

RESEARCH ARTICLE

Exploring student perceptions: Factors influencing academic performance in a school of pharmacy in Nigeria

Ayodapo Oluwadare Jegede¹ , Kayode Toyosi Olabanji² , Tunmise Arolagbade¹ 

¹Department of Clinical Pharmacy and Pharmacy Administration, Faculty of Pharmacy, Obafemi Awolowo University, Ile-Ife, Nigeria

²Department of Health Economics and Pharmacoeconomics, Fresenius University of Applied Sciences, Idstein, Germany

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Correspondence

Ayodapo Oluwadare Jegede

Department of Clinical Pharmacy and

Pharmacy Administration

Faculty of Pharmacy

Obafemi Awolowo University

Ile-Ife

Nigeria

dapo jegede@oauife.edu.ng

Abstract

Background: The failure and success rate of students in pharmacy school have been shown to be dependent on some courses that predict academic performance. The study identified factors that could impact the failure and academic performance of pharmacy students at Obafemi Awolowo University. **Methods:** The study was a cross-sectional study of 219 undergraduate pharmacy students from the third, fourth and fifth years of a school of pharmacy in Nigeria. A pre-tested questionnaire gathered data on demographics, course perceptions and academic factors. Descriptive and inferential statistics such as percentages, weighted averages, and Chi-squared tests were used to analyse the data obtained at $p < 0.05$. **Results:** Financial constraints, family challenges, and a lack of peer interaction were significantly associated with repeating a year. Specific courses perceived as difficult included "Pharmaceutical organic chemistry" (PHC 202), "Practical pharmaceutics I" (PHA 201) and "Medicinal chemistry II" (PHC 402). Courses perceived as difficult, particularly in the fourth year, were notably linked to academic stress. **Conclusion:** The study identified specific factors and courses that affect pharmacy students' performance in the Nigerian context. Policy makers and faculty can take vital feedback to adjust the training content, methods and assessment system to possibly deliver a holistic education to pharmacy students.

Introduction

The success and failure rates of students in pharmacy school have raised significant concerns within the academic community. Research has shown that student engagement is a significant factor and can further predict academic performance (Delfino, 2019; Bayoumy *et al.*, 2021). This concern is further amplified by the profound impact that success or failure can have on a student's self-esteem, with far-reaching consequences that can influence their entire lifetime (Acosta-Gonzaga, 2023). It is expected that the faculty's board of examiners and lecturers would feel a sense of personal failure and blame their teaching for the failure of the students or feel fulfilled toward the success of their students, as the case may be (Tennen & Herzberger, 1987). Ideally, academic performance and

student attrition rates are important concerns for the department and faculty because the university retains accountability for students' success. Since admission decisions are finally accepted or declined by students, it is recommended that pharmacy colleges use reliable and predictable data to help make decisions. As such, it is necessary to identify objective factors that aid education delivery and quality (Chisholm, 2021; OECD, 2012).

Extensively reviewing the state of pharmacy education and the nature of the curricula in Nigerian pharmacy schools, Ogaji and Ojabo (2014) noted that though entry criteria into pharmacy schools and core pharmacy curricula were similar, some schools had slight differences in course content. For instance, Obafemi Awolowo University (the first pharmacy college in West Africa) added biochemistry and physiology to the core

pharmacy curriculum. The core curriculum consists of courses in pharmaceutics, pharmaceutical microbiology, pharmaceutical chemistry, pharmacology, clinical pharmacy, pharmaceutical management and pharmaceutical laws. Pharmaceutical law and pharmaceutical dispensing are mandated by the Pharmacy Council of Nigeria as professional courses, and there is a mandated pass mark of 60 out of 100 points. The impact of education and failure is more important now because of the recent approval for a curriculum change in pharmacy schools in Nigeria to a Pharm.D. programme and the inherent challenges that may arise (Nonyel & Ogbonna, 2022).

