Nursing students' professional identity

A descriptive literature review

Hong Jinyan (Avena)
Yu Tingting (Ailleen)

2019

Abstract

Background: Professional identity played an important role in the transition from nursing students to nurses. However, nursing students' professional identity was less well known. The influencing factor were not presented centrally. Therefore, the research on nursing students' professional identity had great significance.

Aim: To describe the status of nursing students' professional identity and describe the main influencing factors of nursing students to develop their professional identity.

Methods: It was a descriptive literature review. After searching and screening eligible articles in PubMed databases, 10 articles were finally adopted.

Results: The nursing students' professional identity status were different. Factors included external factors (degree type, grade level, university, interprofessional learning, prior interprofessional learning experience, nursing-related vocational training, nursing-related part-time employment, retention benefit and risk of turnover, social comparison and self-reflection, social modelling and monthly family income) and internal factors (gender, role stress, professional self-image, independence of career choice, caring characters, first choice, drinking patterns, belongingness and satisfaction with clinical learning environment, ego identity status). Among them, external factors (education, society and family) played an important role.

Conclusions: Generally nursing students' professional identity of nursing students should be strengthened. Education was the most important factors.

Keywords: Nursing student, professional identity, vocational identity

摘要

背景：职业认同在护生向护士的转变中发挥了重要作用。然而，护生的职业认同度却不太为人所知。因此，对护生职业认同的研究具有重要意义。

目的：描述护生职业认同的现状，及影响护生职业认同发展的主要因素。

方法：描述性文献综述

结果：护生职业认同的现状是不同的。影响因素包括外部因素(学位类型、年级、大学和专业间学习等等)和内部因素(性别、角色压力、职业自我形象等等)。其中，外部因素(教育、社会和家庭)发挥了重要作用。

结论：护生职业认同的培养总体上需要加强。教育是最重要的因素。

关键词：护理学生、职业认同

1 Introduction

1.1 Background

Worldwide, nursing profession is highly appreciated in society, more and more students chose nursing major, the phenomenon was not difficult to be found that nursing had become a key subject (Hoeve, Jansen, & Roodbol, 2014). Nursing education is vigorously developing, the degree of education appeared bachelors, masters and even doctorates, and more and more researches began to focus on the reform of nursing education (Hoeve *et al*., 2014). Most courses of nursing focused on developing students' theoretical knowledge and operational skills. However, it was not enough to become an excellent nurse only with theoretical knowledge and operational skills. In addition to solid theoretical foundation, skillful operations, a strong sense of professional identity was indispensable (Mccrae, Askey-Jones, & Laker, 2014). Nursing professional identity was vital in order to improve nursing students' perceptions of the nursing profession and enhance the quality of care they provided (Mccrae *et al*., 2014). Therefore, helping students to form a qualified professional identity was an important task of nursing education.

Even though nursing became a key profession in medical and developed higher degree, there were many problems about nursing in today's society because the nursing profession as a lowly position in life was not recognized enough (Hoeve *et al*., 2014; Mccrae *et al*., 2014). It reflected that the transformation of nursing profession in social cognition was not smooth. This phenomenon caused people to worry about the status of nursing students' professional identity. In the process of exploring theoretical learning, transition theory showed it could be helpful to understand nursing students' professional identity from university to any workplaces (Alligood, 2014). The transformation included values and environments (Alligood, 2014; Hanson, 2013; Leducq, Walsh, Hinsliff-Smith, & McGarry, 2012).

Nursing has existed for a long time as an auxiliary to doctors, and the definition of nursing has been vague (Mccrae *et al*., 2014). However, it was necessary for a

qualified nurse to have a clear understanding of nursing profession and a strong professional identity (Mccrae *et al*., 2014).

1.2 Nursing students' professional identity - definition

1.2.1 Profession

Profession was defined as people with rich professional knowledge and skills, high standard of moral behavior, provide high level of service (Hilton, 2008).

1.2.2 Professional identity

Professional identity (PI) is a special professional behavior, which took professional values as the core and internalized (Hilton, 2008; Irby, Cooke, & O'Brien, 2010; Mccrae *et al*., 2014; Weis & Schank, 2009). Therefore, PI was affected by the forming elements of professional values. Valid professional value was important for PI.

Professional value was the belief in the value or quality of the concept and behavior of a particular discipline (Elliott, 2017). People from different cultural backgrounds were attracted by the common belief and the belief was considered to be the center of standard PI and ideology (Elliott, 2017). Internalization of the correct nursing professional values and major attitudes toward PI in nursing meant to accept the professional values whatever the physical or the psychical (Irby *et al*., 2010). Nursing professional values derived from personal and social values and were modified and expanded through education, clinical and personal experience (Elliott, 2017; Hanson, 2013; Leducq *et al*, 2012; Weis & Schank, 2009). Nurses took each patient-centered nursing as professional value, sympathized and respected for the dignity of every person, advocated the value of altruism, supported the rights of patients, and determined the individual treatment process (Elliott, 2017).

PI is the embodiment of professional personal value, professional ethics, attributes and professional norms (Cruess, Cruess, Boudreau, Snell, & Steinert, 2014; Holden *et al*., 2015). The development of nursing PI could not be separated from the guidance of correct professional values. Only with correct values and attributes basis, strong PI

and moral attitude could be built, than the professions were selected for nursing, caused the nursing education in training students' core values achieved the target (Mazhindu *et al*., 2016).

1.2.3 Nursing students' professional identity

Nursing PI was defined as nursing professions focus on nursing and integrated nursing professional value into daily nursing work (Elliott, 2017; Hilton, 2008). In other words, people whose behavior and mentality like a nurse equipped with nursing PI (Cruess *et al*., 2014). Nursing PI was a kind of transition. It was an intricate process of constant change and progress, rather than a static state, while it both process and result (Alligood, 2014; Hurley, 2009; Leducq *et al*., 2012). This transition was shaped by occupational stigma (career pathways, physical environment), organizational power (interpersonal relationships, role models) and personal attributes (Brennan & Timmins, 2012; Hoeve *et al*., 2014; Mccrae *et al*., 2014).

Nursing students' PI was defined as the nursing PI show in nursing students. Nursing students internalized the nursing professional value during theoretical learning, practical operation and clinical life to achieve nursing as patient-center and take pride in nursing (Elliott, 2017; Mccrae *et al*., 2014). Improving the PI of nursing students was a very important task of nursing education.

1.3 Nurses' role

In the fast developing modern society, nursing was developing rapidly and nurses' role was also evolving (Hilton, 2008). Nursing role included person, health, environment and nursing.

Excellent nurse role models helped nursing students to find their direction during the transformation of PI (Brennan & Timmins, 2012). Nursing teachers provided right way for forming healthy PI to nursing students (Brennan & Timmins, 2012). For example, they were helping nursing students to insist on caring traits, ensuring safety, and discovering students which difficult to develop PI.

Clinical environment was the most important environmental factor affecting nursing students' PI besides school (Mccrae *et al*., 2014). Clinical practice was the key period of PI transformation (Mccrae *et al*., 2014).

While nursing students has owned strong PI, the quality of nursing has improved. It had enormous implications for promoting health, preventing the development of disease, and alleviating the suffering of patients.

1.4 Nursing theory

This process of transition was dynamically changing (Alligood, 2014). Nursing theory included four elements: nursing, health, environment, human (Alligood, 2014). Transition theory which was written by Afaf Ibrahim Meleis was used in this review (Meleis *et al*, 2000). The theory major included following parts: (1) types and patterns of transitions; (2) properties of transition experiences; (3) transition conditions (facilitators and inhibitors); (4) patterns of response (or process indicators and outcome indicators); and (5) nursing therapeutics (see figure 1).

Transition was the result of change, as well as the reason. It was a movement process (Alligood, 2014).

During the transition, identities, values, roles, relationships, abilities, and patterns of behavior are changing (Alligood, 2014; Elliott, 2017). And this transition experience could determine the status. The success of the transition and its stability were affected by the external environment (Alligood, 2014).

For nursing students, they should change the role of experience from student to nurse in the future, environment from school to clinical, health notion from focusing on themselves both themselves and care patients, nursing from learning nursing related knowledge and skills to cultivate a ability to find and deal with healthy problems (Alligood, 2014; Hurley,2009; Mccrae *et al*., 2014).

For this study, it involved the transition of nursing students' PI. It included the change in school and clinical. The different daily behaviors presented in the nursing students individually.

