RESEARCH ARTICLE

Shaping future pharmacists: Transformative effects of clinical rotations on attitudes toward depression and diabetes care

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Abstract

Background: Clinical rotations play a vital role in preparing future pharmacists for the responsibility of providing care for patients with chronic diseases. This study aimed to evaluate the impact of clinical rotations on the attitudes of final-year pharmacy students at a Nigerian University toward providing Pharmaceutical Care (PC) for patients with depression and diabetes. **Methods:** This was a pre-post interventional study design among randomly selected final-year pharmacy students of a Nigerian public University. All participants took part in a nine-week clinical rotation. Two validated self-administered questionnaires were used for data collection before and after the clinical rotation. Descriptive statistics and paired sample *t*-tests were used for data analysis. **Results:** A total of 301 pharmacy final-year students participated in this study. The findings showed that clinical rotation improved students' attitudes toward providing PC for patients with depression (29.90 ± 10.35 *vs* 32.00 ± 8.10, *p* = 0.006) but had no significant effect on diabetes care (32.47 ± 9.58 *vs* 33.60 ± 8.23, *p* = 0.120). However, pharmacy students had more positive attitudes toward providing PC for people living with diabetes than those with depression (30.95 ± 9.35 *vs* 33.03 ± 8.94, *p* < 0.001). **Conclusion:** Although clinical rotation improved students' attitudes toward providing care for people with depression, the study findings underscore the need for the inclusion of more mental health training to ensure that future pharmacists are equally prepared to care for patients with both mental and physical illnesses.

Introduction

Pharmaceutical care (PC) has become a cornerstone of modern pharmacy practice, emphasising the role of pharmacists in providing patient-centred care, particularly for chronic conditions such as depression and diabetes (Chua *et al*., 2012; Kamusheva *et al*., 2020; Binakaj & Stojkov, 2016). Chronic diseases, including depression and diabetes, require long-term medication management and thus necessitate a deep understanding of the psychosocial aspects of patient care (Akyirem *et al*., 2022). As such, pharmacy

education has increasingly incorporated clinical rotation programmes to expose students to real-world scenarios, with the goal of fostering positive attitudes toward patient care (Ujjan *et al*., 2022). However, the effectiveness of these rotations in shaping the attitudes of pharmacy students, particularly toward managing complex chronic conditions like depression and diabetes, remains a subject of ongoing research. Clinical rotations are designed to bridge the gap between theoretical knowledge and practical application (Belachew *et al*., 2016). Yet, their impact on students' attitudes toward providing comprehensive care is not fully understood.

The challenge of ensuring pharmacy students develop a positive attitude toward providing care for patients with depression and diabetes is huge (Robinson et al., 2020; Crespo-Gonzalez *et al.*, 2022). Depression and diabetes are major contributors to the global disease burden, requiring all-encompassing, empathetic, and patient-focused care (Bommer *et al.*, 2018; Liu *et al.*, 2020). Depression and diabetes might often coexist, with each condition complicating the management of the other. This complexity demands that future pharmacists not only possess robust clinical knowledge but also an empathetic and proactive approach to patient care (McGuire *et al.*, 2016). Additionally, previous studies demonstrated that pharmacy students seem more comfortable providing care for patients with physical than mental illness (Daniswara *et al.*, 2022; Anaam, 2023). Hence, gaining insights into pharmacy students' attitudes to providing PC for patients with depression and diabetes would help identify biases that could potentially affect their future professional performance and patient outcomes. With such insight, any observed biases among students can be addressed through targeted educational interventions during clinical rotation.

Previous studies have demonstrated that contact-based learning, curricular enhancements, experiential learning opportunities, and simulation-based training involving role-plays significantly improved pharmacy students' attitudes and readiness in providing PC for patients with chronic diseases (Keating et al., 2019; Bakos-Block *et al.*, 2022; Bock *et al.*, 2022; Plewka *et al.*, 2024). These strategies bridge the gap between theoretical knowledge and real-world interactions with the patient and thus enhance pharmacy students' communication skills, clinical proficiency, and stigma-free and compassionate attitudes toward providing care for patients with mental illnesses and other chronic diseases, including diabetes (Keating et al., 2019; Bakos-Block *et al.*, 2022; Bock *et al.*, 2022; Plewka *et al.*, 2024). Additionally, participation in psychiatric clinical rotation reportedly improved the attitudes of pharmacy students toward providing PC for patients with depression and schizophrenia (Cates & Woolley, 2017).

