Original Article

Evaluation of students' receptiveness and response to an interprofessional learning activity across health care disciplines: An approach toward team development in healthcare

CrossMark

M.P. Judge [a,*], E.C. Polifroni [a], A.T. Maruca [a], M.E. Hobson [b], A. Leschak [a,1], H. Zakewicz [a]

[a] University of Connecticut School of Nursing, Storrs, CT 06269-4026, USA
[b] University of Connecticut Health Center, Farmington, CT 06030, USA

ARTICLE INFO

ABSTRACT

Objective: This investigation evaluated if exposure to interdisciplinary education improves student readiness for interprofessional learning, fundamental to healthcare team development.

Methods: A pre-test post-test design was used to evaluate 308 students from dental medicine, dietetics, medicine, nursing, pharmacy and physical therapy. The Readiness for Interprofessional Learning Scale (RIPLS) was used to evaluate student responsiveness to interprofessional education.

Results: Nursing RIPLS mean post-test score was higher compared to the pre-test score ($p = 0.020$). Pharmacy students had higher RIPLS mean pre-test score compared to medical ($p = 0.010$) and nursing students ($p = 0.018$). RIPLS mean pre-test score was higher for dietetics than medical students ($p = 0.022$).

Conclusions/Implications: Interdisciplinary learning enhances readiness for interprofessional learning with nursing students. Pharmacy and dietetics students demonstrated a higher level of readiness for interdisciplinary learning compared to other disciplines. Identification of factors influencing readiness for interprofessional learning are key to developing learning strategies targeted to improve teamwork, quality of care and patient outcomes.

Copyright © 2015, Chinese Nursing Association. Production and hosting by Elsevier (Singapore) Pte Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1.   Introduction

Interprofessional education is the gold standard for pedagogy in health care education supporting the development of a pool of collaborative-practice ready professionals for improved health care team development. Interprofessional education provides healthcare students from various disciplines an opportunity to collaborate as a component of their training prior to entering the healthcare workforce. Such collaboration is hypothesized to enhance student receptiveness to interprofessional effectiveness across all healthcare disciplines. In 2011, the Interprofessional Education Collaborative (IPEC) expert panel called for expanded opportunities for healthcare professionals to actively participate in team-based care in interprofessional collaborative environments [1].

Team based healthcare delivery systems can support improved health care quality, safety and access [2]. Professionals from different disciplines make a unique contribution toward achieving a common quality care goal [3]. Traditionally the didactic educational component within specific health care disciplines has been discipline specific with little to no interdisciplinary exposure until students enter their clinical training component. Recent evidence points to the value of prior experience with interprofessional learning in improving professional identity and attitudes toward teamwork [4]. Hence, traditional professional programs would benefit from implementing structured interprofessional learning experiences.

Given the value of interdisciplinary education in healthcare disciplines in improving healthcare outcomes and the importance of prior exposure to such experiences in shaping professional identities and attitudes toward teamwork, the purpose of this study was to explore if an interdisciplinary educational activity improves student readiness for interprofessional learning.

Major Hypothesis: Students from all disciplines will have higher post-test scores on the Revised Readiness for Interprofessional Learning Scale (RIPLS) compared to the pre-test scores.

2.   Material and methods

2.1.   Study design

A Pre-test Post-test design was used to evaluate if students from dental medicine, dietetics, medicine, nursing, physical therapy and pharmacy will have higher post-test scores on the Revised Readiness for Interprofessional Learning Scale (RIPLS) compared to the pre-test scores following an interactive educational intervention.

2.2.   Sample

A convenience sample of students was recruited for the investigation based upon the following criteria: 1.) Currently enrolled in a university affiliated dental medicine, dietetics, medicine, nursing, physical therapy, or pharmacy program; 2.) English proficiency; 3.) At a point in their program when they have had clinical exposure. Students not meeting the inclusionary requirements were not invited to participate.

A total of 308 students from dental medicine (n = 42), dietetics (n = 23), medicine (n = 78), nursing (n = 77), physical therapy (n = 62) and pharmacy (n = 26) participated in an interprofessional learning activity as directed by their respective program coordinators. Undergraduate students from dietetics, nursing, physical therapy and pharmacy who were of varied ethnicity, age, and gender participated in the activity. Additionally, 3rd year medical and dental medicine students who were of varied ethnicity, age, gender also participated.

