PHARMACY STUDENTS' ENGAGEMENT AND EXPERIENCE IN RESEARCH DURING THEIR ACADEMIC CURRICULAR ACTIVITIES

BY

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CERTIFICATION

This is to certify that this project work was carried out by **Destiny Arogundade** with matriculation number **PHA1808342** in the Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, University of Benin, Benin-City, in partial fulfillment of the requirements for the award of Doctor of Pharmacy (Pharm.D) degree.

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DEDICATION

This project work is dedicated to God Almighty for His guidance, mercies, direction and provision throughout the course of this study and to my family for their unwavering love, support, and encouragement throughout my academic journey. Their belief in me has been my greatest motivation.

ACKNOWLEDGEMENT

I sincerely express my gratitude to God Almighty for His grace throughout my time in Pharmacy School.

To my project supervisor, Prof. Ehijie F. O. Enato, I deeply appreciate the opportunity to work under your guidance. Thank you for your invaluable assistance and constant corrections throughout this project.

I extend my heartfelt appreciation to the lecturers in the Faculty of Pharmacy who have, in one way or another, impacted me—particularly Professor Valentine U. Odili, Dr. Vincent Imieje and Dr. Osayemwenre Erharuyi.

Most importantly, I am grateful to my wonderful parents, Mr. and Mrs. Arogundade, and my amazing siblings, Favour Oseremi Arogundade and Praise Ozozoyin Arogundade, for their unwavering prayers, support, and belief in my academic pursuits.

Finally, I want to express my profound gratitude to my love, Osasunmwen Idemudia, for her unwavering love, support, and encouragement throughout this journey. Her belief in me has been a constant source of strength.

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ABSTRACT

Background: Research engagement during academic training helps develop essential attributes such as critical thinking, problem-solving, and evidence-based practice. These factors are fundamental for effective pharmaceutical care delivery.

Objectives: The aim of this study was to assess the engagement and experience of pharmacy students in the University of Benin, Benin City in research during their academic curricular activities.

Methods: The research was conducted among pharmacy students in the accredited faculty of pharmacy in the University of Benin. This study employed a cross-sectional descriptive design to investigate the extent of pharmacy students' engagement and experiences in research during their academic curricular activities. A stratified random sampling technique was employed to ensure that students from each academic level (100–600L) are proportionally represented. Data was collected using an online survey platform comprising institutional email lists, WhatsApp groups, and other social media platforms commonly used by students and was analyzed using Statistical Package for Social Sciences software version 26

Results: In total, 250 participants were enrolled, revealing a nearly even gender distribution (50.8% male, 49.2% female), with majority aged 18-21 years (48.8%). Regarding research engagement, the majority anticipated engaging in data analysis (22.8%), data collection (14%), and presentations (12.8%), with a smaller proportion planning comprehensive involvement across literature review, data collection, analysis, writing, and presentation (9.6%). Most participants viewed research as beneficial for their future careers. Approximately 43.6% rated it as very beneficial and 25.2% extremely beneficial. However, academic workload was expected to interfere with research participation, as 42.4% agreed and 9.2% strongly agreed. The findings revealed varying levels of participation in research activities.

Conclusion: The engagement and experience of pharmacy students at the University of Benin in research during their academic curricular activities were assessed in this study. The findings revealed varying levels of participation in research activities, with some students actively involved while others had limited exposure. Additionally, the perceived benefits of research were also highlighted, including enhanced academic performance and professional growth. However, several challenges, such as academic workload and time constraints, were identified as barriers to research engagement.

Keywords: Research engagement, Research experience, Perceived benefits, Academic training.

CHAPTER ONE

1. Introduction and Background of the study

Pharmacy education is evolving to address the growing complexities of modern healthcare, necessitating that student develop both clinical knowledge and robust research skills. Research engagement during academic training helps develop essential attributes such as critical thinking, problem-solving, and evidence-based practice. These factors are fundamental for effective pharmaceutical care delivery (McLaughlin *et al*., 2017). Furthermore, these competencies prepare students for professional practice and enable them to make informed decisions in dynamic healthcare environments. Moreover, students' competitiveness for postgraduate opportunities are enhanced when they participate in research activities (Mukhwana *et al*., 2016). Many students pursuing advanced education have acknowledged that their research experience significantly strengthened their applications and improved their attractiveness to graduate programs (Cooksey and McDonald, 2019).

Furthermore, engagement in research nurtures inquisitive and reflective practitioners who can contribute meaningfully to scholarly work, beyond academic credentials (Cropley *et al*., 2014). Such individuals bring value to academic institutions and professional organizations worldwide, aligning with the global emphasis on advancing pharmacy education and practice through research. However, despite these benefits, pharmacy students face substantial challenges that hinder their active involvement in research (Armour *et al*., 2007). Anecdotal reports suggest that limited institutional resources, inadequate mentorship, and demanding curricular activities which are often dominated by a focus on examinations, pose significant barriers to research engagement.

These challenges highlight the need to create supportive environments that enable students to balance academic responsibilities with research pursuits. This study is relevant because it addresses the need to evaluate pharmacy students' engagement and experiences in research, focusing on the perceived benefits, encountered challenges, and the overall impact of research activities on their academic and professional growth. Understanding these dynamics is critical for identifying strategies to enhance students' research experiences, improve curriculum design, and ultimately prepare pharmacy graduates to meet the demands of evidence-based healthcare practices.

1.1. Concept of Student Engagement

The Great Schools Partnership defines student engagement as the extent to which students exhibit attention, curiosity, interest, optimism, and passion during learning or instruction. This definition highlights the motivation students have to learn and advance in their education. The concept is based on the idea that learning is more effective when students are curious, engaged, or inspired, and less effective when they are bored, uninterested, or disengaged. Enhancing student engagement is a frequently stated goal among educators (Student Engagement, 2014).

Student engagement refers to a student's interest and enthusiasm for school, which significantly influences their academic performance and behavior. It is a multifaceted concept that encompasses both behavioral and psychological elements. According to Anderson, Christenson, Sinclair, and Lehr (as cited by Olson and Peterson, 2015), engagement includes positive behaviors such as attendance, attentiveness, and class participation, as well as a psychological connection to school, reflected in feelings of being cared for, respected, and part of the school community. This definition highlights the multidimensional nature of student engagement, which can vary as students progress through school. Additionally, engagement levels may differ across

subjects or contexts; for instance, a student might be highly engaged in reading but less so in math or science. These variations can occur both within an individual student and across different students (Olson and Peterson, 2015).

While often mistaken for motivation, which is considered a precursor and the driving force behind behaviour, engagement is distinctively defined as the energy and effort students invest in their learning community. This is evident through various behavioural, cognitive, or emotional indicators along a spectrum. According to Bond and Bedenlier (2019), engagement is influenced by a combination of structural and internal factors, including the dynamic relationships, activities, and environment within the learning context. As students become more engaged and empowered in their learning community, they are more likely to direct that energy back into their learning, resulting in both immediate and long-term benefits that, in turn, further enhance engagement.

Ralph Tyler's research on the connection between time spent on coursework and learning outcomes over 70 years ago is one of the earliest research projects that sparked the fascination in the concept of student engagement. Since then, the study of student engagement has grown significantly, influenced by foundational works examining how the quantity and quality of student effort impact learning, alongside more recent research on environmental factors and individual characteristics that foster engagement. Notably, the National Survey of Student Engagement (NSSE), which evaluates student involvement in various educational activities, is one of the most prominent tools for measuring student engagement. Studies utilizing the NSSE and similar instruments have consistently linked student engagement to positive outcomes such as improved grades, retention, persistence, and completion rates. These findings have reinforced the importance of student engagement in the teaching and learning process. Nevertheless, despite

the growing attention, the concept of student engagement remains widely misunderstood and lacks a universally accepted definition (Schindler *et al*., 2017).

