

Exploring Pharmacy Students' Experiences and Perceptions of Interprofessional Education in Clinical Settings: A Qualitative Study

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Abstract

Introduction: Current health sciences education is increasingly focused on the transition from traditional didactic methods to innovative pedagogical frameworks. While the introduction of interprofessional education (IPE) initiatives in Malaysian teaching hospitals has demonstrated success in fostering students' collaborative competencies, the broad implementation of IPE remains uneven. This study aimed to delve into pharmacy students' experiences, perceptions, and recommendations on an IPE implementation activity during clinical attachments. **Methods:** A descriptive qualitative study was conducted using in-depth, semi-structured online interviews with the final year pharmacy students from Kulliyah of Pharmacy, IIUM. Purposive sampling was used to recruit students who joined an IPE activity between March and May in 2024. The data collected via a validated guide during the interviews were analysed thematically to identify key patterns and themes. Coding was performed by two researchers, with initial coding was further AI-enhanced. **Results and discussion:** Seven final-year pharmacy students accepted the invitation to share their experiences, emerging four distinct themes namely; 1) curricular design and structural challenges, 2) role clarity & interprofessional understanding, 3) impact on learning & competency and 4) personal barriers and educational support. Ward rounds and bedside teaching were highly valued, though challenges included scheduling conflicts, limited exposure and inadequate case preparation. Supportive instructors and collaborative peer interactions recognised as key factors facilitating the learning process. **Conclusion:** Pharmacy students highly valued IPE and highlighted that an early, structured, and longitudinal integration of IPE in the curriculum is necessary to enhance collaborative competencies and professional development.

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Introduction

The Interprofessional education (IPE) is defined by the World Health Organization (WHO) as “structured learning experiences in which two or more professionals engage in learning with, from and about one another with the objectives of fostering collaborative practice and enhancing the quality of patient care” (WHO, 2010). IPE has emerged as a crucial component in the training of healthcare professionals to improve patient care outcomes. Rooted in the principles of teamwork, mutual respect, and shared responsibility, IPE enhances service delivery and the quality of care by promoting effective communication, clarifying professional roles, and aligning educational approaches with the dynamics of contemporary healthcare teams (Grace, 2020). To support the development of students’ interprofessional practice capabilities and ensure readiness for future workforce demands, there is a need for sustainable and authentic interprofessional learning opportunities that enable students to meaningfully integrate theories of interprofessional collaboration into professional practice.

Although IPE has been increasingly incorporated into healthcare curricula, most published studies have focused on evaluating attitudes or educational outcomes using quantitative approaches. While quantitative assessments of interprofessional learning are well-documented in the region, in-depth qualitative insights into how pharmacy students navigate IPE within actual Malaysian clinical environments remain relatively limited. Understanding these lived experiences is essential for uncovering the contextual facilitators and barriers to meaningful interprofessional learning and for informing future curriculum development. Focusing on pharmacy students is particularly timely given that the profession has evolved over the past four decades from traditional dispensing to active, team-based medication therapy management alongside physicians and nurses (Blouin & Adams, 2017). Exploring their perceptions offers nuanced insights into how emerging pharmacists shape their professional identity, understand collaborative

roles, and prepare for patient-centered care in Malaysia.

At the Kulliyyah of Pharmacy of International Islamic University Malaysia (IIUM), IPE programme is implemented during the final-year (year 4) clinical attachment and involves final year undergraduate students from Kulliyyahs of Pharmacy, Medicine, and Nursing. The programme is conducted over a one-day clinical learning experience consisting of ward rounds, bedside teaching, collaborative case discussions, or multidisciplinary case presentations under the supervision of clinical educators from multiple practice or clinical disciplines of each participating Kulliyyah. Through these activities, students learn with, from, and about one another while managing authentic patient cases within hospital settings.

Therefore, this study aimed to explore pharmacy students' experiences, perceptions, and recommendations regarding the implementation of interprofessional education during clinical attachments.

