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# **EFFECTIVENESS OF EMPATHY CLINICAL EDUCATION FOR CHILDREN'S NURSING STUDENTS: A QUASI-EXPERIMENTAL STUDY**

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**Ethical Approval:** Ethical approval for the study was granted by the hospital Research Ethics Committee (HCHLL-2017-31). The study purpose and method were explained in the study participant information letter. Students were assured that their data would be confidential and anonymised. Students had the right to withdraw from the study at any time. Their participation and withdraw would not affect their internship and academic career. A signed consent form was not required from the Research Ethics Committee.

**Contribution of Authors:**

XD, LZ, LW, DL, JML contributed to the design of the study, BZ, SH contributed to the data collection; JS, XD contributed to the data analysis; XD and JML drafted the first manuscript. LZ, LW, DL provided revisions. All authors contributed to manuscript revision, read and approved the submitted version.

## **ABSTRACT**

**Background:** Empathy is a central competence for nursing students in delivering compassionate care. Empathy training might improve the communication skills in children's nursing students.

**Objectives:** To evaluate the effectiveness of the Knowledge, Simulation, and Sharing training programme on empathy skills among children's nursing students.

**Design:** A controlled pre-post intervention study with a quasi-experimental design.

**Setting:** Tertiary children's hospital in China.

**Participants:** Children's nursing students (n=250) in clinical internship.

**Methods:** A Knowledge, Simulation, and Sharing (KSS) module related to empathy learning was developed and tested during a 10-month period in 2017. Nursing students were divided into an experimental group (n=125) and control group (n=125). Both groups received the standard internship programme. The experimental group received the KSS training. Outcome measures were: Jefferson Scale of Empathy-Health Professions Student, Clinical Communication Competence Scale and Professional Identity Scale.

**Results:** At the end of the internship the experimental groups had significantly higher empathy scores than the control group (114.57 versus 110.36;  $p=0.016$ ). The communication skills improved significantly in the experimental group after the training; experimental group mean 90.22 versus control group mean 87.41 ( $p=0.042$ ). The professional identity scores were significantly higher in the

experimental group at the end of the internship compared to the control group (mean 116.43 versus 107.68;  $p < 0.001$ ). Subgroup analysis revealed only significant differences on professional identity outcomes between experimental and control groups on diploma level (mean 115.78 versus 107.72;  $p < 0.001$ ); and bachelor's level (mean 120.05 versus 108.00;  $p < 0.016$ ).

**Conclusion:** The KSS training can enhance empathy and communication skills and the professional identity in children's nursing students. Further long-term effectiveness of the training needs to be tested, ideally with reported outcomes measures of children and parents.

**Key words:** Empathy; Pediatric Nursing; Nurses; Students; Communication; Knowledge; Simulation Training; Education.

## INTRODUCTION

Empathy is an essential component in delivering compassionate nursing care. Several studies have shown that empathy is positively related to the clinical communication competence, self-efficacy, and professional attitude of nurses (Lee et al., 2018; Pazar et al., 2017; Petrucci et al., 2016). It can also affect job satisfaction in nursing students (Duarte and Pinto-Gouveia, 2017). In addition, empathy can improve emotional intelligence and strengthen nursing students' empathy tendency (Bas-Sarmiento et al., 2017; Ozcan et al., 2010).

Empathy has been defined as healthcare professionals' skills in understanding the feelings of others, identifying emotional situations, and responding effectively to patients' needs (Zhai et al., 2015). It is one of the most addressed issues in delivering humanistic patient care (Reynolds et al., 1999). Empathy is a multidimensional concept that includes emotional, cognitive, moral, behavioural and relational dimensions (Derksen et al., 2013).

