

Title: Exploring students' perceptions and opinions about an institutional hierarchy of healthcare professionals and its impact on their interprofessional learning outcomes.

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Abstract

Background: Institutional hierarchy is a phenomenon associated with clinical tribalism.

Interprofessional learning is thought to improve a healthcare team's collaboration and communication.

Aim: The aim was to evaluate student understanding of institutional hierarchy and perceptions and opinions on their participation in interprofessional learning.

Method: Using a questionnaire, this study gathered the opinions of fourth year pharmacy students who had completed two interprofessional learning sessions. Quantitative and qualitative analyses were conducted.

Results: Students (87% Please put all % into 1 decimal place, n = 50) were aware of the institutional hierarchy concept, listing the order as doctors, pharmacists, nurses then allied health. 62% (n = 35) were willing to participate in interprofessional learning sessions.

Students (70%, n = 40) agreed that interprofessional learning sessions have added benefit to patient-centred care, and to understanding different healthcare roles in depth (82%, n = 47) but failed in diminution of the hierarchical ideology.

Conclusions: Interprofessional learning sessions did not change students' opinions about positioning of doctors as the top of the healthcare institutional hierarchy.

Key words: Interprofessional Learning, Institutional Hierarchy, Stereotypes, Tribalism, Multidisciplinary.

Introduction

All healthcare professionals, from their area of specialisation are highly valued in the management of patient's health, wellbeing and providing clinical advice. Interprofessional learning (IPL) or interprofessional education (IPE), is a learning approach used to improve undergraduate students' or practising healthcare professionals' understanding of each other's professional responsibilities, boundaries and ultimately improve their collaboration in the provision of patient healthcare (Buring, *et al.*, 2009). Interprofessional practice will optimise the use of the skills of the healthcare workforce (Buring, *et al.*, 2009). For this study, clinical tribalism was defined as a group of healthcare professionals with similar interests who have professional boundaries, not only defining their identity but also giving them perceived superior or inferior status over others in the multidisciplinary team (doctorsbag.net).

Hammick (1998), highlighted the initial definition of IPL as '*learning together to promote a collaborative practice*'. The Centre for the Advancement of Interprofessional Education (CAIPE) introduced a broader definition, encompassing all clinical professionals and focusing on engagement to enforce collaborative practice. CAIPE defines IPL as, '*occasions when two or more professions learn with, from and about each other to improve collaboration and the quality of care*' (CAIPE, 2002). The World Health Organisation (WHO) issued a report to establish IPL, acknowledging the importance of collaborative practice within a multidisciplinary education setting. This consisted of all healthcare professional students learning together in their early years of study to improve healthcare services thereby improving the effectiveness of teamwork in a clinical setting. A multidisciplinary education setting establishes skill sets that should enhance clinicians' ability to solve health related problems, particularly those susceptible to a teamwork-based approach (World Health Organisation, 1988).

Darlow and colleagues (2015) conducted a study assessing students' attitudes on IPL to identify changes post-exposure. The study initiated an 11-hour IPL program of pre-registration students from mixed healthcare backgrounds (intervention) compared to their regular curriculum (control). The mean post-intervention attitude score was significantly higher in the intervention group. It was concluded that the IPL program had *'improved attitudes towards interprofessional learning, self-reported confidence and self-reported ability to function within a multidisciplinary team.'* This suggested that the IPL exposure had a significant and positive impact on undergraduate attitudes toward students from the other professions. The findings of this study were in line with the core interprofessional competencies stated by the WHO: teamwork, roles and responsibilities, communication, learning and critical reflection, developing working relationships with healthcare personnel and recognising the needs of the patient and ethical practice (World Health Organisation, 2010).

In a report commissioned by the United Kingdom Department of Health (DoH), the importance of IPL and collaborative practice for a patient's health and wellbeing was emphasised, identifying that the lack of organisation skills, failure to communicate, poor leadership, paternalism and 'club culture' can impact collaborative practice. The DoH report established that poor collaborative practice between members of the healthcare team can have *'catastrophic consequences'* (Department of Health and Social Care, 2002).

IPL creates awareness of the prejudices in a work environment and exposes the ranking of positions. The process aims to reduce and eradicate work-related conflicts, enabling students and clinicians to collaborate through identifying each other's strengths and specialisms (Overton & Lowry, 2013). Herath and colleagues (2017) conducted a systematic review on the effects of implementing IPL programs in undergraduate and postgraduate courses. IPL programmes established at the undergraduate level, implemented the shared learning of skills,

knowledge, values and practices. They highlighted that *'many countries, especially the academic institutions are benefiting from the implementation of IPE programs'* (Herath *et al.*, 2017).

