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Comparative analysis of the impact of moral sensitivity on service behavior between Chinese and Pakistani nurses

Na Zhang¹, Xiang Sun¹, Zhen Xu^{2*} and Faheem Gul Gilal^{3*}

Abstract

Background The service behavior of nurses is highly important for enhancing the level of hospital nursing care. However, there is currently a lack of research exploring the impact of moral sensitivity on the service behavior of nurses from an ethical perspective. Additionally, less is known about the effects of nationality differences on this relationship.

Aim To investigate the relationship between nurses' moral sensitivity and service behaviors and compare the differences between Chinese nurses and Pakistani nurses.

Methods A cross-sectional study was conducted. A total of 742 nurses from China and Pakistan were investigated via the moral sensitivity scale and the service behavior scale from March to May 2023. SPSS and Mplus statistical software were used in the data analysis.

Results The moral sensitivity of Chinese nurses significantly positively affects their in-role service behavior ($\beta = 0.311$, 95% CI = [0.224, 0.399], $p < 0.001$) and extra-role service behavior ($b = 0.418$, 95% CI = [0.334, 0.501], $p < 0.001$). The moral sensitivity of Pakistani nurses has a significant positive effect on their in-role service behavior ($b = 0.178$, 95% CI = [0.054, 0.303], $p < 0.01$) and extra-role service behavior ($b = 0.135$, 95% CI = [0.023, 0.247], $p < 0.05$). Nationality differences have a significant moderating effect on the relationship between nurses' moral sensitivity and service behavior ($b = 0.298$, 95% CI = [0.138, 0.438]; $p < 0.001$; $b = 0.520$, 95% CI = [0.357, 0.682]; $p < 0.001$).

Conclusion Our results indicate that, in both China and Pakistan, nurses' moral sensitivity positively influences their service behaviors. Furthermore, the moral sensitivity of Chinese nurses has a more significant impact on both in-role and extra-role service behaviors compared to that of Pakistani nurses. These findings may assist healthcare administrators and policymakers in considering national differences when seeking to enhance nurses' moral sensitivity and, subsequently, improve service behaviors.

Keywords Nurses, Moral sensitivity, Service behavior, Nationality, Moderator

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Introduction

In today's increasingly complex medical environment, the introduction of new technologies, the growing needs of patients, and limited medical resources continuously lead to moral issues in clinical nursing practice [1]. These long-term challenges may lead nurses to face ethical dilemmas in clinical moral decision-making [2], thus affecting the quality of care [3]. Moral sensitivity is the ability to acutely identify moral issues and is an important component of moral decision-making and ethical behavior [4, 5]. Nursing researchers and practitioners believe the moral sensitivity of nurses should be improved to understand moral issues and reach the highest level in order to respect patients' values and rights [6]. Therefore, cultivating and enhancing nurses' moral sensitivity and helping them make correct moral decisions are crucial for providing quality and holistic care [7].

Nurses' service behavior refers to the care or helping behavior shown by nurses to patients, which is always patient-centered [8]. Relevant studies have shown that nurses' service behavior can be divided into in-role service behavior and extra-role service behavior [9]. In-role service behavior is the basic nursing behavior of providing help or solutions on the basis of the nurse's understanding of the needs and wishes of patients. Extra-role service behavior refers to the nonmandatory and constructive individualized service behavior that nurses actively provide in clinical work [10].

Both types of service behaviors reflect personalized nursing care and are closely related to the service orientation of nurses. Therefore, nurses' service behavior is a patient-centered moral behavior [11]. Thus, nurses' moral sensitivity has a significant effect on improving the quality of nurses' service behavior [12].

The importance of nurses is universally recognized [13]. Especially in developing countries, nurses play a key role in providing basic medical services and public health education [14]. As the largest developing country in the world, China's health system and nurses' career development have experienced rapid transformation and expansion. With rapid economic growth and changes in social needs, the number of teams of nurses in China is also growing, and the quality of nurses' service behavior has also increased qualitatively [15].

In contrast, Pakistan, which is also a developing country, faces many challenges, such as an uneven distribution of resources and weak infrastructure [16]. Pakistan is the sixth most populous country in the world, with a population of nearly 200 million, and the number of registered nurses is less than 100,000 [17]. According to the standards of the World Health Organization (WHO), the ratio of nurses to the total population should be 1:200. According to this standard, the demand for nursing personnel in Pakistan is close to one million. Even with the

addition of various supplementary nursing forces, such as nursing assistants and midwives, the shortfall is still enormous, and the quality of care is below average [17].