Methods

Study design and setting

This descriptive qualitative research primarily employed in-depth semi-structured interviews. A semi-structured interview guide was systematically developed following a comprehensive review of the literature on the implementation of IPE in clinical settings. Key domains and guiding questions were informed by established IPE frameworks and empirical studies in clinical pharmacy education to ensure conceptual relevance and alignment with the study objectives. The draft instrument underwent content validation by four experts in pharmacy education, who evaluated the clarity, relevance, and comprehensiveness of each item. Feedback was incorporated to refine wording, improve logical sequencing, and enhance contextual appropriateness.

A pilot interview was subsequently conducted with one eligible participant who was excluded from the final study sample. The pilot assessed the clarity, flow, and feasibility of the interview process,

including the estimated duration. Minor modifications were made to improve question clarity and probing strategies.

These steps strengthened the study's credibility and dependability by ensuring alignment between the research questions and data collection instrument, enhancing methodological rigor, and promoting consistency in the conduct of interviews. The study is reported in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist, which is provided as a supplementary file. With prior consent from participants, all interviews were recorded for transcription and comprehensive data analysis. The primary investigator, who was also a student, was the interviewer that has been trained by a qualitative researcher.

Study population (sample selection, inclusion and exclusion criteria)

The participants were recruited using purposive sampling, where pharmacy students who have been exposed to the IPE activities during clinical placement in 2024 were invited to participate in this research. A total of fifteen pharmacy undergraduate students were approached via email and mobile phone. The pharmacy students who had no prior exposure to IPE programme during the clinical attachment in 2024, were not available during the data collection period or declined to participate were excluded from the study. As this study is an explorative qualitative study, Creswell & Poth, (2018) argued that research involving 5-25 participants who have direct experience are enough to reach the data saturation. Participant information sheets and informed consent forms were initially distributed to the participants. Only individuals who provided informed consent were included in the study. Data collection was conducted through online one-to-one interview sessions to facilitate effective and uninterrupted information exchange via Zoom meeting platform. To ensure transparency and ethical compliance, all selected students were provided with a comprehensive participant information sheet detailing the objectives, procedures, and significance of the study.

Data Collection

The interview process commenced with an introductory segment, during which participants were invited to share brief personal introductions, including relevant background information such as their professional role, and experience. This initial phase was intended to establish rapport, create a comfortable atmosphere, and provide contextual grounding for each participant's perceptions. Following the introduction, the session proceeded with a broad, open-ended question posed to each participant. The questions covered the engagement of the students in the IPE (for example, "how would you describe your experience with IPE"), perceptions of the value and relevance of IPE (In what ways has IPE enhanced your knowledge and understanding about the healthcare system?), barriers and facilitator to an effective IPE (can you describe any obstacles or challenges you have encountered while participating in IPE?) and the recommendation to improve IPE in clinical settings (what is your suggestion to make IPE more effective or impactful in the future?). The interview sessions were video- and audio-recorded with consent from the participants. To maintain confidentiality and minimise potential response bias, only the interviewer and the respective participant were present during each interview. In addition, field notes were also documented by the researcher throughout the interview sessions to record non-verbal cues, contextual observations, and preliminary analytical insights.

Data Analysis

Data gathered from the interviews were transcribed, translated and subjected to thematic analysis to identify recurring patterns and meaningful themes relevant to the research objectives. The audio recordings were transcribed using TurboScribe Web AI. The recorded files were uploaded to the platform, where automated transcription was generated and it was independently reviewed by two researchers against the original audio recordings to verify transcription accuracy. Prior to uploading transcripts to Turbo Scribe Web AI and ChatGPT, all identifiable information, including participants' names and personal identifiers, was

removed. Each participant was assigned a study code (P1–P7). Only anonymised transcripts were processed through the AI platforms, and all final analytical decisions were based on researcher review of the original anonymised transcripts.

1. *Data Familiarisation, keywords and quotation selection.*

Transcripts from the one-to-one interviews were reviewed thoroughly and repeatedly at least three times by two researchers to ensure an in-depth understanding of the participants' narratives with reflective notes documented to inform the initial coding framework. Following manual familiarisation and initial coding by two researchers, ChatGPT (GPT-5; OpenAI) was used as an assistive tool to organise preliminary codes, suggest alternative wording for code descriptions, and facilitate comparison of similar concepts. The data was categorised according to emerging types, patterns, and relationships, with the goal of identifying key themes that reflect students' engagement in, attitudes toward, and challenges within IPE activities. The analysis produced nuanced qualitative descriptions that capture the complex, context-specific realities of pharmacy students' interactions and learning experiences during IPE in clinical settings. All data were anonymised, and no student names or identifiable information appeared in the final presentation of the results.

