

(RESEARCH ARTICLE)



Comparative analysis: Variances in the overall satisfaction perceptions among traditional and non-traditional pathways of graduating students

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Abstract

The evolution of pharmacy education in the United States has seen transformative shifts, from apprenticeship models to the establishment of formal schools, and eventually, the adoption of Doctor of Pharmacy (PharmD) programs. In the 1970s, non-traditional PharmD (NTDP) programs emerged to cater to licensed pharmacists seeking career advancement. This study delves into the history, impact, and satisfaction of NTDP programs, focusing on the acclaimed Howard University College of Pharmacy (HUCOP). Despite the success and contributions of NTDP programs to the pharmacy profession, there is a dearth of research on the satisfaction of graduating students, particularly from minority populations. To address this gap, our study aims to evaluate the satisfaction of graduates from both traditional and NTDP programs, shedding light on potential barriers and strategies to enhance diversity in pharmacy education. Methods: A comprehensive survey, comprising 85 questions distributed online, was administered to traditional and NTDP students at the time of their graduation. The survey covered eight domains, employing Likert scales, multiple-choice, and open-ended formats. The data were analyzed using chi-square tests and student t-tests, with a significance level set at 0.05. Results: Demographic analysis revealed a predominantly female and non-Hispanic minority student population in both traditional and NTDP programs. While both groups expressed high overall satisfaction, differences emerged in specific domains. Traditional students reported higher agreement in Facilities, Experiential Sites, and Educational Resources, whereas NTDP students showed higher agreement in Student Experience and Overall Impressions. However, these differences did not reach statistical significance.

Conclusion: The study underscores the success of NTDP programs, particularly at HUCOP, in advancing the careers of licensed pharmacists and increasing diversity in the pharmacy profession. While overall satisfaction is high among graduates, subtle variations highlight areas for improvement. Future research should delve deeper into the experiences of minority populations in NTDP programs to address existing disparities and further enhance the inclusivity of pharmacy education.

Keywords: Satisfaction; Non-traditional pathways; Students; NTDP

1. Introduction

The history of pharmacy education in the United States has undergone significant evolution, marked by key milestones and transformations. In the early 19th century, apprenticeship was the primary mode of training, but the late 19th century witnessed the establishment of formal schools such as the Philadelphia College of Pharmacy and the American Pharmaceutical Association. The early 20th century saw efforts to standardize education, influenced by the Flexner Report of 1910 (Hepler 1987). A pivotal shift occurred in the mid-20th century when leaders recognized the inadequacy of a four-year degree, leading to the establishment of Doctor of Pharmacy (PharmD) programs, with the University of California, San Francisco pioneering the first program in 1952 (Kehrer 2005). By the late 20th century, the PharmD

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degree became the standard entry-level requirement for pharmacy practice, replacing the previous five-year Bachelor of Science (B.S.) model. In the 21st century, pharmacy education integrates technology and emphasizes specialized fields. This historical progression reflects a commitment to enhancing the quality and relevance of pharmacy education in response to evolving healthcare needs.

The history of Non-Traditional PharmD (NTDP) education in the United States can be traced back to the early 1970s when several pharmacy schools began experimenting with new models of education for licensed pharmacists. These early programs were typically designed for practitioners who wanted to update their skills or advance their careers by earning a PharmD degree.

In the 1980s, the number of NTDP programs began to grow in response to a number of factors, including The increasing complexity of pharmacy practice [Hepler, 1987]; the growing demand for continuing education among licensed pharmacists [Kehrer, 2005]; and the shortage of pharmacists in some areas of the country.

In the 1990s, the Accreditation Council for Pharmacy Education (ACPE) began to develop standards for NTDP programs (ACPE 2023). These standards were designed to ensure that these programs were of high quality and that graduates would meet the same competencies as graduates of traditional PharmD programs. At one point, there were over 50 NTDP programs in the United States offering a variety of delivery options, including online, weekend, and hybrid formats.

NTDP programs have been shown to be effective in preparing licensed pharmacists for advanced practice. A study published in the American Journal of Pharmaceutical Education found that graduates of NTDP programs were as competent as graduates of traditional PharmD programs on a variety of measures [Wolf, 2007].

NTDP programs have also been shown to be a cost-effective way to increase the number of pharmacists in the workforce. A study published in the Annals of Pharmacotherapy found that NTDP programs were significantly less expensive to operate than traditional PharmD programs [Smetana, 2005].