The differences in nurses' service behavior between China and Pakistan reflect not only the different development stages of the two countries. It also reflects their unique economic models and cultural backgrounds [16]. These differences may lead to differences in the quality of care. However, in nursing practice, there has been no research exploring the moral psychological processes by which moral sensitivity influences service behavior among nurses in China and Pakistan. In addition, although previous studies on service behavior involve two types of employee behavior, in-role service behavior, and extra-role service behavior [18], researchers often focus only on one of the service behaviors in their research models [18]. However, these two types of service behaviors may lead to different outcomes and paths [19]. Thus, it is crucial to distinguish between the two types of service behaviors and conduct separate research on them.

On the basis of this background, this study investigated nationality differences in the service behavior of nurses in the healthcare field. This study aims to further explore the role of nationality as a moderator in the impact of moral sensitivity on service behavior. These findings clarify the mechanism underlying the influence of moral sensitivity on nurses' service behavior. Moreover, we expand research on the impact of nationality differences on service behavior.

Theoretical basis and hypotheses

The relationship between moral sensitivity and service behavior

Rest first proposed a four-stage model of moral decision-making [4]. He suggested that there are four stages involved in moral behavior: moral sensitivity (recognizing the moral issue in the situation), moral judgment (determining the moral correctness of an action), moral intention (choosing which behavior to implement) and moral behavior (engaging in moral action). Wotruba reported that these stages typically occur in sequence. Specifically, an individual must first recognize a moral issue, then make a moral judgment, form a moral intention, and finally carry out moral behavior [20].

In addition, Zhang empirically suggested that there is a significant positive correlation between nurses' moral sensitivity and service behavior [21]. Furthermore, Xiang's research revealed that the occurrence of immoral behavior is due mainly to low moral sensitivity [22].

In the process of nurses' service behavior, both the in-role service behavior required by position and extra-role service behavior that spontaneously occurs within the moral context of communicating with and dealing

with patients. Nurses' service behavior can be considered a concrete manifestation of moral behavior [21]. Therefore, we believe that moral sensitivity is also an important influencing factor in the generation of nurses' service behavior. Thus, we propose the following research hypotheses:

H1a Nurses' moral sensitivity has a positive effect on their in-role service behavior.

H1b Nurses' moral sensitivity has a positive effect on their extra-role service behavior.

The moderating role of nationality

According to Huang [23], nursing ethics education plays an important role in improving the moral sensitivity of nurses. Chen's study also emphasized the significant impact of education on the quality of service behaviors [24]. On the basis of these findings, we believe that education plays a central role in cultivating individual moral sensitivity and shaping nurses' service behavior. In terms of education level and its influence on the quality of nurses' service behavior in China and Pakistan, China has achieved impressive economic growth over the past 70 years. It has transformed from an impoverished country to the world's second-largest economy and has maintained rapid economic growth for decades. Moreover, China has maintained a good overall social order, and the education level has greatly improved [25].

In stark contrast, Pakistan is facing geopolitical challenges and is enduring the strategic squeeze by its neighboring countries, as well as uncertainties such as security issues and political turmoil [26]. In Pakistan, society faces developmental lags in multiple aspects, including poor lifestyles, outdated infrastructure, scarce public facilities, low income, low savings, etc [16]. These factors all have a negative effect on the service quality of Pakistani

nurses. On the basis of the above discussion, the following hypotheses are proposed:

H2a Nationality moderates the relationship between nurses' moral sensitivity and in-role service behavior.

H2b Nationality moderates the relationship between nurses' moral sensitivity and extra-role service behavior. Overall, this study examines the impact of moral sensitivity on nurses' in-role and extra-role behaviors. Additionally, it explores nationality as a critical moderate factor in the relationship between moral sensitivity and these behaviors (see Fig. 1).

Methods

Sample and data collection

This study used quantitative research design and survey methods. This study used a random convenience sampling technique and selected China and Pakistan as the geographic scope of the study. Specifically, three hospitals were randomly selected from the two countries, and nurses in these hospitals were randomly selected as research subjects.

Between March and May 2023, the third and fourth authors distributed questionnaires to 950 nurses in China and Pakistan. After the researcher explained the purpose, potential risks, and benefits of the study to the participants, they obtained verbal informed consent. At the same time, we ensured that nurses understood that participation in the questionnaire was completely voluntary. The study did not collect any personal identifiable information, and the survey results were used solely for academic research. In addition, the cover letter of the questionnaire explained in detail the purpose of the study, anonymity, and confidentiality, and how to fill out the questionnaire.

