

Use of profession-role exchange in an interprofessional student team-based community health service-learning experience

Jun Wang (✉ wangjun@wust.edu.cn)

Wuhan University of Science and Technology School of Medicine

Jie Guo

Wuhan University of Science and Technology School of Medicine

Yubin Wang

Wuhan University of Science and Technology School of Medicine

Dan Yan

Wuhan University of Science and Technology

Juan Liu

Wuhan University of Science and Technology

Yinghong Zhang

Wuhan University of Science and Technology

Xianmin Hu

Wuhan University of Science and Technology

Research article

Keywords: Interprofessional education, Profession-role exchange, Role-play, Community service learning, Integration

Posted Date: March 10th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-16614/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Version of Record: A version of this preprint was published on July 2nd, 2020. See the published version at <https://doi.org/10.1186/s12909-020-02127-z>.

Abstract

Background: During interprofessional clinical practice, compared to understanding of one's own professional role and function, it might be more difficult to clarify the roles and contributions of the other health-care team members because of the inter-professional barrier. In order to provide students the opportunity for real experience with other professions in team environments and enhance their perceptions of other professions' role, this study developed a comprehensive and multi-dimension extracurricular interprofessional education (IPE) model through designing and integrating a profession-role exchange component, that was medical students as pharmacists or nurses, pharmacy students as physicians or nurses, and nursing students as physicians or pharmacists in the interprofessional health-care student team, into the service learning experience in a real community setting.

Methods: In this pre/post-intervention study, the effect of integrated profession-role exchange experiences on the students' attitudes towards interprofessional collaboration and their role clarification was evaluated among 60 student volunteers (20 medical students, 20 pharmacy students and 20 nursing students). All involved students were divided into the profession-role exchange intervention group and the control group. Subjects in the control group did not participate the profession-role exchange experiences, the other IPE procedures were the same for both groups. Three survey instruments for attitudes toward interprofessional clinical collaboration were respectively used to measure the students' attitudes toward physician-pharmacist, physician-nurse and nurse-pharmacist collaborations. "Roles and responsibilities" subscale of Readiness for Interprofessional Learning Scale was used to evaluate the overall role clarification during IPE

Results: Compared to the control IPE activity, the addition of profession-role exchange component resulted in the significant increase in students' positive attitudes towards interprofessional collaboration, and the enhancement of students' role awareness.

Conclusions: The profession-role exchange might be more effective and better initiate students to the practice of interprofessional collaboration, and could be used as an effective IPE tool for improving the role awareness of health-care students.

Background

Along with the rapid advancement of modern health-care practices, an interprofessional care model has been well-accepted to be important for supporting a comprehensive patient-centred service provision through blending complementary knowledge and skills from multiple health professions, such as medicine, nursing and pharmacy [1-4]. Through working together in team to care for patients, clinical interprofessional practice makes possible the best use of resources, improves outcomes, and is able to meet increasingly complex health needs of patients [4]. As an essential element of interprofessional practice and collaboration, clear perceptions of interprofessional team members regarding their professional roles are crucial for the effectiveness of interprofessional care [2,3]. To successfully participate in a well-functioning interprofessional team, health-care professionals first need to understand the roles of their own and other team members.

The role is considered to represent "a set of expectations in the sense that it is what one *should do*" [2]. The role perceptions of health-care professionals would translated into actual actions in clinical practice, thus are essential for improving patient care and achieving interprofessional team success [2,3,5,6]. Compared to understanding of one's own professional role and function, it might be more difficult to clarify the roles and contributions of the other health-care team members because of the inter-professional barrier. *Knowledge of professional role of others* has been mentioned as a key competency that is required for successful interprofessional practice and collaboration [7]. In order to provide a comprehensive and optimal team-based health care, each team member should revolve around specific role expectations and meet perceived professional responsibilities. Team members as a group must have an understanding of the competencies and skills which each team member could contribute, and can determine who is the best suitable one to implement the given clinical intervention that is required in a given situation [2]. Nevertheless, a lack of awareness, definition and recognition of one another's role was still believed as a main conceptual barrier to interprofessional collaboration as perceived by the involved actors [4,8,9], which need to be overcome in the future.