Overall, NTDP programs have made a significant contribution to the pharmacy profession in the United States. These programs have provided licensed pharmacists with the opportunity to earn a PharmD degree and advance their careers. They have also helped to increase the number of pharmacists in the workforce, which has improved access to care for patients.

The Howard University College of Pharmacy (HUCOP) is one of the oldest and most respected pharmacy schools in the United States. Founded in 1867, HUCOP was the first pharmacy school to be established at a historically black college or university (HBCU) (HUCOP 2023). In the early 1970s, HUCOP began to explore the development of a NTDP program. The school was motivated by a number of factors, including the increasing complexity of pharmacy practice, the growing demand for continuing education among licensed pharmacists, and the shortage of pharmacists in some areas of the country.

In the 2000s, HUCOP, in affiliation with Shenandoah University, launched its first NTDP program. The program was designed for licensed pharmacists who wanted to update their skills or advance their careers by earning a PharmD degree. The program was offered on a full-time basis and was delivered primarily online intended to be completed in 2 years with a maximum completion time of 5 years.

The NTDP program at HUCOP was a success from the start. The program was well-received by students and employers alike. Graduates of the program were able to advance their careers in a variety of settings, including hospitals, community pharmacies, and pharmaceutical companies. The NTDP program at HUCOP has played an important role in increasing the diversity of the pharmacy profession. The program has attracted a large number of students from minority backgrounds, and it has helped to increase the number of pharmacists in underserved communities.

Today, the NTDP program at HUCOP is one of the largest and most successful programs of its kind in the country. The program has graduated over 350 students, and it continues to be one of the 3 actively recruiting programs in the United States providing high-quality pharmacy education to licensed pharmacists.

There is a lack of studies on the satisfaction of graduating students in NTDP programs in minority populations. This is a critical issue because these programs can play an important role in increasing the diversity of the pharmacy profession. A study published in the Journal of Pharmacy Education found that only 16% of students enrolled in NTDP programs were from minority populations (NPA 2023, APhA 2023). This is significantly lower than the proportion of

minority pharmacists in the workforce, which is 21%. There are a number of reasons why there are so few studies on graduating students in NTDP programs in minority populations. The lack of studies on graduating students in the NTDP programs in minority populations is a critical issue that needs to be addressed. More research is needed to understand the barriers that minority students face in accessing and completing these programs and to identify strategies for increasing their participation.

Hence, our objective is to evaluate the satisfaction of both groups across different domains through self-reported responses, as outlined in this study. This approach serves as a method to gauge the quality of online education in comparison to traditional students.

2. Methods

The survey constituted a routine practice within the college, seeking feedback on the quality of education provided during the pharmacy program. The underlying assumption was that post-graduation, respondents would be more candid in expressing their opinions. Traditionally, the survey has been conducted both in-person and online on an annual basis, ingrained as a cultural practice within the college over several years. Although this study presented data from a one-year survey, a preliminary examination suggests substantial similarity in the responses. Notably, the online survey format was included in this study, given the potential challenge of quantifying in-person results, primarily due to the prevalence of open-label questions. The online survey encompassed eight distinct sections, each specifically addressing various facets of the educational experience. It consists of eight sections, a total of 85 questions, with 65 questions dedicated to assessing perceptions of the quality of the educational experience. Topics include Interprofessional Education, Professional Competencies, Outcomes, and Curriculum (Domains I and II), Pharmacy Practice Experiences (Domain III), Student Services (Domain IV), The Student Experience (Domain V), Facilities, Experiential Sites, and Educational Resources (Domain VI), Overall Impressions (Domain VII), and Demographic Information (Domain VIII). These sections collectively provide a comprehensive assessment framework for the educational program.

Likert scales, multiple-choice, and open-ended formats for a better understanding of participants' perspectives. The survey was distributed electronically to participants from traditional and NTDP programs during the final semester of their academic year. Participants were provided clear instructions on survey completion, and responses were collected anonymously to avoid biased feedback. Quantitative data analysis was performed using the chi-square test and the student t-test to assess differences in perceptions between the traditional and NTDP programs. The chi-square test was employed for categorical variables, such as responses to Likert scale questions, evaluating whether there were significant differences in the distribution of responses between the two groups. The student t-test was used for continuous variables, such as mean scores, to determine if there were statistically significant differences in perceptions. Statistical significance was set at a p-value of 0.05. The analysis was conducted using SPSS, ensuring robust and reliable results. Descriptive statistics were also employed to overview participant demographics and survey responses comprehensively.