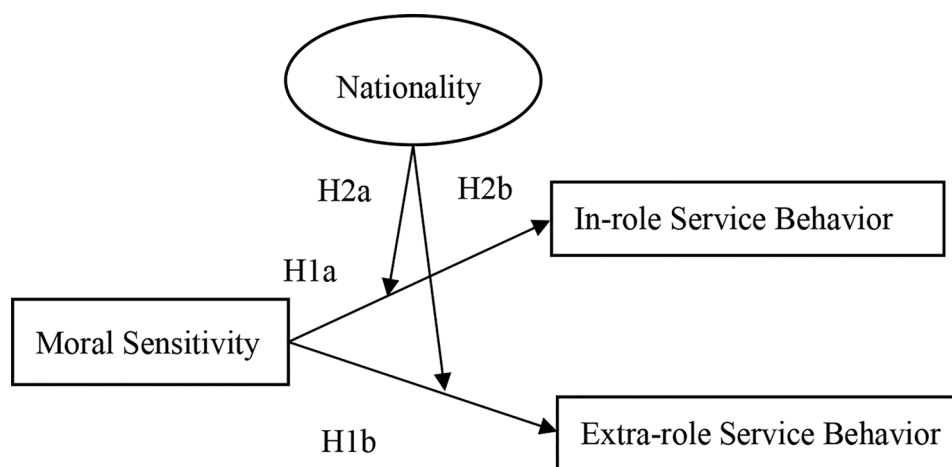


Fig. 1 Conceptual framework

The completion of the questionnaire took approximately 20 min and was completed by the nurses during working hours. At the first page, participants signed a written informed consent form and then jumped to the formal questionnaire section. The questionnaire was self-administered and covered three parts: demographic characteristics, the moral sensitivity scale and the service behavior scale. The completed questionnaires were uniformly placed in the collection boxes prepared by the researchers for each department for subsequent recycling.

Ultimately, the third and fourth authors were responsible for collecting all completed questionnaires. A total of 950 questionnaires were distributed, with 550 sent to China and 400 sent to Pakistan. In China, 525 valid questionnaires were returned, resulting in an effective response rate of 95.5%. In Pakistan, 217 valid questionnaires were returned, with an effective response rate of 56.75%. Overall, 742 valid questionnaires were recovered, and the effective recovery rate of questionnaire reached 78.1%.

Measures

All scales used in this study are established and tested scales that demonstrate strong reliability and validity. The items of the questionnaires are measured using a 5-point Likert scale, where 1 represents “strongly disagree” and 5 represents “strongly agree.”

Moral sensitivity

The moral sensitivity of nurses was measured by the scale developed by Lützné [27]. This scale contains three dimensions, namely, the perception of moral burden, moral strength and moral responsibility, with a total of 9 items. For example, “The ability to perceive the needs of patients always makes me realize that I am not doing enough”, “When patients do not receive good care, I can always easily feel the existence of the problem”, and “Adhering to rules and regulations helps me distinguish which behaviors are beneficial or harmful to patients.” The higher the total score is, the greater the nurse’s moral sensitivity in their clinical practice. The Cronbach’s α coefficient for the scale in this study is 0.929.

Service behavior

Nurses’ service behavior was measured via the scale developed by Taiwanese scholar Chen [24], which includes two dimensions: “in-role service behavior” and “extra-role service behavior,” with a total of 8 items. For example, “I can provide nursing services in accordance with the responsibilities stipulated by the hospital” and “I can help patients solve problems that are not within the scope of nurses’ work”. The higher the total score is, the better the nurse perceives their service behavior. The

Cronbach’s α coefficients for in-role service behavior, extra-role service behavior, and overall service behavior in this study are 0.864, 0.808, and 0.874, respectively.

Control variable. Previous research has shown that demographic characteristics such as gender and years of experience may affect moral sensitivity and service behavior [28, 29], therefore, these variables were included as control variables. Following existing literature [30, 31], all of the above variables are processed using dummy variables before conducting data analysis. Specifically, the moderator variable for nationality was coded as a dummy variable (0 = China; 1 = Pakistan). The other demographic variables include gender (1 = Female; 2 = Male), years of nursing experience (1 = less than 5 years; 2 = 5–10 years; 3 = 11–15 years; 4 = more than 16 years), and employment type (1 = permanent; 2 = contracting/temporary).

