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Analysis of the influential factors on innovative behaviors among ophthalmic specialty nurses in China: a cross-sectional study

Xin Zhang¹, Jie Ren¹, Jing Tang¹, Hong-Mei Luo^{1*} and Ji-Hong Zeng^{1*}

Abstract

Objective To investigate the current situation of innovative behavior and organizational structure authorization of ophthalmic specialty nurses in China, and analyze the influencing factors of innovative behavior.

Methods A cross-sectional survey was carried out among 301 ophthalmic specialty nurses in China, representing 82 hospitals in 25 provinces, using a general data questionnaire, Innovative Behavior Scale (IBS), and conditions of work effectiveness questionnaire (CWEQ-II).

Results The mean total score for innovative behavior among Chinese ophthalmic specialty nurses was (4.73 ± 1.14) , and the mean total score for organizational structure authorization was (61.65 ± 14.69) . The logistic regression analysis revealed that organizational structure authorization, hospital grade, and ophthalmic specialty nurses primarily engaged in clinical care and clinical research had statistically significant impacts on the level of innovative behavior ($P < 0.05$). The higher the organizational structure authorization score, the higher the innovative behavior level of ophthalmic specialty nurses, the level of innovation behavior of grade-B tertiary hospitals is higher than that of grade-A tertiary hospitals. The main positions are low level of innovative behavior in clinical care and high level of innovative behavior in clinical research.

Conclusions The innovative behavior and organizational structure authorization of Chinese ophthalmic specialty nurses are at a medium level, the innovative behavior of ophthalmic specialty nurses is influenced by factors such as organizational structure empowerment level, hospital grade, and main job position. Nursing managers are advised to develop tailored training programs based on the influencing factors of innovative behavior among Chinese ophthalmic specialty nurses, in order to enhance their level of innovation and improve the quality of nursing services provided by Chinese ophthalmic specialty nurses.

Keywords Ophthalmic specialty nurse, Innovation behavior, Influencing factor

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Introduction

Innovation is one of the core competitiveness of hospital development, as well as the first productive force [1], and it is also an essential ability factor for nursing staff to adapt to the dynamic development of the hospital's medical service system [2–4]. As a crucial component of the healthcare industry, nurses engage in innovative practices to enhance the quality of nursing care, prevent diseases, promote health, and improve upon established nursing models. They actively seek out and develop new methods, technologies, theories, and approaches through continuous learning, integrating these innovations into their practical work processes [5–7]. Nurses' innovative behavior is strongly associated with job engagement [8], and has a significant impact on enhancing the quality of clinical nursing services and professional core competitiveness [9, 10]. As a populous country, with the aging of the population and the overuse of electronic products, the incidence of eye diseases in China is increasing year by year, and new technologies and concepts related to ophthalmology are also emerging, and the demand for innovative nursing talents is growing [11]. However, as the backbone of ophthalmic nursing, ophthalmic specialty nurses undertake the important task of the innovation of ophthalmic specialty nursing technology and methods. Therefore, ophthalmic specialty nurses are expected to continuously update and expand their knowledge, maximize their personal potential, and actively innovate in order to enhance the quality of nursing service and promote the sustainable development of the ophthalmic nursing profession.

In recent years, scholars have increasingly focused on the research of nurses' innovative behavior. The primary theoretical framework utilized by domestic scholars in their research is Kurt Lewin's field dynamic theory, this theory proposes that the innovation subject is interactively related to the innovation environment, and the innovation environment is more endowed by the organizational leadership [12]. Research shows [13] that organizational delegation management of nursing managers affects nurses' innovative behavior to a certain extent and is conducive to cultivating nursing innovative talents. Among them, structural delegation is an important part of delegation management and an effective strategy to motivate individual innovative behavior [14, 15]. Structural empowerment means that hospital managers provide resources, information, organizational support, learning opportunities and a favorable working environment for employees to work and grow better, so as to achieve career goals [16]. At present, more and more researchers have explored the effect mechanism of empowerment on employee behavior [17, 18]. Recent studies [19, 20] have demonstrated that structural empowerment can impact nurses' innovative behavior,

while a supportive work environment can influence nurses' perception of the value and significance of nursing work. This in turn enhances their recognition of the accomplishments and pride derived from their work, ultimately increasing their willingness to engage in challenging and creative tasks, thereby contributing to the cultivation of clinical innovative nursing talents.