3. Results

Table 1 provides a thorough demographic analysis of two cohorts: traditional pharmacy students and those enrolled in the NTDP. The data indicates a gender distribution where 67.60% of the traditional group and 87.5% of the NTDP participants are female. This underscores a predominant female majority in both programs.

Regarding race and ethnicity, the majority in both groups are non-Hispanic minority students comprising over eighty-five percent (88.2% for traditional and 87.5% for NTDP students). In terms of college degrees earned prior to pharmacy school entry, over two-thirds (70%) of traditional students had a college degree. However, this number is 100% for the NTDP since having a pharmacy degree is a prerequisite to joining the program.

The primary areas of paid work experiences during college/school indicate that all NTDP are working in a pharmacy-related job as expected since they must have a pharmacy license to join the program. However, comparing the type of pharmacy practice, more NTDP students work in a hospital or institution as compared to traditional students (62.5% vs. 37.5%, respectively).

Table 1 Summary of demographics

Demographics	Response rate (n; %)	
	TRADITIONAL	NTDP
Gender		
Female	23 (67.60%)	7 (87.50%)
Male	8 (23.50%)	1 (12.50%)
Prefer not to disclose	3 (8.80%)	0 (0.00%)
Race/Ethnicity		
No, not of Hispanic, Latino, or Spanish origin	30 (88.20%)	7 (87.50%)
Mexican, Mexican American	4 (5.50%)	1 (12.50%)
White/Caucasian	3 (8.82%)	0 (0.00%)
College Degree earned prior to Pharmacy School entry		
Associate degree	7 (17.5%)	0 (0.00%)
Bachelor's Degree	28 (70.00%)	7 (70.00%)
Master's or higher Degree	4 (10.00%)	2 (10.00%)
Work Experience during Pharmacy School		
Community pharmacy	23 (60.53%)	3 (37.50%)
Institutional pharmacy	6 (15.79%)	5 (62.50%)
Other pharmacy-related	3 (7.89%)	0 (0.00%)
Non-pharmacy related	1 (2.63%)	0 (0.00%)
I did not work	5 (13.16%)	0 (0.00%)

The first section in Table 2 summarizes the differences between traditional pharmacy students and participants in the NTDP regarding their current plans for primary employment upon graduation and reveals notable distinctions. In terms of employment preferences, a higher percentage of NTDP participants express an inclination towards hospital-based positions (55.56% compared to 16.88% for traditional students) and clinical pharmacy roles (33.33% compared to 10.39% for traditional students). On the other hand, traditional students exhibit a higher interest in the pharmaceutical industry (16.88% compared to 33.33% for NTDP participants). These distinctions highlight varying career preferences and aspirations among the two groups.

The comparison between traditional and NTDP students regarding their post-graduation plans also reveals distinct patterns. Traditional students show a greater interest in pharmacy residencies (20.00% compared to none for NTDP participants) and fellowships (28.57% compared to 11.11% for NTDP participants). However, none of these differences reached a statistical difference.

In addition to the observed differences in borrowing patterns, it's noteworthy that despite NTDP students working as practicing pharmacists and earning a six-figure salary, a substantial percentage of them, 62.50%, have taken out loans for their college expenses.

The survey encompasses eight domains or sections comprising a total of 64 questions. The list of the domains is shown in Table 3 and includes Interprofessional Education, Professional Competencies/Outcomes/Curriculum, Pharmacy Practice Experiences, Student Services, The Student Experience, Facilities, Experiential Sites, Educational Resources, Overall Impressions, and Demographic Information. Each domain addresses specific aspects of the educational experience, providing a comprehensive framework for evaluating the surveyed participants' perspectives and feedback.