A sample size adequacy was determined using $\alpha = .05$ and $\beta = .80$ to detect a medium effect of the educational intervention on readiness for interprofessional learning [5].

2.3.   Recruitment

Program participation was conducted in accordance with IRB policies and procedures at the University of Connecticut. Information sheets informing students of this educational research activity were provided to coordinators to distribute to students from various disciplines who participated in the program.

2.4.   Instrument

2.4.1.   Revised Readiness for Interprofessional Learning Scale (RIPLS)

The RIPLS was developed to measure readiness of students from various health care disciplines for interprofessional learning experiences. The RIPLS is a 19-item likert scale survey with a score range of 19–95. High RIPLS scores are reflective of a high level of readiness for interprofessional learning [6]. The RIPLS has 4 individual subscale domains including: 1.) Teamwork & collaboration; 2.) Negative professional identity; 3.) Positive professional identity; and 4.) Roles and responsibility. The Cronbach Alpha value for the total scale is ($\alpha = 0.89$) indicating a high level of internal consistency. Participants completed the RIPLS prior to and immediately following the 4-h interdisciplinary educational program.

2.5.   Procedures

Upon arriving at the planned event and prior to educational activities, students were assigned seats to maximize interprofessional grouping at each table. Once seated, students were asked to complete the RIPLS pre-test. The pre-test created a benchmark of perception prior to the start of the interprofessional education and allowed for post program comparisons to measure program effectiveness. Information regarding specific discipline, gender, age, academic standing, amount of clinical exposure in academic program and number of years (if any) worked in a patient care setting was collected in addition to the RIPLS pre-test. Students were not asked for name or other identifiable information (i.e. name or email address). Post program RIPLS surveys asked students to specify their discipline without any other identifying information.

2.5.1. Educational program

The specific interprofessional learning activity called "Safety Starts with Me" (an interprofessional learning activity focused on high reliability error prevention) was delivered by program moderators using a PowerPoint format. The program was developed by the Connecticut Hospital Association's High Reliability Collaborative. The Collaborative is a first-of-its-kind statewide initiative to eliminate all-cause preventable harm using high reliability science. High Reliability has been used by many other industries that need to manage high risk. Healthcare has the possibility of catastrophic consequences including wrong-side surgery, blood transfusion in-compatibility, and medication errors, to name a few.

2.5.2. Interprofessional learning exercise

The training session included 6 strategically planned inter-active case discussions related to patient safety. The scenarios were chosen to ensure representation of all disciplines with regard to patient safety. During these interactive experiences, students from different disciplines were prompted to share their discipline-specific perspective related to different clinical scenarios. Faculty members representing different healthcare disciplines were assigned student tables and served as program facilitators during the 6 interprofessional learning exercises to encourage maximal interaction between students. Following the completion of the 4-h program, students were asked to complete the RIPLS post-test and to again identify their respective disciplines.

2.6. Statistical analyses

Independent samples t-test was used to compare pre-test scores with post-test scores by discipline and for the entire cohort. A one-way analysis of variance (ANOVA) was conducted to examine significant differences among the specific dimensions of RIPLS by discipline. Additionally, a Bonferroni post-hoc correction was used to perform multiple comparisons across disciplines for each of the dimensions. Note that for the dimension score of Negative Identity, the items were reverse coded for the RIPLS composite score; however, the original scores are presented in the group comparisons to better reflect the nature of the construct. SPSS version 21 was used for all analyses.

3. Results

Analyses of all disciplines combined indicated that 66% of the students were female, and 31% had been in their respective programs for more than three years. The average age of the students was 24.26 years old ($+/-$ 3.57). Discipline specific breakdown of demographic characteristics are outlined in Table 1. The cohort had $\alpha = 0.85$ for the RIPLS total score (pre-test).

3.1. Comparison of pre-test and post-test scores overall and by discipline

Overall, RIPLS post-test score (Mean = 75.32 ± 11.03) did not significantly differ from RIPLS pre-test score (Mean = 73.99 ± 11.14) across disciplines t(611 = −1.72, $p = 0$ .09).

When comparing among disciplines, RIPLS pre-test scores ranged between 66.46 ± 9.07−74.42 ± 7.28 with medicine scoring lowest among the disciplines and pharmacy scoring highest. RIPLS mean pre-test score was significantly higher for pharmacy students than that for medical ($p = 0.010$) and nursing students ($p = 0.018$). Dietetics student RIPLS mean pre-test score was significantly higher than the medical students ($p = 0.022$).

