

The Importance of the Graduation Research Project for Pharmacy Students

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أهمية مشروع بحث التخرج لطلاب الصيدلة

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Abstract:

Graduation research projects are an important component of pharmacy education, helping students develop research, critical thinking, and professional skills. However, evidence regarding pharmacy students' perceptions of these projects in Southern Libya is limited. The aim to assess pharmacy students' perceptions of the importance of graduation research projects, the skills gained, challenges encountered, and suggested improvements. A cross-sectional study was conducted among 93 pharmacy students from several Libyan universities using a structured questionnaire. Descriptive statistics and Chi-square tests were used to analyze the data and assess associations between perception levels and selected variables. The mean age of participants was 24.96 ± 2.72 years, with females comprising 67.7%. Most students were in the fifth year (55.9%) and from Sebha University (60.2%). Overall, 71.0% demonstrated a high perception of the importance of graduation research projects. Most students reported that the projects enhanced research and critical thinking skills (81.7%), scientific data analysis (73.1%), and communication and presentation skills (74.2%). The main challenges were lack of time (38.7%), difficulty selecting a research topic (30.1%), and limited resources (21.5%). No significant associations were found between perception level and demographic or academic variables ($p > 0.05$). Pharmacy students generally had a positive perception of graduation research projects. Strengthening research methodology training, improving supervision, and providing adequate research facilities may further enhance their educational value.

Keywords: Pharmacy students, Graduation research projects, Research skills, Student perceptions, Pharmacy education, Undergraduate research, Research methodology, Critical thinking, Libya.

المخلص

تُعد مشاريع البحث للتخرج عنصراً هاماً في تعليم الصيدلة، إذ تُساعد الطلاب على تطوير مهارات البحث والتفكير النقدي والمهارات المهنية. مع ذلك، فإن الأدلة المتعلقة بتصورات طلاب الصيدلة لهذه المشاريع في جنوب ليبيا محدودة. تهدف هذه الدراسة إلى تقييم تصورات طلاب الصيدلة لأهمية مشاريع البحث للتخرج، والمهارات المكتسبة، والتحديات التي يواجهونها، واقتراح تحسينات. أُجريت دراسة مقطعية شملت 93 طالباً وطالبة في الصيدلة من عدة جامعات ليبية باستخدام استبيان مُنظم. استُخدمت الإحصاءات الوصفية واختبارات مربع كاي لتحليل البيانات وتقييم العلاقات بين مستويات الإدراك والمتغيرات المُختارة. بلغ متوسط عمر المشاركين 24.96 ± 2.72 عاماً، وشكّلت الإناث 67.7% منهم. كان معظم الطلاب في السنة الخامسة (55.9%) ومن جامعة سبها (60.2%). بشكل عام، أظهر 71.0% من المشاركين إدراكاً عالياً لأهمية مشاريع البحث للتخرج. أفاد معظم الطلاب بأن المشاريع عززت مهاراتهم في البحث والتفكير النقدي (81.7%)، وتحليل البيانات العلمية (73.1%)، ومهارات التواصل والعرض (74.2%). تمثلت أبرز التحديات في ضيق

الوقت (38.7%)، وصعوبة اختيار موضوع البحث (30.1%)، ومحدودية الموارد (21.5%). لم تُلاحظ أي ارتباطات ذات دلالة إحصائية بين مستوى الإدراك والمتغيرات الديموغرافية أو الأكاديمية ($p > 0.05$). بشكل عام، كان لدى طلاب الصيدلة تصور إيجابي لمشاريع التخرج البحثية. قد يُسهم تعزيز التدريب على منهجية البحث، وتحسين الإشراف، وتوفير مرافق بحثية ملائمة في زيادة قيمتها التعليمية.

الكلمات المفتاحية: طلاب الصيدلة، مشاريع التخرج البحثية، مهارات البحث، تصورات الطلاب، تعليم الصيدلة، البحث الجامعي، منهجية البحث، التفكير النقدي، ليبيا.

Introduction

Graduation research projects are an important component of pharmacy education, particularly during the final year of undergraduate study. They provide students with an opportunity to apply theoretical knowledge to real-world scientific and healthcare problems while developing essential skills in research methodology, critical thinking, data analysis, scientific writing, and communication. These competencies are important for evidence-based pharmacy practice and lifelong professional development [1,2].

