RESEARCH ARTICLE

Attitudes and beliefs towards implementation of nurse prescribing among general nurses and nurse specialists in China: A cross-sectional survey study

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Abstract

Aims: To investigate the attitudes and beliefs towards the implementation of nurse prescribing among general nurses and nurse specialists.

Design: A cross-sectional survey among general nurses and nurse specialists was conducted in seven provinces and one autonomous region in mainland China using convenience sampling method.

Methods: The attitudes and beliefs towards nurse prescribing were assessed using the Nurse Attitudes and Beliefs towards Nurse prescribing scale, of which Cronbach's coefficient was 0.902, retest reliability was 0.808. Respondents from eight hospitals across the country were employed to complete an online questionnaire.

Results: Nurse specialists ($n = 399$) had statistically significantly more favourable intentions towards nurse prescribing than general nurses ($n = 415$; 105.64 ± 12.83 vs. 96.39 ± 13.16; $p < .001$). The years of clinical work experience, professional title, education degree were positively correlated with general nurses' and nurse specialists' attitudes and beliefs towards nurse prescribing ($p < .05$). Among nurse specialists, the variety of specialties and whether they work in nurse-led clinics on an outpatient basis have positively influence on their intentions towards nurse prescribing ($p < .05$).

KEYWORDS
advanced nursing practice, attitudes, beliefs, general nurses, nurse prescribing, nurse role, nurse specialists, views

1 | INTRODUCTION

Prescriptive authority has been strictly in control within the realm of the medical profession for a long time (Fisher, 2010). However, prescriptive authority has become a reality amongst certain nurses in dozens of countries in response to growing demands for health care (Creedon et al., 2015; Delamaire & Lafortune, 2010). Nurse prescription has experienced a long process of development and was implemented at different times in different countries. It initially developed slowly, and was first introduced in the state of Idaho, America in 1969 (Fletcher et al., 2011). Since this first introduction, it has rapidly evolved globally over the past two decades. Literature has shown that not only could nurse prescription provide quicker service, improvements in quality, efficient patient care and continuity of care for patients (Courtenay et al., 2011; Tinelli et al., 2013) but also could make better utilization of the nurses' professional skills and knowledge (Phillips & Wilkinson, 2015) and increase nurses' autonomy and job satisfaction (Carey et al., 2009). Despite these, nurse prescribing has not yet been introduced widely in China.

2 | BACKGROUND

Parker and Hill (2017) state that it is imperative for Chinese nurses to be prepared and recognized for a more advanced role with greater scope and complexity due to the Chinese context of an ageing society with the biggest population in the world. Evidence shows that nurse prescribers are playing a significant role in issuing prescriptions for those growing number of senior citizens with chronic diseases (such as diabetes; Kroezen et al., 2014). Given the situation in current Chinese health services of long wait times (Peng et al., 2016), any initiative which aims to change this situation will be welcome in China. In November 2017, in order to create more efficient access to medical services for patients and promoting healthcare reform, the healthcare policymakers in Anhui Province took the lead in opening up the non-medication prescriptive authority for 78 supervisor nurses and have achieved good results (Ma & Ding, 2018). These positive results indicate the necessity and potential success of the introduction of nurse prescribing in China (Ma & Ding, 2018).

The role of advanced nursing practice has become a global trend in the 21st century (Shiu et al., 2012). Similarly, Chinese healthcare policymakers sought to raise the standard of specialized care in line with other leading countries; thus, they designated nurses to study in Hong Kong SAR, China, where the hospitals are reputed for their high standards in quality service and specialty training for nurses (Hospital Authority, 2011). A total of 615 nurses successfully completed their 10-month specialist training programme in Hong Kong from 2007–2011 (Hospital Authority, 2011). These nurses are playing a significant role in advancing Chinese nursing practice (Zou et al., 2012). Meanwhile, as the nursing specialism education programme progresses in mainland China, the number of nurse specialists is increasing rapidly and accounts for around 10.1% of all nurses (Cao et al., 2015). These nurses primarily work as nurse consultants in nurse-led clinics or inpatient departments (Zou et al., 2012). However, unlike the Hong Kong nurse specialists who have prescriptive authority, nurse specialists in mainland China find that their abilities are hindered to provide holistic care for patients as they lack nurse prescribing (Sheer & Wong, 2008). Indeed, similar situations are often found in the author's workplace. For instance, we found wound care nurse specialists are not able to prescribe some necessary medicines or dressings in a timely manner when caring the wounds for patients because they lack the authority of nurse prescribing. These nurse specialists have to refer these patients to doctors, resulting in discontinuity of care for patients. Therefore, we feel that nurse prescribing should be addressed as a matter of urgency in the Chinese context.

Overall, these multiple driving forces might put nurse prescribing as a nurses' role expansion on the nursing reform agenda in mainland China. But if so, what barriers might nurse prescribing encounter when implementing in Chinese context? From the literature review, the process of introduction of nurse prescribing experiences a great number of barriers in several countries. Firstly, doctors are conventionally deemed to be at the top of a hierarchy and thus are notoriously protective of their prestige and power (Horton, 2002).

Hence, resistance from doctors is always viewed as a significant barrier when introducing nurse prescribing. Nurse prescribing has been debated continually in mainland China within the literature, questioning whether nurses should broaden their scope of practice (Han & Hou, 2019). Interestingly, although arguments and resistance from doctors have been fuelled in the face of nurse prescribing, the UK still awarded all suitably qualified nurses to prescribe any drugs except controlled drugs since policymakers believed that this decision to expand practice should be driven by a desire to improve the continuity and quality of patient care (Barrowman, 2007). A similar picture can be found in the Netherlands and Ireland when nurse prescribing first began (Kroezen et al., 2014; McBrien, 2015). Indeed, evidence has shown that doctors' attitudes towards nurse prescribing have changed over time, especially after implementation of nurse prescribing in these countries (Shannon & Spence, 2011).