Empathy is a special communication skill and has an impact on interpersonal relationships (Percy et al., 2018). In recent years, the concept of nursing in China and internationally has been constantly changing. The traditional nursing philosophy focusing on physical and psychological support, and thus on strengthening the empathy skills of nursing staff, has increased emphasis on delivering compassionate care (Wang et al., 2017). Empathy is an important competency for nurses in three main areas. First, the concept of empathy is integrated into nursing management. Empathy competency among nurse managers or supervisors can enable them to better understand the feelings and emotions of nursing staff, thereby enabling them to provide greater support to promote staff wellbeing and enthusiasm (Söderberg et al., 2017). Second, empathy skills can improve communication between nurses and patients and consequently enhance their relationship (McMillan et al., 2011). Studies have shown that 50%-80% of nurse-patient conflicts are caused by poor communication between nurses and patients, and good communication skills can effectively promote a positive relationship between nurses and

patients (Studdert, et al., 2003; Corlett and Twycross, 2006; Wu, et al., 2016). Third, utilizing empathy teaching in nursing students has great value and helps them to understand the essence of clinical nursing and achieve better teaching effects (Ozcan et al., 2010).

Understanding patients' needs and feelings is important to include in the nursing curriculum to improve the empathy skills of nursing students (Ding et al., 2018). A recent systematic review identified 23 studies evaluating the effect of various methods of empathy learning (Levett-Jones et al., 2019). The most effective interventions were those with empirical simulation components in the programme. Of the 23 included studies, only six studies described a simulation component in their empathy training intervention, including role play, manikin-based scenarios, and simulations reflecting specific patient disabilities (Levett-Jones et al., 2019). In this respect, simulation education is gaining momentum in nursing education and has demonstrated its beneficial effect compared to that of traditional learning methods (Shin et al., 2015).

Nursing students are expected to show empathy to patients and family members while delivering compassionate care. Traditionally, the Chinese nursing education system has focused on clinical knowledge and skills training, while humanistic and psycho-social care has received less attention (Li et al., 2016; Yang et al., 2013; Sun et al., 2017). This might lead to a low professional identity among nursing students, which may prompt them to leave the nursing profession (Traynor and Buus, 2016; Wang et al., 2017). Researchers documented that a nursing professional identity has a positive correlation with empathy and affects quality of care (Guo et al., 2018; Andrew, 2012; Traynor and Buus, 2016; Browne et al., 2018). Furthermore, greater empathy can increase nurses' understanding of patients' needs and patient engagement. Consequently, this can enhance patient satisfaction and professional satisfaction and inspire nursing professional identity (Bas-Sarmiento et al., 2017; Huang et al., 2016).

Empathy is a skill that can be learned via theory and simulation training

(Reynolds et al., 1999). Ideally, empathy should be included in competency skill training in the curriculum of undergraduate nursing education. Developing an effective training module related to empathy and communication learning for nursing students might enhance their communication skills and improve their professional identity.

A new module for empathy learning was developed and named the Knowledge, Simulation, and Sharing (KSS) module. The module was developed using Bloom's taxonomy of educational objectives theory (Bloom., 1956; Ramirez., 2016). The taxonomy of educational objectives emphasises learning process and is composed of three sections: cognitive, sentiment and practice (Zhao et al., 2015). The KSS module also incorporates the framework of Chen's empathy training course based on the interpersonal relationships of college students (Chen et al., 2011). Chen's course was guided by the theory of empathy education in psychology to train students' empathy skills for handling different situations (Chen et al., 2011).

### AIM

The aim of our study was to develop a module for empathy learning and to evaluate its effectiveness among children's nursing students. Specifically, the objectives were to evaluate the new module with respect to empathy skills, communication skills and professional identity.

### METHODS

#### Study design

The study used a pre-post intervention with a quasi-experimental design. The new educational module was delivered to children's nursing students during their internship at a children's hospital over a 10-month period from March to December 2017 (Fig. 1).