Mahler and colleagues (2018) studied student's opinions of IPL and deemed it to be a positive, innovative programme, emphasising the importance of greater collaboration with other healthcare professionals throughout undergraduate courses. IPL exposure resulted in *'students feeling at ease when approaching other healthcare professionals'*, during their time in practice (Mahler *et al.*, 2018). Both studies promoted collaborative practice between all healthcare professionals and highlighted the need of future initiatives to pursue this approach for delivering better healthcare to patients.

'Institutional hierarchism' is defined as a structure within an organisation where one role is considered superior or more important compared to all other jobs rendering the remainder as being inferior or less important (NHS Scotland, 2013). Braithwaite and colleagues (2016) concluded that professional characteristics should be used as a basis for introducing more IPL and team-based collaborations. In contrast, another study concluded that specialist medical doctors working in an interdisciplinary environment, significantly influence the team's treatment recommendations (Abdulrahman, *et al.*, 2019). This further demonstrates the mismatch between training and real world practice.

Study Purpose

Research on pharmacy students' opinions and perceptions of institutional hierarchy and IPL, is limited. The current literature mainly examines nurses, doctors, and other allied health such as physiotherapy and occupational therapy, therefore, the additional findings will inform improvement of pharmacists' experience of taking part in IPL and how it can be designed to ensure inclusivity.

Study Design and Methods

This was a questionnaire-based study. To enable access to all fourth year pharmacy students within a limited time, it was conducted at the end of a scheduled classroom session. There were 15 questions which were a mixture of open, closed and Likert style (Table I). The questionnaire used multiple choice questions with a single correct choice to avoid misinterpretations of questions and to facilitate data collation and analysis. Participants were also provided with a comment box with every question to enable them to enter free text (Mathers, Fox & Hunn, 2009). Focus groups and interviews were considered unsuitable for this study due to time constraints (Smith, 2010).

<<Insert table I here>>

Study Setting and Participants

Fourth year pharmacy students (n = 74) at the University of Wolverhampton were the target population. By their fourth year in the pharmacy course, the students had completed two rounds of IPL experiences. To maintain anonymity, questionnaires were distributed by a staff member, with the project investigator absent. A participant information sheet was provided, informing students about the purpose and duration of the questionnaire. The submission of a completed questionnaire was considered as the student's implied consent. There were no personal identifiers collected.

Ethics

The project was approved by the University of Wolverhampton School of Pharmacy ethics review board.

Data analysis

Quantitative data were transcribed into percentages, charts and tables for further evaluation and qualitative data were processed through thematic analysis by manual identification of themes and agreement on the themes identified by the researcher and the co-researchers.

Themes identified were short and precise, ensuring that statements were not presented as full opinions (Smith, 2010).

Results

Of the 74 students approached, 57 (77%) students completed the survey. Participants were asked to answer each of the 15 questions and explain the reasoning behind their answers in a comment box at the end of each question.

1. Results related to Healthcare Institutional Hierarchy

– Participants Opinion on Healthcare Institutional Hierarchy

The introductory question established whether participants believed a healthcare professionals' institutional hierarchy exists, 83% (n = 47) stated 'yes' (Table II).

– Place the Pharmacist on the Healthcare Institutional Hierarchy Scale

A total n = 50 (88%) answered this question. The mean ranking position for pharmacists was calculated as 2.64 (Figure 1 and Table II).

<Insert Figure 1 here>

– Order of Healthcare Institutional Hierarchy

Participants were asked which professions they would place equal, above or below the pharmacist. Medical doctors and dentists were ranked higher than pharmacists by most participants (Figure 2).

<Insert Figure 2 here>

Nurses and allied health professionals were ranked below pharmacists by the majority of participants (Figure 3).

<Insert Figure 3 here>

No profession was ranked as equal to pharmacists.

– Healthcare Profession Order of Importance

Question 5 aimed to understand participants' opinions on which healthcare profession they think to be the most important. The theme 'all healthcare professions' was identified (Table II).

– **Healthcare Profession Order of Responsibility**

Question 6 asked which profession had the most responsibility. Three responses were rejected as they failed to mention a single healthcare profession. All themes identified from question 5 were found in question 6, sharing the same phrases and responses.

2. Results related to Understanding and Participating in IPL Activities

Participants were asked to comment on a set of statements about partaking in IPL activities and willingness to engage in the activities offered.

Question 7, 8 and 9 were Likert scale responses with their results presented in figures 4-6.

<Insert Figures 4, 5 and 6 here>

Question 10 asked about their willingness to partake in IPL sessions with other healthcare professional students. The results showed that the majority were very willing to partake (Figure 7).

