RESEARCH

Cognitive Determinants of Academic Performance in Nigerian Pharmacy Schools

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Objective. To evaluate cognitive factors that might influence academic performance of students in Nigerian pharmacy schools.

Methods. A cross-sectional, multi-center survey of Nigerian pharmacy students from 7 schools of pharmacy was conducted using 2 validated questionnaires measuring cognitive constructs such as test anxiety, academic competence, test competence, time management, and strategic study habits.

Results. Female students and older students scored significantly better on time management skills and study habits, respectively. Test anxiety was negatively associated with academic performance while test competence, academic competence, and time management were positively associated with academic performance. These 4 constructs significantly discriminated between the lower and higher performing students, with the first 2 contributing to the most differences.

Conclusion. Test and academic competence, test anxiety, and time management were significant factors associated with low and high academic performance among Nigerian pharmacy students. The study also demonstrated the significant effects of age, gender, and marital status on these constructs.

Keywords: academic performance, cognitive variables, Nigeria, pharmacy students

INTRODUCTION

Examinations taken throughout a curriculum can assess how well students grasp competencies being taught. Attaining or surpassing a set minimum grade point average (GPA) has been a long-standing practice in university curricula as an indicator of achieving competencies. However, some researchers question the validity and utility of academic performance scores or grades as a sole measurement of competency achievement.¹

Literature is replete with studies on the utility of grades and scores, such as those from the Pharmacy College Admission Test (PCAT), and first-year performance as predictors of academic performance in the remaining years of pharmacy school. A few studies, however, focus on nongrade factors that could influence students' academic performance.²⁻⁴ Sansgiry and colleagues reported that academic progression in pharmacy school did not influence academic competency, test competency, time management, or study strategies.² Kidd and Latiff showed

a predictive effect of students' critical-thinking abilities on the overall academic success in a doctor of pharmacy (PharmD) curriculum.³ Finally, Lobb and colleagues found that tools measuring learning and studying strategies and critical thinking among pharmacy students did not predict academic success.⁴ One research area related to nongrade factors is the relationship of cognitive constructs such as test anxiety, test competency, academic competency, strategic study habits, and time management with pharmacy student performance.

Test anxiety is a set of responses, such as worry, depression, nervousness, and task-irrelevant cognitions, to assessment or testing.⁵ Moreover, test anxiety is negatively associated with academic performance.⁶ Academic competence indicates a student's ability to manage study material in the curriculum, while test competence reflects a student's ability to manage study materials for specific examinations.⁷ Students with higher academic or test competence are likely to perform better in their respective tasks.^{8,9} Time management skills are clusters of behavioral skills important in the organization of the study/course load,¹⁰ while strategic studying habit is a student's knowledge and application of effective study skills or techniques.¹¹

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These constructs have been investigated among pharmacy students in the United States as well as non-pharmacy students in other countries like Pakistan.^{8,9,12} These studies revealed similar findings with Sansgiry and colleagues' study.² However, the latter was conducted at only two US schools of pharmacy and suggested that differences in demographic variables at schools in other locations needed further study.² Another study led by Sansgiry at a US pharmacy school revealed test and academic competence as significant factors associated with academic performances, but the authors recognized limitations, such as generalizing study results from a single pharmacy school and including only a small student sample size.⁸

There is a lack of studies in this area outside the United States and none have been reported in Nigeria or in Africa. Our assessment of these cognitive factors on student performance in Nigerian pharmacy schools is the first known effort of its kind outside of the United States and specifically within pharmacy education. Pharmacy schools in Nigeria generally offer a 5-year program for a bachelor of pharmacy degree. However, only one school of pharmacy is partly accredited to offer a 6-year PharmD program that includes an extra year of residency and experiential training. Professional classes commence in the second year of both programs. This study aimed to evaluate constructs such as test anxiety, academic competence, test competence, time management, and strategic study habits among Nigerian pharmacy students. Secondary objectives were to understand the role of demographic differences associated with these constructs and to evaluate factors that differentiate between low or high performing students.