Developmental:
birth, adolescence,
menopause, aging,
death

Situational

Organizational:
changing environmental
conditions

Health and illness:
recovery process,
hospital discharge,
and diagnosis of
chronic illness

Multiplicity

Complexity

Awareness

Engagement

Change and
difference

Time span

Critical points
and events

Types

Patterns

Properties

Nursing Therapeutics

Conditions

Patterns of response

Personal:
meanings,
cultural beliefs and attitudes,
socioeconomic status,
preparation, knowledge

Community
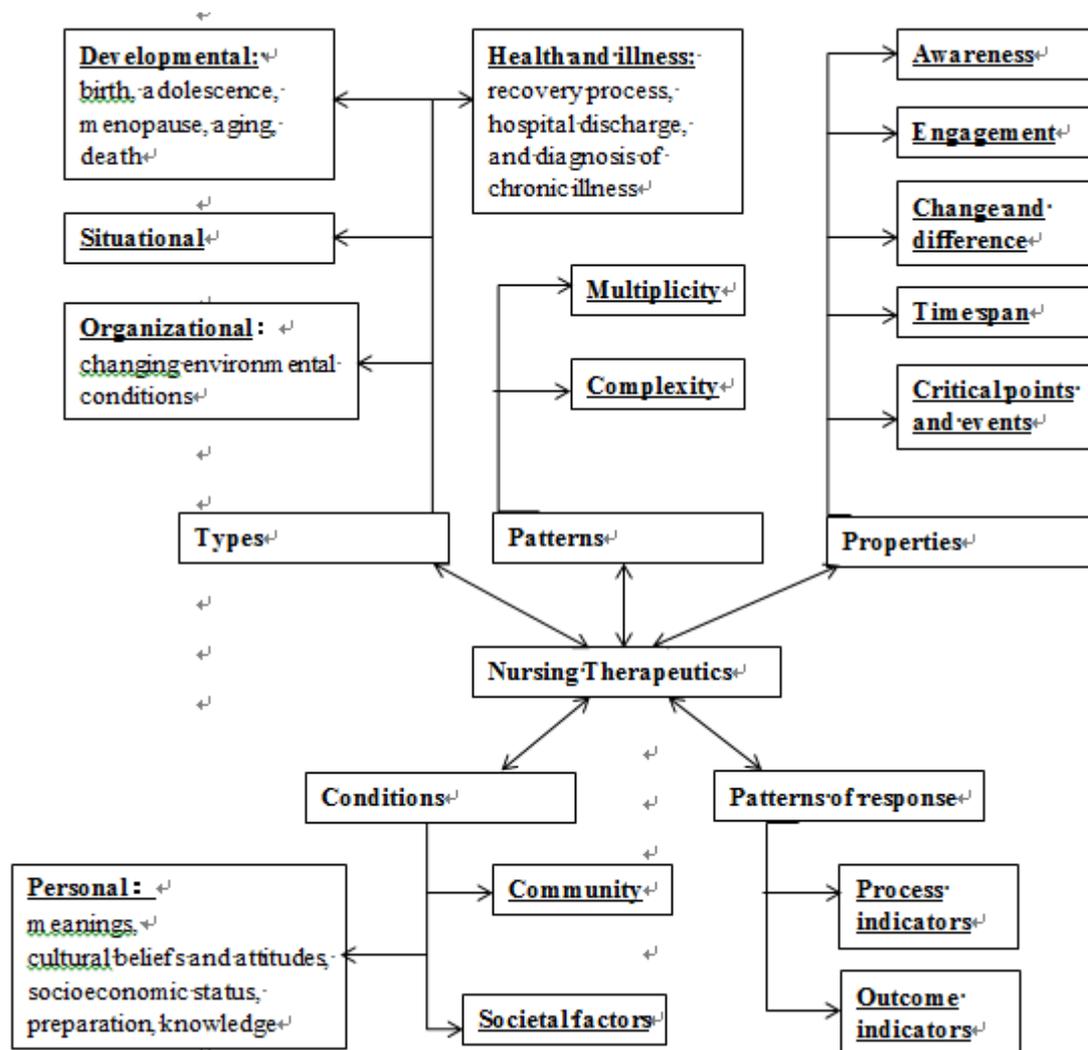
Societal factors

Process
indicators

Outcome
indicators

Figure 1: Middle-Range Transitions Theory.

(From Meleis, A. I., Sawyer, L. M., Im, E. O., Hilfnger Messias D. K., & Schumacher, K. 2000. Experiencing transitions: an emerging middle range theory. *Advances in Nursing Science*, 23(1), 12–28.)

1.5 Earlier reviews

According to the researches have been published, most have been done qualitative researches using interview and theoretical discourse. PI formation involved professional values, moral principles, actions, aspirations, and ongoing self-reflection on the identity of the individual ((Holden, Buck, Clark, Szauter, & Trumble, 2012; Holden *et al*., 2015; Wilson, Cowin, Johnson, & Young, 2013). Undergraduate played a very important role in the formation of PI (Elliott, 2017; Weis & Schank, 2009). Strong PI had a positive impact on career development (Elliott, 2017; Mccrae *et al*., 2014). Researches showed that pre-employment persons with strong PI possessed a strong tendency of positive guidance for positive and neutral stimulation in corresponding professional work (Mccrae *et al*., 2014; Wang, Zhu, Liu, Chen, & Huo, 2018). However, pre-employment persons with weak PI owned a greater tendency to negatively guidance negative stimulation in their professional work, pre-employment persons with strong PI were contrary to pre-employment person with weak PI (Wang *et al*., 2018). Owning strong PI of pre-service nurses in the process of start, for all the stimulation of the large number of positive projects types, and weak PI of pre-service nurses' PI was weak (Wang *et al*., 2018). Improving PI was a process that interacts with social forces.

Generally, the PI of nursing students could strengthen in the contact with hospitals and health service providers (Brennan & Timmins, 2012).

1.6 Problem statement

High level of PI could lead the development of profession, and both patients and nursing students could be benefited. In recently years, PI of nursing students became more and more attention by nursing educational managers and researchers (Hoeve *et al*., 2014). Many elements linked to nursing students' PI were involved, such as the influencing factors and the importance of this topic. It was a pity there was insignificant progress in learning possess of nursing students (Azoulay & Orkibi, 2018). Deeper understanding of the status of nursing students' PI, and analyze nursing students' PI development were necessary. However, few articles made intimate

connection and summarize about nursing students' PI. Therefore, this study focused on review what was the status of nursing students' PI, and the influencing factors to develop nursing students' PI. Although the number of studies on nursing students' PI was increasing day by day, there were few relevant reviews.

1.7 Aim and research questions

The aim of the literature review was to describe the status of nursing students' PI and describe the main influencing factors of nursing students to develop their PI, with the help of the following questions:

1. What was the status of nursing students' PI?
2. What was mainly influencing factors of nursing students to develop their PI?

2. Methods

2.1 Design

A descriptive literature review was used in this study (Polit & Beck, 2012).

2.2 Search strategy

Articles searched in the databases PubMed with restrictions (10 years, English, Full text, University of Gävle) of the present study for the sake of a more related outcome with the aim in order to narrow the range, as depicted in Table 1. The search terms used were "professional identity", "nursing student", "vocational identity" one by one firstly, and then combined them with "AND" to find the articles which were linked to the aims of this study (Polit & Beck, 2012). In the preliminary search (see Table 1), the titles and abstracts of a total of 194 articles were glanced over, 10 articles of which were considered to be fit with the records screened.

Table 1. Results of preliminary database searches.

Database + Date of search	Limits	Search terms	Number of hits	Potential articles (excluding doubles)
Medline through PubMed 2018-09-09	Full text, English, Ten years	professional identity	2152	
Medline through PubMed 2018-09-09	Full text, English, Ten years	Nursing student	18970	
Medline through PubMed 2018-09-09	Full text, English, Ten years	Vocational identity	127	
Medline through Pubmed 2018-09-09	Full text, English, Ten years	Professional identity AND nursing student	192	9
Medline through Pubmed 2018-09-09	Full text, English, Ten years	Vocational identity AND nursing student	2	1
Total				10

2.3 Selection criteria

In this review, articles were mainly discovered by PubMed. The selected criteria included inclusion and exclusion.

12

The inclusion criteria: Articles should be relevant for the aim and research questions. (1) relevant for PI of nursing students such as influencing factors, status; (2) the PI in different environment (school, clinic) or different countries; (3) the quantitative or mix method articles.

The exclusion criteria: (1) the literature was not free; (2) the content was not linking to the aims; (3) unable to access; (4) the definition of literature type was unclear; (5) the qualitative articles and review; (6) the research objected inconsistency.

