

Survey of the Status Quo and Work Situation of Chinese Hospital Infection Control Professionals During the Epidemic of COVID-19

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Abstract

Background:The coronavirus disease 2019 (COVID-19) is spreading rapidly worldwide, bringing great challenges to infection control professionals (ICPs). The study aims to understand the status quo and the situation of work and physical and mental health of Chinese infection control professionals (ICPs) during the epidemic of coronavirus disease 2019 (COVID-19), in order to complete hospital infection control work and respond to public health emergencies better.[1]

Methods:The questionnaire was designed to conduct anonymous investigations on

Chinese ICPs relying on the questionnaire star applet during the epidemic of COVID-19.

Results:A total of 1652 ICPs from 1265 hospitals were surveyed. 84.32% ICPs' professional background was nursing; 33.9% could not be promoted in professional title; 62.65% ICPs' daily income was lower than similar staff at the same level in the hospital; 98% thought that the hospital infection control discipline should be set up. During the epidemic, the ICPs did a lot of work, and most heads of the infection

control department believed that the infection control department had a great role in this epidemic. During this epidemic, 90.47% ICPs worked more than 9 hours a day; the highest psychological stress score was 10 points(out of 10), accounting for 32.14%; 79.3% had worse sleep than usual. Most ICPs felt tired, frustrated and powerless frequently, but only 20.40% complained frequently or consistently.

Conclusions:Chinese ICPs are facing difficulties in promotion of professional title, poor salary, high work intensity and high psychological pressure currently. They have undertaken a lot of work and played an important role in the prevention and control of COVID-19.

Background

Since December 2019, many cases of the coronavirus disease 2019 (COVID-19) have been reported in Wuhan City, Hubei Province, China. Because the disease is highly contagious and spreads quickly, it spread to all parts of the country rapidly. At present, the epidemic in China has been basically controlled, but the international epidemic situation is not optimistic, and the number of infected people is still rising. Among them, many healthcare workers (HCWs) were also infected. As of March 30, 2020, infected HCWs exceeded 3000 in China, 12,000 in Spain, and 8,000 in Italy^[1-3]. The number of infected HCWs this time far exceeded the number of severe acute respiratory syndrome (SARS) events in 2003^[4], which shows that HCWs are facing a huge risk of infection during the COVID-19 epidemic, and hospital infection prevention and control are facing huge challenges. Currently, China's 42,000 HCWs assisting Wuhan have achieved zero infection, and the ICPs have played an important role and made outstanding contributions^[5]. This study conducted an anonymous survey of 1652 ICPs from 1265 hospitals through a questionnaire survey. The purpose is to understand the personnel composition, profession background and situation of work and physical and mental health of the ICPs during the epidemic of COVID-19, in order to accumulate experience in completing hospital infection control work and responding to public health emergencies better.

Methods

Respondents

ICPs who fill in the questionnaire voluntarily.

Survey method

The survey questionnaire is designed. The questionnaire question type is a single-choice question. The questionnaire content includes the basic situation of the ICPs, the situation of the hospital infection control departments, the work and physical and mental health and other related conditions of the ICPs during the epidemic of COVID-19. The questionnaire is divided into three parts. The first part can be filled out by the ICPs, and the second and third departments are filled out by the person in charge of the infection control department. From March 4th to March 16th, 2020, relying on the questionnaire star program (<https://www.wjx.cn>), the questionnaire survey was conducted by means of random forwarding on WeChat chat groups and circle of friends, and the unified guidance was used. The respondents would answer the question based on it and submit it immediately to ensure the validity and authenticity of the sample.

Statistical method

SPSS22.0 is used for statistical analysis of the data. The counted data is represented by the number of cases(n) and percentage (%), and the measured data is represented by $\bar{x} \pm s$.

Results

The basic situation of the ICPs

A total of 1652 valid questionnaires were received in the first part of this survey, of which 1553(94.01%) were female, and 705(42.68%) ICPs were aged 40-45 years old, followed by 482(29.18%) aged 30-40 years old, and 248(15.01%) aged 50-60 years old. Time spent engaging in hospital infection control work: 837(50.67%) spent less than 5 years, 550(33.29%) 5-10 years, 175(10.59%) 10-15 years, 53(3.21%) 15-20 years, 37(2.24%) more than 20 years. Education level: 903(54.66%) ICPs were undergraduates, followed by 613(37.11%) junior college students, 83(5.02%) secondary school students, 49(2.97%) masters, and 4(0.24%) doctors. Profession background: 1393(84.32%) ICPs majored in nursing, 133(8.05%) clinical medicine, 46(2.78%) preventive medicine, 34(2.06%)