Interprofessional education (IPE), whereby students from different health-care professions learn and practise together, has shown to have a positive impact on team work in the students' future health-care practice, contribute to train effectual health-care teams and optimize future holistic patient care [9,10]. In order to prepare the students to interprofessional team practice, health-care education programs should provide adequate learning opportunities that enable students to interact with potential professional team members, gain insight into the roles, professional cultures, and contributions of collaborating team members [2,10]. In our previous study [11], we developed an IPE opportunity through integrating cooperative learning into an interprofessional student team-based community service event, and found a significant increase in positive attitudes among the involved students towards interprofessional collaboration after participation in this IPE activity. The use of cooperative learning interacting with colleagues from other professions was beneficial to expand students' exposure to the role of other health-care professionals [11]. However, this previous IPE opportunity only involved medical and pharmacy students. Importantly, it is generally accepted that role clarification in interprofessional collaboration requires real experience with other professions in team environments [12]. In an effort to improve our existing IPE activity, we further speculated, if some interventions were vividly integrated into the service learning experience in a real community setting, this IPE activity might be more effective and better initiate students to the practice of interprofessional collaboration.

In this study, in order to explore a promising approach for enhancing students' perceptions of the role of other professions and develop a comprehensive and multi-dimension extracurricular IPE model, we designed and integrated a profession-role exchange component, that was medical students as pharmacists or nurses, pharmacy students as physicians or nurses, and nursing students as physicians or pharmacists, in the interprofessional student team-based community service experience. In this protocol, the students were encouraged to experience interprofessional team working in community settings as a different role from their own professional background. Then, the effect of integrated profession-role exchange experiences on the students' attitudes towards interprofessional collaboration and their role clarification was evaluated.

Methods

Study description

A total of 60 third-year students (20 medical students, 20 pharmacy students and 20 nursing students; 19 males and 41 females), who had learned basic disease/drug knowledge and community service skills, volunteered to participate in the IPE activity on May 12-13, 2019. Faculty organized an interprofessional student team-based local community diabetes self-management education. The involved students were randomly divided into the profession-role exchange intervention group and the control group. Each group was composed of 10 medical students, 10 pharmacy students and 10 nursing students. Two weeks prior to the IPE activity, all the student volunteers were informed about the aim and step of this IPE activity, organized into interprofessional teams during an initial meeting convened by faculty committee. The CONSORT guidelines were followed and the study flowchart is presented in Fig. 1.

Step 1 Cooperative learning

Previously, we used cooperative learning based on six-stage model of group investigation to prepare for the subsequent community service learning [11]. The students carried out the cooperative learning in the organized interprofessional teams. Students were arranged to learn and discuss the knowledge and skills, which were required to deliver interprofessional care in the subsequent community service experience, in collaborative small-group learning situations. Moreover, students from different professions were encouraged to offer their own professional opinions about diabetes control, in order to let students from other professions understand their own professional roles and responsibilities. Meanwhile, positive collaborative relationships among the three professions could be built through the reciprocal discussion among team members. On the day before the community service IPE activity, faculty committee convened a formal meeting, in which the students were required to report on their group's cooperative learning work, present the group community diabetes self-management education project, outline and negotiate all team members' potential professional contributions.

Step 2 Community service learning

Considering the prevalence of increased incidence of type 2 diabetes among the public, the hierarchical diagnosis and treatment system reforms for improving the community health service system have been initiated in response to the challenges of chronic diseases represented by diabetes in China [13]. Accordingly, Chinese health profession students have more opportunities to access to a wide variety of patients with a range of acute to chronic diabetic conditions, and learn professional diabetes-related knowledge and skills in community-based settings. Community service-learning is a common representation format for the service/learner model, the latter of which is a team approach to experiential education and has been suggested as a potential teaching method for IPE [14,15]. After cooperative learning, the students participated in a community service experience aiming to increase diabetes self-management education. The interprofessional student teams conducted household visits for the community residents suffering from diabetes, the list of whom was given by the community hospital, to educate them about diabetes self-management and address their health-care needs. The responsibilities of health-care students from different professions were proposed and assigned based on the clinical practice and the Standards for Diabetes Self-Management Education and Support [16](Fig. 1).

Intervention Profession-role exchange

On the days the local community diabetes self-management education IPE activity was conducted, in the intervention group, the profession-role exchange experiences were used to further enhance the role awareness of health-care students. As a kind of role-playing education game, profession-role exchange is an innovative simulation-based experiential learning method, in which health-care students from different professions play one another's role in an environment similar to the clinical environment. This new role experience may help students to develop awareness and valuing of the future collaborating team members' potential contributions in providing effective patient care, as well as objectively view their own role from a perspective of partners. During the community diabetes self-management education IPE activity (Step 2), students in the intervention group were required to perform the responsibilities of the students from other professions. That is, one medical student in a team should perform the responsibilities of the pharmacy students in their team; the other medical student should play the role of the partner nursing students in their team. And one pharmacy student in this team should act as a student physician; the other pharmacy student should adopt characters or roles of the nursing students in their team, and so on. The role-choices of students were based on their own will and the negotiation among the team members. As students began the role-exchange experiences, they were allowed to consult with their peers, but could not let other students work instead of themselves.