2.4 Selection process and outcome of potential articles

First of all, the title of the article was used to determine whether the article can be selected. After the selection, the abstract to further confirm. On the other hand, the title of the article was not clear enough to judge, checked the abstract to determine whether the article was possible to be selected. Next, read carefully selected articles to determine if they were closely related to the aims of the study. Finally, the selected articles were determined and counted. By reading articles, total 10 articles were selected due to titles and abstracts which closely related to the research aims and related questions, figure 2.
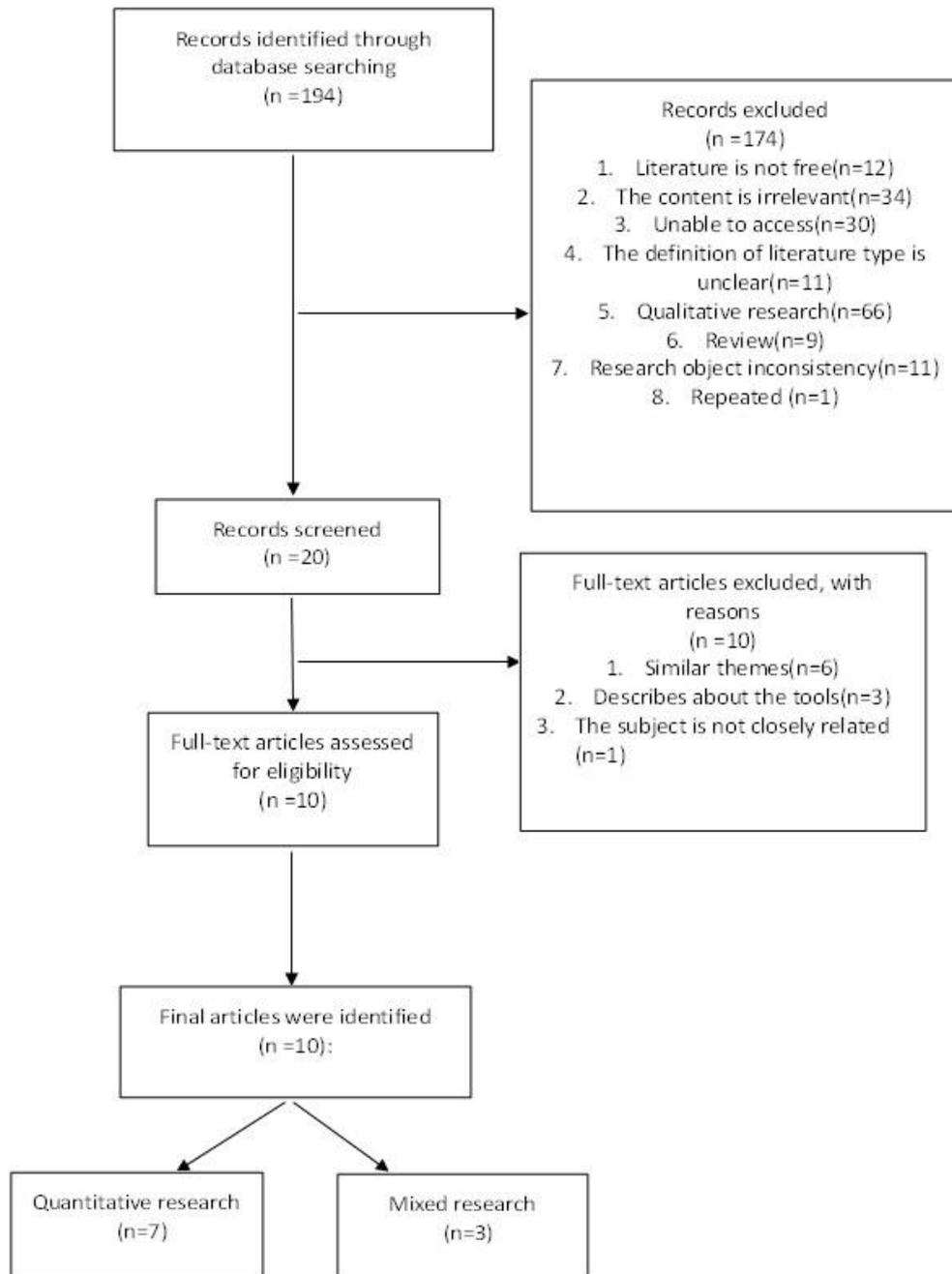
Figure 2: Flow chart of literature review

2.5 Data analysis

Accorded to Polit & Beck (2012), the best approach was using two-dimensional matrix to organize the information of traditional literary narrative commentary because the matrix was more intuitive and clear (Polit & Beck, 2012). The two authors of this review read the articles carefully and numbered each article from 1 to 10 separately to avoid being omitted. Then, an appropriate table was made, and each article was classified, labeled and compared according to the meanings and contents of different parts of the articles, which were similar to an outline for review. Classified articles as nursing students' PI status and impacts of nursing students' PI based on the two aims, annotated articles that involved both two aims. Than filed the basic information (author, title, design, participants, data collection methods, data analysis methods) of the 10 articles. Integrated the same information that appeared in different articles, and discussed and analyzed the data collection methods according to the different types of articles how to be selected. Thematic analysis was used to extract the theme.

2.6 Ethical considerations

The selected articles of this literature review were read carefully and separately and organized in an objective way which were existing published materials and had already been investigated and given ethical approval, see Tables in appendix, never add to personal emotions and ideas, to ensure the research objective and precision, and absolutely put an end to plagiarism. The results would be submitted in full, without changing the opinions of author which was witting the article. Selected articles would be objective and neutral, not plagiarism or forgery. The results must conform to the fact that the subjective language used by the author in the references cannot be changed, which was a working method recommended by Polit and Beck (2012).

3. Result

The results were based on 10 articles with quantitative researches and mixed methods researches. The results of these articles revolved around the PI of nursing students. Based on the methodological issues, the authors continued to read and explore articles, and then introduced the data collection process of the selected studies. This study used these two matrices to analyze and summarize the main information of the selected articles to facilitate understanding (table 3 and table 4). Table 3 extracts the main information which related to nursing students' PI, such as the author, publication year, publication country, title, design, participant, data collection method and data analysis method by reading the selected articles one by one. Table 4 summarized the purpose and results of these articles.

3.1 Nursing students' professional identity status

According to the 10 articles, different students had different degrees of PI, four of them refered to nursing students' PI status (Hensel, 2014; Hensel, Middleton, & Engs, 2014; Hood *et al*., 2013; Hood, Cant, Leech, Baulch, & Gilbee, 2014; Koo & Kim, 2016; Poudel, Ramjan, Everett, & Salamonson, 2018; Sun, Gao, Yang, Zang, & Wang, 2016; Williams & Webb, 2015; Worthington, Salamonson, Weaver, & Cleary, 2013; Guo, Yang, Ji, & Zhao, 2018). One talked about types, others talked about the general degree of nursing students' PI (Hood *et al*., 2013; Hensel, 2014; Guo *et al*., 2018; Koo & Kim, 2016).

 In regard to the general degree of nursing students' PI, the result in China showed it was not ideal but in Korean the opposite (Koo & Kim, 2016; Guo *et al*., 2018). On this basis, the research pointed out that the positive PI of nursing students was significantly higher than medical students and the negative PI of nursing students was lower than medical students (Hood *et al*., 2013).

The research which used PIQNS was published in 2016 show the mean score was 57.63 (range from 28 to 85) and the research which used PISNS was published in 2018 show the mean score was 58.34 (range from 20 to 85) (Sun *et al*., 2016; Guo *et al*., 2018).

16

The article that described 3 types of nursing students' PI elaborated on champions, collaborators, individualists (Hensel *et al*., 2014). The differences between these three types were understanding different aspects of the Quality and Safety Education for Nurses (QSEN) (Hensel *et al*., 2014).

3.2 influencing factor

There were 10 articles involved the influencing factors of nursing students' PI, both external factors and internal factors (Hensel, 2014; Hensel *et al*., 2014; Hood *et al*., 2013; Hood *et al*., 2014; Koo & Kim, 2016; Poudel *et al*., 2018; Sun *et al*., 2016; Williams & Webb, 2015; Worthington *et al*., 2013; Guo *et al*., 2018). On the one hand, external factors included degree type, grade level, university, interprofessional learning, prior IPL experience, nursing-related vocational training, nursing-related part-time employment, retention benefit and risk of turnover, social comparison and self-reflection, social modelling and monthly family income (Hood *et al*., 2013; Hood *et al*., 2014; Koo & Kim, 2016; Sun *et al*., 2016; Williams & Webb, 2015; Worthington *et al*.,2013; Guo *et al*., 2018).

On the other hand, internal factors contained gender, role stress, professional self-image, independence of career choice, caring characters, first choice, drinking patterns, belongingness and satisfaction with clinical learning environment, ego identity status (Hensel *et al*., 2014; Hood *et al*., 2013; Koo & Kim, 2016; Poudel *et al*., 2014; Sun *et al*., 2016; Williams & Webb, 2015; Worthington *et al*.,2013; Guo *et al*., 2018).

The influence of these factors on PI had been clearly summarized in Table 5. In the 1table, the column of "relationship" means that there was a definite signficant relationship between the factor and PI. The colum of "influence" means that the factor showed a clear positive or negative effect on PI, but did not show a clear signficant relationship. The colum of "other" means that the factor was hard to be described simply as positive or negative relationship/influence.

3.2.1 External factors

According to 7 articles that invovled external factors, 11 items were reported (Williams & Webb, 2015; Sun *et al*., 2016; Hood *et al*., 2013; Guo *et al*., 2018; Worthington *et al*., 2013; Hood *et al*., 2014; Koo & Kim, 2016). They were divided into three parts: education, learning experience, society and family.

3.2.1.1 Education produced different influences to nursing students' professional identity

In undergraduate education, Williams and Webb focued on the three external factors, they were degree type, grade level (university of study year level progression) and university (Williams & Webb, 2015). The article pointed out that the significant positive relationship between degree type and PI, in other words, nursing students with double degree had higher PI than those with single degree (Williams & Webb, 2015). The result of grade level was first-year students had the strongest PI, second-year students had the weakest PI, third-year students lower than first-year students but higher than second-year students (Williams & Webb, 2015). However, this result was inconsistent with the positive correlation between grade level and PI stated by Koo & Kim, which described that seniors had stronger PI (Koo & Kim, 2016). Another article showed that there was no significant correlation between grade level and PI (Hensel *et al*., 2014). Another point of the result was nursing students from different universities have different PI, different university affected the development of nursing students' PI (Williams & Webb, 2015).

