behavioral control, attitude, and subjective norm scales significantly covaried, which may further explain why the model and data did not fit better. Further work is needed to refine the instrument.

The demographics for age and ethnic composition were significantly different at each university. This is important because the analysis demonstrated that there were significant differences in responses between whites and Asian/Pacific Islander students and also with students age 22 and older. Moreover, different faculty members taught self-care at each institution, and it was the first time TBL was delivered. This may have impacted student perceptions. A final limitation could be social desirability bias, as students may have answered in a positive manner to avoid impact on their grade. However, it was clearly stated on the survey that it was anonymous; thus, it would have no impact on student grades.

CONCLUSION

This study demonstrated that self-care courses at two universities using team-based learning resulted in significant increases in confidence related to self-care

Table 5. Demographic Information for Cedarville and Manchester University Participants

	Cedarville N=53, n (%)	Manchester N=58, n (%)	Pearson Chi-square value	p value
Gender				
Male	22 (41.5)	25 (43.1)	0.29	0.87
Female	31 (58.5)	33 (56.9)		
Ethnicity				
White	45 (84.9)	26 (44.8)	20.00	<0.01
African American	3 (5.7)	7 (12.1)		
Hispanic	0 (0.0)	1 (1.7)		
Asian or Pacific Islander	3 (5.7)	15 (25.9)		
Other	2 (3.8)	9 (15.5)		
Age				
Less than 19	0 (0.0)	1 (1.7)	23.15	<0.01
20	1 (1.9)	3 (5.2)		
21	27 (50.9)	7 (12.1)		
22	10 (18.9)	13 (22.4)		
23	2 (3.8)	8 (13.8)		
24	1 (1.9)	6 (10.3)		
Older than 24	12 (22.6)	20 (34.5)		
Grade Point Average*				
3.75 to 4.00	8 (15.1)	4 (6.9)	21.85	<0.01
3.50 to 3.74	14 (26.4)	8 (13.8)		
3.25 to 3.49	18 (34.0)	17 (29.3)		
3.00 to 3.24	12 (22.6)	8 (13.8)		
2.75 to 2.99	1 (1.9)	16 (27.6)		
2.50 to 2.74	0 (0.00)	5 (8.6)		
Previous Degrees				
Bachelors of Science	10 (18.9)	32 (55.2)	42.60	<0.01
Bachelors of Arts	7 (13.2)	5 (8.6)		
Masters of Science	1 (1.9)	1 (1.7)		
Other	1 (1.9)	14 (24.1)		
Previously worked in a pharmacy				
Yes	34 (64.2)	40 (69.0)	1.38	0.50
No	18 (34.0)	16 (27.6)		

* Self-reported based on matriculation into the pharmacy program

concepts, which, by Bandura's Social Cognitive Theory, would extrapolate to students being more willing to undertake tasks related to those self-care concepts. Thus, this study affirms the effectiveness of using TBL pedagogy in a self-care course. Additionally, the study did not find that using TBL resulted in a significant increase in perceptions related to self-care. In actuality, it resulted in a significant decrease in perceptions related to nine of the 13 items at one university, and only one item at the second university. Student confidence may be impacted depending on when the course is offered; course delivery in the second semester of the first professional year may provide an additional boost in confidence. Because pharmacists must use self-directed learning to continually expand their knowledge of pharmacy and be adaptable in problem-solving situations, it

is important to establish these skill sets prior to entering the profession.

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