Participation in undergraduate research also promotes independent learning, problem-solving abilities, and students' understanding of scientific and ethical research practices. Through conducting a research project, pharmacy students gain practical experience in literature evaluation, research design, data collection, statistical analysis, interpretation of findings, and dissemination of results. Such experiences may also encourage students to pursue postgraduate education and research-oriented careers [3,4].

Despite these potential benefits, students' perceptions of graduation research projects may vary according to their educational environment, research experience, supervision, and available resources. Assessing students' perceptions of the importance of graduation research is therefore valuable for identifying strengths and challenges in pharmacy research education. This study aimed to assess the perceptions of pharmacy students regarding the importance of the graduation research project and its contribution to their academic, scientific, and professional development.

Materials and methods

A cross-sectional questionnaire-based study was conducted from September to December 2025 to assess the importance of graduation research projects among pharmacy students and graduates in Southern Libya. The study included final-year pharmacy students at the Faculty of Pharmacy, Sebha University, and pharmacists who had graduated from the faculty. The questionnaire was adapted from a previous United States of America (USA) study [5] and consisted of 18 multiple-choice items covering four domains: demographic characteristics, experience with graduation research projects, perceptions of their importance and challenges, and suggestions for improvement.

A total of 110 questionnaires were distributed individually by senior pharmacy students. Participation was voluntary, and respondents were provided sufficient time to complete the questionnaire. Participants who declined consent, were not final-year students or graduates, or submitted incomplete questionnaires were excluded.

Data were entered and analyzed using IBM SPSS Statistics version 27. Categorical variables were summarized as frequencies and percentages. Associations between demographic characteristics and perceptions of the importance of the graduation research project were assessed using the chi-square (χ^2) test. A p-value of <0.05 was considered statistically significant.

Results and discussion

A total of 110 questionnaires were distributed to pharmacy students, of which 93 were completed and included in the analysis, yielding a response rate of 84.54%. The participants had a mean age of 24.96 ± 2.72 years, and most were aged 21–25 years (73.1%). Females constituted the majority of participants (67.7%), while fifth-year students represented the largest academic group (55.9%). Sebha University contributed the highest proportion of participants (60.2%), followed by Tripoli University (15.1%) and Zawia University (8.6%). Regarding graduation research project status, 48.4% of students had completed their projects, whereas 46.2% were still working on them. Most students reported being supervised by faculty members (74.2%). The detailed sociodemographic and academic characteristics are presented in Table 1.

Table 1: Sociodemographic and Academic Characteristics of Participants

		n	%
Age Group	21–25 years	68	73.1
	26–29 years	23	24.7
	≥30 years	2	2.2
	Mean ± SD	24.96 ± 2.72	
Gender	Male	30	32.3
	Female	63	67.7
Year of Study	First year	1	1.1
	Fourth year	40	43.0
	Fifth year	52	55.9
University	Sebha	56	60.2
	Tripoli	14	15.1
	Zawia	8	8.6
	Benghazi	3	3.2
	Gerian	3	3.2
	Zelatin	3	3.2
	Alkhomis	2	2.2
	Musrata	2	2.2
	Zantan	2	2.2
Graduation Research Status	Completed	45	48.4
	Currently working	43	46.2
	Not yet started	5	5.4
Research Supervisor	Faculty member	69	74.2
	External professional	19	20.4
	Other	4	5.4

The predominance of students aged 21–25 years reflects the expected age distribution of undergraduate pharmacy students approaching the final stages of their academic programs. The higher proportion of female participants is also consistent with previous reports describing substantial female representation in pharmacy education [6]. This demographic pattern provides an appropriate context for interpreting students' perceptions of undergraduate research.

Overall, students demonstrated positive perceptions of the importance of graduation research projects. The project was particularly perceived as contributing to the development of research and critical-thinking skills (81.7%), personal and professional development (79.5%), communication and presentation skills (74.2%), and scientific data analysis (73.1%). Students also reported improvements in problem-solving skills (67.8%), preparation for future research and postgraduate studies (66.6%), understanding of pharmacy practice (65.6%), and the ability to apply theoretical knowledge to practice (63.4%) (Table 2).

