COMPARISON OF MEDICAL AND PHARMACY STUDENTS' READINESS FOR INTERPROFESSIONAL LEARNING – A CROSS-SECTIONAL STUDY

MAGDALENA CERBIN-KOCZOROWSKA ^{1*}, PIOTR PRZYMUSZAŁA ¹, MICHAŁ MICHALAK ², SYLWIA EWA PIOTROWSKA-BRUDNICKA ³, PATRYCJA KANT ⁴, AGNIESZKA SKOWRON ⁵

¹Chair and Department of Medical Education, Poznan University of Medical Sciences, 7 Rokietnicka Street, 60-806 Poznan, Poland

²Department of Computer Science and Statistics, Poznan University of Medical Sciences, 7 Rokietnicka Street, 60-806 Poznan, Poland

³Department of Clinical Biomechanics and Physiotherapy in Motor System Disorders, Wrocław Medical University, 2 Grunwaldzka Street, 50-355 Wrocław, Poland

⁴Day Lewis Pharmacy Ltd, 35 Summerfield Road, Margate CT9 3EZ, United Kingdom

⁵Department of Social Pharmacy, Jagiellonian University, College of Medicine, 9 Medyczna Street, 30-688 Krakow, Poland

*corresponding author: mcerbin@ump.edu.pl

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Abstract

Interprofessional education (IPE) is aimed to improve the quality of healthcare services by allowing representatives of different professions to communicate more effectively. However, it can be achieved only if students are ready to participate. The study aimed to determine the readiness of medical and pharmacy students for interprofessional learning at different levels of their education. A cross-sectional survey was conducted among 1402 medical and pharmacy students using the Readiness for Interprofessional Learning Scale (RIPLS) questionnaire. Statistical analysis was performed with the Mann-Whitney U test. The level of statistical significance was assumed at $p < 0.05$. The highest RIPLS results were noted among students of the two final years at both degree courses. Pharmacy students showed significantly higher readiness for interprofessional education than medical students in every study year compared. High RIPLS values among last-years students should encourage implementing IPE elements into the postgraduate training.

Rezumat

Educația interprofesională (IPE) are ca scop îmbunătățirea calității serviciilor medicale, permițând reprezentanților diferitelor profesii să comunice mai eficient. Cu toate acestea, acest lucru se poate realiza numai cu participarea studenților. Studiul a avut ca scop determinarea disponibilității studenților facultăților de medicină și farmacie pentru educația interprofesională. A fost realizat un sondaj transversal pe un eșantion de 1402 studenți, folosind chestionarul *Readiness for Interprofessional Learning Scale* (RIPLS). Analiza statistică a fost efectuată folosind testul Mann-Whitney. Nivelul de semnificație statistică a fost stabilit pentru $p < 0,05$. Cele mai mari valori RIPLS au fost observate în rândul studenților din cei anii finali de studiu. Studenții la farmacie au prezentat o disponibilitate semnificativ mai mare pentru educația interprofesională decât studenții de la medicină, comparativ, pentru fiecare an de studiu. Valorile ridicate RIPLS în rândul studenților din ultimii ani ar trebui să încurajeze implementarea elementelor IPE în formarea postuniversitară.

Keywords: interprofessional education, RIPLS questionnaire, pharmacy students, medical students

Introduction

The multitude of reports on the improvement of treatment's effectiveness and safety [1, 2, 7, 17], as a result of a collaboration between physicians and pharmacists, prompts a search for different solutions enabling and facilitating it. Nevertheless, existing conflicts and communication problems between these professional groups make it difficult to incorporate such collaboration into everyday practice [22]. High expectations have been put on the interprofessional education (IPE) and its proper implementation into both curricula aimed to increase awareness of the pharmacists' role and acceptance of their involvement

in patient care [37]. Classes in which representatives of different professions have a chance to learn "from, with and about one another" [36] seem to allow them to collaborate more compatibly and freely [4]. Many factors are hindering the implementation of IPE. Firstly, both its introduction and subsequent effective realization are very complicated and time-consuming [12, 18, 27]. Secondly, existing curricula do not always acknowledge their importance [9]. Moreover, these curricula are often very extensive, which makes their further expansion considerably difficult [19]. It is also challenging to find time during the day in which students of different degree courses

have no overlapping classes and are free to participate in the interprofessional ones [25, 26, 38]. Difficulties also arise with the assessment of interprofessional classes. Given that IPE implementation into curricula is supposed to increase the quality, effectiveness and accessibility of healthcare services [15, 42], its full evaluation is possible only when taking into consideration patients' benefits resulting from the quality improvement of healthcare services [16]. The interval between participation in IPE activities and the practical use of acquired competencies in future professional life leads to problems with an honest evaluation of its effectiveness [16].

