Impact of workplace incivility in hospitals on the work ability, career expectations and job performance of Chinese nurses: a cross-sectional survey

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ABSTRACT

Objectives The objectives of this study were to investigate new nurses’ experiences of workplace incivility; verify the mediating role of work ability in the relationship between workplace incivility and job performance and examine the moderating role of career expectations in the relationship between workplace incivility and job performance.

Design This cross-sectional survey was conducted in China in May 2016.

Settings The research settings included 54 cities across 29 provinces of China.

Participants Of the 903 participants recruited, 696 new nurses (<3 years of nursing experience) agreed to complete the online questionnaire of the study. The effective response rate was 77.1%. The inclusion criteria were voluntary participation, <3 years of nursing experience and recognition as a registered nurse. The exclusion criteria were refusal to participate, >3 years of nursing experience or not recognised as a registered nurse.

Results New nurses (60.7%) experienced some level of workplace incivility in the previous year, and it was more frequent among those with higher educational degrees. Work ability mediated the relationship between workplace incivility and job performance, and this relationship was moderated by career expectations.

Conclusion Incivility towards new nurses was relatively common in the workplace. Workplace incivility impairs job performance by weakening the work ability of new nurses. Higher career expectations may buffer workplace incivility and contribute to the maintenance of job performance by buffering the detrimental effects of workplace incivility.

INTRODUCTION

Andersson and Pearson defined workplace incivility as ‘low intensity deviant behaviour with ambiguous intent to harm the target, in violation of workplace norms for mutual respect’.1 Workplace incivility is described as rude, discourteous, belittling and insulting behaviour. It is pervasive in healthcare settings and can permeate an entire work environment.2 It may have a destructive influence on the sustainable development of medical and healthcare organisations.3 Unfortunately, workplace incivility negatively affects employees’ mental health and emotional well-being, often causing symptoms of anxiety, depression, somatic symptoms, fatigue and illnesses among nurses.4–6 These negative emotions and physical consequences can hamper nurses’ development of their work abilities. Furthermore, the spread of negative emotions is likely to have adverse effects on nurses’ work environments.3 Workplace incivility has a long cycle and adverse effects on new nurses. High career expectations are accompanied by high motivation, which promotes positive behaviours that may buffer negative emotional experiences caused by workplace incivility. An investigation of current workplace incivility, its mechanisms and negative effects is important, especially in relation to the work ability, career expectations and job performance of new nurses.
**Incivility in the workplace**

Workplace incivility is prevalent worldwide, and its damaging effects on the development of individuals and organisations have been documented. At the individual level, workplace incivility can decrease workers’ job involvement and impair their job performance. It may also reduce or eliminate employees’ job satisfaction and organisational loyalty, and increase their turnover rates. Victims of workplace incivility suffer from depression, mood swings and other negative emotions, which seriously compromise their mental and physical health. At the organisational level, victims tend to be isolated from surrounding social networks. Victims, witnesses and stakeholders involved in workplace incivility may react to it with behaviours that undermine organisational resources and threaten organisational development. More importantly, workplace incivility can spread to the social level, which may escalate to more aggressive behaviour and evoke workplace violence. Nursing in China, a predominantly female profession, primarily involves clinical work under stressful conditions of staff shortages. Workplace incivility hampers professional nursing practice, and decreases the quality of patient care and the health of the nurses. The nursing profession has been associated with the phrase ‘nurses eat their young’, which is viewed by many an initiation rite to determine whether a new nurse can survive their profession. Workplace incivility can have a substantial negative impact on new nurses. Not surprisingly, new nurses can barely distinguish between the theoretical orientation of their nursing education and the focus of clinical practice. Most new nurses lack key competencies, including nursing skills, to respond appropriately to emergencies or effectively manage issues related to the nurse-patient relationship. New nurses who lack work skills and competencies, frequently experience workplace mistreatment, increasing their vulnerability to incivility. Workplace incivility is a subtle form of workplace mistreatment with devastating effects (e.g., mental health) on new nurses. There are numerous anecdotal reports about the effects of incivility in nursing and healthcare settings (e.g., burnout, high turnover rates and job dissatisfaction). However, no empirical research has examined this problem among new nurses in China.