In this study, the measurement scales were presented to participants in the following order: demographic variables such as gender, the moral sensitivity scale, and the service behavior scale.

Data analysis

First, data analysis was performed via SPSS software. The demographic characteristics of the samples, such as the mean (M), standard deviation (SD), number (n), and percentage (%), were described via appropriate means. Differences in service behavior among groups were tested by t-tests or one-way ANOVA. We then presented the means, standard deviations, and correlation values among the study variables. Since nationality is a binary variable (China or Pakistan), we used group comparisons. After controlling for other demographic variables, Mplus was used to compare the relationship between the moral sensitivity and service behavior of nurses of different nationalities.

Results

Descriptive statistics

Among all the nurses who participated in the survey, 70.73% were from China, and 29.27% were from Pakistan. A total of 12.83% were male, and 87.17% were female. The majority of the samples have worked for less than five years, and most employment forms are permanent. The respondents’ demographic information and group differences in moral sensitivity and in-role and extra-role service behavior are described in detail in Table 1.

Table 2 describes the means, standard deviations, and correlations among the variables in detail. The results revealed a significant correlation between moral sensitivity and service behavior.

Hypothesis testing

Intergroup comparisons were used to compare the relationships between moral sensitivity and service behavior

Table 1 Demographic characteristics and comparisons of service behaviors

Demographic characteristics	N	%	In-role service behaviors		Extra-role service behaviors	
			($\bar{x} \pm s$) F/t p		($\bar{x} \pm s$) F/t p	
Nationality						
China	525	70.73	4.19 ± 0.559	4.177	3.95 ± 0.634	0.001
Pakistan	217	29.27	4.41 ± 0.737		4.39 ± 0.876	
Gender				0.582		0.063
Male	95	12.83	4.36 ± 0.659		4.41 ± 0.700	
Female	647	87.17	4.24 ± 0.618		4.03 ± 0.735	
Tenure				6.533		0.539
Less than 5 years	465	62.67	4.22 ± 0.644		4.09 ± 0.739	
Between 5–10 years	171	23.04	4.25 ± 0.606		4.03 ± 0.718	
Between 11–15 years	61	8.22	4.41 ± 0.476		4.04 ± 0.585	
More than 16 years	44	5.93	4.35 ± 0.643		4.18 ± 0.698	
Employee types				1.038		0.001
Permanent	516	69.54	4.18 ± 0.590		4.0 ± 0.723	
Contract/ Temporary	226	30.46	4.41 ± 0.673		4.27 ± 0.748	

Note: N = 742

Table 2 Means, standard deviations, and correlations of variables

Variables	M	SD	1	2	3	4	5	6	7
1 Gender	0.13	0.334	1						
2 Nationality	0.29	0.455	0.419**	1					
3 Tenure	1.61	0.989	−0.141**	−0.295**	1				
4 Emp types	1.76	0.426	−0.088***	−0.431**	−0.235**	1			
5 MS	4.015	0.702	0.119***	0.110**	−0.024	0.021	1		
6 ISB	4.339	0.682	0.068	0.164**	0.081	−0.168**	0.223**	1	
7 ESB	4.078	0.720	0.173**	0.272**	0.007	−0.171**	0.247**	0.569**	1

Note: N = 742; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. (2-tailed). MS = Moral Sensitivity; ISB = In-role Service Behavior; ESB = Extra-role Service Behavior**Table 3** Effect analysis of group comparison

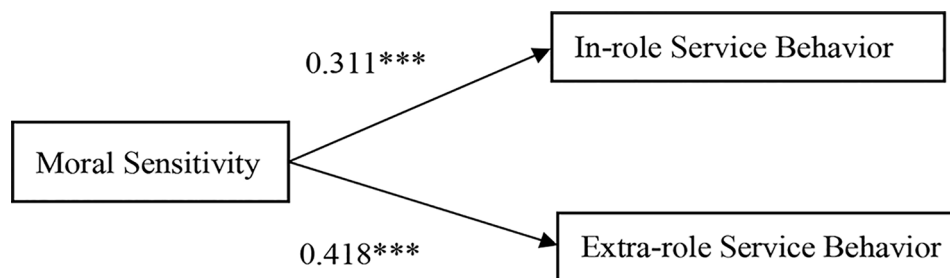
Nationality	Path	Effect	p	95% C. I.
China	Moral sensitivity on			
	In-role service behavior	0.311	0.001	[0.224, 0.399]
	Extra-role service behavior	0.418	0.001	[0.334, 0.501]
Pakistan	Moral sensitivity on			
	In-role service behavior	0.178	0.005	[0.054, 0.303]
	Extra-role service behavior	0.135	0.018	[0.023, 0.247]

among nurses from different countries. The results are shown in Table 3.