At present, the researches of domestic and foreign scholars mainly focus on the training of specialist nurses, and there are few researches on the influencing factors of the innovative behavior of specialist nurses. There is a lack of discussion on the innovative behavior of ophthalmic specialty nurses. Therefore, the purpose of this study is as follows: (1) To explore the current situation of innovative behavior and organizational structure authorization of ophthalmic specialty nurses under the background of Chinese culture; (2) To analyze the influencing factors of innovative behavior among Chinese ophthalmic specialty nurses; (3) To provide a scientific basis for the development of targeted intervention strategies for eye care managers to improve the level of innovative behavior among ophthalmic specialty nurses.

Subjects and methods

Subjects

This study utilizes an online cross-sectional questionnaire survey method, with the collection of questionnaire data following informed consent from the survey subjects. The survey was carried out in a manner that ensured anonymity and did not require the disclosure of any personal or workplace information. A total of 301 ophthalmic specialty nurses from 82 hospitals in 25 provinces in China were included in the data collected in April 2024. Inclusion criteria: (1) In-service nurses who have completed the ophthalmic specialty nurse system course and obtained certification as an ophthalmic specialty nurse; (2) Ophthalmic specialty nurses who have provided informed consent and voluntarily agreed to participate in this study. Exclusion criteria: Ophthalmic specialty nurses who were transferred to other positions, on leave, or resigned, as well as those who did not wish to participate in this study, were excluded. This study has received approval from the Biomedical Ethics Committee of West China Hospital, Sichuan University with batch number Review (554) in 2024, and complies with ethical guidelines.

Study instruments

The general information questionnaire

consists of 9 items, including: hospital classification, whether it is a specialized hospital, age, level of education, professional title, post, duration of clinical work in ophthalmology, time to obtain the ophthalmic specialist nurse, Main job post position.

Innovative behavior scale (IBS)

was designed by Scott and Bruce [21], this scale has been extensively utilized domestically and internationally, and is widely employed by Chinese nurses [22]. The scale consists of 6 items, each using a Likert 6-level scoring method. Based on the average score of each item, innovation behavior is categorized into four levels: very low, low, moderate, and high. A total average score ≤ 2.25 indicates an extremely low level, 2.26–3.50 indicates a low level, 3.51–4.75 indicates a moderate level, and ≥ 4.76 indicates a high level. Higher scores reflect better innovative behavior among ophthalmic specialty nurses. Numerous domestic studies [23–25] have demonstrated that the Cronbach's α coefficient of this scale ranges from 0.854 to 0.890 in the Chinese cultural context, indicating good reliability and validity [26].

Conditions of work effectiveness questionnaire-II(CWEQ-II)

was compiled by Laschinger [27, 28] et al., which was widely used to assess the level of organizational structure authorization obtained by nurses in their work [29]. The scale comprises 6 dimensions (opportunity authorization, information authorization, support authorization, resource authorization, formal authorization and informal authorization) with a total of 19 items. It adopts the Likert 5-level scoring method, and the total score ranges from 19 to 95 points. A higher score indicates a greater level of organizational structure authorization and a more favorable working environment for nursing work. Research has demonstrated that in the Chinese cultural context, the Cronbach's α coefficient of this scale ranges from 0.91 to 0.936, indicating strong reliability and validity [29, 30].

Calculation of sample size

According to Medical Practical Multivariate Statistics [31], the sample size for multi-factor studies should be 10 to 20 times that of the study variables. With approximately 12 influencing factors on the analysis variables in this study, and considering a 20% sample loss and invalid questionnaires, a final required sample size of 288 was calculated. In actuality, a total of 301 valid questionnaires were collected for this study.

Statistical analysis

The data processing was conducted using SPSS 22 software. Descriptive statistics were used to summarize quantitative data, with mean \pm standard deviation for normally distributed data and median and quartile spacing for non-normally distributed data. Classified data were analyzed using frequency and composition ratio. Univariate analysis of nurses' innovative behavior was performed using the Chi-square test, while the effects of general data and working conditions on innovative

behavior were explored through ordered logistic regression. The difference was found to be statistically significant at $P < 0.05$.