METHODS

This study was conducted as a cross-sectional, multi-center survey between June 2012 and March 2013. Seven of the 11 pharmacy schools in Nigeria accredited by the Pharmacists Council of Nigeria (PCN) (as of 2011, the time of the design of the study) were selected for the study. The schools were selected by a multi-stage sampling technique employing both cluster and random methods. The country was divided into 3 clusters (south/southeast, southwest, and north) based on the regions having at least one accredited pharmacy school. Pharmacy schools were then randomly selected "proportionally" within each cluster to produce 7 schools from the possible 11 (south/southeast, 3/4; southwest, 2/4; north, 2/3).

Only students who had previously taken a professional examination (third-, fourth-, fifth-, or sixth-year) were eligible and recruited for the study so performance on professional examinations (in core

pharmacy subjects) could be used as the standard index of academic performance.

The modified Test Anxiety Inventory is composed of 10 validated items from previous scales of the Cognitive Test Anxiety Scale and Reactions to Tests, both of which were developed and validated by Sarason for undergraduate students. The 2 instruments demonstrated high internal consistency and predictive validity of examination performance.^{13,14} The Test Anxiety Inventory was employed among pharmacy students in the United States, and survey results showed good internal consistency with the instrument items.⁸

The 20-item Study Management and Academic Results Test (SMART) measures academic self-efficacy and contains scales for 4 constructs: academic competence, test competence, time management, and strategic studying. The tool was developed and validated by Topman and colleagues in 1994 and the reliability coefficients of its scales ranged from 0.67 to 0.81.¹⁵ The SMART instrument consists of 5 items for each of the 4 constructs measured on a similar 5-point scale ranging from "strongly disagree" to "strongly agree." The study questionnaire also contained a section for student characteristics such as age, gender, marital status, year of study, and self-reported performance on latest professional examinations. The grading systems used in pharmacy schools in Nigeria differ only on grade notifications. While a majority of schools use the ABC grading system for each professional course and GPA for overall performance, a few schools have adopted the distinction-pass-fail grading system for professional papers, which comprises 3 or more courses. The ABC grading system assigns an A to scores of 70% and above, a B for those between 69% and 60%, a C for those between 59% and 55%, a D for those between 54% and 50% and an F for scores below 50%. The distinction-pass-fail system assigns "distinction" for scores of 70% and above, "pass" for scores between 69% and 50%, and "fail" for scores below 50%. For this study, students with a grade of A or score of 70% were classified as high performers and those with grades below an A or a score below 70% as low performers.

The survey was in English and pilot tested to improve item comprehension. No items were changed or modified from the original instruments. The survey was administered after a brief introduction of the study to eligible participants during a mandatory class. With the aid of a school faculty member, questionnaires were administered to all students in each class who consented to participate in the study. Participation was voluntary and there was no reward for participation or penalties for nonparticipating students. Students had 30 minutes to complete

the questionnaires in all centers. All surveys for each class in each participating school were conducted during one class sitting irrespective of the attendance level. Questionnaires from all sampled pharmacy schools were collected and coded.

Questionnaire data were entered into a 2007 Excel spreadsheet by 2 data entry staff to ensure consistency. Negatively worded items in the SMART instrument were reverse-coded before analysis. The data was then transferred to SPSS v16 (Chicago IL, USA) for descriptive and inferential analyses. Simple percentages and mean were used to indicate distribution of student characteristics, cognitive constructs, and items. A reliability estimation of each construct was analyzed and corresponding Cronbach alpha (α) reported. A Cronbach α value of 0.60 and higher was considered as acceptable and indicated reliability of the scale.¹⁶ To check for effects of the study constructs on overall academic performance, students were grouped as either high or low performers and an independent sample *t* test was conducted. To analyze the influence of student characteristics on constructs, independent sample *t* tests and analysis of variance (ANOVA), followed by Scheffe post hoc test were conducted where appropriate. Lastly, a stepwise discriminant analysis was conducted to identify constructs which could discriminate high and low performing students and Wilks lambda values were reported. An a priori level of 0.05 was considered significant.