laboratory medicine, 18(1.09%) public health, 4(0.24%) pharmacy and 24(1.45%) others. Professional title: 663(40.13%) ICPs were intermediate, followed by 496(30.02%) deputy senior, 393(23.79%) junior, 87(5.27%) positive senior, and 13(0.79%) management title. The post: 784(47.46%) ICPs were director, 174(10.53%) deputy director, and 694(42.01%) other post. Working background before engaging in the hospital infection control work: 1257(76.09%) were nurse, 190(11.5%) worked in functional department, 145(8.78%) were doctor, and 60(3.63%) had no working background. Can professional title be promoted: 1092(66.1%) ICPs could be promoted and 560(33.9%) can not. This project does not set whether the condition is before or after engaging in infection control work. In terms of age, profession, professional title distribution and working years, most of the professional titles have been promoted before engaging in infection control work, but even so there were still 33.90% of the ICPs cannot be promoted in professional title. See Table 1 for details. Daily income is compared with similar staff at the same level in the hospital: 1035(62.65%) were lower, 596(36.08%) were the same, and 21(1.27%) were higher.

Table 1
Can the ICPs be promoted in professional title? (n/%)

Major	Can the ICPs be promoted in professional title?		Total
	Can	Can not	
Nursing	914(65.61%)	479(34.39%)	1393(84.32%)
Clinical medicine	79(59.40%)	54(40.60%)	133(8.05%)
Preventive medicine	39(84.78%)	7(15.22%)	46(2.78%)
Laboratory medicine	23(67.65%)	11(32.35%)	34(2.06%)
Other profession	18(75%)	6(25%)	24(1.45%)
Public health	16(88.89%)	2(11.11%)	18(1.09%)
Pharmacy	3(75%)	1(25%)	4(0.24%)
Total	1092(66.10%)	560(33.90%)	1652(100%)

The awareness situation of the ICPs on the relevant professional knowledge

The knowledge of the eight aspects of clinical medicine, nursing, microbiology, infectious diseases, antibacterial drugs, disinfection, hospital infection, and the documents related hospital infection control is given a score according to the degree of awareness (0–10 points), of which 0 point means no understanding at all and 10 points means complete understanding. The level of knowledge about them was from high to low \: nursing 7.63 ± 2.21 points, the documents related hospital infection control 6.66 ± 2.30 points, disinfection 6.59 ± 2.38 points, hospital infection 6.59 ± 2.31 points, clinical medicine 5.54 ± 2.26 Points, infectious diseases 5.13 ± 2.50 points, antibacterial drugs 4.32 ± 2.41 points, microbiology 3.60 ± 2.39 points, see Table 2 for details. In the question of whether hospital infection management/infection control subjects should be set up, 1619 (98%) thought it should be set up.

Table 2
The awareness situation of ICPs on the professional knowledge of clinical medicine, nursing and other eight aspects (n/%)

Knowledge	Score											X ± S
	0	1	2	3	4	5	6	7	8	9	10	
Nursing	11 (0.67%)	28 (1.69%)	29 (1.76%)	39 (2.36%)	44 (2.66%)	131 (7.93%)	112 (6.78%)	181 (10.96%)	408 (24.7%)	328 (19.85%)	341 (20.64%)	7.63 ± 2.21
The documents	13 (0.79%)	30 (1.82%)	52 (3.15%)	78 (4.72%)	93 (5.63%)	235 (14.23%)	207 (12.53%)	265 (16.04%)	286 (17.31%)	229 (13.86%)	164 (9.93%)	6.66 ± 2.30
Disinfect-ion	11 (0.67%)	25 (91.51%)	78 (4.72%)	87 (5.27%)	115 (6.96%)	210 (12.71%)	216 (13.08%)	202 (12.23%)	331 (20.04%)	200 (12.11%)	177 (10.71%)	6.59 ± 2.38
Hospital infection	9 (0.54%)	33 (2%)	54 (3.27%)	79 (4.78%)	128 (7.75%)	221 (13.38%)	213 (12.89%)	237 (14.35%)	305 (18.46%)	215 (13.01%)	158 (9.56%)	6.59 ± 2.31
Clinical Medicine	16 (0.97%)	44 (2.66%)	109 (6.6%)	166 (10.05%)	147 (8.9%)	362 (21.91%)	240 (14.53%)	203 (12.29%)	218 (13.2%)	78 (4.72%)	69 (4.18%)	5.54 ± 2.26
Infectious Diseases	25 (1.51%)	102 (6.17%)	172 (10.41%)	170 (10.29%)	170 (10.29%)	306 (18.52%)	194 (11.74%)	187 (11.32%)	169 (10.23%)	79 (4.78%)	78 (4.72%)	5.13 ± 2.50
Antibacterial drugs	64 (3.87%)	145 (8.78%)	241 (14.59%)	212 (12.83%)	184 (11.14%)	308 (18.64%)	186 (11.26%)	137 (8.29%)	98 (5.93%)	34 (2.06%)	43 (2.6%)	4.32 ± 2.41
Microbiology	128 (7.75%)	220 (13.32%)	283 (17.13%)	232 (14.04%)	191 (11.56%)	252 (15.25%)	156 (9.44%)	81 (4.9%)	62 (3.75%)	22 (1.33%)	25 (1.51%)	3.60 ± 2.39