Subjects in the control group did not participate the profession-role exchange experiences, the other IPE procedures (Step 1 and 2) were the same for both groups. The above IPE experience was governed by a volunteer faculty committee, and under the supervision of three qualified practitioners.

Measures

Physician-pharmacist collaboration survey instrument

As common-used validated instrument for measuring interprofessional collaboration between physicians and pharmacists [11,17], SATP²C was applied to measure the perceptions of physician-pharmacist collaboration among the involved medical and pharmacy students. There are 16 Likert-type items on a 4-point scale (4:strongly agree; 3:agree; 2: disagree or 1:strongly disagree) in SATP²C. Higher scores mean more positive attitudes toward physician-pharmacist collaborative relationships.

Physician-nurse collaboration survey instrument

The medical and nursing students in both intervention and control groups were required to complete the Jefferson Scale of Attitudes Towards Physician-Nurse Collaboration (JSAPNC) [18], which included 15 items on a 4-point scale (1:strongly disagree-4:strongly agree). A higher total score indicates a more positive

attitude toward physician–nurse collaboration.

Nurse-pharmacist collaboration survey instrument

The attitudes toward nurse–pharmacist collaboration among the nursing and pharmacy students were analyzed using a previously self-developed 25-item scale [19], the overall score of which ranges from 25 to 100 theoretically. Higher scores reflect more positive attitudes toward nurse–pharmacist collaboration.

“Roles and responsibilities” subscale of Readiness for Interprofessional Learning Scale (RIPLS)

All the participant students were asked for responses to “Roles and responsibilities” subscale of RIPLS, which was firstly developed by Parsell & Bligh [20] to assess the readiness of health-care students for multi-professional learning. There are three underlying factors in RIPLS, which were respectively named as “Team-working and collaboration”, “Professional-identity” and “Roles and responsibilities” [21]. Among them, “Roles and responsibilities” subscale of RIPLS has been widely used to specially evaluate the overall role clarification during IPE [12,22]. This subscale includes 3 items rated on a 5-point scale, ranging from (1: strongly Disagree - 5: strongly agree). Higher total scores indicate greater role clarification.

Data collection

At the initial meeting before beginning the IPE intervention, students received a letter of information and the printed questionnaires. Only participants completing the questionnaires were included in the subsequent study. Participants received the same questionnaires immediately following the community service-learning experience. All 60 students completed the pre-study questionnaires, but a medical student in the profession-role exchange intervention group and a nursing student in control group did not complete the post-study questionnaires thus were excluded from analyses.

Data analysis

Data were coded and entered into SPSS22.0. Results were expressed as mean \pm standard deviation (SD). The Wilcoxon matched-pairs signed rank test was used to compare the differences between the results from pre- and post-study surveys. The differences between the outcomes of the profession-role exchange intervention group and the control group were investigated using the independent *t* test. Differences were considered to be statistically significant when *p*-value < 0.05.

Results

Because all the participants were the third-year students, their ages were all around 21. Among 29 control students who completed both pre-study and post-study questionnaires, 9 were males and 20 were females. The profession-role exchange intervention group had the same gender distribution as the control group. Collectively, the gender, age, specialty, or grade distribution of participants was approximately equal between the two groups.

Medical and pharmacy students’ attitudes toward physician-pharmacist collaboration

All the medical and pharmacy participants in the IPE activity, except a medical student, completed both the pre- and post-activity surveys on attitudes toward physician-pharmacist collaboration using SATP²C. As shown in Table 1, after the IPE activity, significant enhancements in SATP²C scores were found in both control and intervention groups (*p*<0.01). Importantly, when compared with the control group, the addition of profession-role exchange in the intervention group markedly further increased the total SATP²C scores (*p*<0.05). In the control group, the total SATP²C scores were increased by 17.7 and 13.3% for medical and pharmacy students, respectively; in the intervention group, the total scores were respectively increased by 23.4 and 19.2% for medical and pharmacy participants.