2. *Generating initial codes from the keywords*

Meaningful units of text were coded, and a preliminary coding framework was developed through inductive analysis with the assistance of ChatGPT. All AI-generated outputs were critically reviewed by the researchers, who accepted, modified, or rejected the suggestions based on the original interview transcripts. Final coding, theme development, interpretation, and reporting remained entirely researcher-led. The data was categorised according to emerging types, patterns, and relationships, with the goal of identifying key themes that reflect students' engagement in, attitudes toward, and challenges within IPE activities.

3. *Searching for themes*

The researchers reviewed and grouped the initial codes to identify preliminary themes through an iterative thematic analysis process. ChatGPT (GPT-5; OpenAI) was used as an assistive tool to organise codes and suggest possible thematic groupings. ChatGPT was reported to be effective in handling large volumes of qualitative data by facilitating the rapid identification of key and emerging themes (Yan et al., 2024; Naeem et al., 2025).

4. *Reviewing and defining the themes*

Two researchers further refined the themes through systematic comparison and cross-checking of themes and codes, resulting in a final set of themes that accurately represented the data.

5. *Writing a report*

The final phase involved the synthesis of the analysed data into a formal report. Representative data extracts were selected to provide evidence for each theme, ensuring a balance between narrative description and analytical interpretation.

Data analysis was conducted iteratively. Initial coding commenced after the first three interviews to allow preliminary familiarisation and identification of emerging patterns. Thereafter, analysis proceeded concurrently with data collection, with transcripts reviewed and coded after every two subsequent interviews. The evolving coding framework was continuously refined through team discussions, and consistency of emerging themes was examined at each stage. The recurrence of similar patterns across successive interview sets enhanced the credibility and robustness of the findings. Data saturation was observed starting at the fifth interview; however, two additional interviews were conducted to ensure no new themes emerged, confirming a stable thematic framework.

Results

A total of seven undergraduate pharmacy students consented to the study and completed the interviews, four of them were female. All participants were 23 years old when they experienced the IPE during their final year of undergraduate studies (**Table 1**). The interviews

were conducted for about 45 minutes on average.

Table 1: Demographic data of the participants (n=7)

Characteristics		n (%)
Age (years)		23 (100%)
Gender, n (%)		
Male	- P4	3 (42.86%)
	- P5	
	- P7	
Female	- P1	4 (57.14%)
	- P2	
	- P3	
	- P6	
Programme		Pharmacy (100%)
Year of study during IPE		Year 4 (100%)

From the interviews, four themes have emerged; 1) curricular design and structural challenges, 2) role clarity & interprofessional understanding, 3) impact on learning & competency and 4) personal barriers and educational support (Table 2).

1. Curricular Design and Structural Challenges

Participants described how the composition and dynamics of interprofessional groups influenced their learning experience. Several students perceived the presence of a dominant professional group within discussions, which at times limited balanced participation. Issues related to multidisciplinary team composition and group compatibility were also highlighted. In addition, the integration of clinical ward rounds and bedside teaching created variability in engagement and learning exposure.

"There were 10 medical students and only 2 pharmacy students... they dominated...I was scared to ask questions because there were so many of them." (P1)

Structural limitations were frequently reported. Students noted inconsistencies in session execution, including differences in facilitation style and activity structure. Scheduling constraints between

Table 2: Themes, Subthemes, and Codes Derived from Thematic Analysis of Students' IPE Experiences