Table 2: Students' Perceptions of the Importance of the Graduation Research Project

Statement	Strongly Disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly Agree n (%)
The graduation project helps me apply theoretical knowledge in practice	8 (8.6)	7 (7.5)	19 (20.4)	39 (41.9)	20 (21.5)
It enhances my research and critical thinking skills	8 (8.6)	3 (3.2)	6 (6.5)	40 (43.0)	36 (38.7)
The project improves my ability to analyze scientific data	8 (8.6)	3 (3.2)	14 (15.1)	33 (35.5)	35 (37.6)
It prepares me for future academic research or postgraduate studies	9 (9.7)	4 (4.3)	18 (19.4)	27 (29.0)	35 (37.6)
The project helps me develop problem-solving skills	10 (10.8)	6 (6.5)	14 (15.1)	33 (35.5)	30 (32.3)
The experience improves my communication and presentation skills	9 (9.7)	1 (1.1)	14 (15.1)	32 (34.4)	37 (39.8)
The project contributes to my personal and professional development	6 (6.5)	5 (5.4)	8 (8.6)	39 (41.9)	35 (37.6)
The project increases my understanding of pharmacy practice	7 (7.5)	3 (3.2)	22 (23.7)	30 (32.3)	31 (33.3)

These findings indicate that students perceive graduation research as more than an academic requirement, but also as an opportunity to develop transferable and professionally relevant competencies. The strong recognition of research and critical-thinking skills is particularly important because pharmacy graduates are increasingly expected to critically evaluate scientific evidence and apply it to patient care. Similar findings were reported [7], who found that research courses improved pharmacy students' perceptions of research and increased their confidence in research-related skills. Bhagavathula et al. (2018) also reported that research involvement can enhance analytical, writing, communication, and professional competencies among pharmacy students [6].

The finding that 63.4% of students recognized improvement in applying theoretical knowledge to practice further supports the educational value of research projects as a form of experiential learning. Undergraduate research allows students to move beyond passive acquisition of theoretical information and engage in activities involving literature evaluation, data collection, analysis, interpretation, and communication of scientific findings. This may help bridge the gap between classroom-based learning and practical pharmacy education. Similar benefits of undergraduate research and experiential learning have been reported [8] by Rahim et al. (2024).

When the overall perception score was considered, 66 students (71.0%) demonstrated a high level of perception regarding the importance of the graduation research project, whereas 27 students (29.0%) demonstrated a low level of perception (Table 3; Figure 1).

Table 3: Distribution of Overall Perception Level among Pharmacy Students

Perception Level	no	%
Low perception	27	29.0
High perception	66	71.0
Total	93	100.0

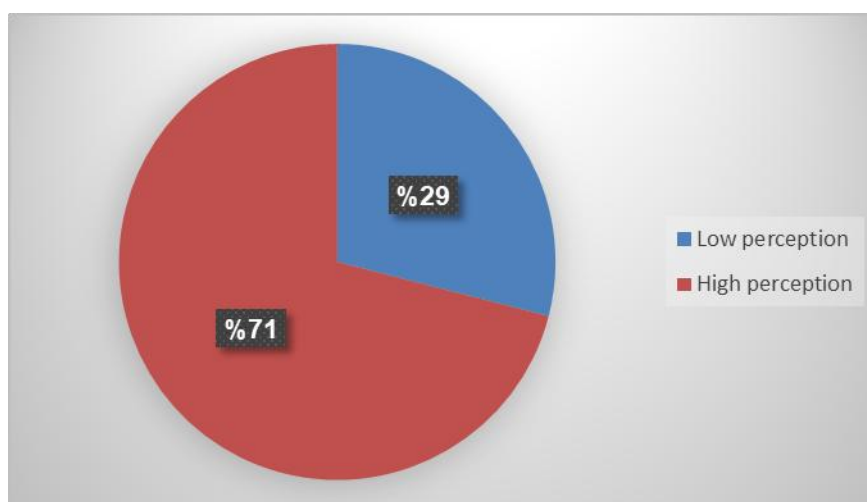


Figure 1: Distribution of Overall Perception Level among Pharmacy Students

The relatively high proportion of students with positive perceptions suggests that undergraduate research is generally valued within pharmacy education in southern Libya. This finding is encouraging because positive perceptions of research may increase students' willingness to engage in research activities and pursue postgraduate education or research-oriented careers.