Ponzer *et al.* [31] argue that participants' level of satisfaction is substantially influenced by the qualifications of teachers. Meanwhile, it seems that the preparation level of the teaching staff is inadequate and rather incidental [42], they do not feel prepared enough to lead the discussion in a group consisting of representatives of different professions [32] and express concerns about increased workload and lack of time for additional activities [5].

Finally, enumerating barriers standing in the way of the IPE popularization, one must not forget the necessity of securing a constant pool of financial resources, required not only for its development and evaluation, but also subsequent maintenance [5, 16]. However, as it was pointed out by Satin [33], securing enough funds does not give warranty of success. Although appropriate funds should be provided for both classic and interprofessional education models, the specificity of the medical and healthcare workers' training system in different countries does not allow for simple incorporation of random existing interventions into the curriculum. They should rather be individualized and skilfully integrated into already existing programs [21]. There are some elective interprofessional courses designed to improve pharmacist-physician collaboration in Poland [8], however, incorporation of IPE as required learning activities should be preceded by an honest evaluation of pros and cons [19].

Moreover, Satin [33] indicated that personal factors, including students' involvement, are also very important factors influencing IPE success. For this reason, this work aimed to determine the readiness of Polish students of medicine and pharmacy for interprofessional learning. According to the authors' best knowledge, research to date has not yet determined this phenomenon in the Polish population. A literature review allows to assume that attitudes may vary between members of different faculties and even year of study. This study provides important insights into students' perception of IPE and therefore, may facilitate the correct choice of study year to best achieve assumed educational goals.

Materials and Methods

The tool

The study aimed to evaluate the readiness of medicine and pharmacy students to enter into interprofessional model of education with the Readiness for Interprofessional Learning Scale (RIPLS) questionnaire [29], containing nineteen items with answers formed as a five-level Likert scale and questions about socio-demographic characteristics of participants (including gender, faculty, year of study and previous experiences with IPE). It allowed to characterize features conditioning the readiness of medicine and pharmacy students to undertake IPE with the use of the RIPLS factor calculated as the sum of points in four subscales: (1) teamwork and collaboration, TC; (2) negative professional identity, NPI, (3) positive professional identity, PPI (4) and roles and responsibilities, RR. Subject matter experts from both pharmacy and medical field were engaged in content validity process of the tool and asked to evaluate whether test items correspond with research hypotheses.

Inclusion and exclusion criteria

The sole criterion of being included in the study group was an active student's status of either medicine or pharmacy degree course. Remaining criteria, including study year and gender, constituted variables of the trial.

Study setting

The study was carried out from January to June of 2014 at the Poznan University of Medical Sciences (PUMS). When the study was conducted, it offered a traditional curriculum and few interprofessional classes were offered to students only as elective courses.

Data collection and analysis

The paper form of RIPLS questionnaire was spread among respondents in person by members of the research team before or after students' regular classes. Prior to the study, the questionnaire was approved by the Bioethics Committee (Resolution No 549/11) and respondents were informed about its aims and voluntary character. To achieve high reporting standards in presenting results of this study, researchers followed the STROBE statement [34].

Due to the ordinal nature of data obtained, the statistical analysis was performed with the Mann-Whitney U test. The analysis was carried out with the use of Statistica 10.0 (StatSoft) software. The level of statistical significance was assumed at $p < 0.05$.

Results and Discussion

Among 1433 medical students and 699 pharmacy students, respectively, 966 and 436 (total 1402) respondents took part in the study, which is representative for the examined population [20]. It allows estimating the range of the study as equal to 67.41% for medicine and 62.37% for pharmacy degree

course. The detailed characteristic of respondents is presented in Table I.