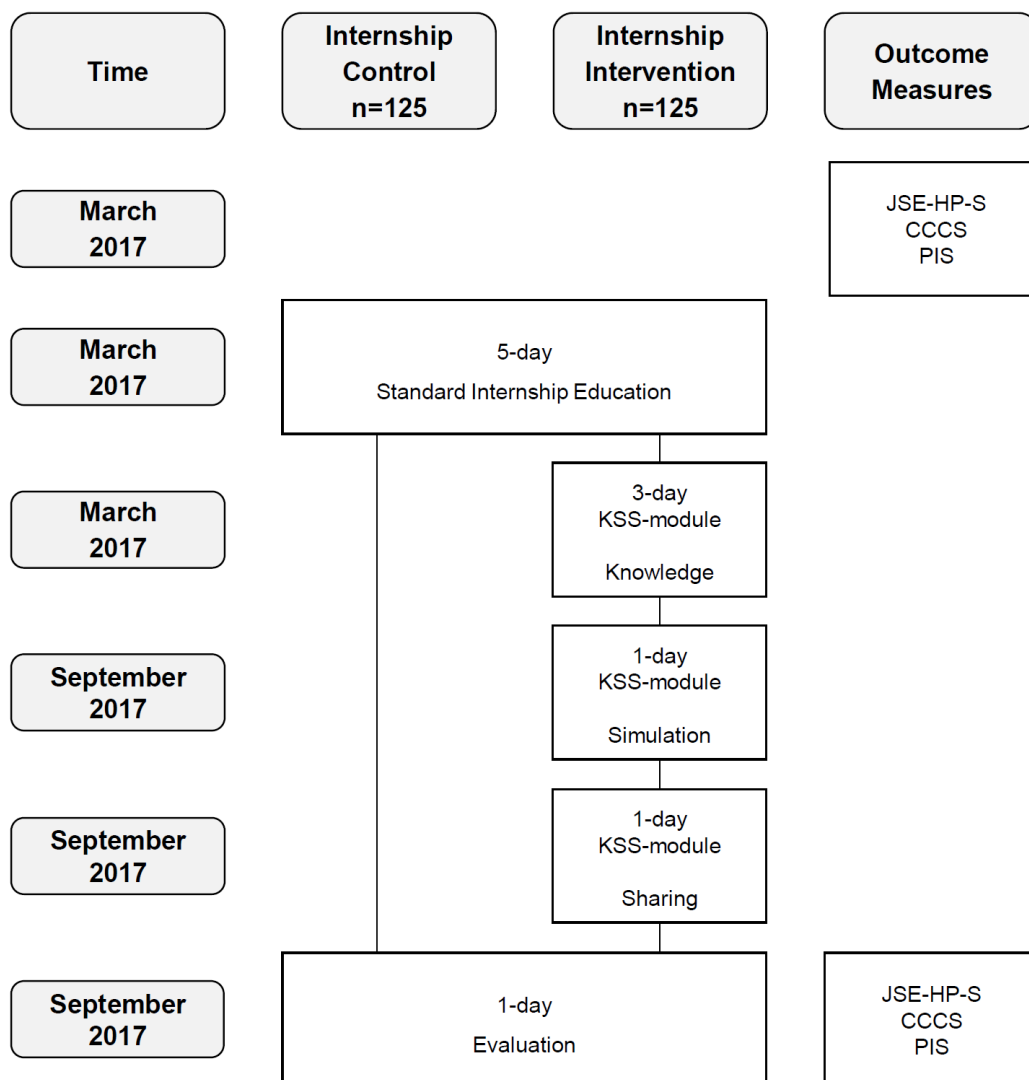


Figure 1. Study Outline

CCCS=Clinical Communication Competence Scale; JSE-HP-S=Jefferson Scale of Empathy-Health Profession-Student; KSS=Knowledge, Simulation, Sharing; PIS=Professional Identity Scale.

The outcome measures were collected before and after the training. A quasi-experimental design was adopted with an experimental and control group due to the limitation of blinding in delivering the KSS module to the experimental group (Bärnighausen et al., 2017). The reporting of our study conforms to the recommendations for improving the reporting quality of nonrandomized evaluations of behavioural and public health interventions: the TREND statement, the Trend Group (Des Jarlais, et al., 2004).

## Setting

The study was conducted at Hunan Children's Hospital in Changsha, China. The hospital is a tertiary teaching hospital with 2000 beds covering all paediatric specialities. The children's nursing students starting their internship in the hospital came from four nursing schools located in Hunan Province.