Comparisons of pre-test and post-test scores by discipline disclosed no significant changes in RIPLS scores from pre-test to post-test for dietetics, medicine, pharmacy or physical therapy (Table 2). In contrast, nursing students had a significantly higher RIPLS post-test score compared to RIPLS pre-test scores.

3.2. Post-test comparison by discipline

RIPLS mean post-test score was significantly higher for pharmacy students than that for medical ($p = 0.000$). Dietetics student RIPLS mean post-test score was significantly higher than the medical students ($p = 0.006$).

3.3. Pre-test scores separated by RIPLS domain

Fig. 1 outlines the average score and standard deviations of RIPLS teamwork and collaboration domain by discipline. The domain score for medicine was significantly lower compared to pharmacy ($p = 0.012$).

Fig. 1 outlines average score and standard deviations of RIPLS negative identity domain by discipline. Dental medicine was significantly higher than physical therapy, nursing, pharmacy, and dietetics ($p < 0 .05$). Medicine was significantly different from physical therapy, nursing, and pharmacy ($p < 0.001$).

Fig. 1 outlines average score and standard deviations of RIPLS positive identity domain by discipline. Medicine was significantly different from pharmacy ($p < 0.01$).

Fig. 1 outlines average score and standard deviations of RIPLS roles and responsibility domain by discipline. Dental was significantly different from physical therapy, nursing, pharmacy, dietetics ($p < 0 .001$). Medicine was significantly different from physical therapy, nursing ($p < 0.001$). Physical therapy was significantly different from dental ($p < 0.001$).

4. Discussion/Conclusion

Contrary to our expectation, RIPLS scores did not significantly improve for the entire cohort following the interprofessional learning activity. Comparisons within each discipline revealed a significant improvement in RIPLS scores with nursing students following the interdisciplinary learning intervention but not for any of the other disciplines evaluated. This finding is in contrast with the work of Lairamore et al. who reported improved RIPLS scores following a case-based interprofessional intervention across all disciplines [7]. Based on this we conclude that the presentation-based intervention used in this investigation may have limited

Table 1 − Demographic characteristics by discipline.

	Dental (n = 42)	Medicine (n = 79)	Physical therapy (n = 62)	Nursing (n = 77)	Pharmacy (n = 27)	Dietetics (n = 18)
Age						
Mean ± SD	25.90 ± 3.68	25.56 ± 2.09	24.44 ± 3.83	22.25 ± 3.88	23.48 ± 1.91	23.96 ± 3.94
Gender						
F = female	57% F	47% F	66% F	87% F	44% F	100% F
M = male	43% M	53% M	34% M	13% M	56% M	
Year in program	100% 3rd year	98% 3rd year	43% 1st year; 33% 2nd year; 25% 3rd year	97% 4th year	33% 3rd year; 33% 4th year; 7% 5th year; 26% 6th year	59% 2nd year; 13% less than 1 and 4th years; 9% 1st year; 5% 3rd year

student receptiveness and supports the notion that interprofessional educational programming is strengthened with a case-based approach or other student centered pedagogy. Further, length of the 4 hour activity, requirement to travel to a different campus, and grouping with undergraduate and graduate level disciplines may have contributed to reduced readiness and these factors should be further evaluated.

Lie et al. reported a mean RIPLS score of 75.33 ± 8.92 for junior level medical students and 75.02 ± 9.39 for senior level medical students [8]. The RIPLS mean scores as reported by Lie et al. were higher than the scores we report for the medical students included in our investigation with a mean RIPLS pretest score of 70.46 ± 9.7. Lie et al. reported a mean RIPLS score of 77.42 ± 8.59 for junior level pharmacy students and 77.52 ± 8.0 for senior level pharmacy students and our RIPLS pre-test mean that we report are in corroboration with these prior findings.

The significantly better mean RIPLS score for pharmacy compared to medical students that we report is in contrast with the findings of Lie et al. who reported no difference between these disciplines [8]. The educational intervention, Safety Starts with Me, used in this investigation focused on high reliability error prevention is a topic that relates directly with the role of pharmacy students and the prevention of such errors is a primary function of pharmacy hospitalists. Further, it is likely that the information in the training was more novel to pharmacy students compared to medical students who may have been exposed to similar content in mandatory hospital orientations and other training. Given this impact, particular focus is necessary when planning interprofessional learning activities to ensure equal engagement among disciplines.