Table I

Detailed characteristics of the sample

Respondent's degree course	Medicine	Pharmacy
Gender [n (%)]		
female	611 (63.25)	342 (78.44)
male	355 (36.75)	94 (21.56)
total	966 (100.00)	436 (100.00)
Year of study [n_{coll}/n_{tot}(resp)]		
1	234/236 (99.15)	87/139 (62.59)
2	69/248 (27.82)	85/148 (57.43)
3	242/260 (93.08)	82/146 (56.16)
4	179/225 (79.56)	61/129 (47.29)
5	108/223 (48.43)	121/137 (88.32)
6	134/241 (55.60)	-

ncoll - number of collected questionnaires [n]; ntot - total population number [n]; data achieved by the courtesy of administrative personnel of the University; resp - response rate [%]

The conducted research confirmed a hypothesis that the readiness of students of medicine and pharmacy degree courses for interprofessional learning varies significantly in regards to their stage of education. The RIPLS factor achieved the highest values among students of the two final years at both degree courses and the statistical analysis showed that they vary significantly from those achieved by lower-years

students. The comparison analysis was also carried out among subsequent subscales. The highest readiness for TC was presented by the students of the 6th year of medicine degree course (32.60 ± 5.01) and the 4th year of pharmacy (36.57 ± 5.52).

What is more, among respondents, the increase of the PPI value was observed with a simultaneous decrease of the NPI value ($R = -0.5086$, $p < 0.0001$). The correlation between variables was higher among medical students (medicine degree course: $R = -0.5728$, $p < 0.0001$, high correlation; pharmacy degree course: $R = 0.3024$, $p < 0.0001$, average correlation). This correlation seems to be optimal for IPE implementation at further stages of education.

The correlation between the values of the RR parameter and the study year was found only in the case of pharmacy students. The obtained results indicate a high level of awareness of the fifth-year students regarding the significance of pharmacists among other members of the medical team.

The results of the study also allowed to confirm a hypothesis stipulating differences in the students' readiness for IPE learning regarding their chosen path of education. The comparison of mean RIPLS results of students of medicine and pharmacy degree courses in the respective subscales is presented in the Table II.

Table II

Comparison of mean RIPLS results of students of medicine and pharmacy degree courses in respective subscales

Degree course	Medicine [$\bar{x}_{\text{mean}} \pm \text{SD}$]	Pharmacy [$\bar{x}_{\text{mean}} \pm \text{SD}$]	p-value
Teamwork and collaboration (TC)			
Study year	1	30.28 ± 6.35^a	33.70 ± 5.38^a
	2	$31.15 \pm 6.45^{a,b}$	$34.59 \pm 4.91^{a,b}$
	3	29.86 ± 6.38^a	33.19 ± 5.90^a
	4	30.16 ± 6.60^a	36.57 ± 5.52^b
	5	$31.05 \pm 6.39^{a,b}$	$35.77 \pm 5.01^{a,b}$
	6	32.60 ± 5.01^b	
p-value		0.0006	0.0003
Total population		30.62 ± 6.29	34.75 ± 5.42
Negative professional identity (NPI)			
Study year	1	9.51 ± 2.09^a	8.54 ± 2.04^a
	2	$8.80 \pm 2.55^{a,b}$	$8.09 \pm 1.95^{a,b}$
	3	$9.21 \pm 2.57^{a,b}$	8.90 ± 2.27^a
	4	$9.11 \pm 2.46^{a,b}$	$8.20 \pm 2.64^{a,b}$
	5	$8.86 \pm 2.28^{a,b}$	7.57 ± 2.00^b
	6	8.60 ± 2.23^b	
p-value		0.0042	0.0004
Total population		9.12 ± 2.37	8.20 ± 2.19
Positive professional identity (PPI)			
Study year	1	12.79 ± 3.17^a	14.76 ± 2.37^a
	2	$13.32 \pm 3.26^{a,b}$	$15.12 \pm 2.81^{a,b}$
	3	12.77 ± 3.60^a	$14.82 \pm 3.02^{a,b}$
	4	$12.88 \pm 3.66^{a,b}$	15.95 ± 2.45^b
	5	$13.27 \pm 3.09^{a,b}$	15.90 ± 2.21^b
	6	13.89 ± 2.82^b	
p-value		0.0208	0.0005
Total population		13.04 ± 3.34	15.32 ± 2.60