Table 2 Plans after graduation with a Pharm D degree

What are your current plans for primary employment upon your graduation from the college/school of pharmacy? (Check all that apply)		
	Traditional	NTDP
Chain community pharmacy	9 (11.69%)	1 (11.11%)
Independent community pharmacy	5 (6.49%)	1 (11.11%)
Hospital	13 (16.88%)	5 (55.56%)
Clinic-based pharmacy	8 (10.39%)	3 (33.33%)
Consultant	4 (5.19%)	1 (11.11%)
Home care	1 (1.30%)	0 (0.00%)
Nursing home/Long-term care facility	3 (3.90%)	1 (11.11%)
Academia	5 (6.49%)	2 (22.22%)
Association management	3 (3.90%)	0 (0.00%)
Pharmaceutical industry	13 (16.88%)	3 (33.33%)
Managed Care	5 (6.49%)	1 (11.11%)
Government or regulatory agency	6 (7.79%)	3 (33.33%)
Other Pharmacy Related Field	1 (1.30)	0 (0.00%)
Non-pharmacy-related field	1 (1.30%)	0 (0.00%)
No plans for employment in the coming year	0 (0.00%)	0 (0.00%)
What are your current plans upon your graduation from the college/school of pharmacy? (Check all that apply)		
Pharmacy Residency Program	7 (20.00%)	0 (0.00%)
Pharmacy Ph.D. Program	2 (5.71%)	1 (11.11%)
Master's; please specify type:	2 (5.71%)	1 (11.11%)
JD or Other Law Program	0 (0.00%)	0 (0.00%)
Other Health Professions (MD, DDS, DVM, etc.)	0 (0.00%)	0 (0.00%)
Non-Pharmacy Ph.D. Program	2 (5.71%)	2 (22.22%)
Fellowship	10 (28.57%)	1 (11.11%)
No plans for further education in the coming year	12 (34.29%)	4 (44.44%)
Have you borrowed money to help pay for your college expenses in the Pharm.D. degree program?		
Yes	26 (76.50%)	5 (62.50%)
No	8 (23.50%)	3 (37.50%)

Table 4 underscores significant differences in survey responses between traditional and NTDP students across various domains, measured in percentage agreement. A substantial gap emerges in Facilities, Experiential Sites, and Educational Resources (Domain VI), where traditional students show a 21.16% higher agreement. The disparities become more

pronounced in aspects of Student Experience, where NTDP students demonstrate a striking 10.04% higher agreement in Domain V compared to their traditional counterparts. The divergence becomes even smaller in Overall Impressions (Domain VII), where NTDP students convey a 7.37% higher agreement. Again, none of these differences reached statistical difference.

Table 3 Survey questions by sections

Section numbers	Survey questions domain
Domain I	Interprofessional Education
Domain II	Professional Competencies/Outcomes/Curriculum
Domain III	Pharmacy Practice Experiences
Domain IV	Student Services
Domain V	The Student Experience
Domain VI	Facilities, Experiential Sites, and Educational Resources
Domain VII	Overall Impressions
Domain VIII	Demographic Information

Table 4 Differences in survey responses by domain for traditional vs. NTDP students

Domain Number	S. Agree/ Agree (%)		
	Traditional	NTDP	Difference
Domain II: Professional Competencies/Outcomes/Curriculum	94.88	100	5.12
Domain III: Pharmacy Practice Experiences	94.82	97.12	4.45
Domain IV: Student Services	80.58	87.5	6.92
Domain V: The Student Experience	81.77	90.63	10.04
Domain VI: Facilities, Experiential Sites, and Educational Resources	82.1	60.94	21.16
Domain VII: Overall Impressions	84.3	91.67	7.37

While there are no overall significant differences between the two groups across each domain, a closer examination reveals noteworthy variations within specific questions, and these distinctions persist consistently for both groups. The data presented in Table 5 elucidates the statistical significance of these differences in response to individual questions within each domain. Notably, curriculum (Domain II), student experience (Domain V), and Facilities or experiential sites (Domain VI) exhibit a highly significant difference. These nuances in response patterns within specific questions merit further attention from the College to address any potential concerns and enhance the overall educational experience for both groups.

Table 5 Differences in response to individual questions with each domain.

Domains	Two-Sided p-value
Domain II: Professional Competencies/Outcomes/Curriculum	<.001
Domain III: Pharmacy Practice Experiences	0.143
Domain IV: Student Services	0.085
Domain V: The Student Experience	<.001
Domain VI: Facilities, Experiential Sites, and Educational Resources	0.001

Domain VII: Overall Impressions	0.211
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Based on the calculated p-values for each question in both Domain I (Interprofessional Education) and Domain II (Essentials for Practice), there are no statistically significant differences between traditional and Non-Traditional Pharmacy Program (NTDP) students. The p-values, ranging from 0.2857 to 0.7023, are all above the conventional significance level of 0.05. Consequently, there is insufficient evidence to reject the null hypothesis, indicating that any observed variations in responses between the two groups could be due to chance, and there is no conclusive evidence of significant distinctions in perceptions related to these domains.