Despite the generally positive perceptions, students reported several challenges during their graduation research projects. The most frequently identified challenge was lack of time (38.7%), followed by difficulty selecting a suitable research topic (30.1%) and limited availability of research resources or equipment (21.5%). In contrast, inadequate supervision (6.5%) and limited access to scientific literature (3.2%) were reported less frequently (Table 4).

Table 4: Challenges Faced by Students During the Graduation Research Project

Challenge	no	%
Lack of time	36	38.7
Difficulty in selecting a topic	28	30.1
Limited resources or equipment	20	21.5
Inadequate supervision	6	6.5
Limited access to scientific literature	3	3.2
Total	93	100.0

The prominence of time constraints may reflect the competing demands associated with completing research projects alongside regular academic coursework, examinations, clinical training, and other university responsibilities. Difficulty selecting an appropriate research topic may also indicate a need for earlier exposure to research methodology and greater guidance during the initial stages of project development. Although inadequate supervision was reported by a relatively small proportion of participants, effective academic supervision remains important for helping students formulate research questions, select appropriate methods, manage project timelines, and interpret findings. Similar barriers to undergraduate research have been reported in pharmacy education, emphasizing the importance of structured research training, appropriate supervision, and institutional support [1].

Students reported acquiring a broad range of skills through their graduation research projects. Research-related skills were the most frequently reported (30.1%), followed by scientific writing (17.2%), data analysis and statistics (12.9%), and communication and presentation skills (10.8%). Other reported benefits included literature searching (8.6%), confidence and personal development (6.5%), critical thinking (5.4%), time management (3.2%), and clinical or practical knowledge (3.2%). Only one student (1.1%) reported gaining no skills from the project (Table 5).

Table 5: Skills Gained from the Graduation Research Project

Skill Category	no	%
Research skills (conducting research, methodology, preparing research)	28	30.1
Scientific writing skills	16	17.2
Data analysis & statistical skills	12	12.9
Communication & presentation skills	10	10.8
Information searching & literature review skills	8	8.6
Critical thinking & problem identification	5	5.4
Confidence & personal development	6	6.5
Time management & organizational skills	3	3.2
Clinical/practical knowledge	3	3.2
No skills gained	1	1.1
Total	93	100.0

The range of skills reported by students demonstrates the multidisciplinary educational value of undergraduate research. Research projects require students to formulate questions, search and evaluate scientific literature, collect and analyze data, interpret findings, and communicate results. These activities can contribute to the development of evidence-based practice competencies that are highly relevant to contemporary pharmacy practice. The development of research-related skills, scientific writing, and statistical abilities is particularly valuable because pharmacists must be able to critically appraise scientific evidence and use reliable information to support clinical and professional decisions. Similar benefits of research participation among pharmacy students have been described [8].

Students also identified several areas for improving the graduation research experience. The most common recommendation was formal training in research methodology (19.4%), followed by improved laboratory facilities and research resources (17.2%) and better academic supervision (15.1%). Other recommendations included improved access to scientific resources and internet services (9.7%), clearer research timelines and better time management (8.6%), financial support (7.5%), improved research topic selection and additional practical research opportunities (7.5%), and further training in statistics and data analysis (6.5%). Only 4.3% of students reported having no specific suggestions for improvement (Table 6).

Table 6: Suggested Improvements for the Graduation Research Project

Suggested Improvement Category	no	%
Introducing research methods courses / training workshops	18	19.4
Improving supervision quality & increasing number of supervisors	14	15.1
Providing laboratory facilities, materials & equipment	16	17.2
Allocating financial support / research budgets	7	7.5
Setting clear timelines & better time management	8	8.6
Improving access to scientific resources & internet	9	9.7
Better topic selection & practical application	7	7.5
Strengthening research methodology & statistical training	6	6.5
Enhancing research culture & publication encouragement	4	4.3
No clear suggestion / Do not know	4	4.3
Total	93	100.0

These recommendations correspond closely with the challenges reported by students and suggest several opportunities for strengthening undergraduate research education. In particular, formal research methodology training could help students develop the knowledge required to formulate research questions, design studies, select appropriate data collection methods, and conduct research ethically. Similarly, additional training in statistics and data analysis could increase students' confidence in interpreting research findings. Improving laboratory facilities, access to scientific databases, internet services, and other research resources may also help reduce institutional barriers to successful project completion.