Multiple factors affect the success rates of students in the faculties of health. The study by Kalungia et al. (2021) underscored the significant impact of numerous factors within the academic environment on the academic self-efficacy and learning experiences of undergraduate pharmacy students in Zambia. Student-related changes, such as managing notional time, emerged as substantial hurdles in coping with the academic workload. The learning environment was adversely affected by inadequate education facilities and large class sizes, which compromised the quality of learning. Some of the pharmacy prerequisites for success in a Pharm.D. programme in Canada include the consistency of the lecturer, the course content and the instruction format (Krol et al., 2019).

Besides these, identified unprofessional behaviours, poor academic performance, pharmacotherapy course failure, and a grade point average of less than two point seven (2.7) in an American study of 669 students predicted failure (Call et al., 2020). In a retrospective review of medical school attrition rates using multiple sources over ten years, there was a total attrition rate of 5.7%, more males were likely to drop out compared to female students. Some of the associated reasons for attrition include absenteeism, academic difficulty, social isolation, psychological morbidity, and despair (Maher et al., 2013). The findings of a particular study strongly suggest a significant correlation between the emotional aftermath of academic failure and its detrimental influence on students' subsequent academic performance (Erhun et al., 2021). Alshagga et al. (2015) also reported that academic-related stressors such as examinations and life-related stressors like financial constraints were significant factors among pharmacy students in public and private universities in Malaysia. This has implications for understanding the nature of stressors in pharmacy education and how they affect the academic performance of students. Specific courses were also implicated in the academic failure of pharmacy students in Iran, alongside educational content, the teacher, students,

educational environment, family and economic factors (Minaiyan et al., 2020).

Despite all these, it is important to recognise that student performance in a course is influenced by a multitude of factors beyond academic capabilities and course content requirements. Some other factors are financial and economic challenges, knowledge gaps between instructors and students, affective and biophysical difficulties, as well as various internal and external influences (Cherif, 2013).

Multiple researchers have approached academic performance and students' perspectives in different ways. One of this is the focus on course instruction and classroom events by Kelley et al. (2001), a predictive model to estimate the GPA of students (Thomas & Draugalis, 2002), use of learning strategies to improve student performance (Sberman et al., 2021), developing an academic performance enrichment programme for low performing pharmacy students (Dirks-Naylor et al., 2019) and improving enrollment in schools of pharmacy (FIP, 2023). The approach taken in this study captures the array of factors influencing academic performance and focuses on three main perspectives: the factors affecting failure, student perception of course difficulty, and the student learning process. The overarching aim of this study is to identify factors that could impact the failure and academic performance of pharmacy students at Obafemi Awolowo University.

Methods

Study design

The study was a cross-sectional survey of third-, fourth- and fifth-year Pharmacy undergraduates of Obafemi Awolowo University, Ile-Ife. The first and second-year students were excluded as they had not taken a professional pharmacy exam at the time of the study. The respondents were to answer based on the examinations they had taken in the previous session.

Study population and sampling

The study population comprised students of the Faculty of Pharmacy, Obafemi Awolowo University, Ile-Ife, in their third, fourth and fifth years. The Taro Yamane formula (1967) for sample size calculations for finite populations was employed to determine the appropriate sample size. The sample size for this study was 219 respondents, chosen through a stratified random sampling method from the three levels.

Data source and collection

Primary data was used for the study. The instrument for data collection, a self-developed questionnaire, covered demographics, perceived course difficulty, and factors influencing academic performance. The questionnaire was pre-tested to ensure reliability and validity. A pilot test was conducted to evaluate the clarity and comprehensibility of the questions, while face validity was established through evaluation by senior faculty members. The reliability of the questionnaire was measured, yielding a Cronbach's alpha coefficient of 0.89. The questionnaire asked the students to rate the courses as either difficult, interesting, or neutral. The validated questionnaire was then physically distributed to the students and retrieved upon completion. Students were requested to complete the questionnaire voluntarily, and their participation was not obligatory. To ensure anonymity and encourage candid responses, the questionnaire was designed to be anonymous, with no requirement for students to provide identifying information. Participants were allotted sufficient time to complete the questionnaire, typically ranging from seven to ten minutes. The questionnaire was administered in a written format, with printed copies distributed to students, and they were instructed to fill it out independently. Additionally, the questionnaire included a combination of closed-ended and open-ended questions. Closed-ended questions provided multiple-choice or Likert scale response options, while open-ended questions allowed students to express their opinions and elaborate on their experiences in their own words. The data collection spanned a period of five months.