Table 2 − Comparison of Pre-test and Post-test scores by discipline.

Discipline	RIPLS pre-test score	RIPLS post-test score	p-value
	Mean ± SD(n)	Mean ± SD(n)	
Dental medicine	69.65 ± 9.79(42)	68.41 ± 11.75(27)	p = 0.642
Dietetics	72.47 ± 9.91(23)	74.91 ± 11.34(22)	p = 0.459
Medicine	66.46 ± 9.07(78)	66.49 ± 12.45(77)	p = 0.969
Nursing	67.71 ± 12.82(77)	70.81 ± 8.33(81)	p = 0.020[a]
Pharmacy	74.42 ± 7.28(26)	75.82 ± 7.66(28)	p = 0.500
Physical therapy	69.25 ± 9.05(62)	69.75 ± 8.22(69)	p = 0.532

[a] Statistically significant.

As outlined, specific subscale domains of the RIPLS include Teamwork & collaboration, Negative professional identity, Positive professional identity and Roles and responsibility. Comparison of the subscale domains by discipline is useful in understanding views and attitudes that may be characteristic of a specific discipline and may provide an explanation for the differences observed between the disciplines for RIPLS composite score. Of particular interest are the Negative Identity and Roles and Responsibilities RIPLS domains. Both dentistry and medicine had significantly higher scores on the Negative Professional Identity domain compared to multiple other disciplines. Specific items in the Negative Professional Identity RIPLS domain include: "I don't want to waste my time learning with other health-care students", "It is not necessary for undergraduate health-care students to learn together" and "Clinical problem-solving skills can only be learned with students from my own department". The significant difference observed in dentistry and medicine on the Negative Professional Identity domain may be in part due to the fact that the item "It is not necessary for undergraduate health-care students to learn together" is geared toward undergraduate students and not dental and medical graduate level students. Likewise, the Roles and Responsibilities RIPLS domain resulted in a significantly higher score for both dentistry and medicine compared to multiple other disciplines. Specific items in the Roles and Responsibilities RIPLS domain include: "The function of nurses and therapists is mainly to provide support for doctors", "I'm not sure what my professional role will be" and I have to acquire much more knowledge and skills than other healthcare students". Given the specific items of the Roles and Responsibilities RIPLS domain, it is understandable that graduate level dental and medical students would score differently compared to other disciplines. Considering the differences we report related to medical and dental students compared to the other disciplines, our findings point to a need for enhanced experiential learning with regard to the role of nursing within the healthcare team as step toward the enhancement of readiness in these disciplines for medical team building. Additionally, given the evolving role of the advanced practice nurse in healthcare delivery, future interprofessional learning research should include advanced practice students to enable the assessment of readiness for interprofessional learning compared to other disciplines.

Resource issues and departmental logistical inconsistencies have been reported as barriers to interprofessional education initiatives [9]. More specifically, from an
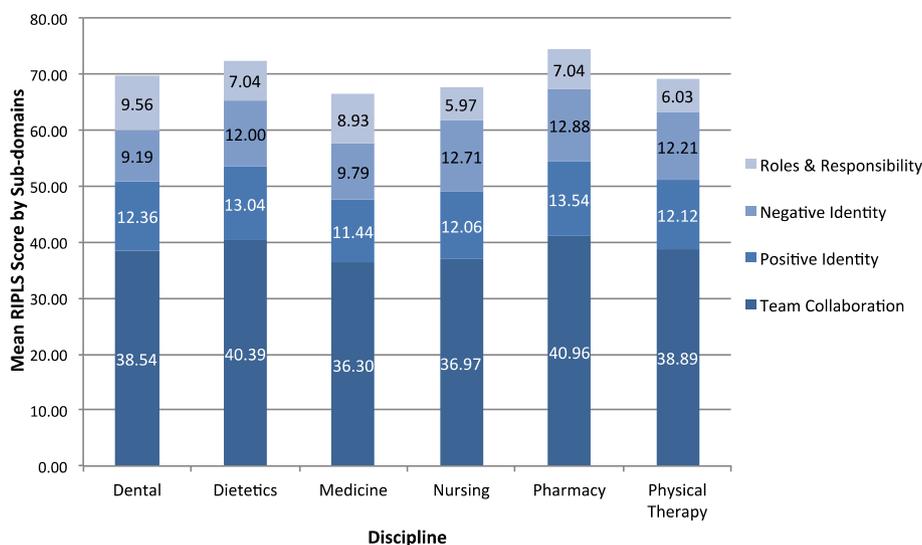
Fig. 1 – RIPLS composite of sub-domain scores by discipline.