Figure 2 shows the results of the impact of moral sensitivity on service behavior among Chinese nurses.

Specifically, for Chinese nurses, the results show that moral sensitivity significantly positively predicts in-role service behavior ($b = 0.311$, 95% CI = [0.224, 0.399], $p < 0.001$) and extra-role service behavior ($b = 0.418$, 95% CI = [0.334, 0.501], $p < 0.001$); thus, hypotheses H1a and H1b are supported.

Figure 3 shows the results of the influence of moral sensitivity on service Behavior among Pakistani nurses. Specifically, for Pakistani nurses, moral sensitivity significantly positively predicts in-role service behavior ($b = 0.178$, 95% CI = [0.054, 0.303], $p < 0.01$) and extra-role service behavior ($b = 0.135$, 95% CI = [0.023, 0.247], $p < 0.05$); thus, hypotheses H1a and H1b are supported.

**Fig. 2** Chinese nurses' moral sensitivity on service behavior

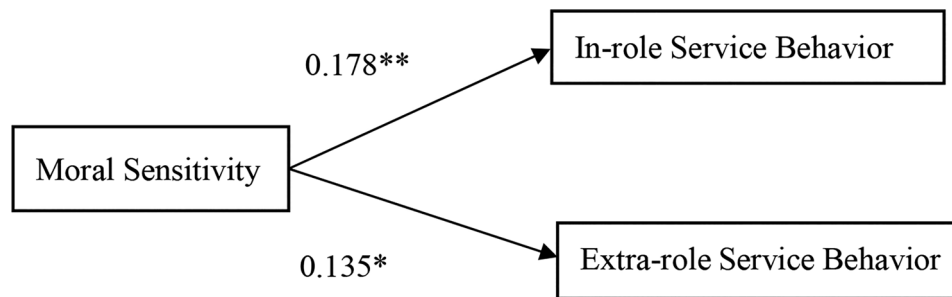


Fig. 3 Pakistani nurses' moral sensitivity on service behavior

Table 4 Moderating effect analysis

Diff	Path	Effect	p	95%C. I.
Moral sensitivity on				
	In-role service behavior	0.298	0.001	[0.138, 0.438]
	Extra-role service behavior	0.520	0.001	[0.357, 0.682]

Note: Diff = China-Pakistan

We subsequently tested the moderating effect of nationality on the relationship between moral sensitivity and service behavior. As shown in Table 4, we define Diff = China-Pakistan. None of the 95% credibility intervals included zero, suggesting that the main effect of moral sensitivity on nurses' in-role service behavior was significant and positive ($b = 0.298$, 95% CI = [0.138, 0.438]; $p < 0.001$). These findings indicate that nurses' moral sensitivity had a greater effect on the in-role service behavior of Chinese nurses than on that of Pakistani nurses. Furthermore, the main effect of moral sensitivity on nurses' extra-role service behavior is significant and positive ($b = 0.520$, 95% CI = [0.357, 0.682]; $p < 0.001$). These findings indicate that nurses' moral sensitivity had a greater effect on the extra-role service behavior of Chinese nurses than on that of Pakistani nurses. Thus, hypotheses H2a and H2b are supported.

Figures 4 and 5 provide graphical representations of the nationality moderating effect.

Discussion

Interpreting the findings

First, these findings indicate that regardless of nationality, the moral sensitivity of nurses positively influences their service behavior. This suggests that the greater the degree of moral sensitivity among nurses is, the better their service behavior tends to be. This finding is consistent with existing related research. Chen's study further revealed that the greater an individual's level of moral sensitivity is, the more keenly they can perceive whether an event involves morality and the more likely they are to engage in reasonable moral behavior [32]. This also corresponds to the results of Kim [33]. He reported that if nurses cannot sensitively perceive moral issues, it will be impossible to achieve positive moral behavior.