<Insert Figure 7 here>

3. Results related to Opinions on Participants IPL experiences

The following set of questions asked participants' opinions on their experience of both IPL sessions during the Master of Pharmacy (M.Pharm) course.

– **IPL impact on students understanding of collaborative patient-centred approach**

Question 11 asked participants, whether they felt IPL equipped them with a collaborative patient-centred approach for the future practice, 62% responded yes.

– **IPL Impact on Students Understanding of the Role of other Healthcare Professionals**

Students were asked about what they learned about other healthcare professionals' roles from both IPL sessions (questions 12 and 13). Themes identified are listed in table II.

– **IPL Impact on Students Understanding of Healthcare Professionals Institutional Hierarchy**

Had IPL influenced or changed their understanding on where healthcare professionals sit on the institutional hierarchy (Q14 and 15). The themes ‘hierarchy still exists’ and ‘hierarchy provides structure’ were disregarded as they did not specify whether the IPL experiences changed their views on where healthcare professionals sit within a hierarchy. Question 15 indicated that 83% (n = 47) participants selected they would have kept the pharmacist exactly the same on the scale versus 13% (n = 8) said they would place the pharmacist higher on the scale and 4% (n = 2) said they would move the pharmacist lower.

<Insert Table II here>

Discussion

The majority of student respondents selected the option that hierarchy existed (83%); popular themes were responsibility, salary and equality & discrimination. Socio-economic status influenced the existence of the institutional hierarchy. Greer and colleagues (2012) highlighted the conflicts within medical teams which resulted in tribalism. Such conflicts stem from status, reputation, opinions, level of authority, responsibility, uniforms, qualification, job title and income (Braithwaite, 2016). The implications of these jeopardise patient outcomes and limit collaborative practice (Abdulrahman, 2019). The study by Greer and colleagues (2012) only included doctors and nurses, but these factors can be applicable to pharmacy since they shape the multidisciplinary team.

Abdulrahman, (2019) found that despite having a team structure, hierarchies continue to influence decision-making, especially where senior members of the team were present.

Sfantou and colleagues (2017) assessed leadership styles in a healthcare setting, concluding that managers are a critical component of any organisation. Increased productivity, strong work ethic and positive patient outcomes are dependent on the leadership style adopted. They

noted that the leadership style of the manager was not directly related to the profession of the person undertaking the managerial role.

The theme of *all professionals being equal* was prominent in those who believed a hierarchy did not exist (17%). Carding (2019) reported professionals showed flexible attitudes towards patient safety when under pressure. He reported Professor Ted Baker of the Care Quality Commission stating, '*In so many of these [never] events we hear that a junior member knows what's happening but feels they can't challenge*' as '*the culture in which they work does not support them taking the right action*' (Professor Baker said in Carding, 2019).

This suggests that healthcare professionals with less experience perceived a hierarchal gap, that those in senior positions will be more confident to speak up. A conflicted understanding between healthcare professionals could be a potential cause of unintentional hierarchism in Carding's findings, which could suggest the reason for the mixed responses to Q1 in this study.

A mean score of 2.64 was calculated as the pharmacists ranking within the hierarchy (Q2, Figure 1) implying the role is perceived as having significance and value.

Responsibility, first line of contact and level of knowledge are themes that emerged out of the study results. A study analysing public opinions of pharmacists concluded the profession is highly valued, but that there was poor understanding of their scope of practice, perceiving it as not exceeding the supply of medication (Hindi, Schafheutle, & Jacobs, 2017). Wilcock and Colleagues (2020) concluded that the involvement of clinically qualified pharmacists in patient care post-discharge, reduced readmission rates. Both studies are supportive of the themes implying pharmacists were ranked quite highly on the hierarchy. Although, both studies provide a patient's perspective of the role, it is interesting to observe the similarity between public and pharmacy students' opinions, since both perceived this role to be valuable and clinically qualified.

Students ranked doctors, medical specialists, surgeons, and dentists above a pharmacist, but perceived midwives, nurses, technicians, support workers and optometrists to be below a pharmacist; 42%, however, indicated nurses were believed the most responsible (Q4, Figure 3).

Overall, doctors were ranked higher, followed by nurses being lower (Figure 2&3). A study assessing physicians and nurses' attitudes towards each other, highlighted the traditional understanding of professional roles as a hierarchal status, concluding that doctors were the dominant profession with nurses perceived as being doctor's assistants (Vazirani *et al.*, 2005). This study did not incorporate all healthcare professions, but demonstrated doctors ranked highly and nurses were positioned lower, resembling the finding of the current study.