Three underlying constructs, namely “Responsibility and accountability”, “Shared authority” and “Interdisciplinary education”, had been emerged from the factor analysis of SATP²C [17]. In line with the changes in the total scores, for the medical students, participating in the profession-role exchange was associated with the increased scores in all the three subscales on the SATP²C (*p*<0.05, vs. control group); for the pharmacy students, the increase of scores in “Responsibility and accountability” and “Shared authority” subscales in the intervention group was 16.1 and 21.2%, respectively; while that in the control group was 9.4 and 14.4%, respectively.

Medical and nursing students’ attitudes toward physician-nurse collaboration

As shown in Table 1, significant statistical differences (*p*< 0.01) in the total JSAPNC score were found between pre-activity and post-activity in both control and intervention groups. And the increases of the total score in the medical and nursing students who had experienced profession-role exchange (31.6 and 29.7%, respectively) was more markedly than those of the control students (17.4% and 16.1%, respectively).

Table 1 The effect of profession-role exchange intervention on the the students’ attitudes towards interprofessional collaboration and their role clarification (Mean \pm SD).

Among the four extracted factors of JSAPNC, it was interesting to found that, after the intervention of profession-role exchange, medical and nursing students displayed significantly more positive attitudes toward “Caring vs. Curing”, “Nurse’s autonomy” and “Physician’s dominance” (*p*<0.05; *p*<0.01), which are factors reflecting students’ perceptions of professional role. The high score in the “Caring vs. curing” factor indicated that the respondent students highly appreciated the nurses’ contributions to educational and psychosocial aspects of patient care [23]. A higher factor score on the “Nurses’ autonomy” dimension suggested a more positive view of nurses’ importance in decisions about patient care [23]. As for two reversely-scored items identified as “Physician’s dominance”

Items	Factors	Medical students				Pharmacy students				Nursing students			
		Control group (n=10)		Intervention group (n=9)		Control group (n=10)		Intervention group (n=10)		Control group (n=9)		Intervention group (n=10)	
		Pre-activity	Post-activity	Pre-activity	Post-activity	Pre-activity	Post-activity	Pre-activity	Post-activity	Pre-activity	Post-activity	Pre-activity	Post-activity
SATP ² C	Responsibility and accountability	27.8±3.8	31.4±2.6**	28.0±2.9	33.4±2.2**#	29.8±2.6	32.6±2.5**	29.2±2.7	33.9±2.3**#	-	-	-	-
	Shared authority	14.9±1.7	18.0±1.5**	15.2±1.7	19.0±1.0**#	16.0±1.7	18.3±1.7**	15.6±1.4	18.9±1.3**#	-	-	-	-
	Interdisciplinary education	6.4±1.1	8.4±0.8**	6.7±1.1	9.1±0.8**#	6.8±1.1	8.7±1.2**	7.3±1.4	9.3±0.8**	-	-	-	-
	Total scores	49.1±5.0	57.8±3.4**	49.9±4.3	61.6±2.88**#	52.6±3.3	59.6±2.7**	52.1±3.0	62.1±3.7**#	-	-	-	-
JSAPNC	Shared education and team work	21.2±1.5	24.7±1.7**	20.8±1.9	24.9±1.9**	-	-	-	-	21.1±2.0	24.6±1.7**	20.8±1.5	24.6±1.7**
	Caring vs. curing	8.9±1.1	10.6±1.1**	8.9±0.9	11.4±1.3**#	-	-	-	-	9.0±1.4	11.1±1.2**	8.8±1.1	11.1±1.2**
	Nurse's autonomy	6.0±2.4	7.2±3.0	5.7±1.9	9.3±2.4**#	-	-	-	-	6.4±1.7	8.0±1.7*	6.1±2.1	8.0±1.7*
	Physician's dominance	3.6±1.5	4.1±2.0	3.9±1.5	6.0±1.9**#	-	-	-	-	4.6±2.1	4.0±1.1	4.7±2.1	4.0±1.1
Scale of attitudes toward nurse-pharmacist collaboration	Total scores	39.7±4.0	46.6±4.8**	39.3±3.1	51.7±4.4**#	-	-	-	-	41.1±2.2	47.7±1.9**	40.4±1.5	47.7±1.9**
	Interprofessional team-based practice	-	-	-	-	30.6±3.8	35.4±5.1**	30.7±4.9	37.3±5.0**	29.4±5.0	35.2±4.8**	29.5±1.5	35.2±4.8**
	Roles/responsibilities for collaborative practice	-	-	-	-	17.8±6.1	21.2±6.3	17.3±6.4	25.0±1.5**#	13.4±5.7	18.4±6.0*	16.0±1.5	18.4±6.0*
	Relationship between nurses and pharmacists	-	-	-	-	10.4±3.2	12.7±3.0*	11.2±2.0	13.9±1.4**	8.9±2.7	12.2±1.6**	9.6±2.1	12.2±1.6**
RIPLS	Nurses' experience of pharmacist's role in drug treatment	-	-	-	-	10.4±1.3	11.7±0.7**	10.4±1.6	11.6±0.7*	9.4±1.1	10.3±1.5	8.5±2.1	10.3±1.5
	Total scores	-	-	-	-	69.2±9.8	81.0±12.6*	69.6±7.5	87.8±7.1**#	61.2±11.2	76.2±9.9**	63.6±11.2	76.2±9.9**
	Roles and responsibilities	11.9±1.7	13.2±1.7*	11.7±1.3	14.2±1.1**#	11.0±1.2	12.3±1.3**	11.6±1.4	13.7±1.5**#	11.8±0.9	12.8±1.0*	11.6±1.5	12.8±1.0*