Data analysis

The data retrieved from the 219 respondents was coded and entered into the Statistical Package for Social Sciences (SPSS version 20) software, cleaned and then analysed. Descriptive and inferential statistics, including percentages, weighted averages, and Chi-Square tests, were employed to assess factors impacting academic performance, perceived course difficulty, and learning processes. A factor analysis was not used in this study because it was an exploratory study designed to immediately identify relevant factors related to academic performance in this population using a simple majority (Kuroda et al., 2023). A detailed factor analysis using the exploratory factor analysis and principal component analysis (Tavakol & Wetzel, 2020) may be explored in further studies to delicately identify latent themes in a larger population including other universities.

Ethical clearance

The ethical clearance was obtained from the Institute of Public Health, College of Health Sciences, Obafemi Awolowo University, Ile-Ife with the certificate number being IPH/OAU/12/1411. Informed consent was also sought and given by the respondents. The privacy of respondents was protected.

Results

The study involved undergraduate pharmacy students from Obafemi Awolowo University (OAU), Nigeria, and aimed to identify factors influencing academic performance and the challenges faced by students in the Faculty of Pharmacy. A total of 219 responses were retrieved. Of these, over 80% are between 19 and 24 years old. Most of the respondents were males (55.3%) and were in their third year (37.9%). The details are shown below in Table I.

Table I: Demographic characteristics of respondents

| Variable | Frequency | Percentage (%) |
|----------------------|-----------|----------------|
| Gender | | |
| Female | 98 | 44.7 |
| Male | 121 | 55.3 |
| Age | | |
| 16 - 18 | 6 | 2.7 |
| 19 - 21 | 89 | 40.6 |
| 22 - 24 | 100 | 45.7 |
| 25 - 27 | 16 | 7.3 |
| 26 and above | 7 | 3.2 |
| Missing | 1 | 0.5 |
| Year of study | | |
| Third year | 83 | 37.9 |
| Fourth year | 74 | 33.8 |
| Fifth year | 62 | 28.3 |

The reasons for difficulty in pharmacy school identified in this study by the respondents (decision rule—a consensus greater than 50% (Kuroda et al., 2023)) highlighted the bulkiness of study materials, number of continuous assessments per course, inadequate learning facilities, financial constraints, poor time management and improper guidance from student advisers as major contributors. These are summarised in Table II. These results emphasise the multifaceted challenges faced by pharmacy students, indicating that both academic and non-academic factors significantly impact their performance.

Table II: Reasons for failure and the ranking by the students

| Reasons | Degree of agreement |
|---|---------------------|
| Bulkiness of study material | 85.90% |
| Number of continuous assessments per course | 84.00% |
| Nature of the learning environment | 83.10% |
| Poor time management skills | 82.60% |
| Poor academic performance due to particular courses | 81.70% |
| Inadequate learning facilities | 79.40% |
| Financial constraint | 77.10% |
| Negligence of academic work | 76.20% |
| Lack of interaction with colleagues | 76.30% |
| Family issues | 74.40% |
| Improper guidance from student adviser | 72.90% |
| Low self-esteem | 67.10% |
| Perperation to write resit in particular courses | 55.70% |

To understand the perceived difficulty of pharmacy courses, the respondents were asked to rate courses based on their experiences. Table III illustrates the weighted averages for various courses, indicating their level of difficulty. A weighted average close to one was taken as an indicator of difficulty, while a weighted average close to two was potentially taken not to be.

Table III shows what courses were perceived to be difficult and their weighted averages. The year with the most difficulty was the fourth year, with four courses rated as difficult, while years three and two had three courses rated as difficult.