On the aspect of importance and responsibility (Q5&Q6), the responses emphasised doctors, and specifically medical specialists, were perceived as having extensive responsibility. The theme *level of patient contact* identified, could be referring to *accessibility to patient care* e.g. pharmacists being perceived to be the first point of contact in a community setting, or *time spent on patient care* e.g. nurses spend more time with patients. The similar theme in Q2, *first line of patient contact* was a consideration in ranking the professions.

Nurses were ranked below a pharmacist but were perceived as the most responsible. This implied knowledge, patient engagement and exposure were the major considerations compared to responsibility, respectively.

It was evident (82% agreed) that IPL enables understanding of other healthcare professions' roles and responsibilities. Supporting research on IPL for medical and nursing students by Homeyer and colleagues (2018), illustrated how this reinforced co-operation, effective communication and understanding of roles, produces improvements in patient-centred care. Participants opinions about the length of time they spent in the IPL sessions (Q8) Illustrated in figure 5, with 36% seeing the sessions as time consuming (Figure 5).

Most respondents disagreed (70%) with the statement that IPL provided no added benefit to patient care (Q9, Figure 6). A supportive study looked at the benefits of IPL and teamwork in primary care, outlining improved education, personal development, patient care and job satisfaction (Carney *et al.*, 2019). Their findings support the opinions held by most participants. Only 62% of students indicated willingness to participate in future IPL sessions suggesting the current model employed could be improved. The positive themes presented were an insight into roles and mutual respect. The negative themes were identified as time consuming, perceived low learning gain and unwillingness to share experiences. These themes concur with Carney's (2019) findings on the effectiveness of IPL. Further research would be required for an in-depth analysis.

Of participants, 62% agreed IPL equipped them for a patient-centred approach for future practice (Q11). Positive themes were the understanding of roles, collaborative practice and effective communication. These findings resonate with those of Darlow and colleagues (2015), emphasising that IPL provides in-depth knowledge about differing roles, self-reported ability to communicate openly and improved personal development skills, facilitating a better patient-centred approach. Poor inclusivity and frequency of sessions were negative themes which require further examination; however, the overall result shows the overall experience was beneficial overall, serving the purpose of IPL.

Participants' understanding of healthcare roles (Q12) associated the theme *career burden* to doctors and nurses, implying their commitment to long working hours and a larger workload compared to others was a significant factor. A second theme, stereotypes, illustrated beliefs on previously held beliefs that were overcome from attending the IPL sessions. Vazirani and colleagues (2005) elaborated on traditional misconceptions and how IPL eradicates stereotypes, the most common being that nurses are subordinate to doctors.

The final theme of knowledge implied scope of practice being restricted to each specialism, highlighting capabilities and level of practice were specific to particular roles. The theme *Importance of a multidisciplinary team* agrees with the findings of Homeyer and colleagues (2018), which emphasised co-operation and teamwork with all healthcare roles improving patient outcomes.

Negative themes concerning limitations in learning were identified (Q13): *limited structure, the frequency of IPL and poor inclusivity*, which outlined why some participants may not have fully benefited from the sessions. This could suggest, students' willingness to take part could have been influenced by these limitations. This also requires further study. Conversely, a single theme: *no limitations*, was supportive of the IPL sessions, implying some felt the experience was beneficial.

The majority (67%) did not change their opinion on IPL affecting perceptions of where professionals sit in a hierarchy. The positive themes: *responsibility and collaborative practice* were supported by Mahler and colleagues (2018), who concluded participants recognised the benefits of IPL once they understand the responsibilities of each healthcare role and the importance of a collaborative practice.

Finally, the views on placing the pharmacist differently on the hierarchical scale before exposure to IPL identified an unchanged view in 83%. Key themes: *experience, responsibility and knowledge* all contributed to ranking the pharmacist in the same position. However, the theme *unchanged opinion* was unaffected from IPL exposure. Supportive literature by Hindi, Schafheutle and Jacobs (2017) and Wilcock and colleagues (2020), suggests why pharmacists were ranked highly, as they are deemed highly valuable and clinically qualified.

Limitations

The three limitations for this study are; that it was conducted at single centre, that only pharmacy students' opinions were collected and only a single year cohort were questioned.

This limits generalisability, but the results of this study were supported by other studies and contribute to the wider literature in this area.

Conclusions

This study confirmed that many believed a hierarchy exists and demonstrated some understanding of this concept, but undertaking IPL currently used did not alter the hierarchy. There were negative views on the hierarchy, but IPL overall was well attended based on willingness of undergraduate students to participate and the perceived future benefit to more patient-centred collaborative practice. IPL sessions did not change students' opinions about the positioning of doctors as the top of the healthcare institutional hierarchy.