In addition, inadequacies in the pharmacology knowledge of some nurses are identified as another recurring barrier to hinder the success of the implementation of nurse prescribing (Offredy et al., 2008). It is essential to provide nurses with adequate educational preparation before they are awarded to prescribe so as to achieve the aim of implementation. Furthermore, the voluminous paperwork with respect to recording each prescription and prescribing limited to certain drugs are demonstrated as barriers that hamper the development of nurse prescribing. For instance, McBrien (2015) reports that too much paperwork associated with registering each drug prescribed has created negative attitudes and led to despondency among nurse prescribers in Ireland. Last but not least, a lack of organizational preparedness, public awareness, legislation, funding and regulation are viewed as other essential barriers of nurse prescribing (Sheer & Wong, 2008; Stenner et al., 2010). In brief, these multiple barriers should be taken into consideration before the implementation of nurse prescribing in mainland China.

Given the important role played by nurses in supporting or impeding the development of nurse prescribing (Kroezen et al., 2014), thus, it is important to consider their views on role expansion. However, what type of nurses in the Chinese context should take up the role? Unfortunately, qualification requirements for nursing prescribers have not yet reached an international consensus, and controversy is mainly focussed on whether nurse prescribing should be allowed by only nurse specialists or general nurses as well (Ross et al., 2014). According to the literature review, evidence has shown that nurse specialists are more confident and capable to prescribe than general nurses (Buckley et al., 2013). However, unlike the USA, where nurse specialists must have a minimum of a master degree (Kennedy-Malone et al., 2008), it should be noted that so far there is no specific, additional degree requirement for becoming a nurse specialist in China. On completion of a minimum of 6-month full-time training course, nurses who have acquired expert knowledge and have passed the assessment at the end of core training can be accredited as a nurse specialist. On the other hand, in countries like the UK and Ireland, Registered Nurses with a minimum of 3 years' work experience are eligible to be trained as a prescriber (Ross et al., 2014). Similarly, although prescriptive authority was initially limited to nurse specialists in the Netherlands, it has been

expanded to general nurses since 2014 (Kroezen et al., 2014). These examples imply that general nurses might also be eligible to become nurse prescribers. Though some general nurses in the UK have shown incapability in prescribing or unwillingness to take on the responsibility (Buckley et al., 2013), general nurses are still of value to investigate in further detail in China, as this area is totally unknown and evidence needs to be collected to add to the body of knowledge. Thereby, nurse specialists, as well as general nurses, are chosen to investigate in this research.

According to the Theory of Planned Behaviour (TPB), attitudes are viewed as the most proximal predictor of behavioural intention (Ajzen, 2005). In other words, attitudes such as individuals' perceived confidence in their abilities to generate expected outcomes by their actions will greatly determine their behavioural intention (Ajzen, 2005). As proven by McConnell et al. (2013) and Darvishpour et al. (2016), negative attitudes amongst nurses can directly hinder the success of introducing new nursing roles, so it is vital to be aware of their attitudes when any new change is occurring in nursing practice. These support us in assuming that the independent variable nurses' attitudes and beliefs towards nurse prescribing will shape their initiatives to take on the new role and their negative attitudes could directly impede the success of introducing nurse prescribing. While no literature regarding Chinese nurses' attitudes towards nurse prescribing could be identified, evidence needs to be collected to help Chinese healthcare policymakers ascertain nurses' intention to carry out the new role and provide them with valuable information for service planning. In light of this, a quantitative research design will be used to get a deeper understanding of these two groups' views on nurse prescribing.

3 | THE STUDY

3.1 | Aim

The aim of this study was to provide a national overview of the attitudes of general nurses and nurse specialists towards implementation of nurse prescribing in China. Specifically, the study had the following three objectives:

1. To determine Chinese general nurses' and nurse specialists' attitudes and beliefs towards implementation of nurse prescribing;
2. To ascertain any difference between general nurses and nurse specialists about their attitudes towards implementation of nurse prescribing;
3. To explore the factors influencing nurses' attitudes and beliefs about the implementation of nurse prescribing among general nurses and nurse specialists.

3.2 | Design

An online cross-sectional survey among general nurses and nurse specialists was conducted in eight provinces in mainland China.

3.3 | Method

3.3.1 | Sample

A nurse specialist in this study is one who, through completion of a minimum of 6-month training course, has acquired expert knowledge and has passed the assessment at the end of training. A general nurse is a Registered Nurse who has graduated from a nursing college or university and has obtained a nursing license issued by a provincial licensing body.

The population of Registered Nurses in China was approximately 4.1 million in 2018 (Statista, 2017). According to Cao et al., (2015), nurse specialists account for around 10.1% among all Registered Nurses in China, so the population of general nurses and nurse specialists is estimated at about 3.7 million and 0.4 million, respectively. The sample size is decided according to the Sample Size Calculator (The Research Advisors, 2016). Its sufficient statistical power is ensured by utilizing a confidence interval of 95% and a margin of error of 5%, resulting in the same sample size ($n = 384$) for each group.