Ethical approval to conduct the study was obtained from research committee of each participating school before commencement of the study. However, deans of two pharmacy schools in the absence of an ethics committee gave approval to conduct the study in their respective schools (a common practice at these schools).

RESULTS

More than 1600 students from 7 schools of pharmacy participated in this survey (overall participation rate 1613/2225, 72.5%). Individual participation rates for each school were: University of Benin, 282/385 (73.2%); University of Uyo, 101/134 (75.3%); University of Nigeria, 478/537 (89.0%); Ahmadu Bello University, 240/352 (68.0%); University of Jos, 156/281 (55.5%); University of Lagos, 174/303 (57.4%); and Olabisi Onabanjo University, 182/233 (78.1%). The majority of students were less than 25 years old (84.2%), and nearly half the students were female (49.9%). Descriptive data of all participants are summarized in Table 1. Regarding students' self-reported performance, more students reported high grades than low grades (64.4% vs 35.6%), though this distribution differed markedly from school to school (Table 1).

Cronbach α values for all cognitive factors ranged from 0.6 to 0.8, indicating adequate reliability. Scores for individual domains are in Table 2 (test anxiety) and Table 3 (academic competence, test competence, study habits, time management). Reliability scores for each construct measured with both instruments were comparable to those previously reported in literature, showing its generalizability and applicability to Nigerian pharmacy students.^{1,8}

For the scale measuring test anxiety, students reported moderate mean (SD) scores [2.75 (0.75); range, 2.16-3.39]. Nearly three-quarters of the students reported being bothered by examinations (73.7%) or were anxious of examinations even when they were well prepared for them (71.9%). About one-third of students, however, reported not sweating (32.3%) and around 64.5% reported thinking of unrelated things when writing their examinations. Responses to the test inventory scale are summarized in Table 2.

Pharmacy students' response to the SMART instrument indicated the following mean (SD) scores: academic competence, 3.69 (0.71); test competence, 3.10 (0.66); time management, 3.05 (0.65); and strategic study habits, 3.71 (0.76). Responses to the SMART instrument are summarized in Table 3.

Analysis of differences in mean responses to each construct showed more female students reported employing better study habits than their male counterparts (3.81 vs 3.60, $p < 0.001$). Students who were engaged or married were less anxious during examinations (2.58 vs 2.76, $p = 0.03$) and had better study habits than single students (3.87 vs 3.70, $p = 0.043$). Time management was the only construct that separated older and younger students, with older students indicating better use of study time (3.13 vs 3.04, $p = 0.033$).

Students at schools located in the southeastern region of the country reported being less anxious and possessing poor study habits than their southwestern and northern counterparts ($p < 0.05$). However, students in Southeastern schools reported significantly higher scores on academic competencies ($p < 0.0001$) and time management ($p < 0.0001$). Lastly, examination performance was significantly influenced by all constructs except strategic studying habits. No significant differences among years of study were observed for any of the cognitive constructs.

Higher performing students reported being less anxious than lower performing students (2.68 vs 2.89, $p < 0.0001$), as well as having higher academic competence (3.74 vs 3.61, $p = 0.001$), higher test competence (3.16 vs 2.95, $p < 0.0001$), and better time management (3.08 vs 2.96, $p = 0.002$). These results are provided in

Table 1. Demographics and Professional Examination Performance of Pharmacy Student Participants