The increasing focus on engagement in research, policy, and educational practice can be attributed to several compelling reasons. Firstly, engagement is recognized as a fundamental driver of academic achievement, as it has been associated with improved performance, higher test scores, and increased rates of school completion. Beyond academics, engagement serves a protective role, contributing to lower instances of behavioral issues, substance abuse, and mental health challenges such as depression. Secondly, engagement is a multidimensional concept that integrates observable actions, cognitive processes, and emotional connections, making it an appealing framework for understanding student behavior and learning. Thirdly, the concept resonates strongly with educators, many of whom identify disengagement as one of the most pressing challenges in their classrooms. Finally, the malleable nature of engagement enhances its appeal, as it responds positively to strategic changes in teaching methods and school practices. This adaptability positions engagement as a critical focus for intervention programs and a cornerstone of school improvement strategies, particularly in secondary education. For example, students are more likely to be engaged in environments where they experience meaningful relationships with teachers and peers, autonomy in their learning, high yet supportive expectations, and engaging, purposeful tasks. Additionally, institutional factors such as school size, disciplinary strategies, extracurricular opportunities, and a positive school culture significantly influence levels of student engagement, further underscoring its importance (Fredricks *et al*., 2016).

1.1.1. Dimensions of Student Engagement

Numerous models of student engagement, each rooted in varying definitions, conceptualize engagement as a multifaceted psychosocial process shaped by both individual and institutional characteristics. These models typically structure engagement into three domains namely:

- Factors influencing engagement (such as institutional culture, curriculum design, and teaching methods),
- Indicators of engagement (such as active interest in learning, interactions with instructors and peers, and meaningful information processing), and
- Outcomes of engagement (such as academic success, retention, and personal development).

Research has also explored the impact of technology on engagement. By employing a broad typology to classify and present findings, scholars have identified three primary forms of engagement: behavioral, emotional, and cognitive. This framework is particularly valuable for its comprehensive scope, capturing the diverse experiences of students without being limited to narrow or overly prescriptive definitions. Furthermore, it adopts a student-centered approach by focusing solely on student-specific indicators rather than blending these with external variables like faculty behavior, curricular activities design, or campus environment. While such variables undoubtedly influence engagement, they are not considered direct indicators of it. Using this typology as a foundation, recent studies and models of student engagement have been examined to better understand the conceptualization of behavioral, emotional, and cognitive engagement and to identify distinct indicators associated with each dimension. This approach provides deeper insights into the complexities of student engagement and its varied manifestations (Schindler *et al.*, 2017).

The widely recognized dimensions of student engagement which include cognitive, affective, and behavioral, offer a comprehensive framework for understanding how students interact with their learning environments (Bond and Bendelier, 2019). Cognitive engagement encompasses the use of deep learning strategies, self-regulation, and a focus on understanding. It reflects the degree of mental effort students invest in understanding and mastering content. Key indicators include motivation to learn, persistence in overcoming academic challenges, and deep information processing through critical thinking, self-regulation, and active knowledge construction (Fredricks *et al*., 2004; Lam *et al*., 2012). While cognitive engagement encompasses motivational aspects, much of the research focuses on students' use of active learning and higher-order thinking strategies. For instance, deep learning which involves integrating new knowledge with prior understanding, is contrasted with surface learning which relies on rote memorization and recall (Schindler *et al*., 2017).

Affective or emotional engagement pertains to students' positive emotional responses to their learning environment, peers, and teachers, including their sense of belonging and interest (Bond and Bendelier, 2019). In essence, it captures students' affective responses to their educational experiences. This dimension includes attitudes, interests, and values related to learning, as well as a sense of belonging within a learning community (Fredricks *et al*., 2004; Witkowski and Cornell, 2015). Affective/Emotional engagement is commonly assessed through self-report measures and provides valuable insight into students' feelings about topics, teaching methods, or instructors (Schindler *et al*., 2017).

Lastly, Behavioral engagement involves active participation, persistence, and constructive conduct within academic settings (Bond and Bendelier, 2019). It refers to the extent to which

students actively participate in learning activities. It is often measured through indicators such as the time and effort dedicated to academic tasks (Zepke, 2014) and interactions with peers, faculty, and staff. These observable actions align with foundational concepts of student engagement, such as earlier works that emphasize the quantity and quality of effort directed toward learning (Schindler *et al*., 2017).

In totality, the key components of student engagement include:

i. **Motivation**: Student motivation and engagement are closely connected, yet they represent distinct concepts. Motivation is primarily concerned with the initiation, direction, intensity, and persistence of behaviour, particularly those aimed at achieving specific goals. In contrast, engagement encompasses a broader range of positive student behaviours and includes the psychological experiences that contribute to learning and participation.
ii. **Connectedness**: A student's sense of connectedness within their school environment is an essential element of engagement. This connectedness reflects the degree to which students feel cared for and supported by both adults and peers in their school. The overall school climate plays a significant role in fostering this sense of belonging and can directly influence a student's level of engagement. By creating a positive and inclusive environment, schools can enhance students' connectedness and, in turn, their engagement.
iii. **Engagement as a continuum**: Engagement exists on a spectrum, ranging from disengaged to fully engaged. Evaluating where students fall on this continuum is critical, as disengagement is often linked to negative outcomes such as academic failure and dropout. While some students may still perform academically despite being disengaged, their feelings toward school and their behaviours often indicate underlying issues. Identifying and

addressing these signs of disengagement is key to reducing failure rates and preventing dropout.

iv. **Parent Engagement**: Parent involvement is another vital component of student engagement. It involves collaborative efforts between parents, families, and schools to support the development of children and adolescents. Increased parental involvement has been shown to boost both academic performance and positive behaviours in students, thereby enhancing their overall engagement. By fostering strong partnerships with families, schools can create a supportive network that promotes student success (Olson and Peterson, 2015).

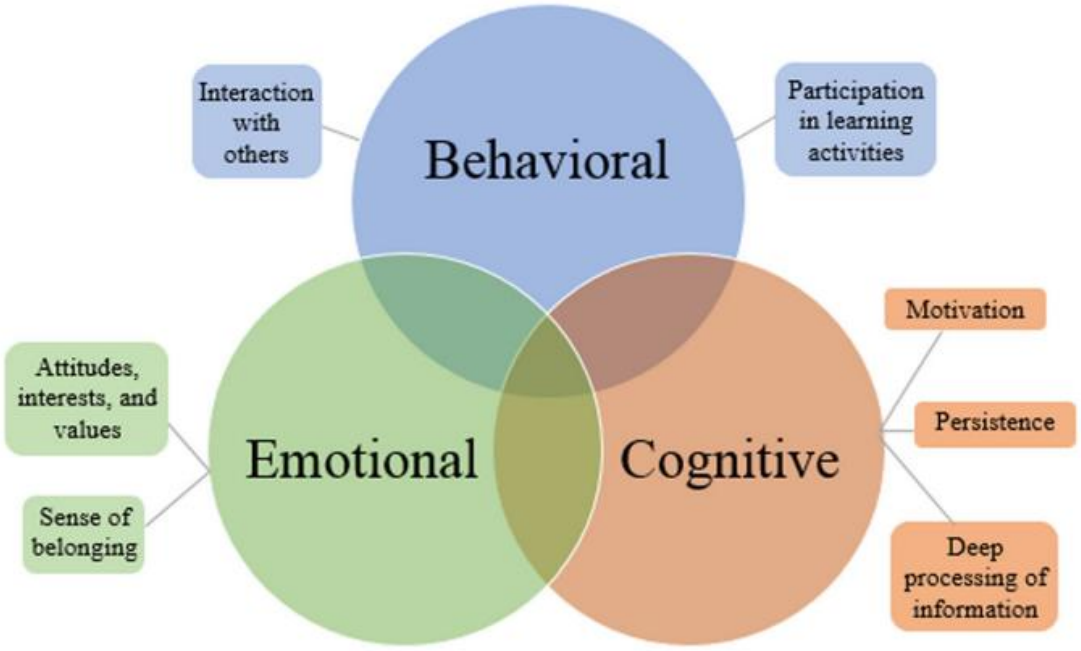

Figure 1: Dimensions of Student Engagement (Schindler *et al*., 2017).

Each of the dimensions of engagement consists of various indicators, experienced along a continuum that fluctuates depending on their level of activation (low or high) and valence (positive or negative). These indicators, understood as manifestations of student engagement, can be observed and measured through the dimensional (cognitive, emotional, or behavioral) actions

or reactions. Although some literature refers to these as "facets" of engagement, the term "indicators" aligns with its usage in foundational studies, emphasizing their role in signaling the presence of engagement. It is also essential to acknowledge disengagement when discussing engagement, not as a separate concept but as a counterpart on the continuum of engagement. Disengagement may manifest as active withdrawal from a learning context or even as a character trait. This duality highlights the dynamic nature of student engagement and its nuanced expressions in academic environments (Bond and Bendelier, 2019).