It was not feasible to include all hospitals in this study due to budgetary and time constraints. Therefore, according to the geographical and demographic characteristics of the hospitals in China, eight large and typical tertiary general hospitals from seven provinces and one autonomous region were selected, including Guangdong, Hunan, Guizhou, Sichuan, Hebei, Yunnan and Jiangsu, Guangxi, which represent the east, west, north, south and central regions of China. The approval has been attained from the head of each Nursing Administration Department of the eight hospitals, and the number of Registered Nurses in total is 15,639, with 13,989 general nurses and 1,650 nurse specialists respectively.

General nurses were chosen from six typical departments in each hospital, including ER, ICU, Orthopedics Surgical department, Oncology physical department, Obstetrics department and Pediatric department. And nurse specialists were chosen mainly from specialties which cover diabetes care, wound care, geriatric care, cancer care, orthopaedic care, obstetric care, critical care, emergency care and cardiovascular care. Nurses who are on long-term sick leave (over 3 months) were excluded and who are full-time clinical nurses and have at least 3 years' clinical work experience were included in our study. Reasons for participants with 3 years' clinical work experience are as follows. Firstly, in the UK, a minimum of 3 years' work experience is the entry level qualification for nurses to be a prescriber (Ross et al., 2014). Additionally, according to Chinese Nurse Byelaw (Chinese Ministry of Health, 2008), new nurse recruits are required to engage in 1-month pre-job training and then engage in a period of 24 months for theoretical and practical training by working in certain assigned departments. After completion of this training programme, they would be settled in one department. We presume participants might have a better understanding in nursing profession and nurse prescribing if they have been working in the designated departments for 1 year. Therefore, nurses with a minimum of 3 years' clinical work experience were chosen in this study.

3.3.2 | Questionnaire

The questionnaire consists of three parts. The first part refers to the gathering of baseline data of the samples, including gender, age, years of clinical work experience, professional title and education degree.

The second part is the main part using a scale named "Nurses' Attitudes and Beliefs towards Implementation of Nurse Prescribing Scale" (NABINPs). It uses for measuring nurses' attitudes and beliefs towards implementation of nurse prescribing and was developed by our preliminary study which was published in a Chinese General Practice Nursing journal (Ling et al., 2021). It comprised of four dimensions with 27 items, including the perception of benefits of nurse prescribing (10 items), nurses' self-efficacy in nurse prescribing (six items), the perception of the barriers of nurse prescribing (5 items), the perception of the necessity of nurse prescribing (six items; see Table 2 for items).

The scale is constructed mainly by four steps as follows. Firstly, an item pool with 38 items was constructed by literature review (Ling, et al., 2017; seven items), group discussion (16 items) and referring to a questionnaire developed by Patel et al. (2009; 15 items). Secondly, ten nurse specialists who were from ICU ($n = 2$), ER ($n = 2$), Orthopedics Dept. ($n = 2$), Geriatrics Dept. ($n = 2$), Cardiovascular medicine Dept. ($n = 1$), Neurology Dept.($n = 1$) were invited in this study to evaluate the accuracy of the 38 items using the Delphi method, and nine items was deleted after two rounds of expert consultation. Then, a minor modification was made by a pilot study, involving 25 nurse participants for testing the feasibility of the actual study. Finally, a total of 368 nurses were recruited to construct the scale and test its reliability and validity. In the end, two items was deleted according to two rounds of exploratory factor analysis, with a retention of 27 items as the final scale. Subsequently, four dimensions were generated by the third round of exploratory factor analysis and scree plot. Bartlett sphericity test reached the significance level ($2 = 6,395.537$, $df = 351$, $p = .000$), indicating that the method of extracting common factors could explain most of the statistical information represented by the items in the scale. The principal component analysis and the maximum orthogonal rotation of variance were further adopted. The eigenvalue with being greater than 1 was used to generate four common factors. The contribution rate of cumulative variation was 68.24%. The factor loads of the 27 items in the scale were ranging from 0.498–0.905, indicating all items of the scale can be explained by the common factors. Cronbach's coefficient of the scale was 0.902, and Cronbach's coefficient of each dimension was 0.969, 0.808, 0.761 and 0.767, respectively. Its retest reliability was 0.808. The correlation coefficient between the total scale and each dimension was 0.62–0.83, and the content validity index (S-CVI) was 0.921. It shows that both the reliability and validity of the scale are satisfied. The five-point Likert rating system was adopted for the scale, ranging from "completely disagree" (1) to "completely agree" (5). The total score ranged from 27–135 points, among which the third dimension (questions 19, 20, 25, 26, 27) was reverse scoring items. The higher the scores are, the higher the nurse's beliefs and intentions of implementation of nurse prescribing are.

Additionally, an multiple-choice question, "opinions on what kind of drugs could be allowed for nurses to prescribe," a single choice question, "opinions on nurses' education degree required for nursing prescribing" and an open question, "do you have any opinions on nurse prescribing?" were added as the third part of the questionnaire.

3.3.3 | Ethics

The research consent was clarified at the beginning of the questionnaire, and submission of the questionnaire is regarded as their voluntary participation in this survey. Respondents were anonymous and non-traceable. This study was approved by Institutional Review Board of the first authors' hospital before the investigation was conducted (approval no: 2018-KY-069C).

3.3.4 | Data collection

"Sojump" platform which is the most popular online survey platform in China was applied to collect data in this study. Firstly, all questions were inputted into "Sojump" for creating an online questionnaire. The informed consent which included the purpose, significance and confidentiality principle of the study was attached to the online questionnaire in detail, and the submission of the questionnaire was regarded as voluntary participation. Then, the online questionnaire link was sent out via the China's largest social networking platform "WeChat" to each general nurse and nurse specialist who meet the inclusion and exclusion criteria by the first author's eight postgraduate classmates who work in the eight selected hospitals. Each of the investigators was paid for 600 yuan RMB to express appreciation for their efforts. They were trained online twice by the first author in relation to the matters they need attention concerning the investigation, and they were not allowed to view the result of the survey. After completion of the questionnaire, 2–3 yuan RMB was automatically and randomly issued to each respondent in appreciation of their participation. Participants could only submit the questionnaire once by one IP address.