Second, the research findings indicate that when the impact of moral sensitivity on service behavior among nurses of different nationalities is compared, Chinese nurses have a high level of moral sensitivity and are more capable of providing better service behavior. This may be related to the specific socio-cultural context of Pakistan. Influenced by patriarchal culture, it is widely believed

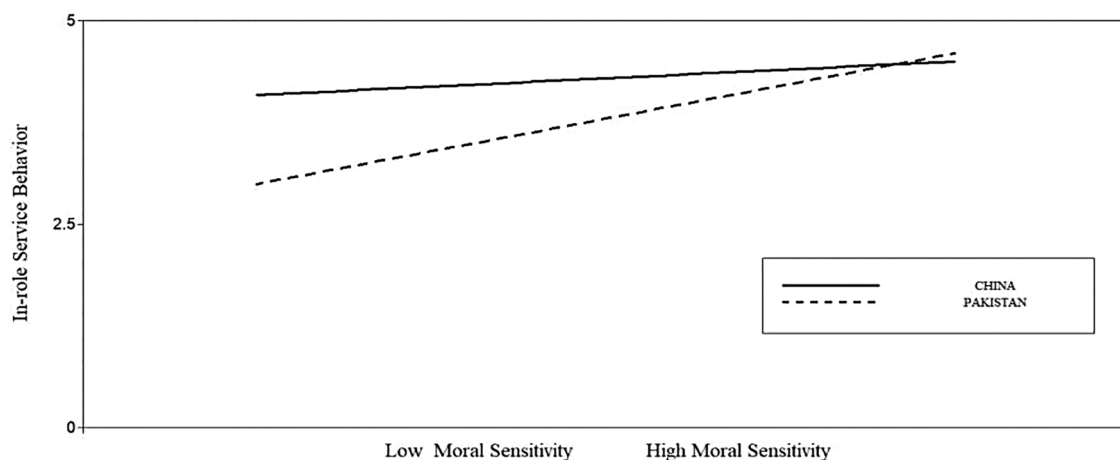


Fig. 4 Moderation effect of nurses' moral sensitivity on their in-role service behavior

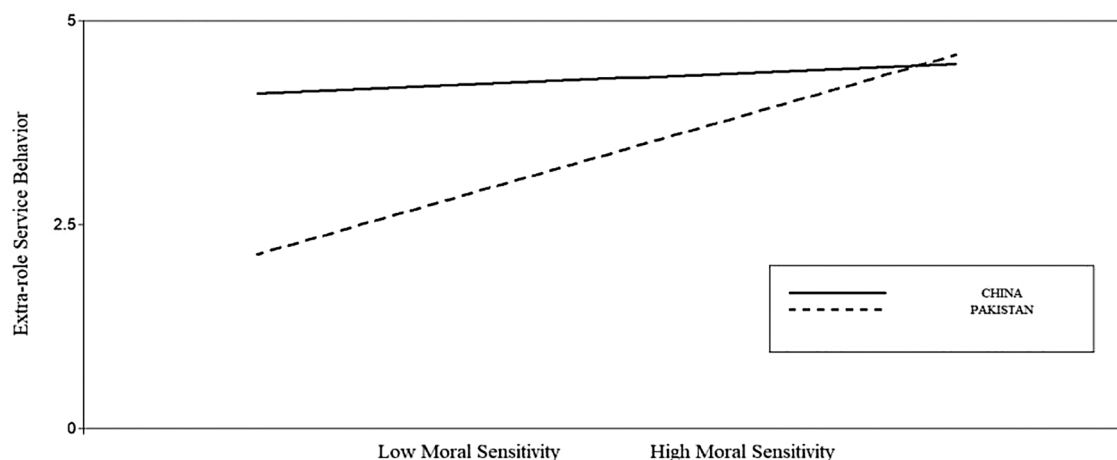


Fig. 5 Moderation effect of nurses' moral sensitivity on their extra-role service behavior

that nurses in Pakistan are incompetent in medical practice and that doctors generally look down on nurses [34]. In Pakistan, it has long been a common norm that the majority of nurses are female [35]. In the absence of legal and policy protections for their rights and professional autonomy, female nurses are particularly vulnerable to victimization, abuse, and professional marginalization [36]. This inequality not only affects the career development of Pakistani nurses but also may lead to professional burnout and poor job performance [37]. Thus, it may negatively impact their service behavior.

Furthermore, as a traditional patriarchal society, the loyalty of ordinary people in Pakistan to family and tribes far exceeds their loyalty to the nation. Compared with Chinese nurses, Pakistani nurses may pay less attention to individual achievements at work and place more emphasis on family interests [38]. This may result in less service behavior in the workplace.