Table III: Most difficult courses based on the pharmacy student's perception

| Year of study | Courses | Course title | Weighted average |
|---------------|---------|---------------------------------------|------------------|
| Second year | | | |
| | PHC 202 | Pharmaceutical organic chemistry | 0.89 |
| | PCG 202 | Unorganised drugs | 0.64 |
| | PHA 203 | Practical pharmaceutics I | 0.89 |
| Third year | | | |
| | PHA 303 | Dispensing | 0.73 |
| | PHA 301 | Liquid and semi-solid dosage forms | 1.31 |
| | PCG 308 | Separation techniques in pharmacy | 1.45 |
| Fourth year | | | |
| | PCA 401 | Forensic pharmacy and pharmacy ethics | 0.57 |
| | PCL 401 | General pharmacology III | 0.73 |
| | PCL 408 | Chemotherapy | 0.57 |
| | PHC 402 | Medicinal chemistry II | 0.85 |

Most respondents (56.6%) have, at some point, had a distinction in at least one course in the faculty. The distinctions are almost evenly split between males (50.8%) and females (49.2%), while most of the distinctions (50%) were in current fourth-year students, third-year students (27.4%), and fifth-year students (22.6%). However, only 21.5% of the respondents had a current cumulative grade index within a distinction range (4.1 – 5.0).

Of the respondents, 63.9% have been asked to take at least one course a second time in a re-sit examination, while 18.7% of the respondents have had to repeat a year. It is worthy of note that a respondent who repeated a year has now moved to a distinction grade.

A check for association showed a significant association between difficulties in “*Separation techniques in pharmacy*” (PCG 308) χ^2 (1, N = 154) 6,784, p = 0.009, “*Pharmaceutical dispensing*” (PHA 303) χ^2 (1, N = 109) 4,439, p = 0.035, “*Medicinal chemistry II*” (PHC 402) χ^2 (1, N = 154) 4, 868, p = 0.027. In investigating the reasons for perceived difficulty with repeating a year, significant associations were observed with financial constraints (p = 0.004), lack of interaction with colleagues (p = 0.0019), and family challenges (p = 0.009).

In investigating the repetition of a class further, negligence was identified to be a significant factor affecting the third-year students (p = 0.036) but wasn't

significant in the fourth and fifth years. Prior knowledge about course content was regarded as important in improving student performance. It is worthy of note, however, that though students sometimes fail outrightly or re-sit an examination for a course or more,

inadequate learning facilities are significantly associated with a re-sit, but not with repeating the entire year. The Chi-square results are shown in Table IV.

Table IV: Impact of inadequate learning facilities on re-sitting an examination and repeating an exam

| Consideration | Test | Value | df | Asymptotic significance (two-sided) |
|---|--------------------|--------|----|-------------------------------------|
| Inadequate learning facilities and re-sitting | Pearson chi-square | 16.602 | 3 | 0.001 |
| Inadequate learning facilities and repeating the year | Pearson chi-square | 5.223 | 3 | 0.156 |

Discussion

The sample was estimated using an established method of size calculation. The use of stratified random sampling ensured that the sample was truly representative of the enrolled pharmacy student population. The balanced gender distribution is noteworthy, reflecting a representative sample that allows for gender-sensitive interpretations of the results (Atif et al., 2021; Ballering et al., 2023). These demographic insights are in line with studies in similar contexts, where the age range and gender distribution often mirror broader university demographics (El Refae et al., 2021).

Research has demonstrated that demographic factors can influence academic performance, with variations in study habits, motivation, and learning styles between age groups and genders (Masud et al., 2019; El Refae et al., 2021).

The factors identified by pharmacy students in this survey resonate with existing literature, particularly in the Nigerian context (Afolabi & Adedoyin, 2020). Financial constraints, a lack of interactions with colleagues, and family challenges have been shown to directly impact repeating a year in this study. The financial constraints challenge is particularly distressing as an extra year extends the academic journey and leads to additional financial expenditure (Shange, 2018). Thus, it is important to explore and provide support opportunities within the pharmacy faculty.

Notably, students who found courses interesting often focused more on grades than the perceived usefulness or practical application of the courses to their professional lives. The significance of "*negligence*" impacting failure in third-year students highlights the need for a mental shift to tackle the challenges of the pharmacy faculty. It is particularly significant because carelessness, like negligence, has been implicated as a reason for poor academic performance (Nauman, 2018).