3.3.5 | Data analysis

The anonymous data from "Sojump" were downloaded and inputted to SPSS (version 23.0) which was used for statistical analyses. The information gathered from the Likert scales was assigned a numeric value, and reverse scoring items were reversed as appropriate. Kolmogorov–Smirnov Z test was used to clarify whether data were normally distributed. Frequency and composition ratio were applied to analyse categorical data. The t test and one-way ANOVA test were used to identify the differences between the two groups

and explore factors affecting nurses' attitudes and beliefs towards implementation of nurse prescribing.

4 | RESULTS

4.1 | Response rates and demographic data

Of the 665 and 521 questionnaires that were sent out to general nurses and nurse specialists respectively, 448 and 417 questionnaires were collected, giving a gross response rate of 67.37% and 80.04%. 51 in total were sent to respondents who did not belong to the two target groups, that is people who worked as a nurse less than 3 years ($n = 41$), people who were not nurses ($n = 3$) and people

who held management positions ($n = 7$). Finally, 415 and 399 questionnaires were valid, with effective response rates of 62.41% and 76.58%, respectively. Finally, 415 general nurses and 399 nurse specialists participated in this study. None of these respondents had legal authority to prescribe. As be seen in Table 1, no significant differences between the two panels in age, gender, years of clinical work experience, or geographical distribution, but there were significant differences in professional title and education degree.

4.2 | Group differences

In general, both general nurses and nurse specialists held moderately positive willingness on the introduction of nurse prescribing in

TABLE 1 Characteristics of the respondents in general nurses and nurse specialists

	General nurses ($n = 415$)	Nurse specialists ($n = 399$)	t/X^2	p-Value
Age (mean $\pm$ SD)	31.9 $\pm$ 5.60	34.80 $\pm$ 4.82	8.50	0.031[*]
Gender (n, %)				
Male	29 (6.99%)	27 (6.77%)	2.79	0.252
Female	386 (93.01%)	372 (93.23%)		
Years of clinical work experience (n, %)			4.77	0.053
3–5 years	31 (7.47%)	7 (1.76%)		
6–10 years	173 (41.69%)	178 (44.61%)		
11–15 years	100 (24.10%)	101 (25.31%)		
Over 15 years	111 (26.74%)	113 (28.32%)		
Professional title (n, %)			28.55	0.001[**]
Junior nurse	48 (11.57%)	5 (1.25%)		
Senior nurse	125 (30.12%)	78 (19.55%)		
Supervisor nurse	167 (40.24%)	208 (52.13%)		
Associate senior nurse and above	75 (18.07%)	108 (27.07%)		
Education degree (n, %)			45.79	0.000[***]
College graduate degree	181 (43.61%)	10 (2.51%)		
Bachelor degree	215 (51.81%)	358 (89.72%)		
Postgraduate degree	19 (4.58%)	31 (7.77%)		
Geographical distribution (n, %)			0.79	0.610
Guangdong	57 (13.73%)	51 (12.78%)		
Hunan	51 (12.29%)	49 (12.28%)		
Guangxi	52 (12.53%)	47 (11.79%)		
Guizhou	49 (11.81%)	51 (12.78%)		
Sichuan	53 (12.77%)	51 (12.78%)		
Hebei	54 (13.01%)	49 (12.28%)		
Yunnan	50 (12.05%)	50 (12.53%)		
Jiangsu	49 (11.81%)	51 (12.78%)		

*p <.05,
**p <.01,
***p <.001.

China, as shown in Table 2. However, general nurses scored significantly lower, with less favourable attitudes and beliefs towards nurse prescribing than nurse specialists (96.39 ± 13.16 vs. 105.64 ± 12.83; p <.001), on dimensions concerning the perception of benefits of nurse prescribing (Dimension A, 39.39 ± 6.89 vs. 42.63 ± 7.1; p <.001), self-efficacy of nurse prescribing (Dimension B, 20.41 ± 4.11 vs. 22.98 ± 3.85; p <.001), the perception of the barriers of nurse prescribing (Dimension C, 15.05 ± 3.92 vs. 15.85 ± 3.95; p =.058) and the perception of the necessity of nurse prescribing (Dimension D, 21.53 ± 3.79 vs. 24.18 ± 3.23; p <.001; see Table 2).

4.3 | Influence factors

See Table 3 for analyses of whether the four potential independent variables influence the scores of general nurses' beliefs and attitudes towards implementation of nurse prescribing, including gender, years of clinical work experience, professional title and education degree. The results showed that three factors with years of clinical work experience, professional title and education degree are positively, significantly correlated with the nurse's attitudes and beliefs towards nurse prescribing (p <.05), but gender had no correlation (p >.05).

Meanwhile, univariate analysis was carried out in the group of nurse specialists to analyse six factors associated with nurse specialists' beliefs and attitudes towards implementation of nurse prescribing. Five factors, including years of clinical work experience, professional title, education degree, the variety of nurse specialists and whether they work in nurse-led clinics or not, have a positive influence on the nurse specialists' attitudes and beliefs towards nurse prescribing (p <.05; see Table 4).