In addition to cultural factors, the shortage of staff in Pakistani hospitals and the excessive workload of healthcare personnel are also reasons for the decline in the quality of nurses' service behavior. Ahmed noted that owing to their heavy workload, nurses often neglect the importance of following structured nursing plans and adhering to medical ethical practices [39], thereby exhibiting less service behavior.

In contrast to Pakistan, China has relatively more abundant medical resources [40]. Chinese nurses have a relatively lighter workload, which provides favorable conditions for them to maintain high moral sensitivity. Thus, it can ensure that these individuals provide higher-quality nurse service behavior. Additionally, Huang's research indicates that Chinese nurses' understanding of moral responsibility is largely based on virtue ethics, emphasizing obligations to patients, colleagues, leaders, and society [41]. Furthermore, Chinese society advocates collectivist values [42]. In collectivist cultures, employees

are more inclined to view behaviors that go beyond their job responsibilities as expected work behaviors [43]. These cultural characteristics work together to enhance the moral sensitivity of Chinese nurses, enabling them to engage in superior service behavior.

These results respond to the calls of previous scholars, who advocated for a deeper exploration of the role of ethnic and cultural dimensions in moral decision-making [44–46]. Many studies have shown that individuals from different nationalities exhibit differences in moral perceptions (i.e., moral sensitivity). Cherry, in a scenario involving bribery to enter the lucrative Asian market, reported that American respondents were more likely than Taiwanese respondents to identify moral issues in the scenario [47].

In Singhapakdi's comparison of Australians and Americans, the independent impact of nationality on moral awareness was also emphasized. Americans are more likely than Australians to identify moral issues in scenarios involving withholding information and misleading evaluators [48]. In a multinational study involving China, Egypt, Finland, South Korea, Russia, and the U.S., Su argued that cultural differences affect moral perceptions in business practices [49].

Moral sensitivity is a key starting point in the moral decision-making process [4]. The differences among individuals at this level can further affect their subsequent moral decision-making. Numerous studies have focused on moral behavior within specific cultural or national contexts, explored Hofstede's cultural dimensions theory [50], and attempted to apply it to Rest's moral intention model [4]. In collectivist cultures, managers, due to high interdependence, often show stronger loyalty to the organization and greater concern for its interests [51]. Correspondingly, employees in collectivist cultures are more likely to express a willingness to make immoral business decisions for the sake of organizational interests.

In contrast, employees in individualist cultures are more inclined to openly question the organization's immoral behaviors [44].

In addition, Westerman and colleagues reported that in cultures characterized by high power distance and high individualism, the influence of peers on moral decision-making is particularly pronounced [52]. These findings provide us with profound insights, revealing how national cultural factors shape individuals' moral sensitivity and subsequent moral behavior.

Contributions to literature

First, this paper performs an in-depth study of in-role and extra-role service behaviors from a comparative perspective [9]. This finding also responds to the call of previous scholars, who suggested studying both types of service behaviors simultaneously [18]. The detailed study of these two types of service behaviors helps to gain a deeper understanding of the specific manifestations and mechanisms of moral sensitivity in nursing practice.

Second, we confirmed the moderate effect of nationality. Previous studies have shown that nationality differences exist in moral sensitivity and service behavior [51]. Moreover, few studies have focused on nationality differences in moral sensitivity and service behavior in the Chinese and Pakistani contexts. By comparing the moral sensitivity of nurses in China and Pakistan, this study reveals the impact of nationality differences on nurses' service behavior. It also offers a new theoretical perspective on moral issues in nursing practice.

Third, this study incorporated service behavior into the moral decision-making model [4], providing a theoretical reference for nursing ethics research. Introducing nurses' service behavior as a specific moral behavior into the field of moral decision-making research can compensate for the lack of empirical research due to the difficulty in measuring moral behavior in existing studies. This study can expand the research scope of nursing ethics and service behavior theory and enrich the findings of moral decision-making theory.

Implications for management

First, these findings reveal that nurses' moral sensitivity has a positive effect on their service behavior. This study provides a solid theoretical foundation for enhancing nurses' service behavior. A survey by Huang et al. indicated that education and training can lead to greater moral sensitivity among nurses [23]. Therefore, hospitals can regularly organize workshops and seminars, encouraging nurses to participate in discussions on moral issues to improve their moral sensitivity.

In addition, research has shown that the organizational ethical climate has a significant positive effect on nurses' moral sensitivity and extra-role service behavior [10].