Degree course	Medicine	Pharmacy	p-value	
	[$\bar{x}_{\text{mean}} \pm \text{SD}$]	[$\bar{x}_{\text{mean}} \pm \text{SD}$]		
Roles and responsibilities (RR)				
Study year	1	7.98 ± 1.98 ^{a,b}	8.39 ± 1.66 ^a	ns
	2	7.80 ± 1.71 ^a	8.45 ± 1.90 ^{a,b}	p = 0.0012
	3	8.26 ± 1.91 ^{a,b}	8.77 ± 2.16 ^{a,b}	p = 0.0195
	4	8.14 ± 1.74 ^{a,b}	8.56 ± 1.76 ^{a,b}	ns
	5	8.46 ± 1.70 ^b		p = 0.0129
	6	8.27 ± 1.78 ^{a,b}	9.16 ± 1.69 ^b	p = 0.0115
p-value	ns		0.0262	
Total population	9.69 ± 1.85	9.18 ± 1.84	p < 0.0001	
Readiness for Interprofessional Learning Scale factor (RIPLS)				
Study year	1	59.44 ± 10.37 ^a	66.31 ± 8.32 ^a	p < 0.0001
	2	61.29 ± 11.40 ^{a,b}	67.99 ± 7.66 ^{a,b}	p < 0.0001
	3	59.66 ± 11.54 ^a	65.80 ± 8.64 ^a	p < 0.0001
	4	59.88 ± 11.77 ^a	70.79 ± 8.81 ^b	p < 0.0001
	5	61.81 ± 10.77 ^{a,b}		p < 0.0001
	6	64.03 ± 8.93 ^b	71.26 ± 8.38 ^b	p < 0.0001
p-value	0.0012		p < 0.0001	
Total population	62.46 ± 8.82	67.46 ± 7.94	p < 0.0001	

a, b – groups followed by the same letter did not reach statistically significant differences; letter symbols applies only to the statistical analysis performed for comparison of results between different years of study; ns – no differences of statistical significance

Pharmacy students showed significantly higher RIPLS results than medical students at every stage of their studies and the similar connection was also observed in regards to TC and PPI subscales. They also showed lower NPI and higher RR values when compared with medical students, however the difference was not statistically significant for every study year.

Due to differences in study time duration of both degrees, an additional comparative analysis of the final year students' results was performed, that is the sixth year medical students and fifth year pharmacy students and the results obtained showed significant differences for both respective subscales and RIPLS factors.

The influence of gender on the readiness of students of medicine and pharmacy degree courses for inter-

professional learning was also examined during the study. Female pharmacy students achieved significantly higher RIPLS results than male pharmacy students and their scores were also significantly higher in regards to TC and PPI subscales. They also scored lower on NPI and higher on RR subscales values when compared with men, however the difference was not found to be statistically significant. Similar trends were also observed among students of medicine degree course, but none of them had statistical significance.

The comparison of mean RIPLS results of students of medicine and pharmacy degree courses in respective subscales in regards to their gender is presented in Table III.

Table III

Comparison of mean RIPLS results of students of medicine and pharmacy degree courses in respective subscales in regards to their gender

	TC [$\bar{x}_{\text{sr}} \pm \text{SD}$]	NPI [$\bar{x}_{\text{sr}} \pm \text{SD}$]	PPI [$\bar{x}_{\text{sr}} \pm \text{SD}$]	RR [$\bar{x}_{\text{sr}} \pm \text{SD}$]	RIPLS [$\bar{x}_{\text{sr}} \pm \text{SD}$]
Medicine degree course					
female	30.90 $\pm$ 6.04	9.06 $\pm$ 2.32	13.16 $\pm$ 3.16	9.74 $\pm$ 1.76	62.83 $\pm$ 8.23
male	30.13 $\pm$ 6.71	9.22 $\pm$ 2.45	12.84 $\pm$ 3.63	9.60 $\pm$ 1.99	61.79 $\pm$ 9.60
p-value	ns	ns	ns	ns	ns
Pharmacy degree course					
female	35.24 $\pm$ 5.25	8.18 $\pm$ 2.23	15.50 $\pm$ 2.54	9.20 $\pm$ 1.76	68.13 $\pm$ 7.73
male	32.99 $\pm$ 5.70	8.24 $\pm$ 2.01	14.67 $\pm$ 2.73	9.08 $\pm$ 2.11	65.15 $\pm$ 8.22
p-value	0.0002	ns	0.0107	ns	0.0054

RIPLS – Readiness for Interprofessional Learning Scale; subscales: TC - teamwork and collaboration, NPI - negative professional identity, PPI - positive professional identity, RR - roles and responsibilities; ns – no differences of statistical significance

Adult learning is thought to be more effective if learners find topics under discussion personally and occupationally important [16]. The results of researches carried out so far allow to conclude that students

invited to participate in IPE are interested in making contacts with representatives of other professions and highly estimate the value of such initiatives [6, 30, 39]. Any potential reluctance to IPE is therefore rather

caused by organizational factors (e.g., possible curriculum changes or time restrictions) than antipathy [26, 32]. It was also noted that one of the factors discouraging from IPE participation was the fear of making errors or showing incompetence in the presence of members of other professions [10, 38]. Still, Vafadar *et al.* [40] observed a strong sense of the need of such activities among students and their awareness of the negative consequences of uniprofessional education. Moreover, the results of the study conducted by Świeczkowski *et al.* showed positive attitudes of Polish medical and pharmacy students towards the introduction of pharmaceutical care [35].