Characteristics	Higher Grade Performers (N=892) n (%)	Lower Grade Performers (N=494) n (%)	pValue
Age			<0.0001
16-25 years	783 (68.0)	369 (32.0)	
26 and above	105 (46.9)	119 (53.1)	
Gender			0.003
Female	455 (68.4)	210 (31.6)	
Male	424 (61.2)	269 (38.8)	
Marital Status			0.012
Single	825 (65.4)	436 (34.6)	
Engaged/married	40 (51.9)	37 (48.1)	
Year of Study			0.063
Third year (second professional)	252 (66.0)	130 (34.0)	
Fourth year (third professional)	324 (63.7)	185 (36.3)	
Fifth year (fourth professional)	268 (61.8)	166 (38.2)	
Sixth year (PharmD)	48 (78.7)	13 (21.3)	
Regional Location of Pharmacy School			<0.0001
South/Southeast			
University of Benin	152 (58.9)	106 (41.1)	
University of Uyo	56 (77.8)	16 (22.2)	
University of Nigeria	324 (70.0)	139 (30.0)	
Southwest			
University of Lagos	101 (71.1)	41 (28.9)	
Olabisi Onabanjo University	96 (76.2)	30 (23.8)	
North			
University of Jos	43 (35.2)	79 (64.8)	
Ahmadu Bello University	120 (59.1)	83 (40.9)	

Overall academic performance (higher ranked scores are distinction score or grades 70% and above; lower ranked scores are pass to fail or grades 69% and below)

Table 4. Of the 5 SMART/TAI constructs, test anxiety (Wilks lambda (λ)=0.98, $p<0.0001$), academic competence (λ =0.99, $p=0.003$), test competence (λ =0.97, $p<0.0001$), and time management (λ =0.99, $p=0.002$) significantly differentiated the 2 groups of students, with test anxiety and test competence contributing the most difference. Classification results showed the model correctly predicted 60.7% of those who scored low grades and 58.8% of those who scored high grades in their last professional examination.

DISCUSSION

This is the first study to report the relationship between cognitive factors and academic performance among Nigerian pharmacy students. The mean test anxiety scores were low and comparable to mean test anxiety scores [2.60 (0.8)] observed previously among pharmacy students in the United States.¹⁷ This indicated that like their US counterparts, Nigerian pharmacy students in general neither panic about examinations nor feel any physical problems during examinations.

It's unclear why students from the south/southeastern region had lower test anxiety compared to their southwestern and northern counterparts. However, larger class sizes in the south/southeastern region than in the latter 2 regions might have contributed. Moreover, larger classes are more prone to academic dishonesty,¹⁸ and might reduce anxieties among students who feel such tests or examinations could be more vulnerable to cheating. It might also be possible that this region has more varied socio-economic differences than the other regions, a factor not measured adequately in this study.

Married students were less test anxious than single students. This is the first study to report such an association. Married pharmacy students, mostly females, also tended to be better prepared and have better study strategies than single students, resulting in less anxiety during examinations.

Pharmacy students who reported being less anxious during examinations performed better than those who were more anxious. This negative effect of test

Table 2. Test Anxiety Scores for Nigerian Pharmacy Students

Variable	Student Responses, n (%)					Mean (SD)
	Not at all typical of me	Not very typical of me	Somewhat typical of me	Fairly typical of me	Very typical of me	
Test anxiety (TA)						2.75 (0.7)
The thought of doing poorly interferes with my performance on examination.	346 (22.1)	347 (22.2)	265 (16.9)	387 (24.7)	219 (14.0)	2.86 (1.4)
During an examination, I frequently get so nervous that I forget information I know.	316 (19.8)	444 (27.8)	314 (19.6)	374 (23.4)	151 (9.4)	2.75 (1.3)
While taking an examination I sweat a great deal.	584 (36.8)	493 (30.9)	279 (17.5)	154 (9.7)	84 (5.3)	2.16 (1.2)
During examination, I find myself thinking of things unrelated to the actual study materials.	542 (34.3)	476 (30.2)	251 (15.9)	225 (14.3)	84 (5.3)	2.26 (1.2)
I panic when I have to take an examination.	324 (20.3)	406 (25.4)	389 (24.3)	353 (22.1)	126 (7.9)	2.72 (1.2)
After important examinations, I am frequently so tense that my stomach gets upset.	320 (20.0)	440 (27.5)	310 (19.4)	378 (23.7)	150 (9.4)	2.75 (1.2)
I usually feel my heart beating very fast during an examination.	269 (17.1)	394 (25.0)	326 (20.7)	457 (29.0)	129 (8.2)	2.86 (1.2)
I usually get very depressed after taking an examination.	390 (24.8)	484 (30.7)	431 (27.4)	186 (11.8)	83 (5.3)	2.42 (1.1)
I wish examination did not bother me so much.	190 (12.2)	220 (14.2)	344 (22.2)	397 (25.6)	402 (25.9)	3.39 (1.3)
Even when I am well prepared for an examination, I feel very anxious about it.	203 (12.8)	241 (15.2)	229 (14.5)	585 (37.0)	323 (20.4)	3.37 (1.3)