Results

General information of ophthalmic specialty nurses

Among the 301 ophthalmic specialty nurses in China, 223 (74.1%) were grade-A tertiary hospitals, 31 (10.3%) were grade-B tertiary hospitals, and 47 (15.6%) were secondary hospital. There were 107 nurses (35.5%) from specialized ophthalmic hospitals and 194 nurses (64.5%) from general hospitals. There were 56 (18.6%) ≤ 30 years old, 180 (59.8%) 31–40 years old, and 65 (21.6%) ≥ 41 years old, as depicted in Table 1.

Scores on the innovative behavior scale for ophthalmic specialty nurses

The level of innovative behavior among Chinese ophthalmic specialty nurses was as follows: 6 individuals (1.99%) were at a very low level; 48 people (15.95%) were in the lower level; 82 individuals (27.24%) exhibited a moderate level, and 165 people (54.82%) were at a high level. The total score for innovation behavior was (4.73 ± 1.14) , as depicted in Table 2.

Score for the conditions of work effectiveness questionnaire for ophthalmic specialty nurses

The average overall score for organizational structure authorization among ophthalmic specialty nurses in China was (61.65 ± 14.69) . The average scores for each dimension, ranked from lowest to highest, are as follows: Formal authorization (9.17 ± 2.83) points, information authorization (9.41 ± 2.86) points, opportunity authorization (9.91 ± 2.64) points, resource authorization (10.02 ± 2.53) points, support authorization (10.07 ± 2.58) points, informal authorization (13.08 ± 3.21) points, as depicted in Table 3.

Comparison of levels of innovative behavior scale among ophthalmic specialty nurses with different demographic characteristics

There were no significant differences in age, Level of educational, professional title, post, and duration of clinical work in ophthalmology ($P > 0.05$). However, there was statistical significance in the main job roles as specialist treatment nurse, nursing supervision, and clinical research ($P < 0.05$), as depicted in Table 4.

Multivariate analysis of influencing factors of innovative behavior of ophthalmic specialty nurses

The overall score of work effectiveness questionnaire, hospital grade, main positions are clinical nursing and clinical research had statistically significant effects on the level of innovation behavior ($P < 0.05$). A higher score in

Table 1 Description of general data of ophthalmic specialty nurses

characteristic	N	%
Hospital grade		
Secondary hospital	47	15.6
Grade-B tertiary hospitals	31	10.3
Grade-A tertiary hospitals	223	74.1
Whether it is a specialized hospital		
Yes	107	35.5
No	194	64.5
Age		
≤ 30 years	56	18.6
31–40 years	180	59.8
≥ 41 years	65	21.6
Level of education		
Junior college and below	15	5.0
Bachelor Degree	272	90.3
Master degree or above	14	4.7
Professional title		
Junior	94	31.2
Intermediate	171	56.8
Senior	36	12.0
Post		
No	262	87.0
Head nurse and above	39	13.0
Duration of clinical work in ophthalmology		
1–5 years	40	13.3
6–10 years	82	27.2
11–15 years	97	32.2
16–20 years	54	18.0
More than 20 years	28	9.3
Time to obtain the ophthalmic specialist nurse certificate		
1 year	140	46.5
2 years	48	15.9
3 years	38	12.6
More than 4 years	75	25.0
Main job position		
clinical care		
No	33	11.0
Yes	268	89.0
clinical teaching		
No	168	55.8
Yes	133	44.2
specialist treatment nurse		
No	171	56.8
Yes	130	43.2
nursing supervision		
No	239	79.4
Yes	62	20.6
Clinical research		
No	267	88.7
Yes	34	11.3
other		

Table 1 (continued)

characteristic	N	%
No	291	96.7
Yes	10	3.3

Table 2 Scores for each item on the innovative behavior scale for ophthalmic specialty nurses

Item	Mean	SD
At work, I look for or apply new technologies, procedures or methods	5.00	1.14
I often come up with some creative ideas or ideas	4.73	1.26
I will explain and promote my new ideas to others in order to gain support and recognition from leaders and colleagues	4.83	1.18
I try to get the resources I need to implement a new idea or action	4.72	1.23
I will design and propose appropriate plans or timelines to promote new ideas	4.65	1.28
Overall, I think I'm a creative person	4.45	1.30
Total score on the Innovation Behavior Scale	4.73	1.14