The study aimed to describe the readiness of medicine and pharmacy students for interprofessional learning and to identify those factors which influence this variable.

Pharmacy students achieved the highest RIPLS results consecutively in the fifth and fourth year of study, which were significantly higher than those of lower-years students. Similarly, respondents from the medicine degree course also showed the highest readiness for IPE learning in the sixth year of study and the reason behind these observations might be an increased number of clinical subjects in their curricula. Moreover, medical students of higher years probably had more opportunities for social relationships with students of other faculties and according to Piecuch *et al.* their interactions with pharmacy students seem to influence medical students' perception of pharmacist's role and pharmaceutical care [30]. However, results obtained from studies published so far are inconsistent. Lie *et al.* [23] reported comparable RIPLS factor values for medicine and pharmacy students, while Coster [11] showed an opposite trend, which she explains by a strong self-identification within a chosen future occupation shown by students commencing their education.

Focused attention should also be paid to observed differences between students of corresponding years of study of both degree courses. RIPLS values of future pharmacists were higher at any given time than those of future physicians, which seems to confirm positive attitudes of pharmacy students towards IPE already described in the literature [14]. Similar observations were also noted by the aforementioned studies of Lie *et al.* [23] and Coster [11]. This is mirrored by results of de Oliveira *et al.* [28] who showed that students of nursing, dentistry and pharmacy degree courses presented higher RIPLS scores than their colleagues from other faculties including physical education, medicine and psychology. Noteworthy, Dabaghzadeh *et al.* [13] concluded that lower scores of medical students are likely to be caused by their sense of pre-eminence over other professions, which can be successfully altered by the help of IPE implementation.

The gender of respondents was also one of the variables influencing the RIPLS factor values in the study, but results were statistically significant only for pharmacy students with females scoring higher than males. Similar trends were also found for medical students, however they were not statistically significant. It is widely believed that women are more willing to establish cooperation than men [3] and this trend can also be observed in the described survey, as RIPLS factor and TC values were higher in the female population. This observation is consistent with data provided by other authors [11, 23]. On the other hand, Dabaghzadeh *et al.* [13] showed no effect of gender on RIPLS values and its subscale scores, however their results were obtained from a smaller sample size. Consequently, the existence of gender to RIPLS score correlation remains uncertain and it is believed that an explicit confirmation of the relationship between these two variables requires further studies.

Meanwhile, a meta-analysis performed by Balliet *et al.* [3] proved the great importance of other additional factors, including students' type of character and a recent study also emphasizes the role of individual's level of empathy [41].

Limitations

We acknowledge that the study had several limitations and as a result its findings should be interpreted with caution. Despite a large size of the dataset and the comparability of educational effects realized throughout medicine and pharmacy degree courses in Poland, the autonomy of the universities in development and realization of their curricula allows finding data obtained as representative only for students of our university. Deducing the findings for the wider population would be possible only after further studies. Moreover, the RIPLS scale itself has certain limitations that should be mentioned. Although overall internal consistency of the scale seems acceptable, some of the subscales, especially the Roles and Responsibilities subscale, tend to be discredited and even excluded. Moreover, its lack of precision of what exactly is assessed and high variation of factor structure are often criticized, which may impede interpretation and comparison of results. Even though the RIPLS is still frequently used, the aforementioned limitations should be kept in mind and considered [24]. Finally, the presented study included only one-time point and authors believe that further studies could be conducted to reassess obtained results and their changes over the years. What is more, it would be interesting to undertake efforts to determine and examine other variables that could potentially influence RIPLS values.

Conclusions

In conclusion, presented research shows that pharmacy students present a higher level of readiness for

undertaking interprofessional learning activities when compared with medical students. Additionally, it was observed that the level of readiness presented in the study was also significantly higher for students of final years of study. Regardless of the degree course, it should encourage to consider implementing IPE elements into the postgraduate training.

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Conflict of interest

The authors declare no conflict of interest.

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