Besides, IPL produced significant positive influence for PI, senior nursing students responded well (Hood *et al*., 2014).

3.2.1.2 Special learning experience could help nursing students enhancing professional identity

Two articles participated in the study of learning experience (Hood *et al*., 2013; Worthington *et al*., 2013). There were 3 special learning experiences been described.

Firstly, prior IPL experience linked to IPL, its influence was similar with IPL (Hood *et al*., 2013). In addition, the article showed prior IPL exprience was not uncommon among nursing students, the porportion almost a half (Hood *et al*., 2013). Nursing-related vocation training and nursing-related part-time employment were shown in the same article, the result indicated that students without these experience had lower MCPIS-9 scores (Worthingtong *et al*., 2013). Therefore, both nursing-related vocation training and nursing-related part-time employment were shown to help nursing students enhance their PI (Worthingtong *et al*., 2013).

3.2.1.3 Society and family could produce influence to nursing students' professional identity

The part of society included retention benefit and risk of turnover, social comparison and self-reflection, social modelling (Sun *et al*., 2016; Guo *et al*., 2018). Articles reported there were significant positive relationship between these 3 social factors and PI (Sun *et al*., 2016; Guo *et al*., 2018).

Koo and Kim fouced on monthly family income, found high monthly family income produced positive influence for PI (Koo & Kim, 2016). It was worth noting that in terms of monthly family income, the article reported the results on the line of 2000 USD, 4000 USD, 6000 USD but only more than 6000 USD showed significant difference from others, did not show a definite signficant relationship with PI (Koo & Kim, 2016).

3.2.2 Internal factors

There were 10 internal factors reported by 8 articles (William & Webb, 2015; Sun *et al*., 2016; Hood *et al*., 2013; Guo *et al*., 2018; Worthington *et al*., 2013; Hensel *et al*., 2014; Poudel *et al*., 2018; Koo & Kim, 2016).

3.2.2.1 The effect of gender on nursing students' professional identity is controversial

Based on the articles, gender was the only one demographic factor described as effect on PI (Hood *et al*., 2013; Williams & Webb, 2015; Worthington *et al*., 2013). Three articles mentioned relevant information, interestingly, the articles gave different results. Therefore, gender was the second controversial item (Hood *et al*., 2013; Williams & Webb, 2015; Worthington *et al*., 2013).

Only one of the three articles pointed out that gender had no significant effect on PI of nursing students, or even no effect (Williams & Webb, 2015). Other 2 articles indicated females had higher degree of PI compared to men, and the difference was significant (Hood *et al*., 2013; Worthington *et al*., 2013).

3.2.2.2 Professional characters produce influence to nursing students' professional identity

Role stress, professional self-image, caring characters and ego identity status were contained in this part (Sun *et al*., 2016; Guo *et al*., 2018; Koo & Kim, 2016). There was an explicit negative relationship between role stress and PI, nursing students with lower role stress own higher PI (Sun *et al*., 2016). Positive professional self-image helped nursing studentds own higher PI (Sun *et al*., 2016). Through the Nursing Caring Characters Assessment Tool and Professional Identity Scale, an obvious positive relationship had been indicated between caring characters and PI (Guo *et al*., 2018).

In the description of ego identity status, it was divided into achievement, moratorium, foreclosure, and diffusion (Koo & Kim, 2016). In these four ego identity states, the degree of PI was ranked as achievement, moratorium, foreclosure, and diffusion from high to low (Koo & Kim, 2016).

3.2.2.3 The impact of choice, life style and work environment on nursing students' professional identity

Independence of career choice and first choice were linked to nursing students' PI (Sun *et al*., 2016; Worthington *et al*., 2013; Poudel *et al*., 2018). Students with more independent in career choice and first choice were nursing possessed stronger PI (Sun *et al*., 2016; Worthington *et al*., 2013; Poudel *et al*., 2018). Migration intention was a potential choice caused negative influence and formed an apparent negative relationship with nursing students' PI (Poudel *et al*., 2018).

Drinking patterns belonged to life style. The article explained by three levels of drinking as abstainers, moderate drinkers, or heavy drinkers and the result displayed a negative relationship between drinking and PI but the relationship was weak (Hensel *et al*., 2014).

In addition, belongingness and satisfaction with clinical learning environment as predictor of PI were positive relationship (Poudel *et al*., 2018).

3.3 Instruments

Related instruments were summarized in this review, see Table 2. There were three main instruments used to evaluate PI, including Professional Identity Questionnaire for Nursing Students (PIQNS), Professional Identity Scale for Nursing Students (PISNS), MCPIS-9 (Sun *et al*., 2016; Guo *et al*., 2018; Worthington *et al*., 2013; Poudel *et al*., 2018). PIQNS and PISNS have the same 5 subdimensions: professional self-image, benefit of retention and risk of turnover, social comparison and self-reflection, independence of career choice, social modeling (Sun *et al*., 2016; Guo *et al*., 2018). Besides, about two instruments involved PI are Readiness for Interprofessional Learning Scale (RIPLS) (Williams & Webb, 2015; Hood *et al*., 2013), Nurse Self-Concept Questionnaire (NSCQ) (Hensel *et al*., 2014). The detailed information of these instruments were summaried in Table 2.

Table 2. Instruments

instrument	Author year	Items		Sub-scales	Cronbach's alpha coefficient	The scores possible range
PIQNS	Hao,2011	17	5-point Likert scale	5	0.86	28-85
PISNS	Hao et al., 2014	17	5-point rating	5	0.96	20-85
MCPIS-9	MacleodClark et al.,	9	six-point Likert scale	-	0.83	17-54
QIPLS	Parsell and Bligh, 1999	19	5-point Likert scale	4	0.84	-
NSCQ	Cowin, (2001)	36	8-point ordinal response scales	6	0.90	6-48

3.4 Characteristics

In this review, there were several characteristics (Hensel, 2014; Hensel *et al*., 2014; Hood *et al*., 2013; Hood *et al*., 2014; Koo & Kim, 2016; Poudel *et al*., 2018; Sun *et al*., 2016; Williams & Webb, 2015; Worthington *et al*., 2013; Guo *et al*., 2018).

3.4.1 Study characteristics

Table 3 extracts the main information which were related to nursing students' PI, such as the author, publication year, publication country, title, design, participants, data collection method(s) and data analysis method(s). Two studies were carried out in China (Sun *et al*., 2016; Guo *et al*., 2018), five studies were in Australia (Hood *et al*., 2013; Hood *et al*., 2014; Williams & Webb, 2015; Worthington *et al*., 2013), the other 4 studies were conducted respectively in Indiana, Nepal, USA, Korea (Hensel, 2014;

Hensel *et al*., 2014; Koo & Kim, 2016; Poudel *et al*., 2018). Definition of article types (quantitative studies, qulititive studies, mixed-method studies, review), there were 7 articles belong to quantitative studies and three were mix-method studies. These studies were published among 2013 to 2018.

3.4.2 Sample characteristics

All participants of 10 studies involved nursing students who have different PI. The differences include university, country, educational level, gender, experience and so on (Hensel, 2014; Hensel *et al*., 2014; Hood *et al*., 2013; Hood *et al*., 2014; Koo & Kim, 2016; Poudel *et al*., 2018; Sun *et al*., 2016; Williams & Webb, 2015; Worthington *et al*., 2013; Guo *et al*., 2018).

4. Discussion

4.1 Main result

Graduate nursing students' PI status was not ideal, undergraduate and college students were equipped with favorable PI. And generally the degree of nursing students' PI was rising. The types of nursing students' PI were classified as champions, collaborators, individualists.

A total of 21 factors had been displayed, 15 items (degree type, IPL, prior IPL experience, nursing-related vocational training, nursing-related part-time employment, retention benefit and risk of turnover, social comparison and self-reflection, social modeling, monthly family income, professional self-image, independence of career choice, caring characters, first choice, belongingness and satisfaction with clinical learning environment, ego identity status) were clearly leaded positive impact to PI, 3 items (role stress, drinking, migration intention) showed negative areas, 2 items (grade level and gender) were controversial, and different university produce different impact to PI.

4.2 Result discussion

4.2.1 Nursing students' professional identity status

Highly and professionally educated nursing students owned stronger PI. The articles reported graduate nursing students owned weak PI but undergraduate and college students owned favorable PI, however, these two articles used different scales, the participants from different countries and their criteria for assessing the status of PI were not clearly stated (Guo *et al*., 2018; Koo & Kim, 2016). Therefore, there was no comparison between the two and not enough to justify opposition. On the other hand, the result significantly indicated the nursing students with double degree possessed stronger PI (Williams & Webb, 2015). A research focused on the PI of working nurses found that the PI of nurses received highly and professional education were more positive than other nurses (de Meis, de Almeida Souza, & da Silva Filho, 2007). Therefore, nursing students with high and professional education owned stronger PI. With nursing developing, nursing students' PI became stronger. PIQNS and PISNS had almost the same criteria. The two articles invoved PIQNS and PISNS showed the total score of PI increased year by year (Sun *et al*., 2016; Guo *et al*., 2018). On the other words, nursing students' PI on the rise. This phenomenon was a great transition during the transformation of nursing students to nurses, which means the transformation was developmental (Alligood, 2014).