**Impact of workplace incivility on work ability, career expectations and job performance**

The work ability of new nurses is influenced by their work environment, work organisation and workload. Creating a work environment and providing humanistic care is necessary for their development. Work ability is defined as workers’ abilities to perform their jobs, taking into account specific work demands and individuals’ health and mental resources. Previous studies have found a link between work ability and various work-related factors, including mental demands, professional development opportunities, satisfaction with work schedule, manager’s style and satisfaction with work prospects and salary. New nurses are expected to adapt to their new roles quickly and smoothly, although their technological skills, clinical experience and adaptability to the work environment are limited. New nurses are the principal victims of nursing incivility. Previous studies showed a significant association between violence at work and reduced working ability, which is a manifestation of job performance, and might be closely related to workplace incivility and job performance. These correlations clarify their influence on new nurses.

Career expectations can be categorised as an individual’s inclination and an externalisation of professional values, which manifests as a person’s philosophy and values. It is one of the most basic and important psychological functions, which encourages employees to achieve their desired goals, such as salary, welfare, work environment and conditions and development opportunities. Traditional expectancy-value theory posits that job performance is influenced by the assessment of individual behaviours and expectations related to the results. That is to say, new nurses with higher career expectations tend to exhibit higher levels of persistence in the process of achieving their goals; thus, promoting positive results. In contrast, nurses with low career aspirations show decreased motivation, leading to lower aspirations and persistence, and, subsequently, fewer contributions to the organisation. New nurses have career expectations based on a desire or passion for nursing, powered by an internal decision to make nursing a career, which can alleviate negative emotions caused by incivility. Occupational expectations have intrinsic power to promote engagement in the nursing profession, which is a determinant of performance. Therefore, it is imperative to explore how career expectations influence the job performance of new nurses after they have experienced incivility.

Workplace incivility is very damaging to organisations. It causes reduced job performance of employees and fosters their intentions to leave the job. Job performance is defined by Motowidlo (2003) as a value of work by an employee, which is expected by an organisation over a period. In the healthcare settings, nurses’ job performance is tied to increases in health outcomes, and to behaviour processes, both of which concern patient satisfaction and quality of life. However, goals and the motivation to achieve them are determinants of job performance. Previous studies showed that incivility experienced by nurses negatively affects their psychological state, job performance and well-being. Scholars have confirmed that incivility is negatively related to job performance and that the association is fully mediated by emotional exhaustion. Therefore, improving the job performance of new nurses from the perspective of work ability and expectations deserves attention. Further investigation of this harmful workplace phenomenon and encouragement of practitioners to develop policies and procedures to reduce its occurrence are warranted.

This study aimed first, to evaluate the current state of workplace incivility, as experienced by new Chinese nurses.
and examine the association between workplace incivility and job performance. Second, it examined the mediating role of work ability on the relationship between incivility and job performance. Third, it explored the moderating role of career expectations on the relationship between incivility and job performance, as shown in figure 1.

METHODS
Participants and procedures
Snowball sampling was used to collect data. Nurses throughout China completed an anonymous online questionnaire in May 2016. This cross-sectional study was conducted across 29 provinces in China. Approximately 60 nurses (with <3 years of service) from the authors’ units were selected to be the ‘original deliverers’ of the survey. The original deliverers were alumni who maintained friendly contact with the researchers and had nursing positions in various hospitals. Prior to commencement of the formal online survey, we provided comprehensive survey training to these initial contacts, and commissioned them to recruit 10–20 nurses to answer the questionnaire during the same period. A webpage link to our questionnaire (https://www.wenjuan.com/) was sent by mobile phone to participants during their rest breaks. The amount of data collected was monitored in real time on the website’s management platform. There were no ‘required responses’ in the online questionnaire. Our sample was selected with strict adherence to exclusion criteria for data management and quality control. For example, we eliminated unanswered or incomplete questionnaires and those answered in an extremely short period and/or with an excessive amount of blank items.

Participants were recruited for the study from 29 cities in China; 903 participants were enrolled and data from 696 valid questionnaires were analysed. The effective response rate was 77.1%. The inclusion criteria were recognition as a registered nurse, <3 years of nursing experience and voluntary participation in the study. The exclusion criteria were not recognised as a registered nurse, >3 years of nursing experience and refusal to participate in the study.