1.1.2. Foci of Student Engagement

Student engagement can be categorized into three primary areas of focus, each representing a distinct dimension. These dimensions, illustrated by Trowler (2010) using a three-dimensional graph, provide a framework for understanding the varied emphases within the literature on student engagement. Each axis of the graph represents a unique aspect of engagement, with individual studies positioned at different points based on their specific focus. This visualization method is particularly useful for interpreting the diversity of perspectives in the field.

Axis 1: Individual Student Learning

The first axis highlights the individual student learning dimension. It spans a continuum reflecting the degree to which a particular study addresses student engagement from the perspective of personal learning experiences. The majority of literature in this area is dedicated to exploring this focus. At one end of the continuum (point 0), studies may exhibit no discernible concern with individual learning. As one moves along the axis, various aspects of student learning become central, including attention and focus during learning activities, levels of interest and enthusiasm in academic content, involvement and active participation in the learning

process, and the degree to which learning is student-centered, encompassing student roles in the design, delivery, and evaluation of their educational experiences.

Axis 2: Structure and Process

The second axis shifts attention to structural and procedural aspects of student engagement. This dimension examines how students interact with and influence governance, representation, and feedback mechanisms within educational institutions. A position at the starting point (0) indicates no explicit focus on structural or procedural concerns. Progressing along this axis reveals increasing attention to consultation practices, such as token inclusion of students in panels without substantial input; observer roles where students are present but do not actively contribute; representation through student delegates who participate in decision-making processes; full membership roles where students are trusted contributors to institutional committees; and comprehensive and integrated student representation across various levels, including courses, departments, faculties, and student unions, ensuring a cohesive approach rather than ad hoc arrangements.

Axis 3: Identity

The third axis explores the identity-related aspects of student engagement. This dimension spans from fostering a sense of belonging for individual students to addressing the inclusion of specific groups, particularly those considered marginalized. Along this axis, the focus shifts through key points such as cultivating individual student belonging within the academic community, exploring the identity students derive from their roles in representation, whether linked to a module, course, institution, or the broader student role and finally engaging with underrepresented groups, including non-traditional students, to ensure their voices are heard and their needs addressed (Trowler, 2010).

1.1.3. Relevance of Student Engagement

The engagement versus disengagement framework offers valuable insights for educators seeking strategies to mitigate the risk of school failure. This perspective is particularly beneficial for several reasons. Firstly, engagement behaviors are readily recognized by practitioners as critical components of effective learning. Empirical research consistently confirms the strong correlation between these behaviors and academic success, making them a practical focus for educational interventions. Second, engagement behaviors exhibit similar patterns throughout different stages of schooling. This continuity allows educators to view dropping out as the culmination of a gradual process of disengagement that often begins in the elementary or middle school years. By identifying at-risk students early, educators can intervene before disengagement becomes irreversible (Finn and Zimmer, 2012).

Thirdly, persistence which is an essential form of engagement, is itself a significant educational outcome. Whether it involves persevering through a challenging class assignment, earning a high school diploma, or completing higher education, persistence reflects a student's ability to remain engaged despite obstacles. Finally, engagement behaviors are malleable and can be influenced by the practices of teachers and schools. This responsiveness provides opportunities to enhance both academic achievement and long-term educational attainment for students who encounter difficulties along their learning journey (Finn and Zimmer, 2012).

1.2. Student Research Engagement

Doctoral programs including the Doctor of Pharmacy (PharmD) program, occupy a central position in higher education, viewed primarily through the lenses of education and research. Depending on the historical evolution and dominant characteristics of various academic communities across Europe and even in Africa, one perspective may take precedence over the

other. In some contexts, doctoral programs are integrated into the educational pathway, emphasizing the role of talented students in pushing the boundaries of knowledge through the creation of innovative and original ideas. During this process, students are expected to enhance their analytical and critical thinking abilities, communicate effectively with diverse audiences, and contribute to technological, social, and cultural advancements in a knowledge-driven society. These programs aim to cultivate advanced skills and competencies in a formal educational setting, where students engage in generating new knowledge. Furthermore, in certain European countries, it is recognized that the principles, policies, and tools applied to previous levels of higher education should also extend to doctoral programs, while respecting the research-centric nature of these degrees (Foroni, 2015).

In other contexts, doctoral training leans more heavily toward research. Graduates are trained to independently produce and expand new knowledge, whether within academia or in non-academic environments. They are typically immersed in dynamic research settings and involved in large-scale, internationally oriented research projects. The role of supervisors is increasingly acknowledged as vital to the successful completion of doctoral programs and research projects. Supervisors play a crucial role in helping candidates acquire a broad spectrum of competencies and shape their research careers. To fulfill these responsibilities, supervisors must receive adequate training and institutional support. A growing trend is the shift from traditional one-on-one supervision to team-based approaches, where candidates collaborate with supervisory teams from diverse research disciplines. The rising emphasis on internationalization, interdisciplinarity, and partnerships with non-academic sectors has led to the establishment of Doctoral Schools and, more broadly, structured doctoral programs. These structured programs bring clearer governance and institutional policies regarding admissions, quality assurance, evaluation, and supervision.

Often as part of this strategy, institutions integrate training activities that span disciplinary and transferable skills. Structured doctoral programs typically include predefined training sessions, coursework, teaching experiences for earlier-cycle students, or internships in industry. Such an approach fosters a more comprehensive and systematic framework for doctoral education and research (Foroni, 2015).

An often-overlooked factor in doctoral student success is their level of engagement in academic research. While much of the existing literature on student engagement has primarily focused on undergraduate students, findings strongly suggest that engagement in academic and educational activities is equally relevant to doctoral student achievement. For instance, Hughes and Pace (2003) investigated college students and found that lower engagement in such activities was linked to early withdrawal or failure to complete their studies. Similarly, another more recent study demonstrated that student engagement significantly influenced persistence and academic performance among college students (Bagaka's *et al*., 2015).

In the context of doctoral education, Lambie *et al*. (2014) highlighted that higher engagement in research activities, such as manuscript publication, correlates with increased research self-efficacy. This self-efficacy, in turn, enhances research knowledge and productivity. Since the primary objective of Ph.D. programs is to prepare scholars in their respective fields, active participation in research activities is crucial for developing scholarly competence (Bagaka's *et al*., 2015). This perspective is also pertinent to the Doctor of Pharmacy (PharmD) program, where research engagement plays a critical role in fostering advanced expertise and professional growth.

1.2.1. Benefits of Student Engagement in Research

1. **Development of Interpersonal and Communication Skills and Confidence:** Participating in research activities and conferences significantly enhances students' interpersonal and communication skills. By engaging in discipline-specific tasks such as writing abstracts and presenting findings, students develop broader competencies essential for effective collaboration and communication. These events also foster personal growth in areas like confidence and self-esteem. Students gain the ability to articulate their ideas, network with peers, and learn from diverse perspectives, building pride in their academic achievements and their capacity to contribute to scholarly discussions (Hall, 2015; Hill *et al*., 2013; Little, 2020).
2. **The Conference as a Borderland Space to Develop Self-Authorship:** Undergraduate research conferences serve as transformative spaces where students develop self-authorship. This involves understanding oneself, reflecting critically on personal knowledge, and forming independent judgments. By engaging in interdisciplinary dialogues, students refine their disciplinary knowledge while gaining insights into other fields. These experiences promote a deeper appreciation of cross-disciplinary connections, fostering a sense of self-authorship. Conferences provide a neutral ground free from hierarchical constraints, encouraging students to explore ideas and expand their academic identities (Walkington *et al*., 2017; Hill and Walkington, 2016; Little, 2020).
3. **Bidirectional Dialogue Between Participants and With Research:** Research conferences encourage a dynamic, two-way dialogue among participants, fostering a culture of mutual respect, critical questioning, and intellectual growth. Students challenge each other’s viewpoints in supportive environments, which stimulates advanced thinking

and innovation. These interactions provide a unique platform for non-traditional learning, extending knowledge exchange beyond institutional boundaries. By actively engaging in these discussions, students gain a more sophisticated understanding of research and its implications (Walkington *et al*., 2017; Hill and Walkington, 2016; Little, 2020).