4.2.2 External factors and importance

Education played an important intermediary role in the transformation of nursing students into nurses, which throughout schools and clinics. The results of degree type, IPL, nursing-related vocational training showed significant positive influence (Hood *et al*., 2014; Williams & Webb, 2015; Worthington *et al*., 2013). Concurrently, clinical practice displayed a important phenomenon. The education during clinical practice found that professional incivility or lateral violence hindered the transformation of PI (Alligood, 2014; Furst, 2018; Thomas, Jinks, & Jack, 2015).

Weak PI was link to adverse social factors (include family). Ideal social modelling, social comparison, retention benefit and risk of turnover, monthly family income could promote nursing students' PI (Koo & Kim, 2016; Sun *et al*., 2016; Guo *et al*., 2018). Increased use of social media has helped nursing students improve their PI, this societal factor was a condition of the transition (Mather, Cummings, & Nichols, 2016).

Nursing students' PI was birthing at the begining of school, its adolescence was the studying process in school, the menopause was practicing process in clinic, and continuous development (Alligood, 2014). The transformation of nursing students' PI was situational and organizational, it was affected by the external environment (Alligood, 2014). Compared with internal factors, it was more important to improve the understanding of external factors. Because internal factors such as gender, role stress and ego identity status were diffcult to adjust, nursing therapeutics of external factors were relatively easy to intervene (Alligood, 2014; Hood *et al*., 2014; Koo & Kim, 2016; Sun *et al*., 2016; Williams & Webb, 2015; Worthington *et al*., 2013). However, professional identity transition conditions didn't exist alone, they linked to each others whatever the facilitators and inhibitors, it was multiple (Alligood, 2014).

4.2.3 Internal factors were basics of nursing students professional identity

Satisfactory personal characteristics were not only conducive to the transition of PI, but also enable the interventions of external factors to get double results with half the work. Strong belongingness and satisfaction with clinical learning environment helped nursing students transforming PI, and facilitated nursing students' adaptation to the clinical work environment (Poudel *et al*., 2018; Thomas *et al*., 2015). Admirable adaptation to the clinical environment was a facilitator in PI transition conditions, which was able to resist professional incivility or lateral violence (Alligood, 2014; Furst, 2018; Thomas *et al*., 2015). The different properties such as awareness, engagement, critical points and so on, could lead to different outcomes of nursing therapeutics (Alligood, 2014). Therefore, professional identity transition conditions were interactional (Alligood, 2014).

4.2.4 Controversial factors

It was unable to acquire the PI of female was stronger than male, except in the context of the country. Different national conditions impacted genders. For example, PI was no gender difference in Mauritius (Alligood, 2014; Hollup, 2014). Mauritius implemented a gendersegregated nursing mechanism (Hollup, 2014). In other words, the needs of male and female nurses were the same, which was also reflected on the number of nursing students, there was no statistically significant difference in the number of male and female nursing students (Hollup, 2014). Moreover, under the influence of dominant consciousness, promotion was more difficult to female, which had a tendency to threaten the PI of female (Hollup, 2014). However, in Brazil, the number of female nursing students much more than male nursing students, and remained basically the same from 1995-2005 (de Meis *et al*., 2007). Gender could not be a facilitator or inhibitor(Alligood, 2014). However, three articles in Australia displayed two different results, but according to the two articles included the most convincing one, female nursing students' PI was stronger (Hood et al., 2013; Williams & Webb, 2015; Worthington *et al*., 2013). The role definition of male nurses in Hong Kong was vague, so the PI was weak (Chan, Lo, Tse, & Wong, 2013). Higher educated students and senior students were more likely to have higher levels of PI. PI was a process of constant transformation, and education can facilitate the transformation (Alligood, 2014; Koo & Kim, 2016; Williams & Webb, 2015).

4.2.5 Instruments

Quantitive researches used different scales and questionnaires to collect data. Instruments were reliable with cronbach's alpha $\alpha > 0.7$. Quantitative data collection avoided the chance of results to some extent. And scales and questionnaires belonged to non-open survey method made the data more objective and convenient for statistical analysis (Polit & Beck, 2012).

Mixed-method researches usd both quantitive methods and qulititive methods. The quantitive methods included scales and questionnaired, and qulititive methods contianed various forms of interviews, narrative and communication. These kind of

open or semi-open survey method could collect more abundant data, but many subjective factors were difficult to be counted, which means the data analysis was more complex (Polit & Beck, 2012). For example, Poudel *et al*. (2018) used a series of standardized scales and face-to-face interviews.

4.3 Method discussion

The descriptive literature review was conducted according to the research program, and information related to the research purpose was extracted through reading. Literature review was a good way to critically and exploratorily observe and review previous studies and summarize the results of each of them (Polit & Beck, 2012). Based on the study by Polit & Beck (2012), criteria were set clear, specific inclusion and exclusion criteria that helped select articles effectively and accurately. Then selected the PubMed database to search articles with certain restrictions. In this review, only the PubMed database was used to search for articles. There were few qualitative articles and the sample was not large enough. The inclusion criteria of this study were described that articles must be written in English, and its main advantage was that English articles were more extensive. At the same time, the limitation was that English was not first language of this article's authors, which means there were misunderstandings and relevant studies in other languages could be missed. Therefore, the result of this review was reference points. It was worth noting that caution should be exercised when used this result in non-english-speaking countries. Exclusion criteria were described that the articles must be made available to the university of Gavle free of charge. The advantage was that the author could read and use English articles for free. Because of lack of resources, some better articles could be missed. What's more, the articles were selected from 2009-01-01 to 2018-12-31 and used "professional identity", "nursing students", "vocational identity" as search terms. This was a search restriction. This could lead to miss out on the earliest and truest studies. But it was also an advantage because it ensured that the results are up to date. According to the requirements of Polit & Beck (2012), every step of the study was recored. Firstly, the aouthors of this descriptive review looked at the overall

outline of the title and abstract to consider whether the question would yield to a literature review. However, many potential articles were omitted because they were not simply found in headlines and abstracts. According to suggestions of Polit & Beck (2012), the two aouthors of this descriptive review read separately and discussen the results with each other in order to ensure that the authors did not omit important information and did not affect the students' understanding of the article. Because of the large number of articles, the two authors considered it an advantage to review them together. Therefore, positive response was made. The data analysis used a descriptive method, the information of articles was tabulated (see Table 3 and Table 4), the results of factors were sorted out by tabulating as well (see table 5).

4.4 Clinical implication

This review listed the internal and external factors affected nursing students' PI, and provided directions for intervention of the PI development. Clinical practice as a important PI transition period, played a vital role in the development of PI. First of all, students must possess strong mentality and had a certain degree of interpersonal skills. Asked others for help on the basis of self-affirmation and encouragement, actively learned knowledge and skills (Thomas *et al*., 2015).

To establish positive PI could mobilize the enthusiasm of students in study, improve nursing students' job satisfaction, promote professional development and sustainability. Thus enhanced the quality of nursing work and promoted the vigorous development of nursing discipline.

4.5 Suggestions for future research

According to the literatures review, nursing students' PI is necessary to focus on transition from nursing students to nurses. Even nursing education become more important than previous period, the researches are not mature. Many studies are scattered and lack of comparability. On the basis of strengthening higher nursing education, future research should pay more attention to clinical practice and IPL. And enhance researches with same topic about nursing students' PI but different variables to establish comparability of results. Or add control researches.

In addition, except the article in result, no more literatures related to nursing students' PI types were researched. Therefore, the types of nursing students' PI could be researched in the future.

5. Conclusion

Nursing students' PI was a key of the transition that nursing students translated to nurses. Generally nursing students' PI should be strengthened, though PI has promoted in recent years. The three types of PI were listed in result. Both external factors and internal factors were reported in this review and external factors were especially important. The external factors showed apparent influence for PI. Education was the most important factors for nursing students' PI transition.

References

Alligood, M. R. (2014). *Nursing theorists and their work*. America: Elsevier Mosby.