*p < 0.05; **p < 0.01. Pre- and post-activity surveys were analysed using the Wilcoxon matched-pairs signed rank test.

#p < 0.05; ##p < 0.01. The differences between the outcomes of the intervention group and the control group were investigated using the independent t test.

questions, more students showed a rejection of physicians' totally dominant role in patient care after profession-role exchange intervention ($p < 0.05$; $p < 0.01$). These data suggested that the profession-role exchange experiences reversed the common role-stereotype of nurses as "collaborators" and physicians as "team leaders".

Nursing and pharmacy students' attitudes toward nurse-pharmacist collaboration

As shown in Table 1, despite the fact that the control IPE activity increased the total attitude scores toward nurse-pharmacist collaboration among nursing and pharmacy students by 17.1 and 24.5%, respectively ($p < 0.05$; $p < 0.01$, vs. pre-activity), the integration of profession-role exchange experience into the IPE activity achieved further improvement ($p < 0.05$; $p < 0.01$, vs. control group). Importantly, the nursing and pharmacy students' attitudes toward "Roles/ responsibilities for collaborative practice" were significantly enhanced by the profession-role exchange experiences (44.5% in pharmacy students and 54.4% in nursing students of the intervention group vs. 19.1% in pharmacy students and 37.3% in nursing students of control group). And the nursing students' scores in the "Nurses' experience of pharmacist's role in drug treatment" subscale were obviously decreased by 29.4% after the profession-role exchange intervention, when compared with those of control nursing students ($p < 0.01$).

Students' scores in "Roles and responsibilities" subscale of RIPLS

In the control group, the medical, pharmacy and nursing students' scores in "Roles and responsibilities" subscale of RIPLS were respectively enhanced by 10.9, 11.8 and 8.5% after the control IPE activity ($p < 0.05$; $p < 0.01$). In the profession-role exchange intervention group, the scores of medical, pharmacy and nursing students were enhanced by 21.4, 18.1 and 19.0%, respectively ($p < 0.05$; $p < 0.01$). The between-group comparison showed that participating in the profession-role exchange further increased the scores in the role understanding subscale of RIPLS among students from any of the three health-care professions ($p < 0.05$).

Discussion

Role-play, as an integral part of simulation-based education method in experiential learning, has been demonstrated to allow for the multi-level brain processing of experiences, thus be effective in constructing the cognitive and emotional learning of health-care students [24,25]. However, previous educational studies were usually associated with students in single roles during simulation rather than assuming multiple roles [24], which might hinder the students from a comprehensive learning experience in the simulation modality. Therefore, several authors advocated the use of a special kind of role playing named as "role reversal" [26], "dual role-play" [27], or "peer role play" [28] as a teaching strategy whereby health-care students assume multiple roles in role-play simulation. No matter what name it was given, this kind of role-play simulation intervention highlighted the importance of perspective taking in the experiential learning. Nevertheless, all these previous studies [26-28] focused on the switching of roles to experience between health-care professional and patient perspectives. In the present study, we firstly used the role exchange between different professions in the interprofessional student team.