4. **Increased Understanding and Appreciation of the Research Process:** Engagement in research conferences offers students a nuanced perspective on the research process. These events create a supportive, risk-free environment where students can explore the complexities of conducting and presenting research. By participating in these activities, students gain firsthand experience of what research entails and develop a sense of belonging to the academic community. This shift from seeing research as a classroom exercise to understanding its real-world impact encourages students to view themselves as active contributors to knowledge creation. Students often leave these experiences feeling legitimized as researchers, recognizing their potential to influence academia and broader societal issues (Little, 2020).
5. **A Pathway to Shaping Future Knowledge:** Through their involvement in undergraduate research, students transition from being passive recipients of knowledge to becoming active participants in its creation. Conferences inspire them to view research as an evolving and impactful endeavour, empowering them to see themselves as agents of change. This realization allows students to envision their role in shaping future academic and societal advancements, moving beyond traditional classroom confines into a broader intellectual landscape (Hill *et al*., 2013; Hall and Walkington, 2016).

1.2.2. Barriers and Challenges to Students' Involvement in Research

A rapid unsystematic review of primary studies revealed several barriers and challenges that healthcare undergraduates face in engaging in research. The key barriers identified across different studies can be categorized into three main areas: knowledge and skill deficits, insufficient faculty support and resources, and structural challenges related to time and research facilities (Adebisi, 2022).

1. **Lack of Knowledge and Skills**: Many students reported a significant lack of knowledge and skills required to engage in research effectively. A common theme across various studies was students' lack of familiarity with research methodology, statistical analysis, and research processes. For instance, Kiyimba *et al*. (2022) highlighted that students struggled with research design and manuscript writing, while Mugabo *et al*. (2021) found that many students felt unqualified to conduct research due to inadequate knowledge of research processes. Similarly, Assar *et al*. (2022) reported that insufficient research skills were a major barrier across six Arab countries.

2. **Inadequate Faculty Support, Mentorship, and Funding**: Lack of mentoring and guidance was frequently mentioned as a major obstacle to research participation. Studies from Uganda (Kiyimba *et al*., 2022) and Rwanda (Mugabo *et al*., 2021) emphasized the importance of mentorship, with students expressing frustration over the lack of available mentors. In addition, many studies identified a lack of funding as a significant barrier. For example, Assar *et al*. (2022) noted that lack of funds, poor collaboration, and insufficient faculty input were key challenges in research practice. Similarly, Awofeso *et al*. (2020) highlighted the absence of proper mentoring and the lack of professional supervisors as significant hindrances to students' engagement in research.

3. **Structural Barriers**: Several structural barriers, such as limited time due to academic workload, lack of access to research facilities, and insufficient infrastructure, were identified across different studies. For instance, Assar *et al*. (2022) reported that lack of time due to educational tasks and lack of access to lab equipment were major barriers. Kiyimba *et al*. (2022) also noted the lack of collaboration opportunities and the difficulties in managing the research process due to time constraints. In addition, Kanmounye *et al*. (2020) highlighted the challenges posed by obsolete patient information management systems, which hindered research progress.

4. **Lack of Motivation and Engagement**: Some studies pointed out that healthcare students were generally not motivated to participate in research due to a lack of rewards or recognition. Kyaw Soe *et al*. (2018) found that lack of motivation, coupled with insufficient time and knowledge, contributed to the low levels of research involvement among students. Similarly, Memarpour *et al*. (2015) reported that students were often more focused on academic instruction than engaging in research due to competing priorities.

1.3. Theoretical Framework

1.3.1. Kolb's Experiential Learning Theory

Kolb's Experiential Learning Theory (ELT) builds on philosophical, psychological, and humanist principles, emphasizing learning as a dynamic, reflective, and experience-driven process. It operates on six core assumptions: learning is a process, arises from experience, is dialectic, holistic, interactive with the environment, and results in knowledge creation. Kolb outlines a

four-stage learning cycle including Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE), which learners progress through iteratively, using reflection to transform experiences into actionable knowledge. Learners differ in their use of these stages, categorized into four learning styles: Divergers (creative and reflective), Assimilators (theoretical and reflective), Convergers (practical and experimental), and Accommodators (adaptable and action-oriented) (Akella, 2010).

1.3.2. Implications of Kolb's Experiential Learning Theory to Pharmacy Students' Engagement in Research

Kolb's framework aligns closely with the research engagement and learning experiences of pharmacy students. Research activities inherently involve **concrete experiences** (e.g., conducting experiments), followed by **reflective observation** as students critically evaluate methods, outcomes, and challenges. These reflections feed into **abstract conceptualization**, where students connect their experiences to existing theories and frameworks, leading to **active experimentation**, such as testing new hypotheses or methodologies.

Pharmacy students' progression through Kolb's learning cycle mirrors the iterative nature of research, requiring continuous planning, acting, observing, and reflecting. The theory's emphasis on adaptability and engagement through reflection supports the idea that research not only builds technical competencies but also fosters critical thinking, problem-solving, and innovation—key outcomes of engagement in academic research. Recognizing individual learning styles within the ELT framework can help educators tailor research mentorship and opportunities to maximize student engagement and success.

1.4. Statement of problem

Many pharmacy students experience limited engagement in research activities during their academic training despite the growing recognition of research as a fundamental component of pharmacy education (Awaisu and Alsalimy, 2015). This lack of involvement can stem from various challenges, including resource constraints, a lack of adequate mentorship, and the overwhelming focus on passing exams within an already demanding curriculum. Such barriers hinder the development of critical research skills and the ability to apply evidence-based practices, which are crucial in modern healthcare settings. Additionally, students often fail to appreciate the long-term benefits of research, such as enhanced problem-solving abilities, improved competitiveness for postgraduate opportunities, and preparation for contributing to scholarly advancements (Linn *et al*., 2015). As a result, many pharmacy graduates may feel unprepared to navigate the complexities of evidence-based pharmaceutical practice. This study seeks to investigate the extent of pharmacy students' engagement in research, their experiences, and the associated challenges to provide insights for improving pharmacy education.

1.5. Justification of study

Pharmacy education must equip students with both clinical knowledge and research skills to successfully navigate the increasing complexities of healthcare (McLaughlin *et al*., 2017). Engaging in research enhances critical thinking, problem-solving, and evidence-based practice, all of which are essential for effective pharmaceutical practice. Participation in research during academic training also improves students' competitiveness for postgraduate opportunities, as many students pursuing further education have acknowledged that their research experience made them more attractive candidates (Cooksey and McDonald, 2019).

Furthermore, involvement in research nurtures inquisitive practitioners who can contribute to scholarly work, a quality highly valued by educational institutions and professional organizations worldwide. However, challenges such as limited resources and a demanding curriculum—where students are primarily focused on passing exams—can restrict their participation in research base on anecdotal reports. This study is therefore justified by the need to examine pharmacy students' engagement and experiences in research, exploring the benefits, challenges, and overall impact on their academic growth and future professional development.

1.6. Objectives of the study

The major aim of this study was to assess the engagement and experience of pharmacy students in the University of Benin, Benin City in research during their academic curricular activities.

Specific objectives include:

i. To assess the extent of pharmacy students' participation in research activities during their academic curriculum.
ii. To evaluate the perceived benefits of research experience on students' academic and professional development.
iii. To identify the challenges and barriers faced by pharmacy students in engaging in research during their studies.

CHAPTER TWO

2. Methodology

2.1. Study Design

This study employed a cross-sectional descriptive design to investigate the extent of pharmacy students' engagement and experiences in research during their academic curricular activities. The design was appropriate for assessing the prevalence of participation, perceived benefits, and challenges within the target population at a specific point in time. The data collected provided valuable insights into students' research activities and their implications for academic and professional development.

2.2. Study Area

The research was conducted among pharmacy students in the accredited faculty of pharmacy in the University of Benin, located in Benin City, Edo State, Nigeria. This institution was selected due to its prominence in pharmacy education and the availability of structured pharmacy curricula that include research components.

2.3. Study Population

The study population consisted of undergraduate pharmacy students from the 100 to 600 levels enrolled in the faculty of pharmacy, University of Benin, Benin City, Edo State, Nigeria.

Inclusion Criteria

- Undergraduate students currently enrolled in the Faculty of Pharmacy.
- Students from all academic levels, including 100 to 600 levels.
- Individuals who have provided informed consent to participate in the study.

- Students willing to complete the study questionnaire or participate in the research process.

Exclusion Criteria

- Students not officially enrolled in the Faculty of Pharmacy during the study period.
- Those who decline to provide informed consent for participation.
- Students who fail to meet age or academic criteria as outlined in the study protocol.
- Individuals unable to complete the questionnaire or required research activities due to personal or logistical reasons.