Patient and public involvement statement
There was no patient or public participation in this study.

Ethical considerations
As the survey was anonymous, it was impossible to obtain written informed consent. Therefore, an informed consent form was included on the cover of the questionnaire. The completed questionnaire was considered informed consent to participate in the survey. Confidentiality was maintained for all information collected in the survey.

Measures and tools
Demographic variables included gender, age, work experience, marital status, professional position and educational level.

Experience of incivility
A widely used 12-item measure developed by Cortina et al was used in this study to assess new nurses’ experiences of workplace incivility.27 They were instructed to rate the frequency of the experience presented in each item. A sample item was: “During the past year, how many times have you been in a situation where a coworker or supervisor paid little attention to your statements or showed little interest in your opinions”? Responses were scored on a 5-point scale from 1 (never) to 5 (very frequently). We averaged the responses of the 12 items, with a high score reflecting a high level of workplace incivility. The validity and reliability of the scale have been examined in workplaces with Chinese nurses.28 Cronbach’s α coefficient for the scale was 0.893.

Work ability index
A single question from the work ability index (WAI)29 was used to assess work ability, specifically the nurses’ ratings of their ‘current work ability compared with their lifetime best’. The total possible score ranged from 0 (completely unable to work) to 10 (work ability at its best), and a high score indicated a high level of work ability. The WAI is a widely used valid and reliable measure of work ability.21
Career expectations

A single question was adopted from the WAI to measure the new nurses’ career expectations, specifically, their ‘current career expectations compared with their lifetime best’. The total possible score ranged from 0 (no career expectations) to 5 (high career expectations). A high score indicated high career expectations. Previous literature has suggested that a single-item questionnaire with high validity and sensitivity can measure these expectations of new nurses.30

Job performance

Job performance was assessed using the Job Performance Scale developed by Williams and Andersons,31 which included five items. We used a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with a high score indicating a high level of job performance. Cronbach’s α for the scale was 0.934.

Data analysis

All data were analysed using SPSS Statistical Software for Windows V.17.0 (SPSS, Chicago, Illinois, USA). Hierarchical linear regression was performed to test the relationships between the variables and the mediating and moderating effects. Statistical significance was set to p<0.05 (two-tailed).

RESULTS

Descriptive statistics

Participants’ demographic data are summarised in table 1. The mean age of the new nurses was 24.55 years (19–25). Female nurses comprised 90% of the sample, and 97.6% of them had at least a college education; 85.34% were unmarried and 83.3% were from tertiary hospitals. They worked in different hospital departments and had <3 years of nursing experience. Analyses revealed that 60.7% (n=696) of the new nurses had experienced some level of workplace incivility during the past year (table 2). Differences in workplace incivility scores across educational levels was statistically significant (F=6.442, p<0.01) (table 1).

Correlations between the study variables

The means, SD and Pearson’s correlation coefficients of the continuous variables are presented in table 3. All the variables were significantly correlated with one another, and workplace incivility was negatively correlated with work ability (r=−0.403, p<0.01), career expectations (r=−0.298, p<0.01) and job performance (r=−0.202, p<0.01). Work ability was positively correlated with career expectations (r=0.366, p<0.01) and job performance (r=0.351, p<0.01). There also was a positive correlation between the career expectations and job performance (r=0.389, p<0.01). The absolute value of the correlation coefficient was between 0.25 and 0.63, which indicated that each variable could be used in the subsequent regression analyses.

Hierarchical linear regression models

Several multivariate hierarchical linear regression analyses were performed to examine the association of workplace incivility with the job performance, work ability and career expectations of the new nurses (table 4). To examine these relationships, we conducted three mediation analyses using linear regression methods described by Baron and Kenny. Workplace incivility was analysed as a predictor variable in the models, work ability as a mediating variable and job performance as an independent variable. Career expectations was analysed as a moderating variable in these models. Age, gender, hospital level, years of experience, educational level and hospital department were used as control variables (M0, M1) to eliminate the effects of demographic and work variables on the regression models (table 4).