## Participants and recruitment

The participants were nursing students in their final year of nursing education. No exclusion criteria were defined because the eligible participants needed to be registered as a children's nursing student at the hospital and to have received an approved health check. The undergraduate nursing education system in China is divided into the diploma and bachelor's levels. Depending on the entry level, the diploma degree duration is three or five years, and the bachelor's degree is four years.

According to previous research (Zhu et al., 2016), the average Jefferson Scale of Empathy score for nursing students was 107.57, with a standard deviation of 17.446. After the implementation of the KSS module, the empathy score for nursing students was expected to reach 115 points, as documented by Qing et al. (2015) among bachelor's nursing students. Assuming that  $\alpha=0.05$  and  $\beta=0.1$ , according to the formula  $n = 2\vartheta^2 \times f(\alpha, \beta)/(u_1 - u_2)^2$ , the number of nursing students included in each group should be 116. We estimated a drop-out rate of 10%, resulting in a total sample size of 255 nursing students to be included. Ultimately, the sample included 250 children's nursing students.

All the nursing students (n=250) started their internship in March 2017 and were assigned by convenience upon registration. The first 125 nurses who registered were assigned to the control group; the last 125 nurses were assigned to the experimental group (Fig. 2).

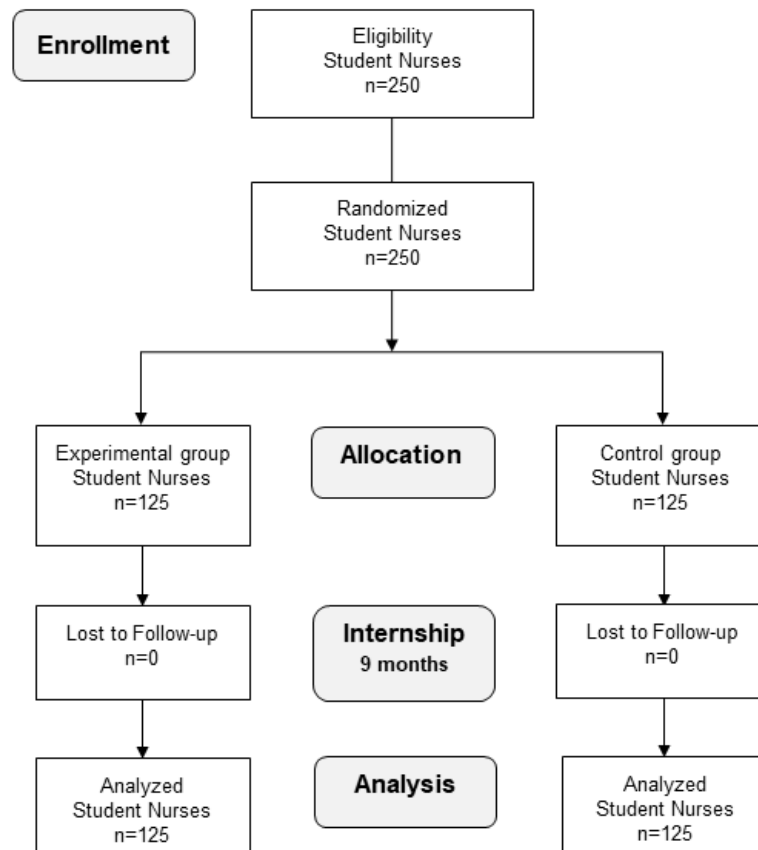


Figure 2. Study Flowchart

### Educational intervention

The content of the KSS module is designed for nursing students in paediatric clinical practice. The module was developed by seven nursing experts and four

psychologists with expertise in nursing knowledge, teaching methods, scenario simulation and communication. The draft curriculum of the module was designed by three authors (XD, DyL, and LhZ) and was based on material from the literature (Zhao et al., 2015; Chen et al., 2011). The draft content of the module was discussed and revised in consultation with senior experts in paediatric clinical nursing, nursing education and nursing management. Agreement on the final content of the KSS module was achieved by a consensus meeting with the experts and developers. The KSS module includes three components: Knowledge, Simulation and Sharing (Table 1).