2.4. Sample Size and Sampling Technique

A representative sample of pharmacy students was determined using the Cochrane formula for estimating proportions in a known population. A stratified random sampling technique was employed to ensure that students from each academic level (100–600L) are proportionally represented. This method provided balanced insights into the research experiences of students at different stages of their academic journey.

$$\textbf{Sample size(n)} = \frac{z^2 \times p(1-p) \div e^2}{1 + \frac{\{z^2 \times P\,(1-P)\}}{e^2 N}}$$

z: Z-score corresponding to the desired confidence level. For a 95% confidence level, z =1.96.

p: Estimated proportion of the population with the characteristic of interest (commonly 0.5 if unknown for maximum variability).

e: Margin of error (e.g., 0.05 for ±5% precision).

N: Population size, which is 1225 (Total number of students in the faculty of pharmacy for the 2023/2024 session)

N (sample size) = 229 students

2.5. Data Collection Instrument

The primary data collection tool was a structured questionnaire designed to capture relevant information on research engagement, perceived benefits, and challenges. The questionnaire was divided into four sections: demographic characteristics, extent of research engagement, perceived benefits of research experience, and challenges/barriers to participation. The instrument was validated through expert review and pre-tested on a small sample of pharmacy students from similar institutions to ensure its reliability and clarity.

2.6. Data Collection Procedure

Data collection was conducted using an online survey platform to facilitate easy access and wider reach among participants. The questionnaire was distributed through institutional email lists, WhatsApp groups, and other social media platforms commonly used by students. The online format ensured flexibility and convenience, encouraging higher response rates.

2.7. Data Analysis

Data was analyzed using Statistical Package for Social Sciences software version 26. Descriptive statistics, including frequencies and percentages, was used to summarize demographic characteristics and the extent of research participation. Inferential statistics, such as chi-square tests or logistic regression, was used to explore associations between variables, including academic level, perceived benefits, and barriers to research engagement.

2.8. Ethical Considerations

Informed consent was sought from all participants, with assurances of confidentiality and anonymity throughout the study. Participation was voluntary, and respondents had the option to withdraw at any point without any repercussions.

CHAPTER THREE

3. Results

3.1. Socio-Demographic Characteristics

Table 1 shows the socio-demographic characteristics and responses of the 250 participants, revealing a nearly even gender distribution (50.8% male, 49.2% female) and a majority aged 18-21 years (48.8%), followed by 22-25 years (38%), with smaller proportions aged 26-30 years (10.8%) and above 30 years (2.4%). Most respondents were in their 2nd Year (24%) and 1st Year (23.6%), with the least representation in 3rd Year (5.2%), while 16.8% each were in their 5th and 6th Years, and 13.6% in 4th Year. Notably, 78% expressed willingness to participate in research projects, and 71.6% planned to take a research methodology course, highlighting a strong interest in academic research engagement.

Table 1: Socio-demographic characteristics of respondents

S/N	Variable		Frequency	Percent
1	Gender	Male	127	50.8
		Female	123	49.2
2	Age	18-21 years	122	48.8
		22-25 years	95	38
		26-30 years	27	10.8
		Above 30years	6	2.4
3	Year of Study	1st Year	59	23.6
		2nd Year	60	24
		3rd Year	13	5.2
		4th Year	34	13.6
		5th Year	42	16.8
		6th Year	42	16.8
4	Will you participate in a research project during your academic program?	Yes	195	78
		No	55	22
5	Will you take a research methodology course during your program?	Yes	179	71.6
		No	71	28.4
		Total	250	100

3.2. Research Engagement

Table 2 highlights the research engagement of respondents, revealing that most participants rated their future research participation experience as either good (42.8%) or neutral (36.4%), with fewer rating it excellent (11.6%), poor (4.4%), or very poor (4.8%). Regarding expected research activities, the majority anticipated engaging in data analysis (22.8%), data collection (14%), and presentations (12.8%), with a smaller proportion planning comprehensive involvement across literature review, data collection, analysis, writing, and presentation (9.6%). Faculty support expectations showed that 54% agreed or strongly agreed they would receive adequate support, while 34.8% were neutral. Satisfaction with supervision was high, with 50% expected to be satisfied and 9.6% very satisfied, though 35.2% remained neutral. Additionally, 68% expected to receive funding or resources for research activities, highlighting a generally positive outlook on research engagement.

Table 2: Research engagement of respondents

S/N	Variable	Response	Frequency	Percent
1	How would you rate your overall experience with research participation in the future?	Very Poor	12	4.8
		Poor	11	4.4
		Neutral	91	36.4
		Good	107	42.8
		Excellent	29	11.6
		Total	250	100
2	Which research activities do you expect to engage in?	Literature Review	16	6.4
		Literature Review; Data collection; Data Analysis	5	2
		Literature Review; Data Collection; Data Analysis; Writing Papers	2	0.8
		Literature Review; Data Collection; Data Analysis; Writing Papers; Presentation	24	9.6
		Literature Review; Data Collection; Writing Papers; Presentation	1	0.4
		Literature Review; Data Collection; Presentation	1	0.4
		Literature Review; Data Analysis	2	0.8
		Literature Review; Data Analysis; Writing Papers	1	0.4
		Literature Review; Data Analysis; Writing Papers; Presentation	4	1.6
		Literature Review; Data Analysis; Presentation	1	0.4
		Literature Review; Writing Papers; Presentation	1	0.4
		Literature Review; Presentation	1	0.4
		Data Collection	35	14

		Data Collection; Data Analysis	15	6
		Data Collection; Data Analysis; Writing Papers	2	0.8
		Data Collection; Data Analysis; Writing Papers; Presentation	4	1.6
		Data Collection; Data Analysis; Presentation	8	3.2
		Data Collection; Writing Papers	2	0.8
		Data Collection; Presentation	7	2.8
		Data Analysis	57	22.8
		Writing Paper	24	9.6
		Writing Papers; Presentation	5	2
		Presentation	32	12.8
3	Do you expect to receive adequate faculty support for your research?	Strongly Disagree	2	0.8
		Disagree	26	10.4
		Neutral	87	34.8
		Agree	91	36.4
		Strongly Agree	44	17.6
4	How satisfied will you be with the supervision provided for your research?	Very Dissatisfied	5	2
		Dissatisfied	8	3.2
		Neutral	88	35.2
		Satisfied	125	50
		Very Satisfied	24	9.6
5	Will you receive funding or resources for your research activities?	Yes	170	68
		No	80	32
		Total	250	100

3.3. Perceived Benefits of Research Experience

Table 3 demonstrates respondents' perceived benefits of research experience, revealing that the majority believed research would improve their critical thinking skills, with 42.8% agreeing and 41.2% strongly agreeing. Most participants also viewed research as beneficial for their future careers, with 43.6% rating it very beneficial and 25.2% extremely beneficial. Regarding postgraduate studies, 43.6% agreed and 25.2% strongly agreed that research would increase their interest, while 22% remained neutral. Additionally, 50.4% agreed and 20.8% strongly agreed that research would better prepare them for professional challenges. Notably, 82.8% recommended integrating more research into the curricular activities, underscoring the recognized value of research in academic and professional development.

Table 3: Respondents' perceived benefits of research experience

S/N	Variable	Response	Frequency	Percent
1	Do you believe research will improve your critical thinking skills?	Strongly Disagree	7	2.8
		Disagree	4	1.6
		Neutral	29	11.6
		Agree	107	42.8
		Strongly Agree	103	41.2
2	How beneficial will research be for your future career?	Not Beneficial	4	1.6
		Slightly Beneficial	18	7.2
		Moderately Beneficial	56	22.4
		Very Beneficial	109	43.6
		Extremely Beneficial	63	25.2
3	Will research increase your interest in postgraduate studies?	Strongly Disagree	6	2.4
		Disagree	17	6.8
		Neutral	55	22
		Agree	109	43.6
		Strongly Agree	63	25.2
4	Do you expect to feel more prepared for professional challenges because of research?	Strongly Disagree	14	5.6
		Disagree	16	6.4
		Neutral	42	16.8
		Agree	126	50.4

5	Would you recommend integrating more research into the curriculum?	Strongly Agree	52	20.8
		Yes	207	82.8
		No	43	17.2
		Total	250	100

3.4. Challenges and Barriers

Table 4 outlines the challenges and barriers associated with research engagement among respondents. The most commonly anticipated challenge was balancing research with academics (17.2%), followed by inadequate resources (12.8%) and a combination of factors, including limited opportunities (12.8%). Regarding future research opportunities, nearly half of the respondents (49.2%) rated their availability as neutral, while 31.2% rated them as good and only 4.4% as excellent. Academic workload was expected to interfere with research participation, as 42.4% agreed and 9.2% strongly agreed. Access to research materials and equipment was a concern, with a nearly even split between those who expected sufficient access (51.2%) and those who did not (48.8%). Lastly, 78.4% believed the curricular activities should be adjusted to accommodate more research, highlighting the need for structural changes to enhance research participation.