Table 3 Scores for each item and dimension on the work effectiveness questionnaire scale for ophthalmic specialty nurses

Dimensions and items	Mean	SD
How many opportunities of each type are available in the hospital where you currently work?	9.91	2.64
Challenging job opportunities	3.17	0.98
Opportunities to gain new knowledge and skills on the job	3.31	0.96
There are opportunities to apply what you learn	3.43	0.91
How much information do you have in the hospital where you currently work?	9.41	2.86
Current situation of the hospital	3.25	0.97
Top management values	3.11	1.05
Top management goals	3.04	1.07
How much support do you receive at the hospital where you currently work?	10.07	2.58
Provides information to enable you to do your job well	3.33	0.95
Will provide you with relevant suggestions as a reference for work improvement	3.34	0.90
When you have a problem with your work, you will be provided with helpful tips or advice on how to solve the problem	3.40	0.90
How many resources do you care about in the hospital you are currently working in?	10.02	2.53
There is sufficient time to complete the necessary nursing records	3.32	0.88
There is enough time to fulfill the job requirements	3.34	0.86
Help is immediately available when needed	3.36	0.93
Job evaluation in the hospital where you currently work?	9.17	2.83
Be rewarded for creative work	3.04	1.11
My job is flexible	2.95	1.11
At the hospital, all my work-related activities are visible to management	3.19	0.96
Do you have access to the following activities at the hospital where you currently work?	13.08	3.21
When I am caring for a patient with a doctor, the doctor can give me advice	3.25	0.93
When colleagues have problems, they turn to me for help	3.45	0.86
When colleagues have problems with the head nurse, they come to me for help	3.15	0.99
In addition to doctors, you can seek advice from other professionals	3.24	0.96
The average overall score for organizational structure authorization	61.65	14.69

organizational structure authorization is associated with a higher level of innovative behavior. Grade-B tertiary hospitals showed a higher level of innovative behavior compared to Grade-A tertiary hospitals. The main positions are the low level of innovative behavior in clinical nursing and the high level of innovative behavior in clinical research, as depicted in Table 5.

Discussion

The innovative behavior of Chinese ophthalmic specialty nurses are at a medium level

The results of the study showed that the total average score of innovative behavior among Chinese ophthalmic specialty nurses was (4.73 ± 1.14) , which was at a medium level, similar to the findings of Xu Zhongmei [32], Ma Dengyan [33], and Arslan [34]. The reason for this may be that most ophthalmic nurses have a certain sense of innovation in clinical work and are willing to explore new technologies and methods.

Table 4 Comparison of innovative behavior scales with different demographic characteristics