Profession-role exchange in this study offered the health-care students some insight into the experience of being the other professional members in interprofessional clinical team. Due to the multiple roles (including: the role that the student played, his/her own profession role, the role of other cooperative team members that other students played) in the IPE programme, students could immersively experience the interprofessional team working, and develop interprofessional knowledge and skills within the same simulation scenario. Here, the profession-role exchange was combined into an integrated learning method of cooperative learning and community service-learning, which we previously presented [11], in order to further improve the effectiveness of the designed extracurricular IPE activity. This study used the previously designed IPE learning method of cooperative learning and community service-learning as

the control, and studied the effect of the addition of profession-role exchange as the intervention on the students' attitudes towards interprofessional collaboration and their role understanding. The results showed a significant facilitating effect on the respondents' orientation toward interprofessional team work and the role perceptions of team members in both the intervention group and the control group. Importantly, this effect is more pronounced after experiencing the addition of profession-role exchange than after experiencing with the control IPE activity without profession-role exchange component. This perspective taking experience allows students to understand other professionals' roles in team-based community health-care work, to reflect on their own past professional skills, as well as to understand the importance of interprofessional communication and collaboration.

In this study, three survey instruments for attitudes toward interprofessional clinical collaboration, including SATP²C [17], JSAPNC [18] and a self-developed 25-item scale [19], were used to measure the students' attitudes toward physician- pharmacist, physician-nurse and nurse-pharmacist collaborations, respectively. The profession-role exchange significantly enhance the scores in some extracted factors, especially "Responsibility and accountability" and "Shared authority" in SATP²C; "Caring vs. Curing", "Nurse's autonomy" and "Physician's dominance" in JSAPNC; "Roles/responsibilities for collaborative practice" and "Nurses' experience of pharmacist's role in drug treatment" in the nurse-pharmacist collaboration survey instrument, which reflected the respondents' professional role clarification. Moreover, the results from "Roles and responsibilities" subscale of RIPLS also indicated that the students' understanding of roles of their own and other interrelated professions was further fostered after participating in the profession-role exchange experiences. These data showed that the experiences of students in role simulation as their cooperative team members in the teamwork situation were effective in strengthening the role identity and the communication among professions in the clinical setting. In their role as collaborators, health-care students have an opportunity to observe their own role in interprofessional collaboration from a new perspective, decide what elements to adopt in their own future clinical practice, and integrate their past professional knowledge and experiences to a novel situation for a creative solution.

Therefore, the combine of profession-role exchange with the cooperative learning-based community service IPE activity could further help students to develop the role perceptions of other health-care professionals, as well as hone their self-awareness, enhance interprofessional collaborative skill acquisition in a safe environment, thus prepare students for future real interprofessional contacts in a collaborative environment, allow for optimal contributions from all team members in providing holistic patient care. The integration of profession-role exchange component in an interprofessional student team-based community health service-learning experience could be used as a comprehensive extracurricular IPE tool for improving the role awareness of health-care students. This study provided a referential model for the professional role assignment during the further simulated IPE programs.

This study contained some limitations. SATP²C, JSAPNC and a previously self-developed 25-item scale were respectively chosen to detect students' attitudes toward physician-pharmacist, physician-nurse and nurse-pharmacist collaboration. However, the psychometric integrity of these instruments is still limited. Therefore, the psychometric properties of these chosen instruments should be further critically appraised. In addition, the intervention of profession-role exchange was conducted only once. The small sample size and single-institution nature may limit the generalizability of the results. Further research and replication of this study with a larger sample of students from multiple institutions are needed to strengthen our findings.

Conclusions

Our study concluded that a profession-role exchange component introduced in an interprofessional student team-based community health service-learning experience allowed the health-care students to experience the perspectives of their partners in the clinical team work under the community-based learning model. The profession-role exchange intervention resulted in the enhancement of students' role awareness in interprofessional collaboration, thus could be used as an effective IPE tool.

Abbreviations

IPE: Interprofessional Education; JSAPNC: Jefferson Scale of Attitudes Towards Physician-Nurse Collaboration; RIPLS: Readiness for Interprofessional Learning Scale; SD: Standard Deviation

Declarations

Ethics approval and consent to participate

Approval was obtained from the Ethics Committee of Medicine College, Wuhan University of Science and Technology (2019039). All participants were informed and consented.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

This work was supported by a project of medical education research funded by Medical education branch of the Chinese medical association and medical education professional committee of the Chinese association of higher education (2018B-N02084), a project of educational science planning in Hubei province (2019GB019), and a Provincial Teaching Research Project in Hubei (2014230).

Authors' contributions

JW contributed to the design of the research, JW, JG, YW, DY, JL, YZ and XH carried out the intervention and data acquisition. JW, JG and XH analyzed, interpreted the data. JW and XH prepared the article. All authors read and approved the final manuscript.