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Table I – study questions list

1. Do you believe an institutional hierarchy exists in healthcare?
2. The line below represents a healthcare institutional hierarchy (5 points ladder). Please indicate where you feel pharmacists sit within this hierarchy.
3. Which healthcare profession(s) do you think would be ranked above a pharmacist in the hierarchy (if any)?
4. Which healthcare profession(s) do you think would be ranked below a pharmacist in the hierarchy (if any)?
5. Which healthcare professional do you think is the most important when dealing with a patient?
6. Which healthcare professional do you think has the most responsibility when dealing with a patient?
7. Interprofessional learning allows me to understand the roles of other healthcare professionals (where 1=strongly disagree and 5= strongly agree).
8. Learning with other healthcare undergraduates is time consuming (where 1=strongly disagree and 5= strongly agree).
9. Learning with other healthcare undergraduates has no added benefit to patient care (where 1=strongly disagree and 5= strongly agree).
10. On a scale of 1 - 5 below, indicate how willing you are to participate in both IPL experiences with other healthcare professional students? (1 = Highly unwilling and 5= Very willing).
11. Do you think Interprofessional Learning has equipped you with a patient-centred approach for your future practice?
12. What have you learnt about other healthcare professional roles from your IPL experiences?
13. Do you think anything limited the opportunity of learning about other healthcare professional roles, from your IPL experiences?
14. Has your IPL experience changed your opinion of where different healthcare professionals sit within an institutional hierarchy?
- 15.** Reflecting back to your response from question 2, would you have placed a pharmacist differently on the hierarchy scale before exposure to your IPL experiences?

Table II: Themes identified for study questions

Theme	Descriptor	Participant (P) number and responses
Question 1		
Responsibility	Healthcare professionals have a range of responsibilities and the level of responsibility varies.	P6 - "Responsibilities define the healthcare professional". P23 - "Responsibility entails being liable, power and ranking". P42 - "The more senior the role, the more responsibility".
Knowledge	Healthcare professionals with more years of study have higher level of knowledge and are ranked higher on the hierarchy ladder.	P17 - "Doctors have more clinical knowledge". P54 - "Pharmacists have more clinical knowledge than nurses".
Managers give structure	Managers can be healthcare professionals or non-healthcare professionals.	P7 - "A hierarchy determines final decisions". P2 - "Everybody has to be liable and report back to a manager". P11 - "Without structure there will be anarchy".
Career progression	Restriction of code of practice limiting pharmacists' progression as managers.	P8 - "Restriction of practice prevents development". P19 - "Job role is capped". P32 - "Unable to move ranks due to restriction of practice".
Salary difference	Earned income could influence the existence of a hierarchy.	P9 - "Earning determines a person's value". P18 - "Salary defines professionals". P22 - "Most skilled get paid more". P36 - "Money talks and shows importance".
Equality and discrimination	Those who stated 'yes' felt discrimination takes place, whereas those who answered 'no' believe equality exists.	P4 - "Everybody is equal as the focus is patient care". P5 - "Club culture is a big thing". P13 - "People only stick to who they know and reject others". P16 - "Nobody discriminates". P35 - "Patients are the main priority". P44 - "Hatred amongst those who do not fit the role".
Question 2		
Responsibility	The higher the profession ranked the more responsibility they have	P5- "Responsibility gives you more power". P18- "Responsibility makes you relevant".
First line of contact	Healthcare professionals who triage patients should be ranked high due to their input on patient care	P8- "Pharmacists are first line of patient contact in a community setting". P14- "Nurses are first line of contact in a hospital". P37- "Doctors are involved in all stages of care".
Knowledge	Level of medical knowledge trigger higher ranking	P3 - "Pharmacists are specialist in drugs". P9- "Doctors/medical specialists are specialist in diagnostics". P22- "Doctors and pharmacists have more years of studying". P50- "Pharmacists can only practice in minor ailments". P39- "Nurses lack therapeutic drug knowledge".
Question 5		
Decision Makers	Clinicians who actively decide patient diagnosis and treatment regimen are the most important.	P15- "Doctors are the decision makers". P4- "Doctors overrule any opinion". P22- "Doctors have the final say".
Prescribing Rights	Clinician's with full prescribing rights should be ranked higher than others	P37 - "Doctors can prescribe freely". P26- "Prescribing freely requires more knowledge".
Level of Patient Contact	Firstline Health professionals are ranked as more important than others	P9- "Pharmacists are first line patient contact in a community setting". P13- "Nurses are first line patient contact in a hospital setting". P20- "Doctors are the first point of contact when diagnosing".
Question 10		
Insight into other healthcare roles	IPL experiences improved the level of understanding about responsibilities and tasks of healthcare professionals	P5- "Nurses have more responsibility". P11- "Pharmacists are specialists in medication". P18- "Doctors are diagnosticians".
Development of mutual respect	IPL effect on student's perceptions of other healthcare professionals.	P2- "Understand a nurse's job role better". P28- "Doctors have more knowledge and responsibility". P35- "Without nurses, patient care would be non-existent".
Learning gain	Opinion on the learning benefit of IPL.	P3- "Sessions not productive". P8- "Did not learn". P14- "Tailored to one healthcare role".
Time consuming	Opinion on the length of the session effect on learning outcomes.	P16- "Waste of time due to being long winded". P31- "Unnecessarily long and dragged".
Unwillingness to share experiences	Pharmacy students limited hands-on clinical skills, negatively impacted the IPL experience, reducing students to interest to engage.	P54- "Lack of engagement, like a normal lecture". P48- "No discussion of healthcare roles". P37- "Silent audience with no student interaction".
Question 11		
Insight into other healthcare roles	IPL experiences improved the level of understanding about responsibilities and tasks of healthcare professionals	P5- "Nurses have more responsibility". P11- "Pharmacists are specialists in medication". P18- "Doctors are diagnosticians".
Development of mutual respect	IPL effect on student's perceptions of other healthcare professionals.	P2- "Understand a nurse's job role better". P28- "Doctors have more knowledge and responsibility". P35- "Without nurses, patient care would be non-existent".
Learning gain	Opinion on the learning benefit of IPL.	P3- "Sessions not productive". P8- "Did not learn".