Themes	Subthemes and Codes
1. Curricular design and structural challenges	Team composition and delivery • Dominant group profession • Multidisciplinary team composition • Group compatibility issue • Clinical ward round and bedside teaching • Inconsistent session execution
	Structural challenges • Scheduling constraint • Infrequent implementation • Unequal access to IPE
	Recommendation • Curriculum integration • Structured discussion sessions (pre and post-session)
2. Role clarity & interprofessional understanding	Role understanding • Understanding the roles of other professions • Pharmacist role recognition • Future professional relevance • Medication-management role
3. Impact on learning and competency	Impact on professional development • Improved confidence level • Enhanced communication skills among profession • Strengthening evidence-based practice skills Perceptions toward IPE • Positive perceptions towards IPE programme • Realisation of the value of IPE
4. Personal Barriers and educational support	Personal Barriers • Limited time for preparation • Low confidence • Lack of preparation prior to IPE session • Time coordination challenges between professions Instructors- and peers- assisted learning • Supportive instructor and lecturer • Peers supports and cooperation

programmes were a recurrent challenge, often leading to rushed preparation or difficulty coordinating meeting times. Some participants also perceived infrequent implementation of IPE and limited opportunities to participate in IPE as only selected students joined the programme.

"The IPL session was uncertain... sometimes it happened, sometimes it didn't...timing was not organised... suddenly it's on, suddenly it's cancelled." (P1)

Participants recommended stronger curriculum integration to enhance sustainability and ensure equitable opportunities for all students.

"IPE should be integrated more because it widens our knowledge." (P2)

2. Role Clarity and Interprofessional Understanding

Participants reported gaining clearer insights into collaborative practice and recognising the pharmacist's contribution, particularly in medication management. This exposure also reinforced the perceived relevance of interprofessional collaboration in their future careers.

"During IPE, I had this moment of clarity. I finally saw how doctors go through the process of making a diagnosis. And with nurses, I saw how much they actually do—from wound care to looking after the patient's well-being throughout their ward stay. IPE really showed me the reality of healthcare, like how making a diagnosis isn't easy at all." (P3)

"We choose medication based on cost and availability...Mainly about medicines... DRP... side effects... informing doctors." (P3)

This theme highlights the importance of IPE in strengthening professional identity while fostering mutual respect and collaborative readiness.

3. Impact on Learning and Competency

Participants consistently reported positive learning outcomes from the IPE experience. Many described improved confidence in communicating within interprofessional settings. Enhanced communication skills across professions were

frequently emphasised, alongside strengthened evidence-based practice skills through shared clinical discussions.

"I became more confident to speak up." (P7)

"We must be quick to find references during discussion... IPE taught me to prepare thoroughly before any discussion." (P2)

Students also expressed positive perceptions of the IPE programme and recognised its relevance to real-life professional practice. Several participants described a clearer appreciation of the value of interprofessional collaboration in achieving shared patient care goals.

"IPE was very beneficial... I only realised its true importance...I could understand the case deeply... not only focus on drugs." (P3)

"It was mind-blowing to see everyone come together to discuss complete patient care...at first I felt reluctant, but after experiencing it, it became interesting." (P4)

Overall, despite noted challenges, the programme was viewed as beneficial and meaningful for professional growth.

4. Personal Barriers and Educational Support

Beyond structural issues, students identified individual-level barriers that affected their participation. Limited time for preparation was a common concern, often contributing to feelings of low confidence. Some participants reported insufficient prior preparation before attending IPE sessions, which affected their ability to contribute meaningfully. Coordinating schedules between different professional programmes further compounded these challenges.

"We had to choose the case last minute because the patient might be discharged." (P2)

"It was difficult to find a time when everyone was available." (P6)

"We only had one day to prepare...we could not answer the consultant's questions." (P7)

Despite these barriers, educational support emerged as a key enabling factor. Supportive instructors and lecturers were perceived as instrumental in guiding

discussions and encouraging balanced participation. Peer cooperation and mutual support also facilitated a more inclusive and constructive learning environment.

"The lecturer guided the discussion using trigger questions." (P6)

"We worked as a team...medical and nursing students were very helpful." (P7)

These findings suggest that facilitative teaching and collaborative peer dynamics can mitigate personal and structural challenges.

Discussion

Our findings indicate that IPE participation fosters a comprehensive understanding among final-year pharmacy students regarding the distinct responsibilities of other healthcare professionals, reinforcing previous research by Semple and Currie (2022). Overall, the majority of participants highlighted that IPE introduced them to new knowledge and provided practical, real-world experiences that enhanced their understanding regarding the responsibilities as a future pharmacist.