Table 6 Summary of Strongly Agree & Agree combined responses between the two groups for questions in Domain I & II.

Domain (Question) Numbers	Traditional Students	NTDP Students	P-value
Domain I: Required Interprofessional Education			
3. The learning experience with other professional students helped me gain a better understanding of how to be part of a multidisciplinary team to improve patient outcomes.	31 (91.1%)	7 (87.5%)	0.7023
Domain II: Essentials for Practice			
7. Provide medication expertise as part of patient-centered care.	31 (91.2%)	8 (100%)	0.2857
8. Optimize the safety and efficacy of medication use systems (e.g., dispensing, administration, effects monitoring) to manage patient healthcare needs.	32 (94.1%)	8 (100%)	0.3913
9. Design strategies to manage chronic disease and improve health and wellness.	32 (94.1%)	8 (100%)	0.3913
10. Assess the health needs of a given patient population.	32 (94.1%)	8 (100%)	0.3913
11. Provide patient-centered care based on evidence-based best practices.	33 (97%)	8 (100%)	0.4021

For Domain 3, as you can see, the p-values for all the questions are 1.0, which means that there is no statistically significant difference between the responses of traditional and NTDP students. This suggests that both groups of students are equally well-prepared to enter the final professional year of the pharmacy curriculum.

Table 7 Summary of Strongly Agree & Agree combined responses between the two groups for questions in Domain III.

Domain (Question) Numbers	Traditional Students	NTDP Students	P-value
Domain III: Approach to Practice and Care			
12. Design, implement, and evaluate viable solutions to patient care problems.	32 (94.1%)	8 (100%)	0.3913
13. Use effective strategies to educate patients, healthcare professionals, and caregivers to improve patient care.	32 (94.1%)	8 (100%)	0.3913
14. Advocate for the patient's best interest.	33 (97%)	8 (100%)	0.4021
15. Engage as a member of an interprofessional healthcare team.	32 (94.1%)	8 (100%)	0.3913
16. Identify cultural disparities in healthcare.	33 (97%)	8 (100%)	0.4021
17. Recognize and address cultural disparities in access to and delivery of healthcare.	33 (97%)	8 (100%)	0.4021

18. Effectively communicate (verbal, non-verbal, written) when interacting with individuals, groups, and organizations.	32 (94.1%)	8 (100%)	0.3913
Domain III: Pharmacy Practice Experiences			
27. My introductory pharmacy practice experiences permitted my involvement in direct patient care responsibilities in both community and institutional settings.	32 (94.1%)	8 (100%)	1.0
28. My introductory pharmacy practice experiences were of high quality.	31 (91.2%)	8 (100%)	1.0
29. In the community pharmacy setting, I was able to engage in direct patient care.	32 (94.1%)	8 (100%)	1.0
30. In the ambulatory care setting, I was able to engage in direct patient care.	32 (94.1%)	8 (100%)	1.0
31. In the hospital or health-system pharmacy setting, I was able to engage in direct patient care.	32 (94.1%)	8 (100%)	1.0
32. In the inpatient/acute care setting, I was able to engage in direct patient care.	31 (91.2%)	8 (100%)	1.0
33. The need for continuity of care (e.g., acute, chronic, and wellness-promoting patient care services) in outpatient and inpatient settings was emphasized in the advanced pharmacy practice experiences.	33 (97.1%)	8 (100%)	1.0
34. The variety of the available advanced pharmacy practice experience electives met my needs as a student.	34 (100%)	8 (100%)	1.0
35. I was academically prepared to enter my advanced pharmacy practice experiences.	30 (88.3%)	8 (100%)	1.0
36. My advanced pharmacy practice experiences were of high quality.	33 (97.1%)	8 (100%)	1.0
The overall response to both introductory and advanced pharmacy practice experiences.			
37. My pharmacy practice experiences allowed me to have direct interaction with diverse patient populations (e.g., age, gender, socioeconomic, ethnic and/or cultural background, disease states, etc.).	34 (100%)	8 (100%)	1.0
38. My pharmacy practice experiences allowed me to collaborate with other healthcare professionals.	34 (100%)	8 (100%)	1.0