In Nigeria, the clinical rotation programme is a compulsory component of the pharmacy curriculum across all pharmacy schools (Auta *et al.*, 2016). The programme and all aspects of pharmacy education in the country are regulated by the Pharmacy Council of Nigeria (PCN). The programme usually involves hands-on training of pharmacy undergraduate students in various healthcare settings, including hospitals and community pharmacies (Okoro *et al.*, 2021). The essence of the clinical rotation programme is to provide pharmacy students with practical experience in patient care, medication management, and clinical decision-making. The programme forms the bedrock of the academic activities of final-year pharmacy students in Nigeria (Okoro *et al.*, 2021). During the clinical rotations, students work under the stewardship of licensed pharmacists and other healthcare practitioners, participating in tasks such as reviewing patient medication histories, reconciling prescribed medication therapy, providing drug information, counselling patients, and monitoring therapeutic outcomes. The programme usually lasts several months, with students rotating through different departments to gain a well-rounded understanding of pharmacy practice. Clinical rotation helps in bridging the gap between theoretical knowledge and actual pharmacy practice, thus preparing future pharmacists for the task of managing a wide array of diseases, including depression and diabetes. The integration of mental health care into chronic disease management is increasingly recognised as essential, yet it requires pharmacists to adopt a holistic and patient-centred approach. However, there is a dearth of knowledge regarding the effect of clinical rotations on the attitudes of future pharmacists toward providing care for patients with chronic illnesses, especially depression and diabetes. Understanding how the clinical rotation programme shapes the students' attitudes can enable educators to identify potential areas for improvement in the curriculum, ensuring that future pharmacists are well-prepared to meet the complex needs of patients with depression and diabetes. Therefore, this study aimed to evaluate the impact of clinical rotations on the attitudes of final-year pharmacy students at a Nigerian University toward providing PC for patients with depression and diabetes.

Methods

Study design and population

This study was a pre-post interventional design targeted at assessing the impact of the clinical rotation programme on the attitudes of final-year pharmacy students toward providing PC for people living with depression and diabetes.

Study setting

The study was conducted at the Faculty of Pharmaceutical Sciences, University of Nigeria, Nsukka, Enugu State, Nigeria. The study centre is one of the premier public universities in Nigeria. The Faculty of Pharmaceutical Sciences is transitioning from a Bachelor of Pharmacy (BPharm) to a Doctor of Pharmacy (PharmD) degree programme but currently

offers both BPharm and PharmD degrees. However, the present final-year students are the last batch of students enrolled in the university's BPharm degree programme. In the BPharm, pharmacy students are exposed to classroom lectures, practical laboratory sessions, seminars, industrial and field trips, and clinical postings in hospitals and community pharmacies.

Eligibility criteria

The inclusion criteria for participants in this study were: (1) Both male and female sex, (2) Being a final-year undergraduate pharmacy student, (3) Participation in the clinical rotation programme for the 2022/2023 academic session, (4) Being willing to adhere to the study protocols, and (5) Students who provided informed consent to participate in the study.

Sample size determination

The sample size for the study was calculated using the Raosoft online sample size calculator. The total population of final-year undergraduate pharmacy students was 409. Therefore, with an assumed 5% margin of error, a 95% confidence interval, and a response distribution of 50%, the calculated sample size was 199. However, 20% of the calculated sample size (n = 40) was added to nullify possible non-responses or dropouts in the study. Therefore, the target sample size in this study was 239.

Sampling procedure

Using the official class list for final-year pharmacy students, the study participants were selected based on a simple random sampling technique using computer-generated random numbers. This sampling method ensured that every student had an equal chance of participating in the study.