Fostering these positive perceptions is vital, as prior literature connects them to heightened motivation, active engagement, and successful application of interprofessional skills in real-world clinical environments (Berger-Estilita et al., 2020)

Many students indicated that these experiential activities allowed them to appreciate the relevance of interprofessional collaboration in clinical practice and reinforced the importance of applying theoretical knowledge in authentic healthcare settings. This aligns with the second theme, *Role Clarity and Interprofessional Understanding* by engaging in collaborative case discussions, students were able to contextualise their theoretical knowledge within defined professional boundaries, thereby strengthening their understanding of role expectations and enhancing readiness for future interprofessional practice. This finding was supported by Ni et al. (2024) that found IPE had a profound impact on student attitudes. According to

Darlow et al. (2022), beyond just improving opinions, the programme also underscored the value of interprofessional teamwork and encouraged a greater willingness among students to join collaborative projects.

Under the theme *Impact on Learning and Competency*, where participants described enhanced confidence, improved interprofessional communication, and strengthened evidence-based practice skills, we suggest that experiential interprofessional engagement not only reinforces cognitive learning but also supports the development of practical competencies essential for collaborative patient care. The deeper understanding of the roles of the healthcare professional from joining the IPE programme allowed pharmacy students to observe how each profession contributes significantly to patient care within a collaborative environment. This is consistent with a previous study by Fahs et al. (2025) that showed an improved understanding of their roles within interprofessional teams, accompanied by a notable positive shift in perceptions related to roles and responsibilities for collaborative practice following the IPE intervention.

Through interprofessional interactions, students gained insight into how various healthcare disciplines collaborate, accommodate differing perceptions, and work together to achieve shared clinical goals. Evidence indicated that pharmacotherapy-centred IPE initiatives further enhanced perceived interprofessional competencies and deepen awareness of professional roles (Mertens et al., 2025). Participation in IPE benefits not only students but also patients, particularly in promoting patient-centred care. Previous studies have shown that IPE helps improve patient-centred care as who received consultations from interprofessional student teams reported positive experiences and gained useful information and education on self-management, indicating that collaborative learning may lead to better patient care (Kent & Keating, 2013). This aspect resonated with the theme *Role Clarity and Interprofessional Understanding* particularly the pharmacist's contribution in medication management. Such role clarification is essential in preventing overlap,

reducing miscommunication, and enhancing coordinated care delivery. Therefore, IPE appears to strengthen patient-centred practice not merely through skill enhancement, but through fostering mutual role recognition and collaborative accountability.

While these findings highlight the educational value of IPE, the extent to which such benefits are realised depends on several facilitating factors and potential barriers. Identifying these elements is essential for understanding how IPE activities can be effectively designed, delivered, and sustained within educational programmes. In this study, participants highlighted some key facilitators to a great IPE experience which includes the support received from the instructor. According to Ratka (2013), the successful integration of IPE into pharmacy curricula requires educators who are competent in IPE and possess appropriate knowledge, skills, and attitudes. Such educators are essential for designing effective implementation strategies, coordinating interprofessional learning activities, and providing leadership in the delivery and advancement of IPE initiatives. This aspect is consistent with our findings, in which pharmacy students reported that the IPE sessions were more engaging and impactful when supported by instructors who were approachable, supportive, and actively involved in facilitating the learning process.

This study identified several barriers that influenced the implementation and effectiveness of IPE. At the structural level, participants reported challenges related to inconsistent session implementation, scheduling constraints, infrequent delivery, and limited opportunities for participation due to cohort balancing across participating disciplines.

Patel et al. (2016) similarly observed that scheduling IPE activities is inherently complex due to mismatched clinical rotation schedules. However, addressing these structural friction points is vital; as Lawlis et al. (2014) suggested, establishing unified, synchronous schedules across professions not only ensures equitable access, but actively cultivates an institutional culture that treats interprofessional collaboration as a non-negotiable priority rather than an ad-hoc requirement.

On the other hand, participants also highlighted difficulties related to team composition, including dominant professional groups and compatibility issues within multidisciplinary teams, which affected collaborative engagement and learning dynamics. Rather than viewing these dynamics purely as negative obstacles, they mirror real-world clinical environments where power hierarchies and communication gaps frequently occur. Navigating these intergroup dynamics within IPE provides students with early, practical exposure to conflict management and psychological safety. At the individual level, personal barriers such as limited time for preparation, low confidence, and insufficient readiness prior to sessions further constrained participation. Coordination challenges between different professional programmes were frequently noted, creating additional pressure on students' ability to engage fully. To address this issue, it is crucial to evaluate students' perception and readiness toward IPE (Thani Alsharari et al., 2025). These findings underscore the need for both organisational planning and learner support strategies to ensure that IPE activities are accessible, well-structured, and conducive to meaningful interprofessional collaboration.