4.4 | Opinions on the scope of nurse prescribing in relation to medication

According to the analyses of the opinions on the scope of nurse prescribing in relation to medication, 84.52% of nurses (n = 814) agree that nurses should have the authority to prescribe low-risk drugs such as Glycerine Enema, while only 10.20% of the nurses believe that nurses are capable to prescribe sedative drugs such as Valium. 77.27% of the nurses believe that they should be authorized to prescribe first-aid drugs so as to provide rescue in a timely manner for patients, as shown in Table 5.

4.5 | Nurses' views on academic qualifications for nurse prescribers

See Table 6 for investigation of the views on the academic qualification for nurse prescribers. Only 1.84% of nurses (n = 814) felt that nurse prescribing could be issued to the nurse with college graduate degree, while 78.13% of the nurses believed that nurse prescribers

should have a minimum education of a bachelor degree as the entry level qualification. 20.02% of the nurses believed that nurse prescribing could be issued to the nurse with a minimum education of a postgraduate degree.

4.6 | Suggestions from respondents on the introduction of nurse prescribing

In our study, 9.8% nurses (n = 814) passively expressed their concerns on nurse prescribing according to the last open-ended question in our survey, which mainly focussed on policy support (n = 34), legal liability (n = 29), pharmacological knowledge of prescription (n = 22) and objection from doctors (n = 19). Their suggestions regarding these issues are as below. Firstly, detailed laws and regulations in relation to nurse prescribing should be formulated accordingly, as well as setting up entry qualifications of being a nurse prescriber. Furthermore, it is necessary to specifically define nurses' legal responsibility with nurse prescribing. Most importantly, nurse prescribing training programmes should be provided before issuing prescriptive authority to nurses.

5 | DISCUSSION

In general, Chinese nurses held moderately positive attitudes and beliefs on introduction of nurse prescribing. As shown in Table 2, the score in dimension A (the perception of benefits of nurse prescribing) is the highest among the four dimensions in both groups. Nurses held strongly positive beliefs that nurse prescribing can increase nurses' autonomy, promote the sense of nurses' responsibility and expand the scope of nursing practice. In addition, they also believed that this might improve the relationship between nurses and patients and improve patient access to medical service as a whole. This would be in line with findings from the literature, where it was shown that patients are highly satisfied with nurse prescribing. Quicker service, improvements in quality and efficient patient care among the benefits are cited most frequently (Courtenay et al., 2011; Tinelli et al., 2013). Advantages in regard to continuity of care (Courtenay et al., 2011), enhancement of nurse–patient relationship (Carey et al., 2009; Ross et al., 2014) and improvements of patients' satisfaction (Tinelli et al., 2013) are also showed in the literature. Moreover, the high degree of agreement in both groups concerning the necessity of the introduction of nurse prescribing is striking. As can be seen in Dimension D, most respondents believe that nurse prescribing is a good idea and should be implemented for nurses soon.

After all, it is encouraging that the views of general nurses and nurse specialists in our study were generally positive towards nurse prescribing. Although it could not directly assume that positive attitudes correspond with actual or future behaviour, and changing traditional roles is generally considered to be the most intractable problem, our findings are still promising as according to the TPB, if a

TABLE 2 Nurses' attitudes and beliefs towards implementation of nurse prescribing

	General nurse (n = 415) (X ± S, score)		Nurse specialists (n = 399) (X ± S, score)			
	Per item	In total	Per item	In total	t	p-Value
Total scale	3.57 ± 0.50	96.39 ± 13.16	3.91 ± 0.48	105.64 ± 12.83	6.612	p <.001***
Dimension A: the perception of benefits of nurse prescribing (Nurse prescribing will...)	3.94 ± 0.70	39.39 ± 6.89	4.26 ± 0.71	42.63 ± 7.1	4.284	p <.001***
13. Increase respect for nurses by other health professionals	3.94 ± 0.85		4.31 ± 0.81		4.263	p <.001***
14. Increase nurses' autonomy	4.01 ± 0.76		4.35 ± 0.78		4.153	p <.001***
15. Improve the sense of nurses' responsibility	4.02 ± 0.79		4.34 ± 0.76		3.903	p <.001***
16. Expand the scope of nursing practice	4.08 ± 0.71		4.33 ± 0.79		3.159	0.002**
17. Increases nurses' job satisfaction	3.86 ± 0.86		4.19 ± 0.84		3.643	p <.001***
18. Improve nurses' work efficiency	3.89 ± 0.83		4.21 ± 0.83		3.589	p <.001***
21. Enhance nurses' ability in nursing care	3.93 ± 0.81		4.27 ± 0.74		4.215	p <.001***
22. Enhance nurse/patient relationships	3.83 ± 0.83		4.11 ± 0.83		3.204	0.001**
23. Improve patient access to medical service	3.93 ± 0.77		4.22 ± 0.79		3.579	p <.001***
24. Shorten waiting time of health services	3.90 ± 0.78		4.27 ± 0.77		4.529	p <.001***
Dimension B: nurses' self-efficacy in nurse prescribing	3.40 ± 0.67	20.41 ± 4.11	3.83 ± 0.64	22.98 ± 3.85	6.115	p <.001***
7. I am not afraid of legal liability caused by nurse prescribing	2.80 ± 1.15		3.84 ± 0.78		9.126	p <.001***
8. I don't think nurse prescribing is a threat to patient safety	3.94 ± 0.93		4.24 ± 0.72		3.539	p <.001***
9. I am familiar with the pharmacological knowledge of prescription	3.43 ± 0.96		3.61 ± 1.01		1.707	0.089
10. I believe I am capable in nurse prescribing	2.95 ± 1.06		3.49 ± 1.06		4.708	p <.001***
11. I believe I am capable in performing physical assessment for patients before issuing prescriptions	3.60 ± 0.97		3.91 ± 0.93		2.861	0.005**
12. I believe I am capable of informing the side effects of drugs for patients	3.69 ± 0.85		3.89 ± 0.91		2.138	0.033*
Dimension C: the perception of the barriers of nurse prescribing (nurse prescribing will...)	3.01 ± 0.78	15.05 ± 3.92	3.17 ± 0.79	15.85 ± 3.95	1.898	0.058
19. Increases nurses' workload (R)	2.56 ± 1.03		2.75 ± 1.08		1.6	0.11
20. Increase nurses' anxiety (R)	2.70 ± 0.94		2.95 ± 1.1		1.508	0.132
25. Make doctors feel threatened (R)	3.41 ± 0.98		3.40 ± 1.15		0.845	0.399
26. Make medical services more complex (R)	3.17 ± 1.05		3.33 ± 1.1		2.923	0.004**
27. Create conflict between doctors and nurses (R)	3.21 ± 1.09		3.42 ± 1.09		3.246	0.001**
Dimension D: the perception of the necessity of nurse prescribing	3.59 ± 0.63	21.54 ± 3.79	4.03 ± 0.54	24.18 ± 3.23	6.781	p <.001***
1. In theory, nurse prescribing is a good idea	3.85 ± 0.83		4.31 ± 0.80		5.272	p <.001***
2. Nurse prescribing will be implemented soon	3.61 ± 0.98		4.05 ± 0.87		4.366	p <.001***
3. Prescriptive authority should be implemented for nurses	3.82 ± 1.04		4.34 ± 0.70		5.137	p <.001***
4. I have a need to prescribe for patients in the process of nursing care	3.64 ± 1.03		4.15 ± 0.73		5.033	p <.001***