Study instruments

Two validated and reliable questionnaires were used for data collection in this study. First, the students' attitudes toward providing PC for patients living with depression or diabetes mellitus were measured using a 16-item self-administered questionnaire adopted from a previous study (Cates et al., 2005). Participants were asked how confident, comfortable, interested, and likely they were to offer various PC services to people living with depression who are receiving psychotropic medications as well as patients with diabetes on antidiabetic medicines. The PC activities contained in the questionnaire included: obtaining medication history, screening for pharmacotherapy problems, monitoring for efficacy and adverse effects, and providing medication counselling. For example, the

students were asked, "*How confident are you in obtaining a medication history?*", "*How comfortable are you with screening for pharmacotherapy problems?*", "*How likely are you to monitor for efficacy and adverse effects?*", and "*How interested are you in providing medication counselling?*". The questionnaire had Likert scale responses (Not at all = 0, less = 1, more = 2, much more = 3). The total aggregate score on the instrument ranged from 0 to 48. The higher the score, the more positive the students' attitudes toward providing PC services for patients with depression or diabetes mellitus. The participants were categorised as either having positive or negative attitudes based on whether their aggregate score was below or above the population mean score.

The second study instrument was a validated 12-item questionnaire adopted from previously published studies that were used to assess potential barriers the students might encounter in providing PC services for patients with depression or diabetes mellitus (Akour et al., 2022; Liekens et al., 2012). The second questionnaire had three response scales, namely "yes, no, and not sure". Additionally, students' sociodemographic characteristics were obtained using a sociodemographic form designed by the investigators. The sociodemographic characteristics obtained were gender, age, marital status, place of residence, and participation in the student industrial work experience scheme. Students' general awareness and self-rated knowledge of depression and diabetes mellitus were also assessed with an attached form.

Validation of study instruments

The study instruments were subjected to face and content validity, reliability tests, and pilot tests before their use for data collection in this study. The content of the questionnaires was initially screened by three experts in pharmacy practice and pharmacy education. The questionnaires were face-validated using 10 eligible pharmacy students. Feedback received during the face validity helped in making any necessary adjustments to ensure that the questionnaire items were clear and easily understandable. The questionnaires were pilot-tested with a larger sample (n = 30). The reliability test for the attitudes to providing PC and the potential barriers to PC instruments yielded acceptable Cronbach's alpha values of 0.88 and 0.73, respectively.

Clinical rotation programme

The 9-week clinical rotation programme for final-year pharmacy students was used as the intervention in this study. The programme is designed to help students acquire skills focused on patient education, counselling,

drug information retrieval, drug monitoring, medication review and reconciliation, and screening for common chronic diseases, including depression, hypertension, and diabetes. The students visited three sites, namely: (1) a tertiary hospital (the University of Nigeria Teaching Hospital, Ituku-Ozalla, Enugu), (2) a secondary hospital (Bishop Shanahan Hospital, Nsukka), and (3) Patient Demonstration and Simulation Laboratory (PDSL) within the faculty building. The students spent three weeks at each clinical rotation site. The pharmacists in the hospital sites are trained preceptors for the clinical rotation programme. The students usually go on ward rounds with their assigned preceptor each week. In the course of the rotation, the students are exposed to both inpatient and outpatient departments, including psychiatric wards, psychological medicine, oncology units, intensive care units, medical wards, outpatient medical departments, pediatric units, and infectious disease units. In the PDSL, the students were exposed to drug information retrieval techniques, Journal club, and simulated cases in community and hospital pharmacy practice settings.

Data collection procedure

The participants were initially briefed by the principal investigator on the study objectives and protocols. Printed self-administered questionnaires were used for data collection. The data were collected in two phases. In phase 1, the questionnaires were assigned study identity numbers (SN001 to SN301) and distributed to the participants before the commencement of the clinical rotation programme. Each participant completed the questionnaires independently and returned them to the research team, which was on hand to oversee the exercise. In phase 2 of the data collection, the same set of questionnaires was given to the participants shortly after completing the nine-week clinical rotation programme. Each participant received the same questionnaires coded with the same study identity number issued in Phase 1. The completed questionnaires were retrieved and stored in a secured cabinet until data analysis was needed. The research team provided clarification to the students where necessary. The participants were incentivised with candy and writing materials. The data collection lasted from January 15, 2024, to March 21, 2024.

Data analysis

The data collected was coded and entered in Microsoft Excel, from where it was exported to the IBM Statistical Package for Social Sciences (SPSS) version 23 for data analysis. Students' sociodemographic characteristics, general awareness, and self-rated knowledge of depression and diabetes mellitus were summarised using descriptive statistics (frequency and percentage). The impact of the clinical rotation programme on students' attitudes toward providing PC for patients with depression or diabetes mellitus was examined using a paired sample t-test. The level of significance was set as $p < 0.05$.