Table 1. Knowledge, Simulation and Sharing module

Component	Context	Time
Knowledge	Five key solutions of happy internships, non-violent communication, non-verbal communication, application of empathy in nursing humanities, dedication and prudence, clinical communication skills, relationship tips in paediatrics.	3 days
Simulation	Students were required to engage with different scenario and role play in clinical settings.	1 day
Sharing	Students were asked to summarize the relevant knowledge points of empathy, write a self-reflection document about what they have learned during the training, and to discuss experience with their teachers and peers.	1 day

The Knowledge phase includes lectures over three days. The teaching component instills knowledge of empathy theory using a problem-oriented teaching model. Case analysis methodology is adopted to teach students the empathy theory and the empathy needs that may arise in different paediatric clinical situations. In the Simulation phase, the students participate in simulation scenarios with six to eight students per group. The aim of this one-day session is to improve the clinical practice of empathy. Students are required to be proactively engaged in the different clinical scenarios and role play. The emphasis of the scenarios is on empathic communication with children and parents and compassionate care. In the Sharing phase, the nursing students

are asked to provide a self-reflection report before coming to the session. During the one-day session, students actively share and discuss their empathy knowledge and experiences with the teachers and their peers.

The module was delivered over five days during the 9-month internship. The first three days occurred in March 2017 and included the Knowledge component of the KSS module. The fourth day involved Simulation training and was delivered in September 2017. The fifth day was the Sharing component of the module, delivered in September 2017. A detailed programme of the KSS module is available online (Electronic Supplement Material 1).

#### Standard internship education

The standard internship education consists of two phases. The first phase is a 5-day course. The first four days are theory-based education related to paediatric nursing, including infection prevention, communication skills, conflict management, medical waste, medical/nursing errors, and an introduction to the hospital. The fifth day is paediatric resuscitation training. The second phase of the internship occurs at the end of the 10-month internship and involves an evaluation meeting in the clinical wards. During this meeting, the students receive theory and skill tests related to their specific clinical area and feedback from their preceptors.

#### Measurements

The outcome measures were related to empathy, communication competence and professional identity. The study used three instruments: the Jefferson Scale of Empathy-Health Profession-Student, the Clinical Communication Competence Scale and the Professional Identity Scale.

The Jefferson Scale of Empathy-Health Profession-Student (JSE-HP-S) was developed by Hojat et al. (2002). The self-administered questionnaire has 20 items organised in three subscales: perspective taking, compassionate care, and standing in the patient's shoes. Responses are given using a seven-point Likert scale ranging from 'totally disagree' to 'totally agree', with a score range of 20-140. A score  $\leq 60$  indicates a low level of empathy; a total score between

61 and 99 indicates a high level of empathy, and a total score  $\geq 100$  indicates a high level of empathy (An, et al., 2008). The questionnaire has been translated into 17 languages and is widely used to evaluate empathy competence among healthcare professionals and students (Fields et al., 2011; Hsiao et al., 2013). The Chinese version of the JSE-HP-S, tested among nursing students, has adequate psychometric properties: a Cronbach's alpha of 0.75, a test-retest reliability of 0.66 and a split-half reliability of 0.77 (An, et al., 2008).

The Clinical Communication Competence Scale (CCCS) was developed by Yang and colleagues to evaluate nursing students' clinical communication skills (Yang et al., 2010). This scale uses communication behaviour as a basic reference and integrates patient-centred care (Yang et al., 2010). The 28-item scale consists of six dimensions: harmonious relationship, identifying patient problems, listening, verifying feelings, participating, and transmitting information. Responses are given using a 4-point scale from 'always' to 'never'. Higher scores indicate better clinical communication skills. The CCCS has adequate psychometric properties: a content validation ratio of 0.84, a Cronbach's alpha of 0.83, a test-retest reliability of 0.84, and a split-half reliability of 0.70.