Finally, a predominant theme among participants was the inadequacy of offering IPE as a single, isolated workshop during their final-year clinical placement. Interview findings consistently indicated that a one-day session is insufficient to generate a deep, lasting developmental impact on their trajectory as future pharmacists. Rather than reflecting disillusionment with interprofessional learning, however, this limitation strongly validates the recognized necessity of longitudinal IPE. Participants expressed an earnest desire for continuous interprofessional engagement, calling unanimously for earlier, sustained integration across the entire health sciences curriculum. Introducing shared learning early in training is essential for fostering interprofessional socialization, dismantling professional silos before stereotyping takes root, and reinforcing professional identity alongside collaborative competencies. These student insights reflect the broader paradigm shift documented by Barr et al. (2014), who observed

that successful IPE must not be just an occasional workshop. Instead, effective programmes evolve into a structured, progressive framework—one where shared learning, joint reflection, and interprofessional assessment are embedded iteratively from early foundational years through advanced clinical practice.

Accordingly, the early and systematic incorporation of interprofessional education into the pharmacy curriculum is both justified and essential. According to Patel et al. (2016), early IPE initiatives generally emphasise basic teamwork skills and role awareness, while final-year programmes assume greater clinical readiness for interprofessional engagement. Nevertheless, longitudinal implementation across all years remains rare, largely due to logistical constraints indicating a need for further studies to explore feasible and sustainable implementation strategies.

The present study has several limitations including that the data were based on self-reported experience which may subject to recall bias. In particular, when participants are required to recall past utilisation events, inaccuracies may occur due to incomplete recall, which is commonly described as memory decay (Khare & Vedel, 2019). Therefore, to minimise this issue this study was conducted using semi-structured guides with probing questions, and participants were provided with contextual prompts to support accurate recollection of experiences. Other than that, findings were also triangulated with course materials to enhance credibility and reduce reliance on recall alone. Second, the sample size of this study was relatively small, which may limit the transferability of the findings. However, this study prioritised in-depth exploration of participants' experiences by purposively sampling individuals with direct exposure to IPE, thereby enhancing the relevance and richness of the data. Overall, the data saturation was achieved, ensuring that the findings comprehensively captured the range of experiences.

Conclusion

This study indicated that IPE enhanced role clarity, collaborative understanding, and professional

development in pharmacy students. Positive perceptions of IPE were largely driven by experiential learning, supportive facilitation, and authentic clinical scenarios. However, there are also several challenges highlighted in the study which include limited duration of IPE activities, logistical constraints, and imbalanced participation arising from case selection. An early integration of IPE into the pharmacy education is needed in order to maximise its impact. Enhancing the IPE experiences by selecting well-prepared instructors also plays a crucial role in strengthening the students' engagement and learning outcome. Overall, the findings underscore the value of interprofessional education in preparing pharmacy students for collaborative practice and highlight the need for sustained, curriculum-wide implementation of IPE to support the training of competent future pharmacists.

Authors contributions

NHMT contributed to the study design, data analysis, interpretation and manuscript revision. NAH conducted data collection, data analysis, and drafting of the manuscript. AMYO assisted with tool validation, data interpretation and critically revising the initial manuscript. All authors reviewed and approved the final manuscript.

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Ethical approval statement (if applicable)

Ethical approval was attained from the IIUM Research Ethics Committee (ID no: IREC-2025-399).

Informed consent statement

Informed consent was obtained from all participants prior to enrolment in the study.

Conflict of interest

The authors declare that there is no conflict of interest.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this manuscript, one author used ChatGPT and Gemini to enhance language clarity and improve readability. ChatGPT is also used as an assistive tool for data analysis. Following the use of these tools, the other authors reviewed and revised the content as necessary and took full responsibility for the accuracy and integrity of the final manuscript.

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