(Continues)

TABLE 2 (Continued)

	General nurse (n = 415) (X ± S, score)		Nurse specialists (n = 399) (X ± S, score)			
	Per item	In total	Per item	In total	t	p-Value
5. Nurse prescribing will be welcomed by patients	3.29 ± 0.93		3.82 ± 0.93		5.194	p <.001***
6. Nurse prescribing will decrease doctors' workload	3.33 ± 0.92		3.51 ± 1.00		1.77	0.077

*p <.05,
**p <.01,
***p <.001.

TABLE 3 Univariate analysis of the factors influencing general nurses' attitudes and beliefs regarding the implementation of nurse prescribing

	General Nurse (n = 415)	Score (mean ± SD)	t/F	p-Value
Gender			0.006	0.674
Male	29	96.25 ± 13.38		
Female	386	96.40 ± 13.34		
Years of clinical work experience			1.925	0.041*
3–5 years	31	94.25 ± 12.17		
6–10 years	173	95.93 ± 13.94		
11–15 years	100	96.95 ± 13.02		
Over 15 years	111	97.20 ± 12.73		
Professional title			2.345	0.028*
Junior nurse	48	93.13 ± 13.15		
Senior nurse	125	94.13 ± 11.55		
Supervisor nurse	167	97.15 ± 13.07		
Associate senior nurse and above	75	100.55 ± 14.02		
Education degree			1.875	0.002**
College graduate degree	181	93.19 ± 9.32		
Bachelor degree and above	234	98.87 ± 13.46		

*p <.05,
**p <.01,
***p <.001.

person has a positive attitude towards the behaviour, then the person will develop the intention to perform and subsequently carry out the behaviour (Ajzen, 2011). It thus supports us in assuming that such nurses' positive attitudes will shape their initiative to take on the new role and ultimately could promote the success of introducing nurse prescribing.

In mainland China, nursing profession, which used to be a subdiscipline of medicine, has become an independent discipline since 2011. As an independent discipline, nursing should have its own independent academic field and scope of practice, and to some extent nurse prescribing is not only the recognition of the independence of nursing profession, but also can provide the potential to make better

utilization of nurses' professional skills and knowledge. It results in legitimizing nurses' prescribing practice, where previously nurses issued medicines under uncertain legal conditions, such as administrating life-saving medications for patients with anaphylactic shock (Han & Hou, 2019; Stenner, et al., 2010). Moreover, having a recognized prescribing qualification increases nurses' credibility with doctors and patients, which is essential to the nurses when they are recommending medications to doctors, and increases nurses' job satisfaction and finally promotes their attraction to the nursing profession and retention rates (Carey et al., 2009; Latter et al., 2010).

Nonetheless, among the four dimensions, dimension C, concerning the perception on the barriers of nurse prescribing, is scored the

	Nurse Specialist (n = 399)	Score (mean ± SD)	t/F	p-Value
Gender			0.905	0.366
Male	27	103.71 ± 11.27		
Female	372	105.78 ± 12.91		
Years of clinical work experience			6.644	0.002**
5–10 years	185	103.39 ± 12.52		
11–15 years	101	105.57 ± 12.38		
Over 15 years	113	109.39 ± 11.84		
Professional title			4.849	0.011*
Senior nurse and below	78	103.86 ± 12.70		
Supervisor nurse	208	105.64 ± 11.43		
Associate senior nurse and above	108	107.01 ± 12.09		
Education degree			2.763	0.001*
Bachelor degree and above	368	104.86 + 13.65		
Postgraduate degree	31	114.86 + 12.66		
Nurse specialist types			2.620	0.040*
Diabetes nurse specialists	31	113.4 ± 7.02		
Wound nurse specialists	27	111.78 ± 9.18		
Emergency nurse specialists	37	111.51 ± 11.61		
Geriatric nurse specialists	31	108.54 ± 10.53		
Hospice nurse specialists	36	108.07 ± 12.15		
Orthopaedic nurse specialists	28	106.36 ± 12.96		
Critical care nurse specialists	35	102.14 ± 7.56		
Cardiovascular nurse specialists	28	100.53 ± 9.45		
Others	146	101.83 ± 16.47		
Nurse specialists who work in nurse-led clinics on an outpatient basis			5.13	0.009**
Yes	92	111.71 ± 12.96		
No	307	103.82 ± 10.53		