The Professional Identity Scale (PIS) was developed in China by Liu and colleagues (Liu, et al., 2011) to assess the professional identity of nurses. This 30-item scale includes five dimensions: cognition evaluation, social support, social skills, frustration response and self-reflection. The PIS uses a 5-point Likert-type scale ranging from 'completely disagree' to 'totally agree'. A score of 30-60 indicates a low level of professional identity, 61-90 a moderately low level, 91-120 a medium level, and 121-150 a high level. The scale has good reliability measures: a Cronbach's alpha of 0.94 and a split-half reliability of 0.88 (Liu, et al., 2011).

#### Data collection

The nursing students in the control group received standard internship education in the hospital without any form of empathy training. The

experimental group received standard internship education and the KSS module. The 250 students received and completed a demographic questionnaire and three questionnaires at the beginning of the internship and at the end of the internship (Fig. 1). The questionnaires were anonymous, and the students were not asked to provide any identifiable data. The data analysis was performed using the anonymous data by two authors (XD and JS) who were not involved in the allocation of the students or the delivery of the training modules. Furthermore, students in the experimental and control groups could not be blinded to their group assignment while working in clinical practice during the nine-month internship. This is a bias that could not be prevented and might have an effect on the data collection and results.

#### Data Analysis

For descriptive statistics, means and standard deviations were used. The differences between groups in terms of the measurement outcomes were tested using an independent t-test. Subgroup analysis of the diploma level and bachelor's level variables was performed for both groups using an independent t-test. A paired t-test was used to determine the difference before and after the intervention in the experimental group and the control group. The difference was statistically significant at a p-value <0.05. IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0 (Armonk, NY: IBM Corp.) was used to calculate the descriptive and inferential statistics.

#### Ethical Considerations

Ethical approval for the study was granted by the hospital Research Ethics Committee (HCHLL-2017-31). The study purpose and method were explained in the study participant information letter. Students were assured that their data would be confidential and anonymised. Students had the right to withdraw from the study at any time. Their participation and withdrawal would not affect their internship or academic career. A signed consent form was not required by the Research Ethics Committee.

## RESULTS

### Participants

In total, 250 participants were included in the study, with 125 students in the experimental group and 125 in the control group. There was no loss to follow-up in the 9-month internship period (Fig. 2). No differences were observed at baseline between the two groups in terms of gender, age, education, educational system, only child status, and birth location (Table 2).

Table 2. Demographic characteristics of participants

Variables		Control (%)	Experimental n (%)	$\chi^2/t$	p-Value
Gender	Male	5 (4)	6 (4.8)	0.278	0.598
	Female	120 (96)	119 (95.2)		
Age		20.04±1.41	20.31±1.26	-1.608	0.109
Education	Diploma	108 (86.4)	106 (84.8)	0.130	0.719
	Bachelor	17 (13.6)	19 (15.2)		
Education system	3-year Diploma	83 (66.4)	80 (64.0)	0.177	0.915
	4-year BSc	7 (5.6)	8 (6.4)		
	5-year Diploma	35 (28.0)	37 (29.6)		
One child in family	Yes	13 (10.4)	15 (12.0)	0.161	0.688
	No	112 (89.6)	110 (88.0)		
Birth location	Rural	104 (83.2)	102 (81.6)	0.110	0.740
	City	21 (16.8)	23 (18.4)		

### Jefferson Scale of Empathy-Health Profession-Student

The experimental group had lower empathy scores than the control group at the beginning of internship. However, the experimental group had higher scores than the control group after training (Table 3). The mean JSE-HP-S score increased in the experimental group from 108.39 to 114.57 ( $p<0.001$ ) after the KSS training. In the control group, the increase in score was not significant after the standard internship education (Table 3).



Table 3. Empathy scores in two groups before and after the standard internship education and the KSS module

	<i>n</i>	Pre-internship mean (SD)	Post-internship mean (SD)	Mean difference (95%CI)	<i>p</i> -Value
Control	125	109.06 (12.12)	110.36 (11.86)	-1.304 (-2.967;0.359)	0.123
Experimental	125	108.39 (12.62)	114.57 (15.43)	-6.176 (-8.101;-4.251)	<0.001
Mean difference (95%CI)		-0.664 (-3.745;2.417)	-4.208 (-7.638;-0.779)		
<i>p</i> -Value		0.672	0.016		

Empathy scores are scores of the Jefferson Scale of Empathy-Health Profession-Student questionnaire; KSS=Knowledge, Simulation, Sharing module as received by the experimental group; SD=Standard Deviation.