Ethical considerations

Ethical approval for the study was obtained from the Ethics Committee of the Department of Clinical Pharmacy and Pharmacy Management on March 6, 2024, with reference number CPPM/HREC/24/UG/0012. Written informed consent was obtained from all study participants. The data collected were handled with utmost confidentiality. No personally identifiable information was collected from any of the participants. The data collected were encrypted and could only be accessed by the research team. However, to encourage student participation in the study, the investigators offered them candy and writing materials as incentives. The incentives were considered modest and unlikely to coerce students' participation in the study.

Results

Sociodemographic characteristics

Table I showed the sociodemographic characteristics of the study participants. A total of 301 pharmacy final-year students participated in this study. More than half of the participants were female (n = 171, 56.8%) and lived outside the university community (n = 175, 58.1%). The vast majority of the students were single (n = 273, 90.7%). More than half of the students had completed the mandatory student industrial work experience scheme, either in the hospital or community pharmacy setting (n = 200, 66.4%). About 43.5% of the students were aware of a family member or friend living with depression, while more than half (n = 172, 57.1%) knew a family member or friend living with diabetes mellitus. More than half of the students stated that they had a good knowledge of depression (53.3%) and diabetes (56.8%), while about 17.3% and 27.2% rated their knowledge of depression and diabetes, respectively, as excellent (Figure 1).

Table I: Students' socio-demographic characteristics (n = 301)

Variable	Frequency	Percent
Gender		
Male	130	43.2
Female	171	56.8
Age (years)		
21-25	225	74.8
26-30	76	25.2
Marital status		
Single	273	90.7
Married	28	9.3
Place of residence		
Hostel	126	41.9
Off-campus	175	58.1
Participated in SIWES		
No	**101**	**33.6**
Yes	**200**	**66.4**
Know family member or friend living with depression		
No	170	56.5
Yes	131	43.5
Know family member or friend living with diabetes mellitus		
No	129	42.9
Yes	172	57.1

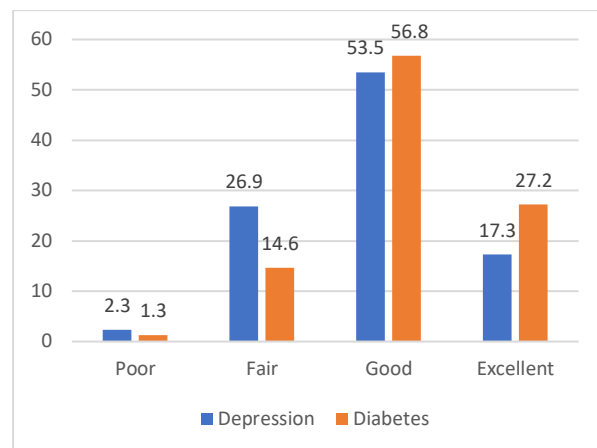SIWES: Student Industrial Work Experience Scheme

Figure 1: Pharmacy students' self-rated knowledge of depression and diabetes (%)

Impact of clinical rotation on students' attitudes

Table II showed the impact of the clinical rotation programme on the attitudes of pharmacy students toward providing PC for people living with depression and diabetes. The findings demonstrated a significant improvement in the attitudes of the students toward providing PC for patients with depression after completing the clinical rotation programme (29.90 ± 10.35 *vs* 32.00 ± 8.10, $p = 0.006$). There was no difference in the attitudes of the students toward providing PC for patients with diabetes before and after the clinical rotation programme (32.47 ± 9.58 *vs* 33.60 ± 8.23, $p = 0.120$). Additionally, the students had more positive attitudes toward providing PC for people living with diabetes than those with depression (30.95 ± 9.35 *vs* 33.03 ± 8.94, $p < 0.001$).