Azoulay, B., & Orkibi, H. (2018). Helpful and Hindering Factors in Psychodrama Field Training: A Longitudinal Mixed Methods Study of Student Development. *Frontiers in Psychology*, 9. doi:10.3389/fpsyg.2018.00196

Brennan, D., & Timmins, F. (2012). Changing institutional identities of the student nurse. *Nurse Education Today*, 32(7), 747–751. doi:10.1016/j.nedt.2012.05.021

Chan, Z. C. Y., Lo, K. K. L., Tse, K. C. Y., & Wong, W. W. (2013). Self-Image of Male Nursing Students in Hong Kong: Multi-Qualitative Approaches. *American Journal of Men's Health*, 8(1), 26–34. doi:10.1177/1557988313488929

Cruess, R. L., Cruess, S. R., Boudreau, J. D., Snell, L., & Steinert, Y. (2014). Reframing Medical Education to Support Professional Identity Formation. *Academic Medicine*, 89(11), 1446–1451. doi:10.1097/ACM.0000000000000427

De Meis, C., de Almeida Souza, C., & da Silva Filho, J. F. (2007). House and Street: Narratives of Professional Identity Among Nurses. *Journal of Professional Nursing*, 23(6), 325–328. doi:10.1016/j.profnurs.2007.06.004

Elliott, A. M. (2017). Identifying Professional Values in Nursing : An Integrative Review. *Teaching and Learning in Nursing*, 12(3), 201–206. doi:10.1016/j.teln.2017.02.002

Furst, C. (2018). The Relationship between Experiences of Lateral Violence and Career Choice Satisfaction among Nursing Students. *Nursing Education Perspectives*, 39(4), 241–243. doi:10.1097/01.NEP.0000000000000314

Hanson, J. (2013). From me to we: Transforming values and building professional community through narratives. *Nurse Education in Practice*, 13(2), 142–146. doi:10.1016/j.nepr.2012.08.007

Hensel, D., Middleton, M. J., & Engs, R. C. (2014). A cross-sectional study of drinking patterns , prelicensure nursing education , and professional identity formation. *Nurse Education Today*, 34(5), 719–723. doi:10.1016/j.nedt.2013.08.018

Hensel, D. (2014). Typologies of Professional Identity Among Graduating Baccalaureate-Prepared Nurses. *Journal of Nursing Scholarship*, 46(2), 125–133. doi:10.1111/jnu.12052

Hilton, S. (2008). Education and the changing face of medical professionalism: From priest to mountain guide? *British Journal of General Practice*, 58(550), 353–361. doi:10.3399/bjgp08X280128

Hoeve, Y. ten, Jansen, G., & Roodbol, P. (2014). The nursing profession: Public image, self-concept and professional identity. *Journal of Advanced Nursing*, *70*(2), 295–309. doi:10.1111/jan.12177

Holden, M., Buck, E., Clark, M., Szauter, K., & Trumble, J. (2012). Professional identity formation in medical education: The convergence of multiple domains. *HEC Forum*, 24(4), 245–255. doi:10.1007/s10730-012-9197-6

Holden, M. D., Buck, E., Luk, J., Ambriz, F., Boisaubin, E. V, Clark, M. A., … Dalrymple, J. L. (2015). Professional Identity Formation : Creating a Longitudinal Framework Through TIME (Transformation in Medical Education). *Academic Medicine*, 90(6), 761–767. doi:10.1097/ACM.0000000000000719

Guo, Y., Yang, L., Ji, H., & Zhao, Q. (2018). Caring characters and professional identity among graduate nursing students in China-A cross sectional study. *Nurse Education Today*, 65, 150–155. doi:10.1016/j.nedt.2018.02.039

Hollup, O. (2014). The impact of gender, culture, and sexuality on Mauritian nursing: Nursing as a non-gendered occupational identity or masculine field? Qualitative study. *International Journal of Nursing Studies*, 51(5), 752–760. doi:10.1016/j.ijnurstu.2013.09.013

Hood, K., Cant, R., Baulch, J., Gilbee, A., Leech, M., Anderson, A., & Davies, K. (2013). Prior experience of interprofessional learning enhances undergraduate nursing and healthcare students ' professional identity and attitudes to teamwork. *Nurse Education in Practice*, 14(2), 1–6. doi:10.1016/j.nepr.2013.07.013

Hood, K., Cant, R., Leech, M., Baulch, J., & Gilbee, A. (2014). Trying on the professional self : nursing students ' perceptions of learning about roles , identity and teamwork in an interprofessional clinical placement. *Applied Nursing Research*, 27(2), 109–114. doi:10.1016/j.apnr.2013.07.003

Hurley, J. (2009). Mental health nurse identity: Building upon Crawford et al. *International Journal of Nursing Studies*, 46(2), 291–293. doi:10.1016/j.ijnurstu.2008.10.011

Irby, D. M., Cooke, M., & O'Brien, B. C. O. (2010). Calls for Reform of Medical Education by the Teaching : 1910 and 2010. *Academic Medicine*, 85(2), 220–227.

Koo, H., & Kim, E. (2016). Vocational Identity and Ego Identity Status in Korean Nursing Students. *Asian Nursing Research*, 10(1), 68–74. doi:10.1016/j.anr.2015.11.001

Leducq, M., Walsh, P., Hinsliff-Smith, K., & McGarry, J. (2012). A key transition for student nurses: The first placement experience. *Nurse Education Today*, 32(7), 779–781. doi:10.1016/j.nedt.2012.05.022

Mather, C., Cummings, E., & Nichols, L. (2016). Social media training for professional identity development in undergraduate nurses. *Nursing Informatics*, 225, 344–348. doi:10.3233/978-1-61499-658-3-344

Mazhindu, D. M., Griffiths, L., Pook, C., Erskine, A., Ellis, R., & Smith, F. (2016). The nurse match instrument: Exploring professional nursing identity and professional nursing values for future nurse recruitment. *Nurse Education in Practice*, 18, 36–45. doi:10.1016/j.nepr.2016.03.006

Meleis, A. I., Sawyer, L. M., Im, E. O., Hilfnger Messias D. K., & Schumacher, K. (2000). Experiencing transitions: an emerging middle range theory. *Advances in Nursing Science*, 23(1), 12–28. doi:10.1097/00012272-200009000-00006

Mccrae, N., Askey-Jones, S., & Laker, C. (2014). Merely a stepping stone? Professional identity and career prospects following postgraduate mental health nurse training. *Journal of Psychiatric and Mental Health Nursing*, 21, 767–773. doi:10.1111/jpm.12131

Polit F.D. & Beck Tatano C. (2012) *Nursing research: Generating and assesing evidencefor nursing practice.* Philadelphia: J.B Lippincott company

Poudel, C., Ramjan, L., Everett, B., & Salamonson, Y. (2018). Exploring migration intention of nursing students in Nepal : A mixed-methods study. *Nurse Education in Practice*, 29, 95–102. doi:10.1016/j.nepr.2017.11.012

Sun, L., Gao, Y., Yang, J., Zang, X., & Wang, Y. (2016). The impact of professional identity on role stress in nursing students : A cross-sectional study. *International Journal of Nursing Studie*s, 63, 1–8. doi:10.1016/j.ijnurstu.2016.08.010

Thomas, J., Jinks, A., & Jack, B. (2015). Finessing incivility: The professional socialisation experiences of student nurses' first clinical placement, a grounded theory. *Nurse Education Today*, 35, e4–e9. doi:10.1016/j.nedt.2015.08.022

Wang, X. Q., Zhu, J. C., Liu, L., Chen, X. Y., & Huo, J. Y. (2018). Active construction of profession-related events: The priming effect among pre-service teachers with different professional identity. *Frontiers in Psychology*, 9. doi:10.3389/fpsyg.2018.00233

Weis, D., & Schank, M. J. (2009). Development and psychometric evaluation of the nurses professional values scale–revised. *Journal of Nursing Measurement*, 17(3), 221–231. doi:10.1891/1061-3749.17.3.221

Williams, B., & Webb, V. (2015). A national study of paramedic and nursing students ' readiness for interprofessional learning (IPL): Results from nine universities. *Nurse Education Today*, 35(9), e31–e37. doi:10.1016/j.nedt.2015.05.007

Wilson, I., Cowin, L. S., Johnson, M., & Young, H. (2013). Professional Identity in Medical Students: Pedagogical Challenges to Medical Education. *Teaching and Learning in Medicine*, 25(4), 369–373. doi:10.1080/10401334.2013.827968

Worthington, M., Salamonson, Y., Weaver, R., & Cleary, M. (2013). Nurse Education Today Predictive validity of the Macleod Clark Professional Identity Scale for undergraduate nursing students. *Nurse Education Today*, 33, 187–191. doi:10.1016/j.nedt.2012.01.012

Appendix 1

Table 3. Overview of the selected articles.

Code	Author(s) (Name, years and country)	Title	Design(possibly approach)	Participants（sampling method, No., age, gender, inclusion/exclusion criteria）	Data collection method(s)(Instruments)	Data analysis method(s)
1.	Williams Brett, Webb Vanessa 2015 Australia	A national study of paramedic and nursing students' readiness for interprofessional learning (IPL): Results from nine universities	A cross-sectional study	Sampling method: convenience sampling Number: 1264 Age: 23.57 (average age) Male: 516 (40.8%) Female: 748 (59.2%) Inclusion criteria: full time enrolment status in a participatory university in 2011 and/or 2012, and voluntarily consenting to participate in the study. Exclusion criteria: this article has no clear exclusion criteria	1). Readiness for Interprofessional Learning Scale (RIPLS) used to examine students' attitudes towards IPL. The RIPLS is a standardised self-reporting 19 item scale that consists of four subscales, with Subscale Two being reversed scored. The subscales include Subscale One: Teamwork and Collaboration, Subscale Two: Negative Professional Identity, Subscale Three: Positive Professional Identity, Subscale Four: Roles and Responsibilities. Individually subscales 1, 2, and 3 were reliable ($\alpha = .89$, $\alpha = .76$ and $\alpha = .74$ respectively), subscale 4 demonstrated poor reliability ($\alpha = .53$)	1).Data storage, tabulation and generation of inferential and descriptive statistics. 2). Demographic data was summarised through means [m] and standard deviations [SD]. 3). inferential statistics, t-tests and one-way analysis of variance [ANOVA], including post hoc tests. 4). Unless otherwise stated all tests were two tailed, with a p value b 0.05.