	N	Very low or low	moderate	high	Chi -square	P
Hospital grade						
Secondary hospital	47	10(21.28)	12(25.53)	25(53.19)	5.944	0.203
Grade-B tertiary hospitals	31	4(12.9)	4(12.9)	23(74.19)		
Grade-A tertiary hospitals	223	40(17.94)	66(29.6)	117(52.47)		
Whether it is a specialized hospital						
Yes	107	18(16.82)	27(25.23)	62(57.94)	0.658	0.720
No	194	36(18.56)	55(28.35)	103(53.09)		
Age						
≤ 30 years	56	13(23.21)	9(16.07)	34(60.71)	5.930	0.204
31–40 years	180	30(16.67)	57(31.67)	93(51.67)		
≥ 41 years	65	11(16.92)	16(24.62)	38(58.46)		
Level of education						
Junior college and below	15	1(6.67)	3(20)	11(73.33)	-	0.544a
Bachelor Degree	272	52(19.12)	75(27.57)	145(53.31)		
Master degree or above	14	1(7.14)	4(28.57)	9(64.29)		
Professional title						
Junior	94	15(15.96)	19(20.21)	60(63.83)	7.603	0.107
Intermediate	171	32(18.71)	56(32.75)	83(48.54)		
Senior	36	7(19.44)	7(19.44)	22(61.11)		
Post						
no	262	50(19.08)	70(26.72)	142(54.2)	1.820	0.402
Head nurse and above	39	4(10.26)	12(30.77)	23(58.97)		
Duration of clinical work in ophthalmology						
1–5 years	40	11(27.5)	11(27.5)	18(45)	10.280	0.246
6–10 years	82	10(12.2)	20(24.39)	52(63.41)		
11–15 years	97	20(20.62)	29(29.9)	48(49.48)		
16–20 years	54	6(11.11)	17(31.48)	31(57.41)		
More than 20 years	28	7(25)	5(17.86)	16(57.14)		
Time to obtain the ophthalmic specialist nurse certificate						
1 year	140	26(18.57)	35(25)	79(56.43)	3.051	0.806
2 years	48	9(18.75)	15(31.25)	24(50)		
3 years	38	4(10.53)	10(26.32)	24(63.16)		
More than 4 years	75	15(20)	22(29.33)	38(50.67)		
Main job position						
clinical care						
No	33	4(12.12)	6(18.18)	23(69.7)	3.313	0.191
Yes	268	50(18.66)	76(28.36)	142(52.99)		
clinical teaching						
No	168	37(22.02)	45(26.79)	86(51.19)	4.476	0.107
Yes	133	17(12.78)	37(27.82)	79(59.4)		
specialist treatment						
No	171	38(22.22)	48(28.07)	85(49.71)	6.032	0.049
Yes	130	16(12.31)	34(26.15)	80(61.54)		
nursing supervision						
No	239	50(20.92)	65(27.2)	124(51.88)	7.568	0.023
Yes	62	4(6.45)	17(27.42)	41(66.13)		
Clinical research						
No	267	54(20.22)	75(28.09)	138(51.69)	11.729	0.003
Yes	34	0(0)	7(20.59)	27(79.41)		
other						
No	291	51(17.53)	81(27.84)	159(54.64)	2.018	0.365
Yes	10	3(30)	1(10)	6(60)		

a: Fisher exact probability method

Table 5 Multivariate analysis of influencing factors of innovative behavior

Variable		OR	SE	Wald value	DOF	P	95%	CI	
	The overall score of work effectiveness questionnaire	1.065	0.010	37.336	1	0.000	1.043	1.086	
Hospital grade	Secondary hospital	1.025	0.381	0.004	1	0.949	0.486	2.161	
	Grade-B tertiary hospitals	2.890	0.463	5.257	1	0.022	1.167	7.157	
Age	≤ 30 years	0.638	0.505	0.791	1	0.374	0.237	1.717	
	31–40 years	0.947	0.388	0.020	1	0.889	0.442	2.028	
Level of education	Junior college and below	2.765	0.963	1.117	1	0.291	0.419	18.238	
	Bachelor Degree	0.710	0.700	0.239	1	0.625	0.180	2.799	
Professional title	Junior	1.805	0.597	0.980	1	0.322	0.561	5.812	
	Intermediate	0.955	0.501	0.009	1	0.926	0.357	2.551	
Post	No	1.505	0.527	0.600	1	0.438	0.535	4.231	
Whether it is a specialized hospital	Yes	0.983	0.263	0.004	1	0.948	0.587	1.646	
Time to obtain the ophthalmic Specialist nurse certificate	1 year	1.105	0.317	0.099	1	0.753	0.593	2.058	
	2 years	0.820	0.401	0.245	1	0.621	0.374	1.799	
	3 years	1.171	0.461	0.117	1	0.733	0.474	2.890	
Main job position	clinical care	No	2.600	0.444	4.638	1	0.031	1.090	6.205
	clinical teaching	No	0.871	0.275	0.253	1	0.615	0.508	1.492
specialist treatment	No	0.808	0.271	0.616	1	0.433	0.475	1.375	
nursing supervision	No	0.665	0.432	0.893	1	0.345	0.285	1.551	
Clinical research	No	0.268	0.542	5.912	1	0.015	0.093	0.774	