The regression models showed workplace incivility had a significant negative association with the work ability (β=−0.388, p<0.01, M1) and the job performance (β=−0.199, p<0.01, M1) of new nurses after controlling
for the demographic and work variables; work ability had a significant positive association with job performance ($\beta=0.305, p<0.01, M_1$). When the mediation variable (work ability) was controlled for, the regression coefficient ($\beta=0.080$) decreased from the coefficient in the previous model ($\beta=-0.199$), and was no longer statistically significant. Therefore, work ability ($\beta=0.305, p<0.01, M_1$) had a full mediating effect (figure 2).

In the last two models, career expectations had a positive association with job performance ($\beta=0.360, p<0.01, M_2$). The interaction term between workplace incivility and career expectations was significant ($\beta=0.058, p<0.01, M_3$), and career expectations had a moderating effect on the relationship between workplace incivility and job performance. The moderating effect was estimated by referencing a previous study. This interaction effect is illustrated in figure 2. A simple slope test revealed that both high and low career expectations were correlated with the nurses’ performance in workplaces with high levels of incivility. Job performance was significantly better among new nurses with high career expectations than those with low expectations (figure 3).

**DISCUSSION**

In this study, 60.7% of new nurses reported experiencing some level of workplace incivility in the past year. This result is consistent with the finding that 27%–85% of nurses experience incivility and might be due to the particular status of the nursing profession in the current medical environment and the structure of medical resources of China. China is a collectivistic and unequal society, in which ‘Jun Chen’ thought and caste-consciousness are deeply rooted. New nurses are accustomed to obeying the rules of their leaders and colleagues; hence, the unfavourable workplace. However, internal mechanisms remain to be tested in future research. This study investigated the incidence of workplace incivility among new nurses and found they reported a high incidence of rude behaviour during the past year.

The nurses with high educational degrees pursue autonomy, innovation, individuality and diversity. Work allocation is not clear in the nursing profession; so, they feel undervalued because of the repetitive nature of the work, which contributes to the development of role conflict. Nurses with higher educational degrees experience a gap between the ideal and the real workplace when facing difficulties, and struggle to adapt to the new environment and organisational culture. Ultimately, incompetent performance leads to admonition and workplace incivility.

The findings of this study are consistent with previous research finding. Workplace incivility had a significant negative association with new nurses’ work ability ($\beta=-0.388, p<0.01$) and job performance ($\beta=-0.199,$

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**Table 2** Incidence states of workplace incivility among new nurses (n=696)

<table>
<thead>
<tr>
<th>Workplace incivility item</th>
<th>Never N (%)</th>
<th>Occasionally N (%)</th>
<th>Sometimes N (%)</th>
<th>Frequently N (%)</th>
<th>Very frequently N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paid little attention to your statements or showed little interest in your opinions</td>
<td>77 (11.1%)</td>
<td>217 (31.2%)</td>
<td>322 (46.3%)</td>
<td>72 (10.3%)</td>
<td>8 (1.1%)</td>
</tr>
<tr>
<td>Doubted your judgement on a matter over which you had responsibility</td>
<td>64 (9.2%)</td>
<td>267 (38.4%)</td>
<td>299 (43%)</td>
<td>60 (8.6%)</td>
<td>6 (1.9%)</td>
</tr>
<tr>
<td>Gave you hostile looks, stares or sneers</td>
<td>356 (51.1%)</td>
<td>252 (36.2%)</td>
<td>80 (11.5%)</td>
<td>7 (1%)</td>
<td>1 (0.1%)</td>
</tr>
<tr>
<td>Addressed you in unprofessional terms either publicly or privately</td>
<td>199 (28.6%)</td>
<td>290 (41.7%)</td>
<td>176 (25.3%)</td>
<td>26 (3.7%)</td>
<td>5 (0.7%)</td>
</tr>
<tr>
<td>Interrupted or ‘spoke over’ you</td>
<td>149 (21.4%)</td>
<td>319 (45.8%)</td>
<td>184 (26.4%)</td>
<td>41 (5.9%)</td>
<td>3 (0.4%)</td>
</tr>
<tr>
<td>Rated you lower than you deserved on an evaluation</td>
<td>171 (24.6%)</td>
<td>314 (45.1%)</td>
<td>181 (26%)</td>
<td>27 (3.9%)</td>
<td>3 (0.4%)</td>
</tr>
<tr>
<td>Yelled, shouted or swore at you</td>
<td>364 (52.3%)</td>
<td>225 (32.3%)</td>
<td>85 (12.2%)</td>
<td>17 (2.4%)</td>
<td>5 (0.7%)</td>
</tr>
<tr>
<td>Made insulting or disrespectful remarks about you</td>
<td>503 (72.3%)</td>
<td>156 (22.4%)</td>
<td>33 (4.7%)</td>
<td>4 (0.6%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Ignored you or failed to speak to you</td>
<td>361 (51.9%)</td>
<td>243 (34.1%)</td>
<td>77 (11.1%)</td>
<td>12 (1.7%)</td>
<td>3 (0.4%)</td>
</tr>
<tr>
<td>Accused you of incompetence</td>
<td>246 (35.3%)</td>
<td>319 (45.8%)</td>
<td>114 (16.4%)</td>
<td>15 (2.2%)</td>
<td>2 (0.3%)</td>
</tr>
<tr>
<td>Targeted you with anger outbursts or temper tantrums</td>
<td>333 (47.8%)</td>
<td>278 (39.9%)</td>
<td>72 (10.3%)</td>
<td>12 (1.7%)</td>
<td>1 (0.1%)</td>
</tr>
<tr>
<td>Made jokes at your expense</td>
<td>459 (65.9%)</td>
<td>174 (25%)</td>
<td>57 (8.2%)</td>
<td>5 (0.7%)</td>
<td>1 (0.1%)</td>
</tr>
</tbody>
</table>