Table II: Impact of clinical rotation programme on pharmacy students' attitudes toward providing pharmaceutical care for people with depression and diabetes

Medical condition	Group	Mean± SD	*t*-value	*p*-value
Depression	Pre-clinical rotation	29.90 ± 10.35	-2.769	**0.006***
	Post-clinical rotation	32.00 ± 8.10		
Diabetes	Pre-clinical rotation	32.47 ± 9.58	-1.557	0.120
	Post-clinical rotation	33.60 ± 8.23		
Depression *vs* Diabetes	Depression	30.95 ± 9.35	-6.424	**<0.001**
	Diabetes	33.03 ± 8.94		

*Significant at $p < 0.05$

Mean difference analysis of students' attitudes toward providing PC for patients with depression and diabetes

Table III showed the relationship between students' sociodemographic characteristics and their attitudes toward providing PC for patients with depression and diabetes before and after clinical rotation. The findings showed that being single (30.42 ± 10.05 *vs* 25.20 ± 11.95, $p = 0.009$), living off-campus (28.12 ± 10.17 *vs* 32.01 ± 10.21, $p = 0.001$), and having

participated in the SIWES programme (27.69 ± 12.02 *vs* 30.82 ± 9.46, *p* = 0.031) were significantly associated with more positive attitudes to providing PC for patients with depression during pre-clinical rotation phase. On the other hand, being a male pharmacy student (33.88 ± 9.67 *vs* 31.43 ± 9.41, *p* = 0.029) and living off-campus (30.93 ± 9.87 *vs* 34.28 ± 8.92,

p = 0.002) were significantly associated with more positive attitudes toward providing PC for patients with diabetes during the pre-clinical phase. However, there were no differences in attitudes toward providing PC for patients with depression and diabetes based on students' sociodemographic characteristics after clinical rotation (*p* > 0.05).

Table III: Sub-group analysis of pharmacy students' attitudes toward providing PC for patients with depression and diabetes

Variable	Depression				Diabetes			
	Pre-clinical rotation	*p*-value	Post-clinical rotation	*p*-value	Pre-clinical rotation	*p*-value	Post-clinical rotation	*p*-value
Gender								
Male	30.80 ± 10.64	0.196	32.33 ± 8.36	0.541	33.88 ± 9.67	0.029*	34.15 ± 8.54	0.315
Female	29.24±10.11		31.75 ± 7.91		31.43 ± 9.41		33,18 ± 7.98	
Marital status								
Single	30.42 ± 10.05	0.009*	31.70 ± 8.05	0.058	32.45 ± 9.48	0.920	33.34 ± 8.29	0.091
Married	25.20 ± 11.95		34.89 ± 8.20		32.63 ± 10.69		36.11 ± 7.20	
Place of residence								
Hostel	28.12 ± 10.17	0.001*	31.37 ± 7.46	0.255	30.93 ± 9.87	0.002*	33.36 ± 7.06	0.651
Off-campus	32.01 ± 10.21		32.45 ± 8.52		34.28 ± 8.92		33.77 ± 8.98	
Participated in SIWES								
No	27.69 ± 12.02	0.031*	31.25 ± 8.71	0.253	32.65 ± 10.52	0.833	32.49 ± 9.04	0.098
Yes	30.82 ± 9.46		32.38 ± 7.77		32.39 ± 9.19		34.16 ± 7.75	
Know family member or friend living with depression								
No	29.81 ± 10.81	0.842	32.41 ± 8.06	0.316	32.28 ± 9.96	0.667	33.59 ± 8.46	0.986
Yes	30.05 ± 9.61		31.46 ± 8.16		32.77 ± 8.97		33.61 ± 7.96	
Know family member or friend living with diabetes								
No	29.23 ± 11.39	0.349	31.67 ± 7.20	0.547	31.83 ± 10.42	0.344	32.56 ± 7.84	0.057
Yes	30.27 ± 9.57		32.24 ± 8.73		32.90 ± 8.97		34.38 ± 8.44	

*Independent *t*-test was significant at *p* < 0.05; SIWES: Student Industrial Work Experience Scheme

Potential barriers to providing PC for people living with depression and diabetes

Table IV revealed the potential barriers that pharmacy students might face in the quest to provide PC for patients with depression and diabetes. The most frequently reported potential barriers to providing PC for people living with depression were insufficient staff (43.6%), fear or discomfort of dealing with such patients (43.1%), time constraints (42.6%), a lack of private counselling area (41.8%), lack of patient information (41.4%), and a lack of patient understanding of PC (41.1%). On the other hand, the most commonly reported potential challenges in providing PC for people living with diabetes include insufficient staff (39.3%), time constraints (38.6%), a lack of patient understanding of PC (38.1%), and a lack of private counselling area (37.4%).