The prominence of factors such as inadequate learning facilities and financial constraints align with existing literature on higher education challenges. Students frequently grapple with limited resources, and the impact of suboptimal learning environments is well-documented. These challenges not only hinder academic performance but can also contribute to stress and burnout among students (Zurainan et al., 2021; Hassan et al., 2022).

The acknowledgement of improper guidance from student advisers as a contributing factor points to potential areas for improvement in academic support systems. It highlights the importance of effective mentorship and guidance in helping students navigate the complexities of their academic journey (Jegede et al., 2023). This finding aligns with studies emphasising the pivotal role of mentorship in promoting student success and satisfaction (Cutillas et al., 2023; Saranya et al., 2023).

The educational framework and practices in Nigeria should be designed to gain greater prominence and relevance in actual practice, this will possibly result in a diminished perceived significance of some courses or some aspects of these courses (Okoroma, 2006; Alnahar et al., 2022). For instance, PHA 303 (Pharmaceutical dispensing), as the first "*professional council course*" with a pass mark of 60 and strict guidelines, associates potential difficulty with a re-sit examination. Modifying test formats to include case scenarios, presentations, discussions, and written examinations could alleviate the perceived burden on students (Singh et al., 2021).

Courses in the fourth year were reported to be the most challenging due to the introduction of clinical and pharmacy administration courses, along with an additional professional course with a 60% pass grade. While these courses were not perceived as difficult, the sheer volume made the year demanding. Exploring the perceived difficulty of pharmacy courses by students

potentially sheds light on student subjective experience within the academic curriculum.

The weighted averages assigned to specific courses offer insights into the courses students find most challenging. For instance, courses like "*Practical pharmaceutics*" (PHA 201), "*Pharmaceutical organic chemistry*" (PHA 202), "*Medicinal chemistry II*" (PHC 402) in the fourth year received higher difficulty ratings. Students and instructors are aligned on the role instructor enthusiasm and style of teaching plays in meeting medicinal chemistry teaching outcomes and tackling perceived difficulty. However, in the same study, students recognise their roles in motivation and keen attention to achieving better medicinal chemistry outcomes (Alsharif & Qi, 2014). Thus, it may be valuable to reevaluate teaching methods, assessment formats, and support structures within these courses.

The discussion around perceived difficulty underscores the need for a student-centric approach to curriculum development. While academic rigour is essential for maintaining educational standards, it should be coupled with an understanding of student cognitive loads and stressors. Strategies such as diversified assessment methods, early intervention for struggling students, and enhanced support mechanisms can contribute to a more balanced and effective curriculum (Bevitt, 2015; Hammond et al., 2020; Berlinski et al., 2022).

Reviewing the possibility of swift changes reveals that departments and individual lecturers can readily make changes, but addressing the "*inadequate learning facilities*" problem requires significant administrative and financial commitments. The impact, however, is limited to re-sitting an examination, slightly reducing the urgency of the problem. This is implied, as this study reveals inadequate learning facilities directly correlated to re-sitting an examination. While re-sitting an examination is challenging, it may be acceptable instead of repeating the year, especially with limited financial resources (Proud, 2014). Additionally, students could be relaxed and not study as hard when the option to re-sit an examination is there (Nijenkamp et al., 2022).

An interpretation of inadequate learning facilities is subjective, and further research may be sought to directly unravel this perspective. However, investigating the impact of inadequate learning facilities unveils a critical systemic issue within the educational infrastructure. Admittedly, the significant association between inadequate learning facilities and re-sitting an examination accentuates the direct link between the learning environment and academic performance. It has been shown that adequate learning

facilities often aid student success and achievements (Ramli & Zain, 2018).

The absence of a significant association between inadequate learning facilities and repeating an entire year is intriguing. It prompts a closer examination of the factors contributing to year repetition. This finding suggests that while learning facilities may influence short-term outcomes such as examination performance, repeating an entire year is influenced by a broader set of factors.

The nature of these associations calls for a holistic approach to addressing systemic issues within the learning environment. Initiatives to improve learning facilities should be integrated with comprehensive support mechanisms targeting the various dimensions of student challenges (Nandish, 2023). This holistic strategy must acknowledge the interconnected nature of factors influencing academic performance and lead to multifaceted interventions to create an optimal learning environment for pharmacy students.