Theme	Descriptor	Participant (P) number and responses
		P14- "Tailored to one healthcare role".
Time consuming	Opinion on the length of the session effect on learning outcomes.	P16- "Waste of time due to being long winded". P31- "Unnecessarily long and dragged".
Unwillingness to share experiences	Pharmacy students limited hands-on clinical skills, negatively impacted the IPL experience, reducing students to interest to engage.	P54- "Lack of engagement, like a normal lecture". P48- "No discussion of healthcare roles". P37- "Silent audience with no student interaction".
Questions 12 and 13		
Career burden	Understanding workload for each healthcare professionals.	P46 - "Nurses have large workloads". P35- "Doctors work several hours".
Knowledge	Lack of understanding of specialities.	P32- "Doctors don't specialise in medications". P28- "Nurses are not diagnosticians".
Multidisciplinary team	Importance of functional multidisciplinary team in patient care and errors reduction.	P19- "Working together improves patient outcomes". P33- "All healthcare professionals play a pivotal role". P44- "Patients' life would be at an increased risk without all disciplines actively involved".
Stereotypes	Opinion on the impact of stereotyping of healthcare professionals.	P7- "Pharmacists do not just push pills". P11- "Doctors do not specialise in everything". P55- "Nurses are not doctors' assistants".
Learning gain	The value of knowledge gained from the IPL sessions.	P57- "Did not allow me to learn anything". P13- "Not informative, preventing knowledge to be obtained".
Limited structure	IPL sessions structure and teaching to activities ratio.	P3- "Not inclusive of other students". P4- "A spokesperson dictated the lecture". P9- "There was no group activities".
Frequency of IPL	Length and frequencies of the IPL sessions.	P12- "Far too short to learn anything". P16- "Lack of sessions".
Poor inclusivity	IPL sessions inclusion of all participating healthcare roles not mainly focused on medical and nursing students.	P18- "The sessions were catered to nurses". P20- "Dominated by medical students". P22- "Minimal interaction, only asked indirect questions to some healthcare groups".
Questions 14 and 15		
Responsibility	IPL further students learning about each healthcare role and what their job roles entail.	P11- "Predisposed opinion was biased until IPL". P17- "IPL sessions altered my chain of understanding". P54- "Roles of a pharmacist are understood better". P59- "Nurses have more responsibility than expected".
Collaborative practice	Opinion on how healthcare professionals working together impact patient care.	P50- "Working together improves patient outcomes". P48- "Professionals collaborating enhances patient care".
Opinion change	IPL sessions impact on changing students' opinion about other healthcare professionals.	P15- "Exposure was not sufficient to influence change". P31- "Pharmacists are more clinically qualified, hence no change". P35- "Frequency of IPL sessions limited learning outcomes, resulting in no change". P37- "Pharmacists have more responsibility so still hold the same view". P45- "Previous understanding is cemented".
Experience impacted decision	Real world exposure and experiences compared to the IPL sessions.	P3- "Working in the healthcare sector". P5- "Working in a hospital setting created awareness". P7- "University placements provided insight".
Knowledge	The level of qualification and knowledge impact ranking.	P21- "Pharmacists specialise in medication". P27- "Pharmacists have more therapeutic understanding".