Hospitals can work toward fostering a positive organizational ethical climate, forming values that are consistent with ethical norms. It can also encourage nurses to participate in medical decision-making and promote communication among nurses and other professionals. This is conducive to enhancing the level of moral sensitivity among nurses, leading to more moral decisions and positive moral behaviors.

Second, good nurses' service behavior is the key to implementing overall nursing, improving the quality of nursing, and providing better services for patients [10]. Hospitals can enhance nurses' nursing service capabilities through professional and psychological training, teaching them to use appropriate skills for effective communication and psychological support with patients. This can improve nurses' treatment effectiveness and strengthen their humanistic literacy.

As previous studies have shown that self-efficacy has a positive effect on enhancing extra-role service behavior [53], hospitals can hold regular commendation ceremonies to publicly praise and reward outstanding nurses, thereby enhancing their sense of achievement and self-efficacy. These measures can effectively enhance nurses' service behavior, improve patient experience, and promote the high-quality development of nursing services.

Finally, moral education is key to cultivating moral sensitivity [23]. In classroom teaching, it is important not only to impart basic knowledge of ethics but also to integrate interdisciplinary content, such as ethics and psychology. It can help nursing students understand medical ethics and moral norms in depth and expand their horizons.

Especially, when many Pakistani students are coming to study in China [17], Chinese medical schools can optimize educational management strategies for international students in daily teaching and internship processes. Medical schools can provide them with more opportunities to work and learn with classmates from different countries and cultural backgrounds. This not only enhances their professional skills but also promotes communication and cooperation among them. Through these strategies, medical schools can effectively increase the moral sensitivity and service behavior of nursing students, allowing them to cultivate nursing professionals who are better adapted to modern medical needs.

Limitations and future research

First, the data were collected mainly through questionnaires, and the measurement of all variables relied on self-assessment, which may increase the common method bias and interfere with the accuracy of the study conclusions. Future studies could employ meta-analyses or qualitative research methods, such as interviews, to analyze existing data and integrate and compare different

research results. Thus, it can enhance the breadth and depth of the study and verify and enrich the research conclusions. In addition, the individual is the primary channel for obtaining personal morally sensitive information. In self-reported studies, social expectation bias is an issue that needs to be addressed. Especially in the field of ethics research, researchers must remain alert to response bias, which may be influenced by social expectations [54]. To address this challenge, future research should use diverse assessment indicators, including physiological and psychological indicators, to assess moral sensitivity, thereby increasing the accuracy of the assessment results.

Second, the sample size was limited when cross-country comparisons were performed, which may limit the generalizability and reliability of the study results. Therefore, future research should increase the sample size to increase the robustness of the conclusions and explore their applicability in different cultural and geographic backgrounds. At present, research has focused mainly on Asia. In the future, the scope of the study can be considered to expand to Western countries such as Europe and the United States for more extensive comparative analysis. By doing so, research can provide more comprehensive and in-depth insights, thus providing a more solid scientific basis for global nursing education and practice.

Finally, we explored the relationship between nurses' moral sensitivity and their service behavior, primarily from the perspectives of nationality and culture. However, we also recognize that religious and spiritual factors play a significant role in the formation of moral sensitivity [55]. China is deeply influenced by Confucian culture, which emphasizes collectivism and social harmony [42]. Moreover, Pakistan's Islamic culture profoundly affects people's daily lives, including their views on health and illness [36]. Future research should include these religious and spiritual factors in the research framework to more comprehensively understand the moral sensitivity and service behavior of nurses in different cultural contexts.

Conclusion

The current study shows that nationality is a significant moderator in the relationship between nurses' moral sensitivity and service behaviors. These findings may help healthcare administrators and policymakers better understand the nuances of how nurses' moral sensitivity influences their service behaviors across different cultural contexts, thereby informing the development of more effective and culturally sensitive nursing practices.

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Author contributions

N. Z. and Z. X. conducted conceptualization, review and editing, and funding acquisition. X. S. and F. G. participated in the methodology, writing, original draft and formal analysis. N. Z. contributed to the review and editing. All the authors have read and approved the final manuscript.

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Data availability

The datasets generated and analyzed during the current study are not publicly available but are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the Declaration of Helsinki. The research design was approved by the biomedical research ethics committee of the School of Medicine in Hebei Engineering University [approval number: 2023[KJ030 – 20]. Data privacy and confidentiality were maintained and assured by obtaining participants' informed consent to participate in the research. All participants provided written informed consent for participation. All methods were performed in accordance with the relevant guidelines and regulations.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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