Table IV: Potential barriers toward providing pharmaceutical care for people living with depression and diabetes mellitus

SN	Barriers	Agree, n (%)	
		Depression	Diabetes mellitus
1	Lack of knowledge	219(36.4)	153(25.5)
2	Lack of training in pharmaceutical care practice	221(36.8)	173(28.8)
3	Lack of patient understanding of pharmaceutical care	247(41.1)	229(38.1)
4	Insufficient staff	262(43.6)	236(39.3)
5	Lack of communication skills	194(32.3)	178(29.6)
6	Lack of drug information sources	221(36.8)	183(30.4)
7	Lack of documentation skills	219(36.4)	192(31.9)
8	Lack of private/counselling area	251(41.8)	226(37.6)
9	Fear or discomfort of dealing with patients	259(43.1)	168(28.0)
10	Lack of patient information e.g. treatment goals	249(41.4)	225(37.4)
11	Time constraint	256(42.6)	232(38.6)
12	Lack of initiative	208(34.6)	183(30.4)

Discussion

The present study sought to investigate the impact of the clinical rotation programme on the attitudes of final-year undergraduate pharmacy students toward providing PC for people living with depression and diabetes. The findings of this study demonstrated that the clinical rotation programme improved pharmacy students' attitudes toward providing PC for people living with depression but had no substantial effect on their attitudes to providing care for patients with diabetes. However, pharmacy students had more favourable attitudes toward providing care for patients living with diabetes than those with depression. That is, the students were confident and comfortable obtaining medication history, screening for pharmacotherapy problems, and providing medication counselling for patients with diabetes rather than depression. However, the students' major concerns in providing PC for patients with depression and diabetes were inadequate staff, time constraints, a lack of patient understanding of PC, and a lack of private counselling area in a pharmacy setting.

The present study revealed that clinical rotation programmes significantly improved the attitudes of final-year pharmacy students toward providing PC for individuals living with depression. This finding aligns with the results of previous research indicating that experiential education and clinical exposure play crucial roles in enhancing pharmacy students' confidence and willingness to engage in mental health care (Diefenderfer *et al.*, 2020). For instance, a study found that pharmacy students who participated in mental health clinical rotations reported increased knowledge

and comfort in managing mental health conditions, including depression (O'Reilly *et al.*, 2011). This exposure helps demystify mental health issues and reduces stigma, fostering a more proactive approach to patient care. Additionally, Zolezzi and colleagues (2023) observed that clinical rotation in psychiatry reduced pharmacy students' stigma and misconception about mental disorders, including depression, and significantly improved students' readiness to offer mental health services.

There were no observed differences in the attitudes of pharmacy students toward providing PC for patients with diabetes before and after clinical rotation. This finding is consistent with existing literature that highlights the complexity of attitudinal changes in healthcare education. Previous research suggests that while clinical rotations are crucial for skill development and practical knowledge, they may not be sufficient in altering deeply ingrained attitudes or beliefs (Cates & Woolley, 2017; Macdonald *et al.*, 2021; Roberts *et al.*, 2022; Yaas *et al.*, 2023). The finding of the current study underscores the need for a more comprehensive approach that includes reflective practice, mentorship, and patient interaction, which can help in shaping positive attitudes toward chronic disease management. Moreover, the lack of significant improvement in attitudes may also reflect broader challenges in pharmacy education. Literature suggests that educational interventions alone are often inadequate in changing attitudes unless they are part of a well-integrated, holistic curriculum. Moreover, for attitudinal change to occur, students need continuous exposure to real-world patient interactions coupled with structured reflection and feedback (Seselja *et al.*, 2019). This

approach helps bridge the gap between theoretical knowledge and practical application, fostering a more empathetic and proactive attitude toward patient care. Therefore, the findings of the study suggest that while clinical rotations are valuable, they must be complemented by other educational strategies to effectively improve students' attitudes toward providing PC for patients with diabetes.