Figure 1: Frequency of ranking position of a pharmacist according to 50 participants.

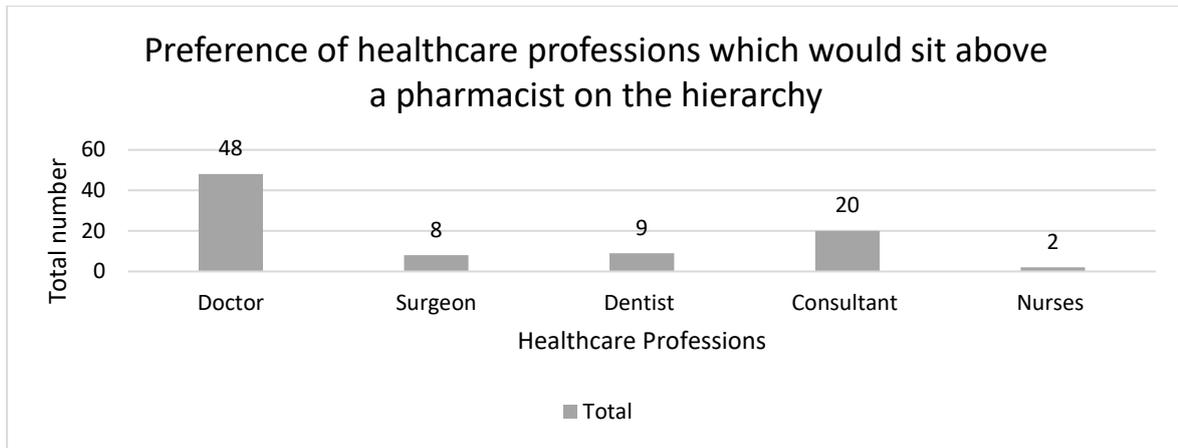


Figure 2: Frequency of each named profession that would sit higher than a pharmacist

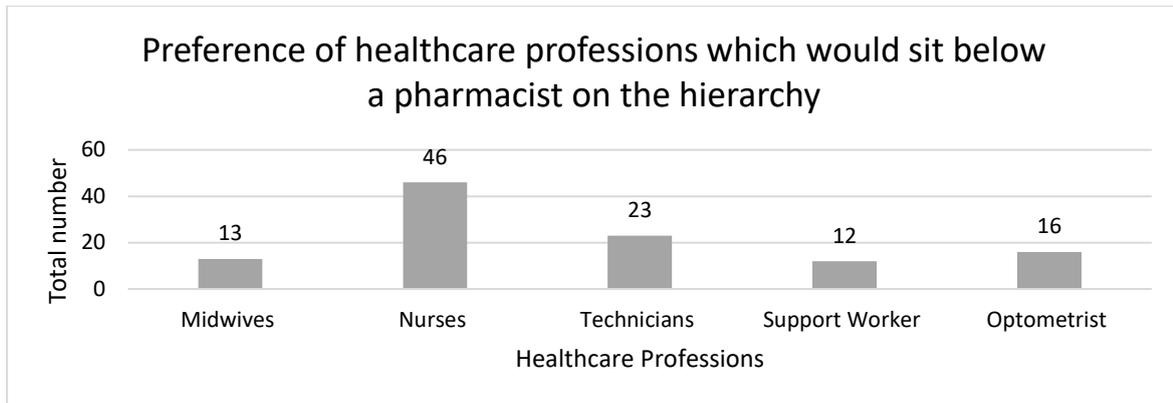


Figure 3: Frequency of each named profession that would sit below a pharmacist

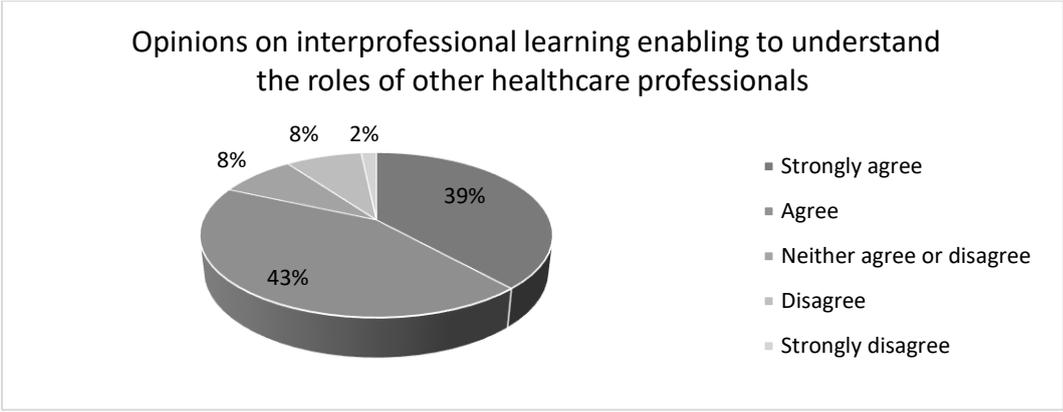


Figure 4: Participants opinion on understanding healthcare roles in IPL – question 7.