TA Cronbach alpha=0.8

anxiety on performance has been consistently observed.^{8,19,20} Strategies to reduce test anxiety might prove to be an important area for improving performance among pharmacy students. Academic competencies and test competencies are predictors of test anxiety.⁸

Mean academic competence scores were high and comparable to those in studies of US pharmacy students.^{2,8} This suggests that some students were enjoying the classes and found course materials interesting—2 factors that define academic competence.²¹ Introduction of experiential courses or training (eg, introductory pharmacy practice experiences) during the first and second years of pharmacy school, as practiced in most schools in the United States, might help students achieve academic

competency early in the curriculum.⁸ In our study, academic competence was significantly and positively correlated with academic performance, a trend reported in previous studies.^{22,23}

Test competence scores in this study were neutral and similar to those of other studies,⁸ suggesting that Nigerian pharmacy students possess moderate ability to manage course material used for an examination and cope easily with examination tension. Students from the northern region were less test competent than those from other regions, an association possibly related to poor confidence levels among Northern students. A student with poor test anxiety and poor academic and test competency is likely have a poor academic grade. Test competence highly differentiated lower performing from higher

Table 3. Nigerian Pharmacy Students' Scores on the SMART Cognitive Factors

Variable	Student Responses, n (%)					Mean (SD)
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Academic competence (AC)						3.69 (0.7)
I have been able to manage the academic course load at the pharmacy school.	82 (5.1)	128 (8.0)	296 (18.6)	735 (46.1)	352 (22.1)	3.72 (1.0)
I easily understand course material taught in the pharmacy school.	84 (5.3)	245 (15.4)	493 (31.1)	591 (37.2)	174 (11.0)	3.33 (1.0)
I find courses taught in pharmacy school interesting.	62 (3.9)	126 (7.9)	362 (22.7)	677 (42.5)	367 (23.0)	3.73 (1.0)
I enjoy courses offered in the pharmacy curriculum.	60 (3.8)	161 (10.1)	437 (27.4)	655 (41.1)	281 (17.6)	3.59 (1.0)
I always do my best to understand course material in pharmacy school.	50 (3.1)	69 (4.3)	133 (8.3)	777 (48.6)	570 (35.6)	4.09 (0.9)
Test competence (TC)						3.10 (0.7)
I can easily manage the amount of course material used for an examination.	106 (6.7)	320 (201.)	437 (27.5)	573 (36.0)	154 (9.7)	3.22 (1.1)
I do not find it difficult to prepare for an examination.	184 (11.6)	442 (27.9)	438 (27.6)	404 (25.5)	117 (7.4)	2.89 (1.1)
I can easily cope with examination tension.	86 (5.6)	194 (12.7)	455 (29.7)	633 (41.3)	165 (10.2)	3.39 (1.0)
I usually don't expect complex questions on an examination.						
I have great difficulty managing the amount of study material for an examination. ^R	137 (8.9)	410 (26.5)	430 (27.8)	415 (26.8)	155 (10.0)	3.02 (1.1)
Time management (TM)						3.05 (0.6)
I find it very difficult to balance study and leisure time. ^R	248 (15.7)	399 (25.3)	378 (23.9)	361 (22.9)	193 (12.2)	2.91 (1.3)