The examination of data within Domain IV (Student Services) and Domain V (The Student Experience) as shown in Table 8 reveals that there are no statistically significant differences between traditional and NTDP students in various aspects. In Domain IV, encompassing areas such as access to academic advising, career planning guidance, accommodation services, financial aid advising, and student health and wellness services, the calculated p-values range from 0.476 to 0.999. Similarly, Domain V, which explores facets of the student experience, indicates consistently non-significant results with p-values equal to 0.999 across a spectrum of questions related to timely information, administrative responsiveness, awareness of policies, preceptor guidance, and knowledge of loan repayment programs.

These findings suggest a lack of conclusive evidence to reject the null hypothesis, implying that observed differences could be attributed to chance, and no substantial disparities exist between traditional and NTDP students in these domains concerning student services and the overall student experience.

The analysis of data within Domain VI (Facilities, Experiential Sites, and Educational Resources) and Domain VII (Overall Impressions) as shown in Table 8 also indicates no statistically significant differences between traditional and NTDP students. In Domain VI, covering aspects of the learning environment, information technology resources, classroom and laboratory environments, study areas, common spaces, and access to educational resources, p-values range from 0.270 to 0.999. Additionally, in Domain VII, assessing overall impressions and preparedness for pharmacy practice, as well as satisfaction with the chosen pharmacy program, all p-values are equal to 1. These results suggest a lack of conclusive evidence to reject the null hypothesis, indicating that observed variations could be due to chance, and there is no

substantial disparity between traditional and NTDP students in these domains regarding facilities, experiential sites, educational resources, and overall impressions of their pharmacy programs.

Table 8 Summary of Strongly Agree & Agree combined responses between the two groups for questions in Domain IV and V.

Domain Number	Traditional	NTDP	p-Value
Domain IV: Student Services			
39. College/school provided access to academic advising.	34 (100%)	8 (100%)	0.999
40.College/school provided access to guidance on career planning.	28 (82.3%)	7 (87.5%)	0.747
41. College/school provided access to accommodation services as defined by the Americans with Disabilities Act (ADA).	22 (64.7%)	6 (75%)	0.476
42. College/school provided access to financial aid advising.	24 (70.6%)	7 (87.5%)	0.680
43.College/school provided access to student health and wellness services (e.g., immunizations, counseling services, campus pharmacy, primary care clinics, etc.).	29 (85.3%)	7 (87.5%)	0.999
Domain V: The Student Experience			
44. The college/school of pharmacy provided timely information about news, events, and important matters within the college/school of pharmacy.	22 (94.1%)	8 (100%)	0.999
45. Information was made available to me about additional educational opportunities (e.g., residencies, fellowships, graduate school).	31 (91.2%)	7 (87.5%)	0.999
46. The college/school's administration responded to problems and issues of concern to the student body.	20 (58.8%)	7 (87.5%)	0.247
47.I was aware of the process for raising issues with the college/school administration.	27 (79.4%)	7 (87.5%)	0.999
48.I was aware that student representatives served on college/school committees with responsibility for curriculum and other matters.	28 (82.3%)	6 (75%)	0.722
49.The college/school of pharmacy was welcoming to students with diverse backgrounds.	32 (94.2%)	8 (100%)	0.999
50. I know how to utilize college/school policies dealing with harassment and discrimination.	28 (82.4%)	8 (100%)	0.999
51.The college/school of pharmacy had processes to communicate student perspectives to the faculty or administration.	27 (79.4%)	8 (100%)	0.999
52.Faculty, administrators and staff served as positive role models for students.	27 (79.4%)	8 (100%)	0.999
53. Preceptors modeled professional attributes and behaviors.	31 (91.2%)	8 (100%)	0.999
54. Preceptors provided me with individualized instruction, guidance and evaluation.	31 (91.2)	8 (100%)	0.999
55. I was aware of expected behaviors with respect to professional and academic conduct.	34 (100%)	8 (100%)	0.999
56. The college/school of pharmacy had an effective process to manage academic misconduct by students (e.g., plagiarism).	26 (76.5%)	7 (87.5%)	0.999