These results are inconsistent with those of Li Fuai [35], Tan Lin [36], Zhou Lifang [37], The reasons may be related to the different specialties of nurses surveyed by the researchers, the different survey tools of innovative behavior used in the study, and the possible regional and hospital grade differences. According to the results of the innovative behavior scale, 45.18% of ophthalmic specialty nurses were at a moderate or lower level of innovative behavior, which was similar to the findings of Wang Weining [23]. Among the items, actively seeking new methods scored highest, while those who considered themselves creative and sought resources to implement ideas scored low. The reason may be that although ophthalmic specialty nurses actively seek innovative ideas in clinical work, they are still passive in the process of implementing ideas and are affected by various factors [38], resulting in a low level of innovative behavior. The aforementioned content indicates that the innovative behavior of Chinese ophthalmic specialty nurses is sub-optimal. As the backbone of ophthalmic nursing, their ability to innovate directly impacts clinical nursing quality, work efficiency, and patients' medical experience. Previous research shows that the importance managers attach to nurses' innovative work and the intensity of policy support are important prerequisites for nurses to carry out innovative work [39, 40]. Therefore, it is recommended that ophthalmic managers actively promote and prioritize the innovative ideas and actions of specialist nurses in clinical management. By implementing relevant

incentive systems for nurse innovation, providing necessary resources to support innovation, fostering a conducive atmosphere for innovation, and other measures, we can create an environment conducive to nurse innovation and enhance their level of innovative behavior.

The level of organizational structure authorization for ophthalmic specialty nurses in China needs to be enhanced

The study found that the total organizational structural authorization level of ophthalmic specialty nurses in China was (61.65 ± 14.69) , which was at a medium level, similar to the results of previous studies by Wang Kun [29], Wang Lei [30], Zeb [41]. The scores for all dimensions are higher than those reported by Bao Ling [42]. The reason may be that with the development of the times and the introduction of relevant policies in the medical and health field, innovation has been paid more and more attention by the management. Ophthalmic specialist nurses are the backbone of the nursing team, and nursing management may provide more support in terms of structural authorization. The three dimensions with low scores in each dimension are formal authorization (9.17 ± 2.83) , information authorization (9.41 ± 2.86) , and opportunity authorization (9.91 ± 2.64) , which are similar to the results of Wang Qian [43]. The reason may be that nursing managers do not pay enough attention to the formal authorization, information acquisition and various innovation-related learning opportunities of nurses in

organizational structure authorization. The above findings indicate the necessity for enhancing the level of organizational structural authorization for ophthalmic specialty nurses in China. Previous research has demonstrated that structural authorization has an indirect impact on nurses' innovative behavior [19, 20]. Therefore, this outcome also suggests that eye care managers should attach importance to the formal authorization, information authorization and opportunity authorization of ophthalmic specialty nurses in future management practices, and create a dynamic and innovative working atmosphere by optimizing the working environment [44], so as to increase the autonomy and decision-making power of ophthalmic specialty nurses in clinical work to a certain extent. To provide strong support and guarantee for the emergence and realization of the innovative behavior of ophthalmic specialty nurses.

Analysis of influencing factors of innovative behavior of Chinese ophthalmic specialty nurses

The research results indicate that the level of organizational structure authorization influences the innovative behavior of ophthalmic specialty nurses. The higher the score of organizational structure authorization, the greater the level of innovative behavior exhibited by ophthalmic specialty nurses, which is consistent with the findings of Zhao Mengshu [45], Knol [46]. Upon analysis, it is evident that ophthalmic specialty nurses with higher organizational structure empowerment are able to access more resources and information in their work. They can also receive maximum support from leadership, thereby stimulating innovative thinking and actively implementing innovative practices in clinical work, demonstrating a positive and commendable level of innovative behavior. Furthermore, previous research has substantiated [13, 16] the notion that when nurses receive increased resources, educational opportunities, and organizational support within their professional environment, they are more likely to experience a heightened sense of empowerment. This enhanced empowerment has been shown to directly and positively correlate with the innovative behavior exhibited by nurses.