I find it difficult to study regularly. ^R	194 (12.5)	504 (32.4)	308 (19.8)	377 (24.2)	174 (11.2)	2.89 (1.2)
I usually end up cramming for examinations. ^R	253 (16.2)	419 (26.8)	428 (27.4)	291 (18.6)	171 (10.9)	2.81 (1.2)
I can organize my study material and leisure time easily.	146 (9.4)	381 (24.6)	467 (30.1)	417 (26.9)	139 (9.0)	3.01 (1.1)
I always start preparing for an examination well in advance.	113 (7.4)	206 (19.9)	383 (25.0)	471 (30.7)	261 (17.0)	3.86 (1.0)
Strategic study habits (SH)						3.71 (0.8)
While I am studying, I regularly try to find out what questions lecturers may ask and they ask examination questions.	48 (3.1)	133 (8.5)	258 (16.5)	666 (42.6)	458 (29.3)	3.86 (1.0)
Planning well in advance is the best way to handle study material.	65 (4.1)	209 (13.3)	433 (27.5)	591 (37.5)	276 (17.5)	3.51 (1.0)
I discuss course materials with my classmates while studying for an examination.	80 (5.2)	189 (12.2)	306 (19.7)	637 (41.0)	340 (21.9)	3.62 (1.1)
I test my knowledge before taking an examination by answering past examination questions and questions from fellow students.	68 (4.3)	128 (8.1)	220 (13.9)	667 (42.2)	499 (31.5)	3.88 (1.1)
While studying, I regularly summarize course materials in my own words.	90 (5.7)	186 (11.5)	292 (18.4)	578 (35.8)	438 (27.2)	3.69 (1.2)

SMART=Study Management and Academic Results Test; ^R reversed items for higher values to signify more positive response; AC Cronbach alpha=0.7; TC Cronbach alpha=0.6; TM Cronbach alpha=0.6; SH Cronbach alpha=0.8

performing students in our study. Thus it may be important to re-assess the amount of study material used for examinations. In essence, while these students enjoyed the study materials used in the curriculum,

they found it difficult to cope with the amount for each examination.

Mean score on time management was neutral and similar to that of other studies, but mean score on strategic

Table 4. Influence of Nigerian Pharmacy Students' Characteristics on Cognitive Variables

Demographic Variables	Mean score of Cognitive Variables (SD)				
	Test Anxiety	Academic Competence	Test Competence	Time Management	Study Strategy/Habits
Age					
Less than 25 years	2.76 (0.7)	3.68 (0.7)	3.10 (0.7)	3.04 (0.7)	3.71 (0.7)
More than 25 years	2.67 (0.8)	3.74 (0.7)	3.08 (0.7)	3.13 (0.6)*	3.71 (0.8)
Gender					
Female	2.76 (0.7)	3.68 (0.7)	3.10 (0.6)	3.05 (0.6)	3.81 (0.7)
Male	2.74 (0.7)	3.71 (0.7)	3.10 (0.7)	3.05 (0.6)	3.60 (0.8)†
Marital Status					
Single	2.76 (0.7)*	3.69 (0.7)	3.10 (0.7)	3.04 (0.6)	3.70 (0.8)*
Engaged/Married	2.58 (0.8)	3.79 (0.7)	3.13 (0.7)	3.17 (0.7)	3.87 (0.7)
Year of study¶					
Third	2.81 (0.7)	3.71 (0.7)	3.08 (0.6)	3.04 (0.7)	3.69 (0.8)
Fourth	2.76 (0.8)	3.64 (0.7)	3.07 (0.7)	3.05 (0.7)	3.77 (0.7)
Fifth	2.73 (0.7)	3.73 (0.7)	3.13 (0.6)	3.06 (0.6)	3.66 (0.7)
Regional Location of Pharmacy School					
South/Southeast (n=3)	2.67 (0.7)‡§	3.76 (0.7) ‡§	3.10 (0.6) ‡§	3.11 (0.5) §	3.64 (0.8) ‡§
Southwest (n=2)	2.79 (0.7)	3.59 (0.7)	3.23 (0.7)	3.05 (0.8)	3.80 (0.7)
North (n=2)	2.89 (0.7)	3.61 (0.7)	2.97 (0.7)	2.89 (0.7)	3.77 (0.8)
Overall Year Performance					
Lower Grade Performance	2.89 (0.8)†	3.61 (0.7)*	2.95 (0.7)†	2.96 (0.7)*	3.65 (0.7)
Higher Grade Performance	2.68 (0.7)	3.74 (0.7)	3.16 (0.6)	3.08 (0.6)	3.73 (0.8)