The study's use of a single university in Nigeria, which may limit the generalisability of the findings to other pharmacy schools in Nigeria or other countries, was a major limitation. The study also relied on self-reported data, which may be subject to bias or inaccuracy. Overall, the study provides some valuable insights into the factors that influence academic performance among pharmacy students in Nigeria. However, it is important to keep the study's limitations in mind when interpreting the findings.

Conclusion

In conclusion, this study at Obafemi Awolowo University unravelled complex factors affecting academic performance among pharmacy students. The most prevalent challenges include the bulkiness of study materials, the number of continuous assessments per course, and the nature of the learning environment. Financial constraints, family challenges, and limited peer interactions were identified as pivotal contributors to academic setbacks, emphasising the need for comprehensive student support mechanisms. The association between specific challenging courses, particularly in the fourth year, underscores the importance of curriculum reassessment and innovative teaching strategies. These findings advocate for a holistic approach, urging institutions to enhance academic support, address financial barriers, and promote social interactions. By adopting multifaceted strategies, educational institutions can create a

conducive learning environment, fostering improved academic outcomes for pharmacy students.

Family and mental health support: Recognising the association between family challenges and academic setbacks, institutions should consider holistic support structures that extend beyond the academic.

Recommendations

The implications of these findings are to be interpreted with some caution and should be validated across more institutions and geo-political zones in Nigeria. However, they call for a re-evaluation of existing support structures and pedagogical approaches and provide a useful insight in the ongoing curriculum re-design in Nigerian pharmacy schools. The identified challenges underscore the need for a holistic understanding of students' experiences, encompassing academic, financial, and psychosocial dimensions.

Enhancing academic support systems: Institutions should invest in robust academic support systems, including mentorship programs, academic counselling, and targeted interventions for students facing challenges. Identifying struggling students early and providing tailored support can prevent the escalation of academic setbacks.

Curricular reassessment: The perceived difficulty of certain courses warrants a critical examination of the curriculum. Educators should explore innovative teaching methods, diverse assessment formats, and strategies to alleviate the workload while maintaining academic rigour. Flexibility in adapting to students' learning styles and needs is essential for fostering an inclusive learning environment.

Addressing financial constraints: The association between financial constraints and academic challenges highlights the need for financial support mechanisms. Institutions should explore scholarship opportunities, financial aid programs, and partnerships with external organisations to alleviate the financial burden on students.

Improving learning facilities: The significant impact of inadequate learning facilities on examination performance emphasises the urgency of infrastructure improvement. Educational institutions should prioritise investments in state-of-the-art learning spaces, libraries, and laboratories to create an environment conducive to effective learning.

Promoting peer interaction: The lack of interaction with colleagues emerged as a contributing factor to academic challenges. Initiatives promoting peer interactions, collaborative learning, and a sense of community can enhance students' social support networks, contributing to a more positive educational experience.

Additional comments

"First professional course" – The first professional course is PHA 303 – Pharmaceutical Dispensing, taken by third-year pharmacy students. It is a fully practical course in drug compounding, labelling and presentation. There is little room for error as this course mirrors the pharmacy practice professional environment where an error could be fatal. The pass mark is 60 points out of 100.

"Bulkiness of study materials" – The bulkiness of study materials refers to the sheer volume of study materials accumulated through the semester and academic session. Some courses are examined at the end of the year, e.g. Pharmaceutical separation techniques in Pharmacy, Toxicology, Chemotherapy, etc.

"Inadequate learning facilities" refer to deficiencies or insufficiencies in the resources, infrastructure, or environments necessary for effective learning and academic success. These may include limited access to libraries, laboratories, study spaces, textbooks, internet connectivity, or outdated equipment.

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Conflict of interest

The authors of this study have no conflicts of interest to disclose.

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Ethics approval and informed consent

The ethical clearance was obtained from the Institute of Public Health, College of Health Sciences, Obafemi Awolowo University, Ile-Ife with the certificate number being IPH/OAU/12/1411. Informed consent was also sought and given by the respondents.

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