Acknowledgements

We thank all persons who participated in our study.

Author details

¹ College of Medicine, Wuhan University of Science and Technology, Wuhan, China.

References

1. Wan S, Teichman PG, Latif D, Boyd J, Gupta R. Healthcare provider perceptions of the role of interprofessional care in access to and outcomes of primary care in an underserved area. *J Interprof Care*. 2018;32(2):220–3.
2. Bochatay N, Muller-Juge V, Scherer F, et al. Are role perceptions of residents and nurses translated into action?. *BMC Med Educ*. 2017;17(1):138.
3. Benson H, Lucas C, Benrimoj SI, Williams KA. The development of a role description and competency map for pharmacists in an interprofessional care setting. *Int J Clin Pharm*. 2019;41(2):391–407.
4. Supper I, Catala O, Lustman M, Chemla C, Bourgueil Y, Letrilliart L. Interprofessional collaboration in primary health care: a review of facilitators and barriers perceived by involved actors. *J Public Health (Oxf)*. 2015;37(4):716–27.
5. Bittner CA. The Importance of Role Clarity for Development of Interprofessional Teams. *J Contin Educ Nurs*. 2018;49(8):345–7.
6. Saxe JM, Balano K, Wamsley M, Nakajima M, Brock T. Promoting Role Clarity for Health Professional Students Participating in an Interprofessional Behavior Change Counseling Workshop. *J Allied Health*. 2017;46(2):e35–7.
7. Macdonald MB, Bally JM, Ferguson LM, Lee Murray B, Fowler-Kerry SE, Anonson JM. Knowledge of the professional role of others: a key interprofessional competency. *Nurse Educ Pract*. 2010;10(4):238–42.
8. Morin C, Desrosiers J, Gaboury I. Enablers and barriers to the development of interprofessional collaboration between physicians and osteopaths: A mixed methods study. *J Interprof Care*. 2018;32(4):463–72.
9. Homeyer S, Hoffmann W, Hingst P, Oppermann RF, Dreier-Wolfgramm A. Effects of interprofessional education for medical and nursing students: enablers, barriers and expectations for optimizing future interprofessional collaboration - a qualitative study. *BMC Nurs*. 2018;17:13.
10. von der Lancken S, Gunn E. Improving role identity by shadowing interprofessional team members in a clinical setting: an innovative clinical education course. *J Interprof Care*. 2019;33(5):464–71.
11. Wang J, Hu X, Liu J, Li L. Pharmacy students' attitudes towards physician-pharmacist collaboration: Intervention effect of integrating cooperative learning into an interprofessional team-based community service. *J Interprof Care*. 2016;30(5):591–8.
12. Hudson CC, Gauvin S, Tabanfar R, Poffenroth AM, Lee JS, O'Riordan AL. Promotion of role clarification in the Health Care Team Challenge. *J Interprof Care*. 2017;31(3):401–3.
13. Xue-Juan W, Hao W, Cai-Ying G, et al. Impact of an intelligent chronic disease management system on patients with type 2 diabetes mellitus in a Beijing community. *BMC Health Serv Res*. 2018;18(1):821.
14. Buff SM, Jenkins K, Kern D, et al. Interprofessional service-learning in a community setting: findings from a pilot study. *J Interprof Care*. 2015;29(2):159–161. doi:10.3109/13561820.2014.934956
15. Hall P, Weaver L. Interdisciplinary education and teamwork: a long and winding road. *Med Educ*. 2001;35(9):867–75.
16. Beck J, Greenwood DA, Blanton L, et al. 2017 National Standards for Diabetes Self-Management Education and Support. *Diabetes Educ*. 2020;46(1):46–61.
17. Hojat M, Spandorfer J, Isenberg GA, Vergare MJ, Fassih R, Gonnella JS. Psychometrics of the scale of attitudes toward physician-pharmacist collaboration: a study with medical students. *Med Teach*. 2012;34(12):e833–7.
18. Hojat M, Fields SK, Veloski JJ, Griffiths M, Cohen MJ, Plumb JD. Psychometric properties of an attitude scale measuring physician-nurse collaboration. *Eval Health Prof*. 1999;22(2):208–20.
19. Wang SP, Wang J, Huang QH, Zhang YH, Liu J. Pharmacy and nursing students' attitudes toward nurse-pharmacist collaboration at a Chinese university. *BMC Med Educ*. 2018;18(1):179.
20. Parsell G, Bligh J. The development of a questionnaire to assess the readiness of health care students for interprofessional learning (RIPLS). *Med Educ*. 1999;33(2):95–100.
21. McFadyen AK, Webster V, Strachan K, Figgins E, Brown H, McKechnie J. The Readiness for Interprofessional Learning Scale: a possible more stable sub-scale model for the original version of RIPLS. *J Interprof Care*. 2005;19(6):595–603.