#### Clinical Communication Competence Scale

At baseline, there were no significant differences between the groups. The differences between the experimental and the control group became significant at the end of the internship ( $p=0.042$ ) (Table 4). In the experimental group, the mean communication skill score increased significantly after the KSS training from 85.97 to 90.22 ( $p<0.001$ ). In the control group, the score increased only slightly between before and after the standard internship education (Table 4).

Table 4. Communication skills scores in two groups before and after the standard internship education and the KSS module

	<i>n</i>	Pre-internship mean (SD)	Post-internship mean (SD)	Mean difference (95%CI)	<i>p</i> -Value
Control	125	86.87 (10.03)	87.41 (11.69)	-0.536 (-2.439;1.367)	0.578
Experimental	125	85.97 (9.33)	90.22 (9.99)	-4.248 (-6.171;-2.325)	<0.001
Mean difference (95%CI)		-0.896 (-3.309;1.517)	2.816 (0.106;5.526)		
<i>p</i> -Value		0.465	0.042		

KSS=Knowledge, Simulation, Sharing module as received by the experimental group; SD=Standard Deviation.

#### Professional Identity Scale

The experimental group and control group had similar PIS scores before the start of the internship. After the internship, the experimental group following the KSS module had significantly higher scores than the control group (Table 5).

The mean PIS score increased in the experimental group from 108.34 to 116.43 ( $p < 0.001$ ) after the KSS training. In the control group, the difference was not significant (Table 5).

Table 5. Professional identity scores in two groups before and after the internship education and the KSS module

	n	Pre-internship mean (SD)	Post-internship mean (SD)	Mean difference (95%CI)	p-Value
Control	125	108.55 (10.58)	107.68 (11.46)	0.792 (-1.959;3.543)	0.531
Experimental	125	108.34 (10.37)	116.43 (11.56)	-8.088 (-10.785;-5.390)	<0.001
Mean difference (95%CI)		-0.208 (-2.828;2.402)	8.672 (5.803;11.541)		
p-Value		0.875	<0.001		

KSS=Knowledge, Simulation, Sharing module as received by the experimental group; SD=Standard Deviation.

#### Subgroup Analysis

Subgroup analysis was performed on the variables diploma level and bachelor's level for all the outcome measures (Table 6). The results revealed significant differences only for the PIS outcomes between the experimental and control groups at the diploma level (mean 115.78 versus 107.72;  $p < 0.001$ ) and bachelor's level (mean 120.05 versus 108.00;  $p < 0.016$ ).

Table 6. Subgroup analysis of the post-internship data related to education level and outcome measures

<b>Empathy</b>						
Education	Experimental		Control		Mean difference (95%CI)	p-Value
	n	Mean (SD)	n	Mean (SD)		
Diploma level	106	114.29 (15.56)	108	110.42 (12.24)	3.876 (0.106;7.645)	0.044
Bachelor level	19	116.11 (14.93)	17	110.00 (9.45)	6.105 (-2.475;14.685)	0.157
Mean difference (95%CI)	1.813 (-5.819;9.445)		-0.4167 (-6.569;5.736)			
p-Value	0.639		0.894			
<b>Communication skills</b>						
Education	Experimental		Control		Mean difference (95%CI)	p-Value
	n	Mean (SD)	n	Mean (SD)		
Diploma level	106	90.132 (10.039)	108	87.27 (12.11)	2.864 (-0.136;5.864)	0.061
Bachelor level	19	90.736 (9.988)	17	88.29 (8.88)	2.443 (-3.991;8.876)	0.446
Mean difference (95%CI)	0.605 (-4.342;5.552)		1.026 (-5.037;7.088)			
p-Value	0.809		0.738			
<b>Professional Identity</b>						
Education	Experimental		Control		Mean difference (95%CI)	p-Value
	n	Mean (SD)	n	Mean (SD)		
Diploma level	106	115.78 (11.08)	108	107.72 (10.94)	8.608 (5.093;11.029)	<0.001
Bachelor level	19	120.05 (13.73)	17	108.00 (14.76)	12.053 (2.402;21.703)	0.016
Mean difference (95%CI)	4.269 (-1.406;9.945)		0.2778 (-5.668;6.223)			
p-Value	0.139		0.926			