* $p < 0.05$

† $p < 0.001$

‡ $p < 0.05$ for SSE vs. SW

§ $p < 0.05$ for SSE vs. N

|| $p < 0.05$ for SW vs. N

South/Southeast (n=3; University of Nigeria Nsukka, University of Uyo, University of Benin), Southwest (n=2; Olabisi Onabanjo University, University of Lagos), North (n=3; University of Jos, Ahmadu Bello University)

studying in this study was higher than that reported in the literature.⁹ For the time management construct, students reported they were not well equipped in managing leisure and study time and found it difficult to study regularly. This difficulty with time management was also reported in the studies conducted among Pakistani undergraduates and US pharmacy students, suggesting it maybe a global issue.^{2,12} Effective, adequate time dedicated to study material is critical for a pharmacy program, which requires a high level of reflective reasoning and critical thinking. One recommendation is that students get involved in group discussions and exchange ideas while memorizing key points, especially when time may be inadequate for study.²⁴

Two items contributing to the high mean score for strategic studying were “finding out what questions the lecturer might ask” and “testing my knowledge by using past questions.” Nigerian pharmacy students can be dependent on past examination questions, especially in courses where redundancy in question setting is common.

An overdependence on past examination questions may cause students to lose focus on course content and to be caught off guard when questions are extensively revised on an examination. Strategic studying habits were not associated with performance in the professional examinations in this study. This result was contradictory with the findings by West and Sadoski,²⁵ which reported a strong association of study skills and academic performance among medical students. However, other studies conducted among pharmacy students corroborated our nil association.^{8,9} Married students, however, reported better study habits than single students.

Unlike Sansgiry et al's findings that found test competence to be the only variable with a significant discriminant ability for high and low performing students,⁸ our study indicated that test anxiety, academic competence, and time management could also significantly differentiate between these 2 groups. However, these studies defined low and high performances differently because of the various grading styles in each setting.

Future studies on the influence of school curriculum on cognitive factors could give a better understanding of their effects on pharmacy students' overall performances. This study was conducted with a nationally representative sample of pharmacy students in a country with varying educational systems, a design that improved on previous studies, in which only one or two institutions were represented.

This study had some limitations. It did not consider the effect of curriculum type used by the schools on the study constructs. Another limitation was self-reported performances by students. Because participation in the study was voluntary and participants not identified, it would be difficult to validate these self-reported results with actual student records. However, adequate variance in academic performance indicated a degree of validity to the self-reported data.

CONCLUSION

Test anxiety, academic competence, test competence, and time management skills significantly influenced performance in Nigerian pharmacy students and may help determine students who score low and those who score high on their professional examinations. The study also demonstrated effects of age, gender, and marital status on test anxiety, time management, and studying habits. Efforts to improve cognitive behaviors among pharmacy students may be beneficial at the preceptor/instructor level as well as at the counseling service level at universities.

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