**Table 3** Means, SD and correlations of continuous variables (n=696)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Workplace incivility</td>
<td>1.893</td>
<td>0.532</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Work ability</td>
<td>6.610</td>
<td>2.133</td>
<td>−0.403</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Career expectation</td>
<td>3.490</td>
<td>0.955</td>
<td>−0.298</td>
<td>0.366</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4. Job performance</td>
<td>3.204</td>
<td>0.885</td>
<td>−0.202</td>
<td>0.351</td>
<td>0.389</td>
<td>1</td>
</tr>
</tbody>
</table>

**P <0.01, correlation is significant at the 0.01 level (two-tailed).**
This study also makes a new theoretical contribution, in that workplace incivility had both direct and indirect effects on new nurses’ performance and work ability (β=0.305, p<0.01), and fully mediated this relationship. Career expectations (β=−0.568, p<0.01) had a moderating role. Ultimately, workplace incivility may reduce job performance by weakening the work ability of new nurses; however, high career expectations may buffer the negative emotional effects of workplace incivility and improve performance by altering the direction of the relationship. Possible mechanisms are described below.

Past studies have shown that individuals’ emotional responses to workplace events largely determine their attitudes and subsequent behaviours.36 As a novice in the workplace with unique professional characteristics, new nurses are an easy target for workplace incivility from supervisors and colleagues. Those who experience negative events are more likely to develop...
negative emotions and behaviours. Nurse’s work ability encompasses their performance across the nursing process, and it is related to their clinical experiences, psychological states and motivation. New nurses may feel stressed when facing a gap between higher career expectations and lower clinical competence, and when they experience ambiguous and subtle behaviours, such as ignoring their reasonable requests, being treated unfairly, confronted with sharp language or threatened by colleagues. Given such behaviours, victims of incivility are trapped in negative psychological states, including severe distress, anxiety and other emotions. Workplace incivility adversely affects the attitudes and cognitions of new nurses, and drastically decreases their self-confidence. Therefore, they have difficulty objectively evaluating their own work ability, which might be weakened by negative cognitions. Workplace incivility adversely affects new nurses’ behaviours, and is more likely to generate negative experiences and behaviours. Negative experiences (eg, role stress) can increase role ambiguity and difficulty adjusting to new roles. This is harmful to the development of their work ability. Weakened work ability could lead to a lower quality of nursing care. The accumulation of adverse events caused by workplace incivility induces negative emotions, thereby decreasing the organisational commitment of new nurses, and disrupting their career development. This negative impact is likely to be a long vicious cycle, undermining nursing service quality. A harmonious medical work environment can improve the efficiency and quality of nursing care, and nurses may show altruism and positive behaviour. Clearly, it is a compelling obligation for their colleagues and supervisors to build an environment to provide humanistic care for their development.