Table 4: Challenges and barriers associated with research engagement

S/N	Variable	Response	Frequency	Percent
1	What challenges do you anticipate facing during research?	Lack of Time	20	8
		Lack of Time; Lack of Support	2	0.8
		Lack of Time; Lack of Support; Inadequate Resources	1	0.4
		Lack of Time; Lack of Support; Inadequate Resources; Balancing with academics	17	6.8
		Lack of Time; Lack of Support; Inadequate Resources; Balancing with Academics; Limited Opportunities	32	12.8
		Lack of Time; Lack of Support; Inadequate Resources; Limited Opportunities	6	2.4
		Lack of Time; Inadequate Resources	1	0.4
		Lack of Time; Inadequate Resources; Balancing with Academics	13	5.2
		Lack of Time; Inadequate Resources; Balancing with Academics; Limited Opportunities	5	2
		Lack of Time; Inadequate Resources; Limited Opportunities	1	0.4
		Lack of Time; Balancing with Academics	10	4
		Lack of Time; Balancing with Academics; Limited Opportunities	1	0.4
		Lack of Time; Limited Opportunities	1	0.4
		Lack of Support	12	4.8

		Lack of Support; Inadequate Resources	5	2
		Lack of Support; Inadequate Resources; Balancing with Academics	1	0.4
		Lack of Support; Balancing with Academics	1	0.4
		Inadequate Resources	32	12.8
		Inadequate Resources; Balancing with Academics	14	5.6
		Inadequate Resources; Balancing with Academics; Limited Opportunities	8	3.2
		Inadequate Resources; Limited Opportunities	6	2.4
		Balancing with Academics	43	17.2
		Balancing with Academics; Limited Opportunities	5	2
		Limited Opportunities	13	5.2
2	How would you rate the availability of research opportunities in the future?	Very Poor	6	2.4
		Poor	32	12.8
		Neutral	123	49.2
		Good	78	31.2
		Excellent	11	4.4
3	Do you expect the academic workload to interfere with your research participation?	Strongly Disagree	4	1.6
		Disagree	28	11.2
		Neutral	89	35.6
		Agree	106	42.4
		Strongly Agree	23	9.2
4	Will there be sufficient access to research materials and equipment?	Yes	128	51.2
		No	122	48.8
5	Do you think the	Yes	196	78.4

curriculum should be adjusted to accommodate more research?			
	No	54	21.6
	Total	250	100

3.5. Overall Satisfaction

Table 5 summarizes the overall satisfaction of respondents regarding research engagement. Most respondents expressed satisfaction with research opportunities in their program, with 43.2% satisfied and 11.2% very satisfied. A majority (68.4%) expected their research experience to meet expectations, and 75.2% stated they would participate in research again if given the opportunity. Additionally, 48% agreed and 22.4% strongly agreed that research would better prepare them for job opportunities. Notably, 84.8% would recommend the program to future students based on its research involvement, indicating a positive perception of research engagement overall.

Table 5: Overall satisfaction of respondents on research engagement

S/N	Variable	Response	Frequency	Percent
1	How satisfied will you be with the overall research opportunities in your program?	Very Dissatisfied	2	0.8
		Dissatisfied	26	10.4
		Neutral	86	34.4
		Satisfied	108	43.2
		Very Satisfied	28	11.2
2	Do you expect the research experience to meet your expectations?	Yes	171	68.4
		No	79	31.6
3	Would you participate in research if given another opportunity?	Yes	188	75.2
		No	62	24.8
4	Do you think research will better prepare you for job opportunities?	Strongly Disagree	4	1.6
		Disagree	9	3.6
		Neutral	61	24.4
		Agree	120	48
		Strongly Agree	56	22.4
5	Will you recommend this program to future students based on research involvement?	Yes	212	84.8
		No	38	15.2
		Total	250	100

CHAPTER FOUR

4. Discussion

4.1. Socio-Demographic Characteristics

The socio-demographic data of the 250 respondents provides a foundational understanding of the study population, revealing a balanced gender distribution and diverse age and academic-year representation. The near-equal gender split ensures inclusivity, mitigating potential gender biases in interpreting engagement and experiences with research.

A significant portion of participants fell within the 18-21 years age group, reflecting a youthful cohort commonly found in the early years of academic programs. This trend aligns with the majority of respondents being 1st- and 2nd-year students. The representation of senior students, such as those in their 5th and 6th years , provides insight into the longitudinal evolution of research interest and participation throughout the academic journey. However, the relatively low participation from 3rd-year students warrants further investigation, as this group might face unique academic or personal challenges influencing their engagement.

The willingness of majority respondents to participate in research projects and the intention of more than two third respondents to take a research methodology course underscore the high level of interest in research activities. These findings highlight a fertile ground for fostering research culture within the academic curricular activities. Institutions could leverage this enthusiasm by providing structured opportunities for students to actively participate in research, particularly in their early years, to sustain and nurture this interest.

The distribution of socio-demographic variables provides a nuanced backdrop for interpreting the findings. Younger respondents and those in earlier academic years may perceive research as an exploratory journey, while senior students might approach it with a focus on career or

postgraduate aspirations. These perspectives could justify observed trends in engagement and expectations.

4.2. Research Engagement

The respondents' engagement with research paints a picture of optimism tempered by practical expectations. A substantial proportion rated their anticipated experience with research as “good,” while a minority remained neutral. The combined (a little less than one-tenth) who rated their expectations as “poor” or “very poor” highlights a minority with reservations. This aligns extensively with the findings from the study by Kaul *et al*. (2016) who found that majority of students believe undergraduate research is a very difficult and tedious process and activity. These could be due to the fact that some students have varying perceived barriers or prior negative experiences that influences this response and perceptions. Addressing these concerns through mentorship and accessible resources could positively shift perceptions.

The findings on engagement might relate to the awareness of these students about the components of the research process. Though not a major focus of their study, Kiyimba *et al*. (2022) found that a significant proportion of respondents were aware of the concept of medical research, and majority knew a colleague who had participated in research. Despite this awareness, only a minority had personally participated in research outside academic requirements, with many of these participants engaged as research assistants rather than principal investigators. This indicates that while students are aware of research, a gap exists in active participation, which could be influenced by perceived barriers or a lack of full understanding of the research process. The study suggests that, while there is general awareness about research, limited active involvement could contribute to the poor perception of undergraduate research. This could be due to a lack of hands-on experience in critical components of research, such as proposal writing,

data collection, and manuscript preparation, which 65.8%, 27.4%, and 18.5% of students had been trained in, respectively. The disparity in training might further explain the low expectations regarding comprehensive involvement in the research process, as found in the study where only a small proportion of respondents expected to participate fully in literature review, data collection, analysis, writing, and presentation. Therefore, bridging the gap between awareness and active participation, alongside comprehensive research training, could enhance students' perceptions and experiences of undergraduate research.

In terms of specific activities, data analysis, data collection, and presentations emerged as the most anticipated areas of involvement. However, the relatively low proportion of respondents expecting to participate comprehensively in all available activities indicates potential gaps in holistic research training. Encouraging students to engage in the entire research cycle could enhance their critical thinking and project management skills.

Faculty support plays a crucial role, with more than half of the respondent agreeing or strongly agreeing that they would receive adequate support. Nevertheless, minority remaining neutral and about one-tenth expressing disagreement suggests room for improvement in faculty-student collaboration. Institutions could implement structured faculty mentorship programs to bridge this gap. Satisfaction with supervision appears promising, with more than half of the respondent expecting to be “satisfied” or “very satisfied.” These findings emphasize the importance of accessible, knowledgeable, and supportive supervisors in enhancing research engagement. The finding that about two-third of respondents expect to receive funding or resources for research activities indicates optimism regarding institutional support. However, the remaining minority highlights the need for transparent and equitable allocation of resources to ensure that all

interested students can participate in research activities without financial constraints. This could stem from existing disparities in resource distribution or awareness among students.