Pharmacy students exhibit more positive attitudes toward providing PC for patients with diabetes than for those with depression. In other words, pharmacy students were more confident, comfortable, and likely to obtain medication history, screen for pharmacotherapy problems, and provide medication counselling for patients with diabetes than depression. This finding agrees with existing literature on healthcare professionals' attitudes toward different chronic conditions. Studies have shown that mental health conditions, like depression, often carry a stigma that may influence the willingness and confidence of healthcare providers, including pharmacy students, to engage with these patients (Anosike *et al.*, 2019; Meng *et al.*, 2022). For example, research has highlighted that healthcare professionals, including pharmacists, frequently feel less prepared and less comfortable managing mental health conditions due to the complex and subjective nature of these illnesses compared to more tangible and widely understood physical conditions such as cardiovascular diseases (Morral & Morral, 2016; Giannetti *et al.*, 2018). This disparity in attitudes may also stem from the differences in educational exposure and clinical experiences pharmacy students receive, which often emphasise the management of physical conditions more than mental health issues (Blebil *et al.*, 2022). Furthermore, the chronic nature of diabetes and the clear outcomes from PC (e.g. improved blood sugar levels) may offer a more rewarding experience for pharmacy students, thereby reinforcing their positive attitudes (Inasu & Kumudavalli, 2020). The disparity in attitudes highlights the need for enhanced education and training in mental health to equip future pharmacists with the skills and confidence necessary to provide comprehensive care across both physical and mental health conditions (Dean et al., 2020; Atienza-Carbonell *et al.*, 2022).

The current study identified several barriers to providing effective PC for patients with both depression and diabetes, including inadequate staff, time constraints, lack of patient understanding of PC, and the absence of private counselling areas in pharmacy settings. These concerns are well-documented in the literature and highlight systemic challenges that hinder the delivery of comprehensive PC (Baral *et al.*, 2019; Katoue *et al.*, 2014; Tawfiq *et al.*, 2021; Hatem et al., 2023). About 78% of pharmacy students in a National Survey in the United

Arab Emirates agreed that a lack of private counselling area could hinder their ability to provide PC for patients (Tawfiq *et al.*, 2021). The findings of the study highlight significant barriers that have the potential to impede the delivery of PC in pharmacy settings, particularly among pharmacy students managing patients living with depression and diabetes. These observed challenges suggest the need for targeted interventions in pharmacy practice. To enhance the quality of PC, there should be an emphasis on increasing staff capacity, allocating sufficient time for patient interaction, and improving patient education on the importance of PC. Additionally, the creation of private counselling spaces is crucial to ensure confidentiality and foster more meaningful patient-pharmacist interactions. Addressing these issues will likely improve patient outcomes, particularly for chronic conditions like diabetes and depression, where effective PC is critical.

Limitations

This study had a few limitations that should be taken into consideration while interpreting its findings. First, the study was conducted in a single school of pharmacy in Nigeria. Hence, the generalisation of its findings beyond the study might be limited, especially in schools with significantly different models of clinical rotation programmes. Second, the clinical rotation programme lasted for only nine weeks. The duration of the clinical rotation programme appears rather too short; hence, the students might not have been exposed to adequate learning opportunities during the rounds. Third, the study findings are subject to potential social desirability and recall bias owing to the self-reported nature of the data collection, even though the questionnaires were anonymised to encourage honest responses. Furthermore, since there was no control group, it would be practically impossible to isolate the effect of clinical rotation from other variables that could potentially affect students' attitudes toward providing PC for patients with depression and diabetes. Lastly, due to the pre-post design, the present study could not determine whether the observed attitudes of pharmacy students toward providing PC for patients with depression and diabetes remain stable over time. Hence, future longitudinal and randomised controlled trials evaluating the effect of clinical rotation on attitudes toward providing PC for patients with depression and diabetes involving pharmacy students from multiple universities or programmes are recommended. Additionally, further studies incorporating feedback from students through qualitative approaches such as interviews and focus

group discussions would enhance a clearer understanding of the variables investigated.

Conclusion

The findings of this study suggest that clinical rotations improved pharmacy students' attitudes toward caring for people with depression but had no significant influence on their attitudes to providing diabetes care. However, the students had more positive attitudes toward providing care for people with diabetes compared to those living with depression. Although clinical rotation improved students' attitudes toward providing care for people with depression, the study findings underscore the need for the inclusion of more mental health training during clinical rotations to ensure that future pharmacists are equally prepared to care for patients with both mental and physical illnesses. Furthermore, enhancing educational programmes, addressing staffing and infrastructure issues, and improving patient education are essential steps to ensure that pharmacy graduates are well-prepared to provide holistic care for individuals with mental and physical health conditions.

Conflict of interest

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