The recommendations concerning improved supervision further emphasize the importance of the supervisor–student relationship. Although most students reported faculty supervision, structured supervisory systems with clearly defined expectations, regular meetings, and monitoring of project progress could help students overcome difficulties related to topic selection, study design, time management, and data analysis. Providing students with clearer project timelines and milestones may also address the most frequently reported challenge, namely lack of time.

Chi-square analysis demonstrated that overall perception level was not significantly associated with age ($\chi^2 = 1.227$, $p = 0.542$), gender ($\chi^2 = 1.253$, $p = 0.263$), year of study ($\chi^2 = 1.063$, $p = 0.588$), graduation project status ($\chi^2 = 0.851$, $p = 0.654$), or supervisor type ($\chi^2 = 1.145$, $p = 0.564$) (Table 7). Although differences in the proportion of students with high perceptions were observed across some demographic and academic categories, none reached statistical significance.

Table 7: Association Between Perception Level and Demographic/Academic Variables

Variable	Category	Low n (%)	High n (%)	χ^2	p-value
Age Group	21–25 years	19 (27.9)	49 (72.1)	1.227	0.542
	26–29 years	8 (34.8)	15 (65.2)		
	≥30 years	0 (0.0)	2 (100.0)		
Gender	Male	11 (36.7)	19 (63.3)	1.253	0.263
	Female	16 (25.4)	47 (74.6)		
Year of Study	First year	0 (0.0)	1 (100.0)	1.063	0.588
	Fourth year	10 (25.0)	30 (75.0)		
	Fifth year	17 (32.7)	35 (67.3)		
Graduation Project Status	Completed	15 (33.3)	30 (66.7)	0.851	0.654
	Currently working	11 (25.6)	32 (74.4)		
	Not yet started	1 (20.0)	4 (80.0)		
Supervisor Type	Faculty member	18 (26.1)	51 (73.9)	1.145	0.564
	External professional	7 (36.8)	12 (63.2)		
	Other	2 (40.0)	3 (60.0)		

The absence of significant associations suggests that the positive perception of graduation research was relatively consistent across different student characteristics. This finding is broadly consistent with previous research indicating that pharmacy students generally value research experiences regardless of demographic characteristics [9]. However, the lack of statistically significant associations should be interpreted cautiously because the sample size was relatively small, which may have limited the statistical power to detect smaller differences between subgroups.

Taken together, the findings demonstrate that graduation research projects are highly valued by pharmacy students and are perceived to contribute substantially to academic, research, and professional development. The projects appear to provide students with important competencies in research methodology, scientific writing, data analysis, communication, critical thinking, and professional development. At the same time, the reported challenges—particularly limited time, difficulties in selecting research topics, and insufficient research resources—indicate areas where institutional improvements could enhance the student research experience.

The findings support the integration of structured research training throughout the pharmacy curriculum rather than limiting research education to the final-year graduation project. Early introduction to research methodology, scientific writing, literature searching, statistics, and evidence-based practice could better prepare students before they begin their graduation projects. Furthermore, strengthening academic supervision, improving access to research facilities and scientific resources, providing practical research opportunities, and establishing clear project timelines may further enhance the quality and educational value of undergraduate research.

Overall, graduation research projects represent a valuable component of pharmacy education in southern Libya. Their perceived contribution to students' research competencies, critical thinking, communication abilities, and professional development supports their continued inclusion in pharmacy curricula. Addressing the barriers identified by students could further strengthen the effectiveness of these projects and better prepare pharmacy graduates for evidence-based practice, postgraduate education, and future research activities.

Conclusion

This study demonstrates that pharmacy students in Southern Libya generally perceive the graduation research project as an important component of their academic and professional development. Students reported improvements in research skills, critical thinking, scientific writing, data analysis, communication, and the application of theoretical knowledge to practical problems. However, lack of time, difficulty in selecting research topics, limited resources, and the need for stronger research training and supervision were identified as major challenges. No significant association was found between students' perception levels and demographic or academic characteristics. Strengthening research training, supervision, and institutional resources may therefore enhance the educational value and effectiveness of graduation research projects among pharmacy students.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

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