TABLE 4 Univariate analysis of factors influencing nurse specialists' attitudes and beliefs regarding the implementation of nurse prescribing

*p <.05,
**p <.01,
***p <.001.

lowest in both groups. Nurses held attitudes that nurse prescribing might make doctors feel threatened, create conflict between doctors and nurses and make medical service slightly complex, indicating that nurses have low confidence in support from doctors about nurse prescribing. This may be related to the fact that all the respondents have not yet really prescribed. Actually, their concerns are not unreasonable, as we can trace back to the findings from the UK, where certain physicians initially greatly opposed nurse prescribing and believed boundaries of the prescribing roles and nursing work were blurred (Bowskill, 2012; Earle et al., 2011). However, once doctors had experience with nurse prescribing, it was shown that doctors' attitudes became much more positive than when they lacked

TABLE 5 Nurses' opinions on the categories of drugs that should be implemented for nurse prescribers

Nurse prescribers should be authorized to prescribe:	Total nurse (n = 814)		General nurse (n = 415)		Nurse specialist (n = 399)	
	Agree	Agree (%)	Agree	Agree (%)	Agree	Agree (%)
Low-risk drugs: such as Glycerine Enema	688	84.52	335	80.72	353	88.47
First-aid drugs: such as Atropine	629	77.27	323	77.83	306	76.69
Drugs which are taken long term by patients with chronic diseases	483	59.34	232	55.90	251	62.91
Painkillers	287	35.26	167	40.24	120	30.08
High-risk drugs: such as Insulin	189	23.22	103	24.82	86	21.55
Sedative drugs: such as Valium	83	10.20	46	11.08	37	9.27

TABLE 6 Nurses' views on the application of relevant academic qualifications for nurse prescribers

Nurse prescribing could be issued to the nurse with:	Total nurse (n = 814)		General nurse (n = 415)		Nurse specialist (n = 399)	
	Agree	Agree (%)	Agree	Agree (%)	Agree	Agree (%)
College graduate degree	15	1.84	9	2.17	6	1.50
Bachelor's degree and over	636	78.13	331	79.76	305	76.44
Postgraduate degree and over	163	20.02	75	18.07	88	22.06

this hands-on experience. In fact, Jabareen (2009) has proven that nurse prescribing is an effective way to enable interdisciplinary co-operation and to bridge the distance between nursing and other professions, benefiting the whole team and allowing doctors to focus on more complicated clinical cases. This suggests that nurse prescribing actually has a positive influence on the relationship between nursing and other professions. Even so, Chinese doctors' attitudes towards nurse prescribing are valuable to be investigated in the future so as to understand whether there are any barriers about implementation of nurse prescribing.

Despite the fact that both general nurses and nurse specialists held moderately positive views on nurse prescribing, there were significant differences between the groups. As we expected, nurse specialists scored significantly more positively on 22 of the 27 items (three of the four dimensions) regarding the views towards nurse prescribing than general nurses did (p <.05), as shown in Table 2. For example, nurse specialists scored significantly higher on Dimension B with nurses' self-efficacy in nurse prescribing compared to general nurses. Several possible explanations for our findings can be sought as follows. Firstly, the nursing clinical career pathways are now well constructed and thus enable nurse specialists who have extensive experience and expertise to remain in clinical practice (Drennan et al., 2011). However, these nurse specialists find that their ability is hindered to provide holistic patient care owing to lack of prescriptive authority (Jabareen, 2009). Furthermore, compared with general nurses, nurse specialists have a higher reservation of professional knowledge and thus have more confidence in the ability to exercise nurse prescribing (Tuaoi et al., 2011). Additionally, the rapid development of nurse-led outpatient clinics in hospitals in mainland China might be an important reason that nurse specialists have higher

intentions to prescribe. This has been verified by the results shown in Table 4, where it reveals that nurse specialists who work in nurse-led clinics on an outpatient basis are positively correlated with the nurse's beliefs and attitudes towards nurse prescribing. Also, from the last open-ended question of the questionnaire in our survey, some nurse specialists expressed that they feel they could not prescribe some necessary medicines or treatment in a timely manner when caring for patients in nurse-led clinics. Then, they have to refer these patients to doctors, which leads to discontinuity of patient care. Additionally, in order to meet the increasing demands for medical services caused by big and ageing population, the Chinese Ministry of Health has encouraged nurse specialists to provide home-based transitional nursing care services (e.g. replacement of gastric tube) for patients in recent years. However, the policy has not worked well, in part because it is controversial and illegal for these nurses to provide these services as they have no prescriptive authority. So providing certain prescriptive authority for them can legitimated their home-based nursing practice. Therefore, we feel that nurse prescribing should be addressed as a matter of urgency in the Chinese context, so as to provide efficient patient care and continuity of care for patients, which leads to improve patients' satisfaction. Based on our study, we suggest that hospitals might start with a nurse prescribing pilot on nurse specialists, especially for nurse specialists who work in nurse-led clinics.