22. Stull CL, Blue CM. Examining the influence of professional identity formation on the attitudes of students towards interprofessional collaboration. *J Interprof Care*. 2016;30(1):90–6.
23. Hojat M, Gonnella JS, Nasca TJ, et al. Comparisons of American, Israeli, Italian and Mexican physicians and nurses on the total and factor scores of the Jefferson scale of attitudes toward physician-nurse collaborative relationships. *Int J Nurs Stud*. 2003;40(4):427–35.
24. McNamara N. Preparing students for clinical placements: The student's perspective. *Nurse Educ Pract*. 2015;15(3):196–202.
25. Young J. Using a Role-Play Simulation Game to Promote Systems Thinking. *J Contin Educ Nurs*. 2018;49(1):10–1.
26. Mathews JL, Parkhill AL, Schlehofer DA, Starr MJ, Barnett S. Role-reversal exercise with Deaf Strong Hospital to teach communication competency and cultural awareness. *Am J Pharm Educ*. 2011;75(3):53.
27. Lim EC, Oh VM, Seet RC. Overcoming preconceptions and perceived barriers to medical communication using a 'dual role-play' training course. *Intern Med J*. 2008;38(9):708–13.
28. Bosse HM, Schultz JH, Nickel M, et al. The effect of using standardized patients or peer role play on ratings of undergraduate communication training: a randomized controlled trial. *Patient Educ Couns*. 2012;87(3):300–6.

Figures

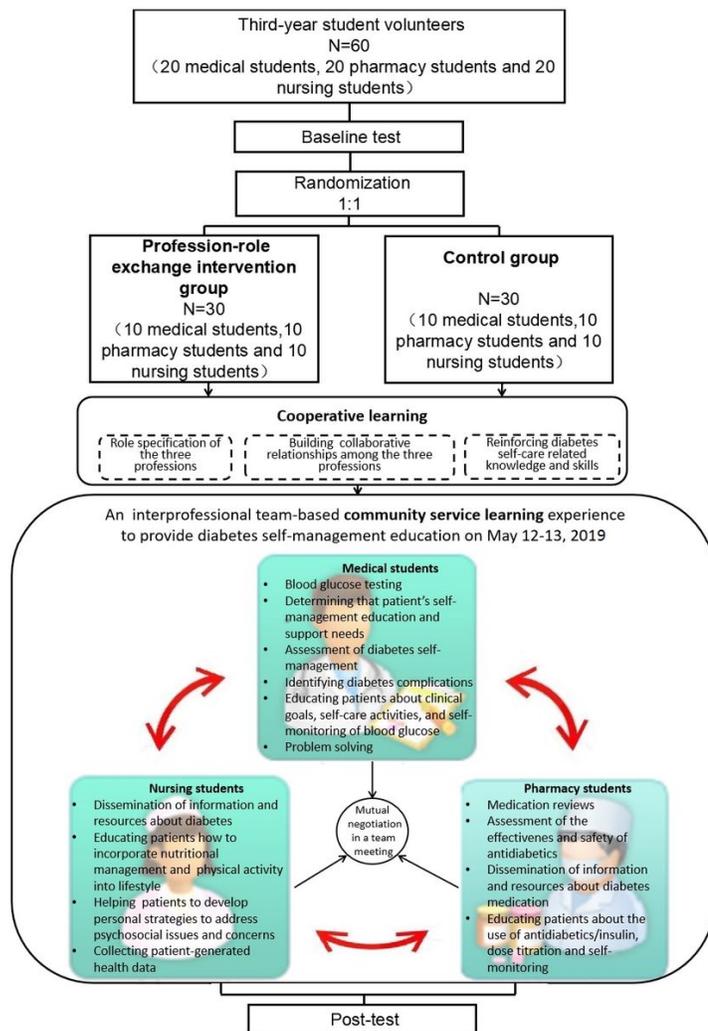


Figure 1
Study flowchart. Subjects in the control group did not participate the profession-role exchange experiences (shown as red arrows), the other IPE procedures were the same for both groups.