CI=Confidence Interval; SD=Standard Deviation.

## DISCUSSION

The aim of our study was to evaluate a new training module related to empathy learning in children's nursing students. We developed the KSS module based on knowledge, simulation and sharing in clinical settings. This training module was designed to enhance nursing students' competencies in empathy and communication and their professional identity to promote the delivery of compassionate care. Overall, the results of our study show promising outcomes that the KSS module is effective for nursing students in their professional

development and for improving clinical care for sick children and their parents.

The results of our study indicated a significant increase in JSE-HP-S scores in the experimental group, indicating that KSS training is effective. Several studies have developed communication and empathy training programmes for nursing students (Ancel, 2006; Cunico et al., 2012; Levett-Jones et al., 2019). The situated teaching programme in Taiwan developed by Lee and colleagues (2018) included a 10-hour programme involving lectures and role play. The second-year undergraduate nursing students in the experimental group (n=48) showed higher empathy scores as measured by the JSE-HP-S (Lee, et al., 2018). In another experimental study from Spain, an education intervention was developed to improve the empathy of second-year nursing students (Bas-Sarmiento, et al., 2017). The programme included 10 sessions involving role play, behaviour assays, a flipped classroom and reflective writing and showed significant improvements in empathy learning (Bas-Sarmiento, et al., 2017). As in our KSS module, both studies used simulation and role play in their empathy training, which can be considered effective learning methods for enhancing empathy skills (Shin et al., 2015).

In our study, a significant difference was observed between the groups regarding the professional identity scores. The KSS training, with a focus on driving the student nurses forward in their empathy and communication skills, might have improved their professional identity by inspiring their peers and causing them to work with passion and pride. To our knowledge, no studies have explored the effect of communication skills training on the professional identity of student nurses. Instead, most studies on professional identity in nursing are explorative in nature. However, the significance of communication has been addressed by Shakespeare and Webb (2008). In their qualitative study with 24 mentors and final-year nursing students, the main finding was that communication cannot be folded into a standard set of skills but is instead a complex element in the process of developing nursing professional identity. The emphasis on professional identity in nursing education is important for the

nursing profession in the future. A review indicated that nurses should become proactive in communicating their professionalism to patients, organisations and the public (ten Hoeve, et al., 2014). Thus, early education on nursing professional identity is important to prepare the future nursing workforce to deliver compassionate care that is valued by patients and the public.

### Limitations

Our study has several limitations to address. First, the use of self-reported outcome measures has limitations because respondents might exaggerate the responses or provide socially accepted answers instead of being truthful. Second, although our study included a large cohort of nursing students, the effectiveness of our KSS module warrants further testing with a larger cohort of students to provide conclusive evidence. Further studies would also be needed to document possible cultural implications because our study included only Chinese children's nursing students. This could limit the transferability of the KSS module to other countries; therefore, further testing of the KSS module is warranted. Third, we included only nursing students, while the KSS module might be beneficial for clinical nursing staff and/or healthcare professionals. A multi-disciplinary approach is suggested in future studies. Finally, our study used a quasi-experimental design due to the non-randomisation of the study participants, and no long-term follow-up data were collected, such as outcome data on children and their parents. Further studies need to consider these limitations and incorporate long-term follow-up measures.

### CONCLUSION

In this study, we developed a new teaching module to enhance empathy learning. The KSS module can enhance empathy and communication skills and professional identity in children's nursing students. The long-term effectiveness of the KSS module needs to be tested, ideally with reported outcome measures on children and parents.

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