The main job position and hospital grade of ophthalmic specialty nurses were significant factors influencing their innovation behavior. The main job posts are the low level of innovative behavior in clinical care and the high level of innovative behavior in clinical research. The reason may be that ophthalmology is a highly specialized discipline with a wide variety of diseases, a large number of operations, a fast turnover of patients, and a fast pace of clinical nursing work. Ophthalmic specialty nurses who mainly work in clinical nursing are mostly leaders on the clinical front line, and they spend a lot of time and energy on clinical work and quality management every day. Even

some ophthalmic specialty nurses undertake night shifts; therefore, even if there are innovative ideas, it is difficult for them to have more time and energy to practice innovation, resulting in lower levels of innovation behavior. Ophthalmic specialty nurses whose main role is clinical research demonstrate better innovative behavior. This may be due to the fact that full-time clinical research nurses have more time and energy to engage in innovative work, possess strong scientific research awareness and ability, and are also the primary force behind the disciplinary development of the department. They pay more attention to and place greater importance on new progress and technology in ophthalmology.

In addition, the management will provide more information resources, financial support and learning opportunities for the research nurses in order to develop the eye nursing discipline and produce more scientific research outputs. Therefore, the main post is the ophthalmic specialty nurse specialized in clinical research, which has a higher level of innovative behavior. The research demonstrated that the hospital grade significantly influenced the innovative behavior of ophthalmic specialty nurses, the level of innovation behavior of grade-B tertiary hospitals is higher than that of grade-A tertiary hospitals. This finding contradicts previous studies by Li Fuai [35] and Bao Haiqin [47], possibly due to the later training of ophthalmological nurses compared to other specialties. There are fewer specialist nurses in grade-B tertiary hospitals. Ophthalmological nurse qualification certificate holders are selected from a pool of excellent nurses, demonstrating high learning requirements, active work engagement, and receiving more resources and support from management for specialist nurse development, leading to enhanced innovative behaviors. The ophthalmic specialist nurses at third-grade A hospitals handle more serious cases due to the higher level of the hospital unit, resulting in more challenging nursing care. They may also be involved in scientific research, quality control, special management, teaching, and other work. Therefore, nurses from grade-A tertiary hospitals face greater pressure and work difficulty, which may distract the energy of specialist nurses. As a result, they exhibit lower levels of innovative behavior compared to nurses in grade-B tertiary hospitals.

At present, the training of ophthalmic nurses is mainly concentrated in grade-A tertiary hospitals, and the innovative behavior of these nurses is not ideal. Therefore, eye care managers should pay attention to the cultivation of innovative behaviors of these specialized nurses, and formulate training programs for ophthalmic nurses in various positions, so as to provide them with more innovative resources and development opportunities and stimulate their innovative behaviors.

Research limitation

The training of ophthalmic specialty nurses in China lags behind other specialties, and its training and certification system is still in the exploratory stage. At this point, the training of ophthalmic specialty nurses does not reach all hospitals, with limited sample scope and size. The samples in this study mainly came from grade-A tertiary hospitals, and the study was only a cross-sectional survey over a period of time. Therefore, the representativeness of the samples had certain limitations, and the results cannot be generalized to all Chinese ophthalmic specialty nurses. Future studies will need to expand the source and size of the sample to further validate its findings.

Conclusion

The innovative behavior and level of organizational structure authorization among ophthalmic specialty nurses in China require enhancement. The results of a multi-factor analysis indicate that the innovative behavior of ophthalmic specialty nurses is influenced by organizational structure empowerment level, hospital grade, and main job position. The findings of this study offer a scientific framework for eye care administrators to cultivate innovative behavior among ophthalmic specialty nurses. We strongly recommend that nursing managers gradually enhance the post management system for specialist nurses, establish an effective resource guarantee and incentive system, improve information sharing across various platforms, develop specialized training programs for ophthalmology specialty nurses in different posts, prioritize communication and personalized care for specialist nurses, and support their individual needs and self-realization. This will encourage innovative behavior among ophthalmic specialty nurses to continuously elevate service quality and promote sustainable development within the field of eye nursing.

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Author contributions

Xin Zhang collected data, performed statistical analysis and drafted the manuscript. Jie Ren and Jing Tang collated the data. Ji-Hong Zeng and Hong-Mei Luo designed the study, supervised the study, gave critical comments and revised the manuscript. All authors read and approved the final manuscript. No conflict of interest exists in the submission of this manuscript.

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Data availability

The datasets used and/or analyzed in the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was approved by the Biomedical Ethics Committee of West China Hospital of Sichuan University, with ethics lot No. 2024 (554). All ophthalmic nurses participating in the study obtained informed consent and volunteered to participate in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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