The overall findings of this study on research engagement also align with the findings by Oliveira *et al*. (2014) who highlighted the importance of faculty support and institutional resources in fostering research engagement. Oliveira *et al*.'s observation showed that financial support and positive departmental experiences are crucial motivators for students' involvement in undergraduate research with a substantial proportion of students benefiting from financial support. There are however disparities between the two studies. In Oliveira *et al*.'s study, majority of students expressed interest in participating in research despite not having prior involvement, which reflects a strong desire to engage in research which contrast with the findings of this present study suggesting that, while there is interest, there are also practical concerns or perceived barriers, such as lack of access to mentorship or adequate resources. Additionally, Oliveira *et al*. (2014) found that curriculum enrichment was a major motivation for students to participate in research. In this present study, although faculty support and expectations of funding were strong, the low proportion of students expecting to participate comprehensively in all aspects of research (literature review, data collection, analysis, writing, and presentation) indicates a gap in holistic research training. Encouraging students to engage more fully in the entire research cycle could help develop critical thinking and project management skills, which aligns with Oliveira *et al*.'s focus on the broader benefits of research participation for students' academic and professional development.

4.3. Perceived Benefits of Research Experience

The perceived benefits of research underscore its transformative potential for academic and professional growth. Majority believe that research will enhance their critical thinking skills.

This aligns with the broader educational goal of developing analytical and problem-solving capabilities among students. This finding correlates with that of Kiyimba *et al*. (2022) who found that personal development and gaining experience are strong motivators for research participation. Similarly, the findings also align with that of Shcheglova *et al*. (2022), particularly in the emphasis on the development of critical thinking skills who concluded that both academic and research engagement activities play in key role in cultivating these skills. Ferdoush *et al*. (2020) reported that a significant majority of students expressed interest in participating in research, while a large majority agreed that research is beneficial, particularly for enhancing critical thinking and policy implementation. This mirrors the enthusiasm observed in the present study regarding the potential benefits of research for academic and professional growth.

Similarly, majority view research as "very" or "extremely" beneficial for their future careers, reflecting its perceived relevance to professional success. Interest in postgraduate studies is another area positively influenced by research exposure, with more than two-third of respondents agreeing or strongly agreeing that research will increase their interest in advanced education. This finding highlights the role of undergraduate research experiences in shaping long-term academic aspirations. This is also mirrored in the study by Shcheglova *et al*. who highlighted that extracurricular activities are of great importance and addition to academic involvement, suggesting that universities should broaden their focus to include research and other activities.

Notably, majority of respondents expect research to better prepare them for professional challenges, reinforcing its practical value beyond academia. A majority recommended integration of more research into the curricular activities, emphasizing a strong demand for institutional reforms to embed research more deeply into academic programs. This feedback

underscores the need for curricular adjustments that prioritize experiential learning and active research participation. The alignment of perceived benefits with personal and professional goals may explain the high levels of enthusiasm observed. These findings could be justified by the increasing global emphasis on research-driven innovation and professional competitiveness.

The findings of this study correlate with those of Little (2020), particularly in emphasizing the multifaceted benefits of undergraduate research experiences. Little highlights that participation in research conferences fosters the development of presentation skills, confidence, and the ability to handle challenging questions, all within a supportive and low-risk environment. These conferences also provide students with opportunities to present their research interests, enhancing their ability to tailor content to diverse audiences and learn from interdisciplinary interactions. Moreover, Little notes that the collaborative nature of these activities allows students to refine teamwork skills, including feedback provision and workload management. The observed benefits extend beyond academia, with students applying these skills in professional contexts, such as preparing presentation materials for conferences. These findings underscore the broader academic and professional value of undergraduate research and align with the push for experiential learning and active student participation in research activities.

4.4. Challenges and Barriers

The challenges associated with research engagement are multifaceted, with balancing research and academics emerging as the most common issue. This reflects the intense workload pharmacy students often face, necessitating strategies to integrate research seamlessly into their schedules. Inadequate resources and limited opportunities further compound the challenges, pointing to systemic issues that require institutional attention. The availability of future research opportunities garnered mixed responses, with slightly less than half of the respondents rating

them as neutral and about one-third of the respondents viewing them positively ("good" or "excellent"). This highlights the need for clearer communication about available opportunities and proactive efforts to create more avenues for student involvement in research. Academic workload is a significant barrier, with more than half the respondents agreeing or strongly agreeing that it interferes with research participation. Institutions could explore flexible academic schedules or research credit systems to alleviate this burden. Access to research materials and equipment also presents a concern, with less than half of the respondents of expecting insufficient access. Investing in infrastructure and partnerships to provide students with the necessary tools is crucial for fostering a conducive research environment. The finding that majority of respondents believe the curricular activities should be adjusted to accommodate more research activities reinforces the call for structural reforms. Implementing such changes would not only address current barriers but also align the curricular activities with students' aspirations and the evolving demands of the healthcare field.

The findings of this study align with those of Ferdoush *et al*. (2020) regarding the barriers to research engagement faced by students. Ferdoush *et al*. identified compact academic tasks, insufficient guidance, and limited familiarity with research methodology as major challenges. Similarly, this study highlights the significant burden of balancing academic workload with research participation, with slightly more than half of respondents acknowledging this as a barrier. Both studies underscore the need for institutional strategies to alleviate these challenges, such as flexible academic schedules and structured mentorship programs. Additionally, limited resources and opportunities were identified as key issues in this study, with inadequate access to research materials and equipment being a prominent concern. Ferdoush *et al*. also emphasized insufficient time and guidance as critical barriers, reinforcing the systemic nature of these

challenges across different contexts. Addressing these shared barriers requires targeted interventions, including investments in infrastructure, enhanced communication about available research opportunities, and integration of research training into curricula. Both studies call for a concerted effort to create a more supportive and resource-rich environment to foster meaningful student engagement in research.

Furthermore, the findings of this study also align with Alsaleem *et al*. (2021) on the barriers to research engagement and the need for institutional support. Alsaleem *et al*. reported lack of time, skills, funding, facilities, and limited access to medical journals as significant barriers to conducting research. The emphasis on insufficient access to research materials and infrastructure in this study mirrors the barriers of limited facilities and access highlighted by Alsaleem *et al*. Assar *et al*. (2022) in their study also highlighted educational priorities, lack of time, and limited access to research materials as the primary obstacles to student research involvement further justifying the findings of the present study. This underscores the systemic nature of these barriers, emphasizing the need for institutions to invest in infrastructure and provide more balanced academic and research schedules. Moreover, while Assar *et al*. found generally positive attitudes toward research, their observation that this positivity often does not translate into adequate knowledge or practice mirrors the findings in this study regarding the mixed responses to future research opportunities and limited student engagement. Both studies advocate for initiatives such as structured mentoring, better training systems, and clearer communication of research opportunities to bridge the gap between interest and active participation. This highlights the importance of transforming positive attitudes into actionable outcomes through targeted support and resources.

The intersection of these challenges with socio-demographic factors such as academic level or financial constraints, could further justify the need for targeted interventions that address unique needs and contexts.

4.5. Overall Satisfaction

The findings on overall satisfaction with research engagement in this study reveal a generally positive perception among respondents. A significant proportion of participants expressed satisfaction with the research opportunities provided in their program, while an additional one-tenth were very satisfied. Furthermore, majority of respondents indicated they would recommend the program to future students based on its research involvement, highlighting a strong endorsement of the program's ability to foster a supportive environment for research. Notably, majority of respondents expressed a willingness to participate in research again if given the opportunity, further emphasizing the value they place on these experiences.

These findings are consistent with those of previous studies that underscore the benefits of research engagement for students. For instance, Little (2020) highlighted the role of undergraduate research in fostering critical skills such as collaboration and presentation, which enhance students' academic and professional readiness. Similarly, the current study revealed that majority of respondents agreed or strongly agreed that research engagement better prepares them for job opportunities. This aligns with Ferdoush *et al*. (2020), where students recognized research as a vital component of career preparation, particularly in developing critical thinking and problem-solving skills.