As can be seen in Table 6, 78.13% of nurses (n = 814) believed that nurse prescribers should have a minimum education of a bachelor's degree as the entry level qualification. Table 3 and Table 4 also show that both general nurses' and nurse specialists' beliefs and attitudes towards nurse prescribing are positively correlated with their educational background, as well as the length of clinical

work experience and professional title. Actually, there is variation between countries as to the qualifications of nurses with prescriptive authority. For example, to obtain nurse prescribing licensure, countries such as New Zealand and Australia require a minimum of a master's degree and 5 years' work experience, an expert knowledge base and complex decision-making skills (Fong et al., 2015; Wilkinson, 2015). America has even started to require a doctorate degree as the entry level qualification (Tuaoi et al., 2011). By contrast, it is much less restrictive in the UK, where any Registered Nurse with a minimum of 3 years' work experience is eligible to be trained as a prescriber (Ross et al., 2014). In fact, although the UK has awarded all trained nurses the ability to prescribe, many studies have uncovered that nurse prescribers did not prescribe for many reasons, such as incapability in prescribing or unwillingness to take on the responsibility (Offredy et al., 2008). Conversely, countries like the USA or Australia, where nurse prescribers are highly qualified with at least a master's degree, show that the amounts of medication prescribed by nurse prescribers are comparable with those prescribed by doctors, particularly for patients with long-term illness (Buckley et al., 2013). Based on our findings, combined with the literature review, we thus suggest nurses' education degree, professional title and years of work experience should be fully considered for healthcare service seekers when deciding what kind of nurses should be authorized to prescribe in order to ensure patients' safety and success in implementation of nurse prescribing.

It is worth mentioning that the variety of nurse specialists influenced their attitudes and beliefs on nurse prescribing, and we found acertain variety of nurse specialists, such as nurse specialists in diabetes, wound, emergency, geriatric and hospice specialties, had higher willingness in nurse prescribing than other specialties (see Table 4). This is in agreement with the results of our earlier paper (Ling et al., 2017), in which we found that nursing prescribing mainly targets patients with chronic diseases who are in stable condition and need long-term medication, terminally ill patients who need palliative care, and patients in an emergency state who need first aid. Our findings reveal that the variety of nurse specialists impacts the degree of their intentions on nurse prescribing.

The majority of nurses believed that low-risk drugs and first-aid medication should be implemented for nurse prescribers (see Table 5). They believe low-risk drugs should be permitted to nurses, which is not only conducive to provide timely and effective treatment for patients, but also can reduce the workload of doctors and increase nurses' autonomy and job satisfaction (Carey et al., 2009; Tinelli et al., 2013). Additionally, nurses might be the ones who first discover patients' conditions changing as they closely take care of patients in inpatient wards or ER, etc. If nurses have the authority to prescribe, then patients who are in emergency circumstances would get timely treatment and help to ensure patient safety. However, nurses show low confidence in prescribing high-risk drugs such as insulin and sedative drugs. Therefore, when establishing the scope of nurse prescribing, what kind of drugs that can be permitted by nurses should be fully taken into account by medical policymakers.

6 | LIMITATIONS

To the authors' best knowledge, this was the first large, in-depth investigation and comparison of the beliefs and attitudes on nurse prescribing between general nurses and nurse specialists in China, so the findings might help to fill the gap. However, several limitations of the research bear mentioning. Firstly, this is a paid survey, which may lead to selective bias. Additionally, the convenient sampling method was adopted in this study, and the samples come from eight provinces rather than 23 provinces, four municipalities, five autonomous regions and two special administrative regions of the whole country. Thus, this may have resulted in bias in relation to representation. Moreover, stratified sampling was not carried out according to nurses' education degree, professional title, length of clinical work experience, etc., resulting in a small sample size of certain individual groups as shown in Tables. Therefore, the conclusions still need to be further verified by a better sampling method in the future. Furthermore, since nurse prescribing has not yet been widely implemented in Mainland China, this may influence the respondents' actual answers as they have not experienced this new role. Nevertheless, we argue that identifying Chinese nurses' attitudes on nurse prescribing is invaluable to inform service planning in the future. Finally, we concede that respondents might have altered their answers to what they feel the researcher desired and may have felt obliged to complete the questionnaire, which is called Hawthorne effect (Parahoo, 2014), but we had reassured anonymity and confidentiality to the participants, which might have assisted in reducing this bias (Bowling, 2014).

7 | CONCLUSIONS

This research is the first to survey Chinese nurses' views on nurse prescribing using a large-scale cross-sectional survey design; also it is the first study in China to directly compare the views of general nurses and nurse specialists. The results of our survey are promising for the introduction, expansion and acceptance of nurse prescribing in practice in China. In general, both general nurses and nurse specialists held moderately positive willingness on introduction of nurse prescribing, and nurse specialists have significantly higher intentions of nurse prescribing than general nurses. It is suggested that nurse prescribing can be tried out with nurse specialists at the initial stage, especially for nurse specialists who work in nurse-led clinics. Moreover, nurses' education degree, professional title and years of work experience should be fully considered for healthcare service seekers when deciding what kind of nurses should be authorized to prescribe. Additionally, what types of drugs that can be allowed for nurses to prescribe should be taken into account carefully when establishing the scope of nurse prescribing.

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AUTHOR CONTRIBUTIONS

Dong-Lan Ling: Conceptualization, acquisition of data, methodology, data analysis and original draft. **Jiale Hu:** Writing—review and editing. **Mei-Yun Zhong:** Acquisition of data and data analysis. **Wan-Ting Li**: Methodology and writing. **Hong-Jing Yu**: Project administration, supervision and writing.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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