					Each item uses a 5-point Likert-scale (1 = strongly disagree and 5 = strongly agree). 2). Demographic questions	
2.	Sun Li, Gao Ying and Yang Juan, et al. 2016 China	The impact of profession al identity on role stress in nursing students: A cross-sectional study	A cross-sectional study	Sampling method: convenience sampling Number: 474 Age: 17 - 26 years (M = 23.02, SD = 1.29), Male: 9 Female: 465 Inclusion criteria: 1). nursing students after a 6-month sub-internship in a general hospital, with the students being enrolled in either a junior college or a bachelor's degree study programmes; 2). three nursing schools provided two education formats in China. Exclusion criteria: no response.	1). The Role Stress Scale (RSS), used to measure individuals levels of role stress. The RSS consists of 3 sub-dimensions with a total of 12 items: role conflict (5), role overload (4) and role ambiguity (3). The items are answered using a 5-point Likert Scale (strongly agree = 5, agree = 4, neutral = 3, disagree = 2, and strongly disagree = 1). In the role ambiguity sub-dimension, scoring is reversed. Cronbach s alpha coefficient of 0.78, cronbach s alpha coefficients for the sub-dimensions were 0.81, 0.65 and 0.64 2). The Professional Identity Questionnaire for Nursing Students (PIQNS), to measure nursing students professional identity. It contains 17 items loading on 5 sub-dimensions: professional self-image (6 items), retention benefit and risk of turnover (4 items), social comparison and self-reflection (3 items), career choice independence (2 items) and social modelling (2 items).	1). Tabulated 2). Calculate descriptive indices, Pearson correlation, point-biserial correlation and multiple linear regression analysis. 3). Descriptive analysis 4). Pearson and point-biserial correlations were conducted to examine the correlations. P-values <0.05 (2-tailed) were considered statistically significant.

					Items are assessed dona five-point Likert scale (complete conformity = 5, conformity = 4, neutral = 3, inconformity = 2, and 'complete inconformity' = 1). The total scores range from 17 to 85, with higher scores indicating a stronger professional identity. Cronbach's alpha coefficient for the Chinese version of the PIQNS was 0.86. Cronbach's alpha coefficients for each sub-dimension were 0.83, 0.68, 0.55, 0.15 and 0.78. 3). The participants personal characteristics questionnaire: age, gender, education level, status as an only child, place of residence, part-time work experience, experience in community organizations and reason for enrolment in nursing education. Professional identity and personal characteristics were regarded as the predictor variables, and role stress was seen as the dependent variable.	
3.	Hood Kerry, Cant Robyn and Baulch Julie, et al. 2013 Australia	Prior experience of interprofessional	A cross-sectional survey	Sampling method: convenience sampling Number: 741 Age: 19-53 years Male: 242 Female: 499	1). Readiness for Interprofessional Learning Scalev(RIPLS): 19-item loading on 3 main constructs were identified in the scale: Teamwork/Collaboration (9 items), Professional Identity (7 items)	1). Analysis of metric scales and independent t-tests and one-way ANOVA. p <0.05 2). Chi-square

				Inclusion criteria: undergraduate healthcare students attending a single university and who were scheduled for clinical placement in one large Melbourne metropolitan health service between June 2011 and July 2012. Exclusion criteria: this article has no clear exclusion criteria.	and Role/Responsibilities (3 items). Items are assessed dona five-point response scale was based on agreement (1: Strongly disagree to 5: Strongly agree). Cronbach alpha of 0.84. 2). Demographic question set: age, year of birth, course and year of university course and whether they had previously experienced IPL	3). Descriptive and parametric statistics
		learning enhances undergraduate nursing and healthcare students' professional identity and attitudes to teamwork				
4.	Desiree Hensel 2013 Indiana	Typologies of Professional Identity Among Graduating Baccalaureate-Prepared Nurses	A modified Q-methodology design	Sampling method: purposive sampling Number: 36 Age: 21 - 50 years (M = 25, SD = 7.27), Male: 3 Female: 33 Inclusion criteria: BSN students graduating from three campuses of a large Midwestern university in the United States with traditional and accelerated BSN degree options.	The Q-methodology framework to select statements for sorting: 19 statements represented views, agree with all QSEN attitudes, options for disagreement. The numbers of statements for each competency were as follows: patient-centered (n = 15), teamwork and collaboration (n = 10), EBP (n = 6), QI (n = 4), safety (n = 7), informatics (n = 4). The statements were individually printed on cards, called the Q-deck, to allow for rank ordering, which became the participant's Q-sort.	1). Generating a correlation matrix 2). Varimax rotation 3). Calculating the factor scores

				Exclusion criteria: this article has no clear. exclusion criteria.		
5.	Guo Yu-jie, Yang Lei, Ji Hai-xia, et al. 2018 China	Caring characters and professional identity among graduate nursing students in China-A cross sectional study	A descriptive cross-sectional study.	Sampling method: convenience sampling Number: 216 Age: 21-35 years (M=25) Male: 9(4.17%) Female: 207(95.83%) Inclusion criteria: 1). graduate nursing students from a three-year master program; 2). people who enrolled in the full time master program were eligible to participate in the study, no matter which kind of program they were in; 3). willing to participate in the study. Exclusion criteria: this article has no clear.	The self-fill questionnaire included three sections. 1). An introductory section explaining the purpose of the study and the option to fill out the questionnaire while assuring the anonymity of respondents. 2). Collected demographic information section: age, gender, grade, region, work experience, et al. 3). Nursing Caring Characters Assessment Tool (NCCAT), used to measure nurses' caring characters. 29 items loading on 4 dimensions: attitude of caring, knowledge of caring, ability of caring, perceptions of caring. Each item is rated on a 5-point likert scale ranging from 1 (disapprove) to 5 (approve). Total scale scores range from 29 to 145, with higher scores indicating better caring characters. The Cronbach's alpha was 0.91 and for sub-scale ranged from 0.71 to 0.85. The content validity was 0.98. 4). Professional Identity Scale for Nursing Students (PISNS) used to measure professional identity.	1) Descriptive statistical methods (percentage distributions, means and standard deviations) were used for data analysis. 2) Pearson's correlation test 3) Hierarchical regression analysis

				17 items loading on five subscales: "professional self-image", "benefit of retention and risk of turnover", "social comparison and self-reflection", "independence of career choice" and "social modeling". It is formed with 5-point rating, with 1 = strongly disagree, 2 = disagree, 3 = equally disagree and agree (neutral), 4 = agree, and 5 = strongly agree. Cronbach's alpha coefficient was 0.96	
6.	Worthington Melissa, Salamonson Yenna, Weaver Roslyn, et al. 2013 Australia, Singapore	Predictive validity of the Macleod Clark Professional Identity Scale for undergraduate nursing students	A longitudinal follow-up study approach	Sampling method: no clearly Number: 540 Age: 17-52 years (M=25.3) Male: 97(18%) Female: 443(82%) Inclusion criteria: 1). first year students enrolled in the undergraduate nursing program in 2009; 2). students(n=540) who completed the survey and consented for their survey to be linked to their academic grades and enrolment status;	1). Collected the following student data: age, gender, language spoken at home, nursingrelated vocational training, whether nursing was the first choice of study, engagement in paid work, and type of paid work during semester. 2). The MCPIS-9 was a professional identity scale. This 9-item scale used a six-point Likert scale for responses ranging from Strongly Disagree to Strongly Agree. Cronbach's alpha was 0.83.	1). Construct validity of the MCPIS-9 was assessed using principal component analysis with listwise deletion. 2). Cattell's scree test criterion. 3). Discriminant power 4). Item-total correlation and Cronbach's alpha. 5). Logistic regression 6). The Hosmer and Lemeshow goodness-of-fit test was used to determine regression model fit. Statistical