The expectation of research experiences meeting students' aspirations, reported by two-third of respondents in this study, reflects findings from Alsalem *et al*. (2021). Alsalem's study

demonstrated a positive correlation between students' attitudes toward research and their perceived readiness for future opportunities. However, while the current study showcases strong satisfaction rates, it also revealed that about one-third of respondents rated their satisfaction as neutral. This suggests that while the program has successfully engaged many students, there is room for improvement in fully meeting diverse student expectations.

Another compelling insight is the respondents' willingness to recommend the program to others, with majority endorsing the research opportunities as a key strength. This parallels findings from Assar *et al*. (2022), where students expressed positive attitudes toward the relevance and usefulness of research but also highlighted barriers such as insufficient resources and limited time. Similarly, earlier findings in this study noted academic workload and access to resources as significant challenges, which may explain why some participants remained neutral in their satisfaction ratings.

Overall, these findings highlight the need for institutions to build on existing strengths while addressing areas for improvement. To enhance satisfaction further, programs should focus on expanding access to research opportunities, improving resource availability, and providing structured mentorship and training. Clear communication of the benefits of research engagement, as emphasized in Little (2020) and Ferdoush *et al*. (2020), can also reinforce the value of participation. By addressing these factors, institutions can ensure that their research programs not only meet but exceed student expectations, fostering a culture of engagement and advocacy for future cohorts.

CHAPTER FIVE

5. Conclusion

The findings of this study provide a comprehensive understanding of pharmacy students' engagement and experiences with research during their academic curricular activities. Majority of pharmacy students actively engage in research activities.

Students recognized numerous benefits of research engagement, including enhanced critical thinking, improved problem-solving skills, and increased competitiveness for postgraduate and professional opportunities.

Students are faced with significant challenges and barriers such as academic workload, limited access to research materials, and inadequate institutional support.

Addressing these challenges through targeted interventions such as mentorship programs, resource allocation, and curricular reforms, can enhance research participation and maximize its transformative potential for students. Institutions must act on these insights to cultivate a robust research culture that prepares students for academic and professional excellence.

5.1. Limitations of the Study

This study has several limitations that should be acknowledged. Firstly, the sample size was limited to 250 respondents, which may not adequately capture the diversity of perspectives among all pharmacy students. Consequently, the findings may lack generalizability to students in other institutions or regions with different academic structures and resources.

Secondly, the reliance on self-reported data introduces the potential for social desirability bias. Respondents may have provided answers they perceived as favourable rather than entirely accurate, which could affect the authenticity of the data on research engagement and associated

challenges. Thirdly, the study employed a cross-sectional design, providing a snapshot of the respondents' perceptions and experiences at a specific point in time. This design limits the ability to assess changes in attitudes or experiences over time, which could offer deeper insights into the evolving nature of research engagement.

Additionally, the study primarily relied on quantitative methods, limiting the exploration of nuanced qualitative perspectives. The absence of in-depth interviews or focus group discussions restricted the ability to gain a comprehensive understanding of the barriers and motivators for research participation. Lastly, the challenges identified, such as academic workload and resource limitations, may be specific to the institution where the study was conducted. As a result, the findings might not fully reflect the experiences of students in institutions with different academic environments or resource allocations.

By considering these limitations, future studies can adopt broader and more inclusive methodologies to address these gaps and provide a more comprehensive understanding of research engagement among pharmacy students.

5.2. Recommendations

1. **Increase Awareness and Communication of Research Opportunities**: Institutions should improve communication about available research opportunities and the benefits of participation. This can be achieved through regular seminars, workshops, and mentorship programs tailored to pharmacy students.

2. **Incorporate Research into Academic Curricula**: To address the challenge of balancing academics and research, institutions should integrate research projects into the academic

curricular activities. Offering credit for research engagement or creating flexible schedules can reduce the burden of balancing both activities.

3. **Enhance Resource Availability**: Addressing resource limitations is crucial. Institutions should invest in infrastructure, including access to research materials, databases, and equipment. Partnerships with external organizations and research bodies can also provide additional support.

4. **Structured Mentorship Programs**: Establishing structured mentorship programs where experienced faculty guide students through research processes can help reduce barriers related to inadequate guidance. Such programs can also foster a culture of research excellence and skill development.

5. **Promote a Supportive Research Culture**: Creating a research-friendly environment that prioritizes student engagement is essential. Institutions can organize student research conferences, provide funding for student-led projects, and recognize outstanding contributions to research through awards and incentives.

6. **Address Time Constraints through Strategic Planning**: To alleviate the burden of time constraints, institutions could explore introducing modular research programs that allow students to engage in research during less academically intensive periods.

7. **Foster Collaboration Across Disciplines**: Encouraging interdisciplinary collaboration among students from various departments can create more diverse and impactful research opportunities. This approach also broadens students' perspectives and enhances the overall research experience.

8. **Longitudinal Research Engagement Studies**: Future studies should adopt a longitudinal approach to assess changes in students' perceptions, attitudes, and participation rates over time. This would provide a clearer picture of the long-term impact of institutional interventions on research engagement.

By addressing these limitations and implementing the recommendations, institutions can foster a more inclusive, supportive, and productive research environment for students, ultimately enhancing their academic and professional development.

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Appendix

DATA COLLECTION INSTRUMENT

Questionnaire: Pharmacy Students' Engagement and Experience in Research During Their Academic Curricular activities

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Section A: Socio-demographic Information

1. **Gender:** Male [ ] Female [ ]
2. **Age:** 18-21 years [ ] 22-25 years [ ] 26-30 years [ ] Above 30 years [ ]
3. **Year of Study:** 1st Year [ ] 2nd Year [ ] 3rd Year [ ] 4th Year [ ] 5th Year [ ]
4. **Will you participate in a research project during your academic program?** Yes [ ] No [ ]
5. **Will you take a research methodology course during your program?** Yes [ ] No [ ]

Section B: Research Engagement

1. **How would you rate your overall experience with research participation in the future?** Very Poor [ ] Poor [ ] Neutral [ ] Good [ ] Excellent [ ]
2. **Which research activities do you expect to engage in? (Check all that apply):** Literature Review [ ] Data Collection [ ] Data Analysis [ ] Writing Paper [ ] Presentation [ ]
3. **Do you expect to receive adequate faculty support for your research?** Strongly Disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree [ ]

4. **How satisfied will you be with the supervision provided for your research?** Strongly Dissatisfied [ ] Dissatisfied [ ] Neutral [ ] Satisfied [ ] Strongly Satisfied [ ]

5. **Will you receive funding or resources for your research activities?** Yes [ ] No [ ]

Section C: Perceived Benefits of Research Experience

1. **Do you believe research will improve your critical thinking skills?** Strongly Disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree [ ]

2. **How beneficial will research be for your future career?** Not Beneficial [ ] Slightly Beneficial [ ] Moderately Beneficial [ ] Very Beneficial [ ] Extremely Beneficial [ ]

3. **Will research increase your interest in postgraduate studies?** Strongly Disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree [ ]

4. **Do you expect to feel more prepared for professional challenges because of research?** Strongly Disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree [ ]

5. **Would you recommend integrating more research into the curricular activities?** Yes [ ] No [ ]

Section D: Challenges and Barriers

1. **What challenges do you anticipate facing during research? (Check all that apply):** Lack of Time [ ] Lack of Support [ ] Inadequate Resources [ ] Balancing with Academics [ ] Limited Opportunities [ ]

2. **How would you rate the availability of research opportunities in the future?** Very Poor [ ] Poor [ ] Neutral [ ] Good [ ] Excellent [ ]
3. **Do you expect the academic workload to interfere with your research participation?** Strongly Disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree [ ]
4. **Will there be sufficient access to research materials and equipment?** Yes [ ] No [ ]
5. **Do you think the curricular activities should be adjusted to accommodate more research?** Yes [ ] No [ ]

Section E: Overall Satisfaction

1. **How satisfied will you be with the overall research opportunities in your program?** Strongly Dissatisfied [ ] Dissatisfied [ ] Neutral [ ] Satisfied [ ] Strongly Satisfied [ ]
2. **Do you expect the research experience to meet your expectations?** Yes [ ] No [ ]
3. **Would you participate in research if given another opportunity?** Yes [ ] No [ ]
4. **Do you think research will better prepare you for job opportunities?** Strongly Disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree [ ]
5. **Will you recommend this program to future students based on research involvement?** Yes [ ] No [ ]