administrative perspective, fixed annual budgets are typically endowed with the sufficient amount necessary to maintain the status quo and have limited flexibility with regard to new initiatives [9]. A team of interdisciplinary faculty members is necessary in planning, course development, teaching and student evaluation which can be costly from both budgetary and time perspectives. Another issue relates to varied requirements for licensure across individual disciplines. Curricula are often packed with courses tailored around licensure requirements and additional course requirements or significant restructuring of existent courses may ultimately result in additional student expense [9]. In addition to resource and administrative issues, healthcare disciplines vary with regard to attitude and willingness to engage in interprofessional learning [10,11]. Progressive steps are necessary in developing university-wide interprofessional initiatives supporting collaboration across university health-care disciplines. University-wide interprofessional initiatives should be tied with key educational models thus creating a framework to serve as a basis for planning [9].

In summary, careful consideration of specific educational intervention activity and discipline grouping by undergraduate vs. graduate status are likely to impact student readiness for interprofessional learning and to enhance receptiveness through interdisciplinary educational activities. Future research in this area should be expanded to consider prior exposure to interprofessional educational activities as prior experience of interprofessional learning has been reported to enhance student professional identity and attitudes toward teamwork [4]. Curriculum planning across disciplines should consider integrated exposure to interprofessional activities throughout the curriculum to maximize student receptiveness to interprofessional learning and ultimately medical team building.

Author contributions

All authors worked together is study conception, and implementation. Judge and Polifroni designed the trial and conducted data collection and statistical analyses. Polifroni obtained project funding. Judge drafted the manuscript and all authors contributed substantially to manuscript development and revision. Judge takes responsibility for the paper as a whole.

Conflict of interest

The authors declare no conflict of interest.

R E F E R E N C E S

[1] Interprofessional Education Collaborative Expert Panel. Core competencies for interprofessional collaborative practice. Report of an expert panel. Washington, DC: Interprofessional Education Collaborative; 2011.
[2] World Health Organization (CH). Framework for action on interpersonal education and collaborative practice. Winter available from. 2010., http://www.who.int/hrh/resources/framework_action/en/index.html.

[3] College of Nurses of Ontario (CA). Practice guideline: utilization of RNs and RPNs. College of Nurses of Ontario; 2005.

[4] Hood K, Cant R, Baulch J, Gilbee A, Leech M, Anderson A, et al. Prior experience of interprofessional learning enhances undergraduate nursing and healthcare students' professional identity and attitudes to teamwork. Nurse Educ Pract 2014;14(2):117—22.

[5] Polit DF, Beck CT. In: Nursing research. 9th ed. Philadelphia: Wolters Kluwer Health/Lippincott, Williams & Wilkins; 2012.

[6] McFadyen AK, Webster V, Strachan K, Figgins E, Brown H, McKechnie J. The readiness of interprofessional learning scale: a possible more stable sub-scale model for the original version of RIPLS. J Interprofessional Care 2005;19(6):595—603.

[7] Lairamore C, George-Paschal L, McCullough K, Grantham M, Head D. A care-based interprofessional education forum increases health students' perceptions of collaboration. Med Sci Educ 2013;23(3S):472—81.

[8] Lie DA, Fung CC, Trial J, Lohenry K. A comparison of two scales for assessing health professional students' attitude toward interprofessional learning. Med Educ Online 2013;18(21885). online.

[9] Tourse JF, Mooey J, Shindul-Rothschild J, Prince J, Pulcini JA, Platt S, et al. The university/community partnership: transdisciplinary course development. J Interprofessional Care 2008;22(5):461—74.

[10] Rose M, Smith K, Veloski JJ, Lyons JK, Umland E, Arenson CA. Attitudes of students in medicine, nursing, occupational therapy and physical therapy toward interprofessional education. J Allied Health 2009;38(4):196—200.

[11] Wilhelmsson M, Ponzer S, Dahlgren LO, Timpka T, Faresjo T. Are female students in general and nursing students more ready for teamwork and interprofessional collaboration in healthcare? BMC Med Educ 2011;11(15). online.