Opinions on the aspect of learning with other healthcare undergraduates is time consuming

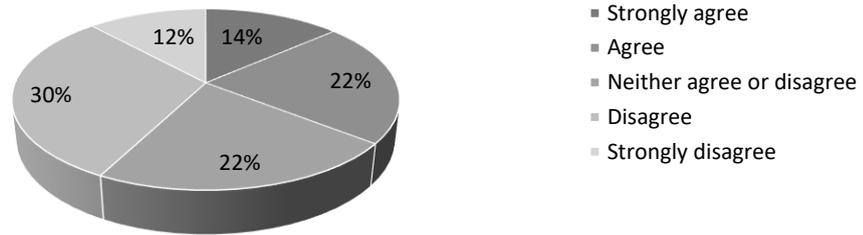


Figure 5: Participants opinion on time and learning with other healthcare students – question 8.

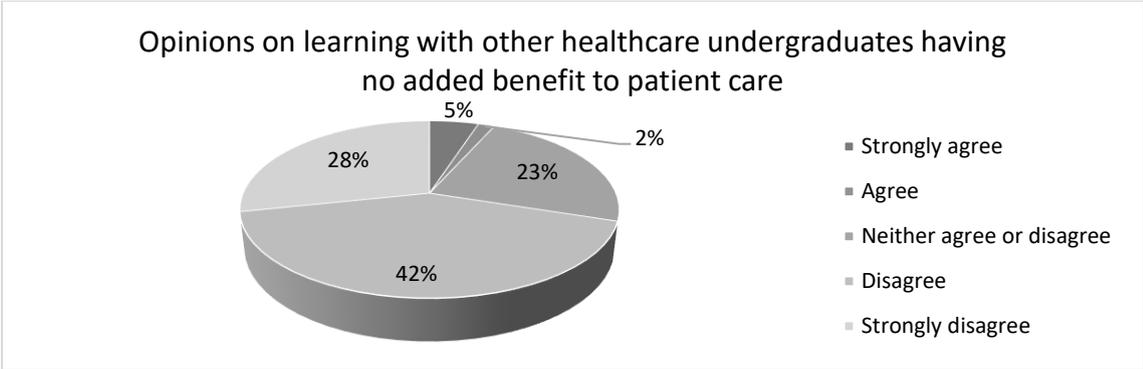


Figure 6: Participants opinion on learning with other healthcare students and its benefit to patient care

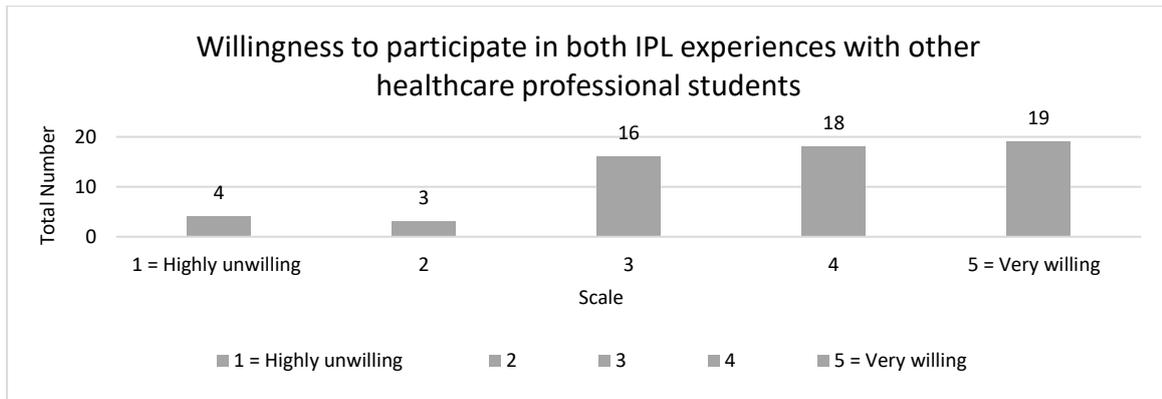


Figure 7: Participants opinion on their willingness to partake in IPL sessions – Please use brighter colours to differentiate in key.