Individuals tend to control their own ideas and reactions to achieve their goals. New nurses who have experienced workplace incivility report greater job-related stress, distraction and dissatisfaction. They experience less creativity and greater psychological distress, which is referred to as ‘negative ego’. The low level of motivation leaves the nurses with low expectations in a ‘negative ego’ state after experiencing workplace incivility. Their career plans become unclear; thus, they lack internal motivation to achieve higher goals. The ability to defend against external negative incidents is a characteristic of individuals with low expectations. This leads to role ambiguity, and in turn, reduces work efficiency and the quality of nursing service, thereby impairing overall work performance. However, classical motivational theory shows that high professional expectations raise employees’ motivational levels and enhances their performance. New nurses are full of expectations for professional development and exhibit risk-averse reactions. They are not overly sensitive to negative emotional experiences caused by workplace incivility, and are focused on how to achieve their desires and ambitions. They are more likely to pursue career success and concentrate on the development of their career; new nurses with high career expectations are more socially involved persistent. They control and adjust their negative emotions to mitigate their inferior status in a timely and effective manner. They are enthusiastic about work and desire to learn nursing skills and function efficiently. These characteristics contributed to their ability to acquire key competencies and assume nursing responsibilities faster and smoother, thereby enhancing
overall organisational performance. Ultimately, it is realistic for them to achieve a high quality of life and promote the satisfaction of the patients.

Limitations
Despite the significant findings reported, this study has several limitations. First, the use of a convenience sample increased the risk for sampling bias. Second, the cross-sectional design does not permit making causal inferences about the relationships between the workplace incivility, work ability and job performance. Thus, longitudinal designs are needed in future studies. Third, the use of self-report instruments can result in response bias (social desirability or negative affect). New nurses might have overestimated or underestimated the association between the study variables. Fourth, the samples from the different regions were not proportional, thereby requiring further studies with representative samples. The validity and sensitivity of the single-item questionnaire about career expectations needs further examination. In conclusion, this study focused on workplace incivility and, for the first time, evaluated the current situation in a sample of new nurses working in hospitals in China. The study showed that work ability mediated the relationship between workplace incivility and job performance, and that career expectations moderated the relationship between workplace incivility and job performance. Workplace incivility towards the new nurses impaired their work ability, which was probably followed by a gradual decline in their job performance. In this study, incivility induced ‘negative ego’, a term we use to describe a state of reduced creativity and greater psychological distress. High career expectations buffered the negative emotional experience of workplace incivility and improved job performance by altering the direction of the relationships. The model generated in this study theoretically extends the research on workplace incivility, especially among new Chinese nurses. It is important for new nurses to adapt to the workplace environment and improve their work ability to promote a high quality of nursing service.

CONCLUSIONS
This study focused on nursing workplace incivility and, for the first time, evaluates the current situation among China’s new nurses. It demonstrates that ‘work ability’ may serve as an action mechanism that influences the relationship between workplace incivility and job performance. Meanwhile, this relationship may be moderated by career expectation. First, this study examined the association between workplace incivility and job performance of the new nurses in China’s nursing workplace. Second, the findings indicate that work ability mediated the association between workplace incivility and job performance of the new nurses. Third, it demonstrates that career expectation moderated the relationship between workplace incivility and job performance. Namely, Workplace incivility in hospitals towards new nurses could weaken their work ability and, in turn, gradually reduced job performance. In this process, incivility induced negative ego. A high level of career expectation could buffer negative emotional experience caused by nursing workplace incivility and improve performance by adjusting the directional motives. The model theoretically extends the study of workplace incivility, especially to the Chinese new nursing group. It is significant for new nurses to adapt to the environment and improve work ability for the purpose of promoting nursing service quality.

REFERENCES

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Contributors
Conceived and designed the experiments: TS, SZ, CM. Conducted the survey: SZ, CM, YS, FX, JL, SC, XD. Analysed the data: TS, SZ. Contributed reagents/materials/analysis tools: DM, JW, CM. Wrote the paper: SZ, CM, TS.

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None declared.

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Obtained.

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No additional data are available.

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