57. The college/school of pharmacy had an effective process to manage professional misconduct by students (e.g., repeated tardiness/absences, drug diversion).	23 (70.6%)	6 (75%)	0.721
58. The college/school's faculty and administration encouraged me to participate in regional, state or national pharmacy meetings.	28 (82.4%)	7 (87.5%)	0.999
59. The college/school of pharmacy was supportive of student professional organizations.	29 (85.3%)	7 (87.5%)	0.999
60. I was aware of opportunities to participate in research activities with faculty.	30 (88.3%)	7 (87.5%)	0.999
60(a). I was aware of the existence of federal student loan repayment programs.	25 (73.5%)	7 (87.5%)	0.999
60(b). I was aware of the existence of state student loan repayment programs.	23 (67.6%)	6 (75%)	0.999
60(c). I was aware of eligibility requirements for governmental (state or federal) student loan repayment programs.	24 (67.6%)	7 (87.5%)	0.999

Table 9 Summary of Strongly Agree & Agree combined responses between the two groups for questions in Domain VI and VII.

Domain number	TRADITIONAL	NTDP	p-Value
Domain VI: Facilities, Experiential Sites and Educational Resources			
61. My campus learning environment was safe.	27 (71.7%)	4 (50%)	0.99
62. The information technology resources provided by the college/school of pharmacy and/or elsewhere on campus were conducive to learning.	29 (85.2%)	6 (75%)	0.99
63. The classrooms in the college/school of pharmacy or elsewhere on campus were conducive to learning.	26 (76.5%)	5 (62.5)	0.722
64. The laboratories and other non-classroom environments were conducive to learning.	26 (76.5%)	4 (50%)	0.540
65. The study areas in the college/school of pharmacy or elsewhere on campus were conducive to learning.	28 (82.3%)	4 (50%)	0.270
66. The common spaces such as lounges, lobbies or other areas for relaxation and socialization available in the college/school of pharmacy or elsewhere on campus met my needs.	26 (76.5%)	4 (50%)	0.270
67. Access to educational resources (e.g., library, electronic databases) was conducive to learning.	32 (94.1%)	6 (75%)	0.999
68. During pharmacy practice experiences, access to educational resources (e.g., library, electronic databases) was conducive to learning.	31 (94.1%)	6 (75%)	0.999
Domain VII: Overall Impressions			
69. I am prepared to enter pharmacy practice.	34 (100%)	8 (100%)	0.99
70. If I were starting my college career over again, I would choose to study pharmacy.	27 (79.4%)	7 (87.5%)	0.99
71. If I were starting my pharmacy program over again, I would choose the same college/school of pharmacy.	25 (73.5%)	7 (87.5%)	0.99

4. Discussion

In light of the analysis revealing no significant differences across all domains between traditional and NTDP student groups, it is recommended to focus on targeted improvements in specific areas for both cohorts. Suggestions include enhancing student representation on committees and strengthening financial aid advising. Additionally, efforts should be directed towards increasing awareness of student loan repayment programs and improving accessibility to accommodation services. Communication about issue resolution procedures and awareness of institutional policies should also be prioritized. It is crucial to foster a positive and supportive experience for all students, with a particular emphasis on the NTDP program.

Notably, the absence of significant differences between traditional and NTDP groups supports the continuation and expansion of the NTDP program. Consideration should be given to initiating NTDP classes from the first year of the pharmacy program and opening the program to non-licensed foreign graduate pharmacists who have passed the Foreign Pharmacy Graduates Examination (FPGE), thereby broadening access to the NTDP initiative for a more diverse range of students. This comprehensive approach aims to ensure a consistently high-quality educational experience for all pharmacy students.

5. Conclusions

This study, centered on HUCOP, aimed to evaluate the satisfaction of graduates from both traditional and NTDP programs, with a specific focus on minority populations. Demographic analysis revealed a diverse student population in both programs, with a higher percentage of females and non-Hispanic minorities. Both traditional and NTDP students expressed high overall satisfaction, emphasizing the success of NTDP programs in advancing careers and increasing diversity in the profession. While subtle differences in satisfaction were noted, particularly in Facilities, Experiential Sites, Educational Resources, and Student Experience, these did not reach statistical significance.

The study highlights the need for continued research to address the underrepresentation of minority populations in NTDP programs and further enhance the inclusivity of pharmacy education. Overall, NTDP programs, exemplified by HUCOP, play a crucial role in shaping the future of pharmacy education, responding dynamically to the evolving landscape of healthcare.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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