				Exclusion criteria: this article has no clear.		significance cut-off was set at P<0.05.
7.	Hensel Desiree, Middleton Mary Jean, Engs Ruth C. 2014, USA	A cross-sectional study of drinking patterns, prelicensure nursing education, and professional identity formation	A cross-sectional, descriptive study	Sampling method: convenience sampling Number: 333 Age: 22.9 (Mean age) Male: 28 Female: 305 Inclusion criteria: 1). being a traditional undergraduate BSN student; 2). enrollment at the study institution; 3). willingness to participate. Exclusion criteria: missing data.	1). Nurse Self Concept Questionnaire (NSCQ): 36 items on 8-point ordinal response scales that measure the six dimensions of a nurse's professional self-concept described. Cronbach's alpha scores for the subscales as follows: Nurse General Self-Concept, 0.90; Caring, 0.82; Staff Relations, 0.88; Knowledge, 0.79; Communication, 0.82; and Leadership, 0.89. 2). Student Alcohol Questionnaire (SAQ) assessed college students' knowledge, behaviors, and drinking patterns, measured problems resulting from drinking, 18-item. Cronbach's alpha was 0.92.	1). Standard deviations 2). Post hoc analysis using the Bonferroni correction 3). A one-way between-subjects ANOVA 4). A matrix using Pearson product-moment correlations
8.	Poudel Chandra, Lucie Ramjan, Everett Bronwyn, et al. 2018 Australia	Exploring migration intention of nursing students in Nepal: A	A mixed methods approach, with a dominant quantitative compone	Sampling method: no clearly Number: 799 Age: 15-35(19.7 ±2.1) Male/Female: this article has no clear. Inclusion criteria:	1). Intention to Stay in Nepal (ITSINS-5) - five-item scale - Cronbach's alpha: 0.85 2). English Language Usage Scale (ELUS-5) - five-item scale - Cronbach's alpha: 0.67	1) Descriptive statistics 2) Spearman's rho correlation analysis 3) Stepwise multiple linear ression analyses 4) Thematic analysis

		mixed-methods study	nt supported by a qualitative component.	Nursing students enrolled in two pre-registration programs, the four-year baccalaureate nursing or the three-year diploma nursing program, in four principal nursing colleges in Nepal. Exclusion criteria: this article has no clear.	3). Nepali Language Usage Scale (NLUS-5) - five-item scale - Cronbach's alpha: 0.74 4). Macleod Clark Professional Identity Scale (MCPIS-9) - nine-item scale - Cronbach's alpha: 0.85 5). Revised Belongingness Scale-Clinical Placement Experience (BES-CPE-27R) - twenty seven-item scale - Cronbach's alpha: 0.90 6). Clinical Learning Environment Inventory (CLEI-19) - nineteen-item scale - Cronbach's alpha: 0.87 7). Face-to-face interviews were used to collect qualitative data. The interview was guided by semi-structured questions related to participants' migration intention and the factors influencing this intention. Before conducting these interviews, pilot testing among two nursing students was conducted to further refine the interview schedule.	
9.	Hood Kerry, Cant Robyn,	Trying on the profession	Qualitative and quantitati	Sampling method: no clearly Number: 23	1). Interprofessional Clinical Placement Learning Environment Inventory (ICPLEI), explores students'	1). Descriptive and inferential statistics

	Leech Michelle, et al. 2014 Australia	al self: nursing students' perceptions of learning about roles, identity and teamwork in an interprofessional clinical placement	ve program evaluation	Age: not clearly Male/Female: no clearly Inclusion criteria: undergraduate students participated in the training ward rotations in a hospital rehabilitation ward in a large Melbourne health service. Exclusion criteria: this article has no clear.	perceptions of the learning environment: the orientation program, supervision, autonomy, roles and collaboration, Included 26-item, used ratings of statements from 1 (strongly disagree) to 5 (strongly agree) (Leech et al., 2013). Cronbach alpha was 0.75. 2). An on-site focus group discussion. Each group was facilitated by a trained researcher and the discussions were audio-recorded. An interview schedule was developed that included asking students to describe the features of IPL and any impact on their learning, to discuss what was positive or negative about their experience; suggest how the placement could be improved; describe how the experience might influence future practice and describe any relationships that might be of value in the future. Each group ran over 20–40 minutes.	2). Transcribed verbatim 3). Thematic analysis 4). Initial coding
10.	Koo Hyun-Young, Kim Eun-Jung 2016 Korea USA	Vocational Identity and Ego Identity Status in Korean	A cross-sectional descriptive study	Sampling method: convenience sampling Number: 311 Age: 18-48 years (M = 21.11, SD = 4.69) Male: 28 (9.0%) Female: 283 (91.0%)	1). Career Identity Scale: measured vocational identity. 23 items divided into three subdimensions, including emotion (8 items), cognition (8 items), and behavior (7 items).	1). One-way analysis of variance 2). Descriptive statistics 3). t test 4). Chi-square test

Nursing Students	Inclusion criteria: nursing students in South Korea who either attended a 4-year bachelor's program or a 3-year diploma program and who voluntarily consented to participate. Exclusion criteria: missing data.	Answered each item on a 5-point, Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Cronbach a for the current study was 0.88, 0.80, and 0.78 . 2). Extended ObjectivemMeasure of Ego Identity Status II, measured Ego identity status. 64 items divided into two areas including an ideological area (32 items) and an interpersonal area (32 items). Each item was assessed on a 6-point, Likert-type scale, ranging from 1 (strongly disagree), to 6 (strongly agree). Classified into pure identity status (achievement, moratorium, foreclosure, and diffusion) Cronbach a for achievement, moratorium, foreclosure and diffusion in this study was 0.77, 0.60, 0.84, and 0.67 3). Demographic information

Appendix 2

Table 4. The aims and the results of the selected articles.

Code	Author(s) (name/years/country)	Aim	Results
1.	Williams Brett, Webb Vanessa 2015 Australia	To assess the attitudes of undergraduate paramedic and nursing/paramedic students from nine Australian universities towards IPL over a two year period.	Double degree students have higher professional identity. First grade students have the highest professional identity and second grade the lowest. Gender has little influence on occupational identity, while degree type and years of college study have a great influence on occupational identity.
2.	Sun Li, Gao Ying and Yang Juan, et al. 2016 China	To investigate the level of nursing students' professional identity and role stress at the end of the first sub-internship, and to explore the impact of the nursing students' professional identity and other characteristics on role stress.	The level of professional identity is negatively related to the level of role stress. The level of professional identity is positively related to nursing course retention. At present, nursing students have positive professional self-image. Job opportunities, stable income, social status and other external environment can affect the professional identity of nursing students. Professional identity can motivate the individual career development of nursing students. Practice in hospital can help nursing students improve their professional identity.
3.	Hood Kerry, Cant Robyn and Baulch Julie, et al. 2013 Australia	To examine the attitudes of undergraduate health professional students towards interprofessional learning within a large multidisciplinary undergraduate cohort.	The PI of nursing students was significantly higher than medical students. And prior IPL experence was positive factor. Female own higher PI than male.
4.	Desiree Hensel 2014 Indiana	To identify patterns of professional identity arising from the Quality and Safety Education for Nurses	The types of professional identity was based on different point of attention, the three types were champion, collaborator, and individualist.

		(QSEN) attitudes among students completing their prelicensure education.	
5.	Guo Yu-jie, Yang Lei, Ji Hai-xia, et al. 2018 China	To explore the graduate nursing students' professional identity and caring characters in China, and analyze their correlation.	Graduate nursing students perceived they possessed positive caring characters while their professional identity was at a low level. A significant positive correlation was found between the Nursing Caring Characters Assessment Tool and Professional Identity Scale for Nursing Students.
6.	Worthington Melissa, Salamonson Yenna, Weaver Roslyn, et al. 2013 Australia, Singapore	The purpose of this study was to evaluate the psychometric properties of a professional identity scale and to determine the relationship between professional identity and student retention in a large group of first year nursing students.	Female students who have received nursing vocational training and regard nursing as the first choice or engage in paid nursing work have relatively higher professional identity.
7.	Hensel Desiree, Middleton Mary Jean, Engs Ruth C. 2014, USA	To describe drinking behaviors and professional identity formation among baccalaureate of nursing students	The drinking pattern which drinking more, had lower PI.
8.	Poudel Chandra, Ramjan Lucie, Everett Bronwyn, et al. 2018 Australia	To assess the migration intention of students enrolled in pre-registration nursing	Those with low professional identity and who did not make nursing their first choice were more likely to migrate.

		programs in Nepal, and to explore factors influencing this intention.		
9.	Hood Kerry, Cant Robyn, Leech Michelle, et al. 2014 Australia	To describe how senior nursing students viewed the clinical learning environment and matured their professional identity through interprofessional learning in a student-led hospital 'ward' .	During the interprofessional learning, students follow these five points to develop their professional identity: 1.experiencing independence and autonomy ; 2.seeing clearly what nursing's all about ; 3.altered images of other professions ; 4.ways of communicating and collaborating; 5.becoming a functioning team .	
10.	Koo Hyun-Young, Kim Eun-Jung 2016 Korea USA	To investigate the association between vocational identity and ego identity status among Korean nursing students	In the description of ego identity status, it was divided into achievement, moratorium, foreclosure, and diffusion. In these four ego identity states, the degree of PI was ranked as achievement, moratorium, foreclosure, and diffusion from high to low.	

Appendix 3

Table 5. The influencing factors of nursing students to develop their professional identity.

type	factor	Relationship	influence	other
	Degree type	+		

External environment influence	Grade level			Year 1 students had the strongest PI, year 2 students had the weakest PI; no significant difference; or higher grade level, higher PI
	University			Student in different university had different PI
	IPL		+	
	Prior IPL experience		+	
	Nursing-related vocational training		+	
	Nursing-related part-time employment		+	
	Retention benefit and risk of turnover	+		The most insignificant subscale in the PISNS The highest level of inconformity in PIQNS
	Social comparison and self-reflection	+		The highest level of conformity in PIQNS
	Social modelling	+		The most important subscale in the PISNS
	Monthly family income			Income more than 6000 USD own higher PI

Internal environment influence	gender		No effect or female was stronger than male
	Role stress	-	
	Professional self-image	+	Positive professional self-image link to higher PI
	Independence of career choice,	+	
	Caring characters	+	
	First choice	+	First choice was nursing
	Drinking patterns	-	
	Belongingness and satisfaction with clinical learning environment	+	
	Ego identity status	+	Different status with different degrees of PI
	Migration intention	-	