The working situation of the ICPs during the epidemic of COVID-19

The average daily working time of the ICPs during the epidemic was 9–10 hours at most, which was 959(58.05%), 259(15.68%) from 11 to 12 hours, 1276(16.71%) less than 9 hours, and 58(9.56%) more than 12 hours. Among them, the ICPs of the COVID-19 designated hospitals worked longer than non-designated hospitals, and the vast majority worked more than 9 hours, accounting for 90.47%, of which 38.60% worked more than 11 hours. This shows that the work intensity is very large, see Table 3 for details. Weekly rest time: 650(39.35%) ICPs did not take a rest, 720(43.58%) took a one-day rest, and only 273(16.53%) took a two-day rest. 54.88% of the ICPs in the COVID-19 designated hospitals did not have a weekend for rest, see Table 4 for details.

Table 3
The average daily working hours of the ICPs in designated hospitals and non-designated hospitals during the epidemic (n/%)

Whether designated hospital	The average daily working hours the ICPs				Total
	≤8 hours	9–10 hours	11–12 hours	≥12 hours	
Yes	41(9.50%)	223(51.86%)	95(22.10%)	71(16.51%)	430(100%)
No	128(15.42%)	505(62.05)	131(15.78%)	66(7.96%)	830(100%)
Remarks: There are 5 out of 1265 not selected whether it is a designated hospital, so the total is 1260					

Table 4
The weekly rest time of the ICPs in designated hospitals and non-designated hospitals during the epidemic (n/%)

Whether designated hospital	The weekly rest time of the ICPs				Total
	0 day	1 day	2 days	> 2 days	
Yes	236(54.88%)	118(27.44%)	75(17.44%)	1(0.23%)	430(100%)
No	309(37.23)	429(51.69%)	90(10.84%)	2(0.24%)	830(100%)
Remarks: There are 5 out of 1265 not selected whether it is a designated hospital, so the total is 1260					

The physical and mental health situation of the ICPs during the epidemic of COVID-19

The highest score of psychological stress (the greater the score, the greater the stress) was 10 points, accounting for 32.14%, 7.83 ± 2.21 point. See Table 5 for details. Most ICPs had feelings of fatigue, frustration, and powerlessness frequently, which were 776(46.97%), 704(42.62%), and 667(40.38%) respectively. Most only had a sense of career belonging occasionally, which was 726(43.95%), and 491(29.72%) ICPs did not have a sense of career belonging. But most only complained occasionally, there were 1081(65.44%), and 234(14.14%) did not complain, see Table 6 for details. During the epidemic, 1310(79.3%) ICPs had worse sleep than usual, and most of them were hard to fall asleep, easy to wake up halfway and early wake up 1–2 times a week, and there were 794(48.06%), 754(45.64%), 763(46.19%) respectively, followed by sleep problems 3–4 times a week, see Table 7 for details.

Table 5
The situation of psychological stress of the ICPs during the epidemic (n/%)

Score	0	1	2	3	4	5	6	7	8	9	10	X ± S
number	9	13	26	42	36	140	127	200	317	211	531	7.83 ± 2.21
	(0.54%)	(0.79%)	(1.57%)	(2.54%)	(2.18%)	(8.47%)	(7.69%)	(12.11%)	(19.19%)	(12.77%)	(32.14%)	

Table 6
The situation of fatigue, frustration and other six aspects of the ICPs during the epidemic (n/%)

Aspect	Degree				Total
	No	Occasionally	Frequently	Always	
Fatigue	30(1.82%)	472(28.57%)	776(46.97%)	374(22.64%)	1652(100%)
Frustration	58(3.51%)	670(40.56%)	704(42.62%)	220(13.32%)	1652(100%)
Sense of powerlessness	64(3.87%)	664(40.19%)	667(40.38%)	257(15.56%)	1652(100%)
Like to complain	234(14.16%)	1081(65.44%)	294(17.80%)	43(2.60%)	1652(100%)
Sense of career belonging	491(29.72%)	726(43.95%)	285(17.25%)	150(9.08%)	1652(100%)

Table 7
The situation of sleep of the ICPs during the epidemic (n/%)

Types of sleep problems	Frequency				Total
	no	1-2times weekly	3-4times weekly	> 4 times weekly	
hard to fall asleep	324(19.61%)	794(48.06%)	316(19.13%)	218(13.2%)	1652(100%)
wake up halfway easily	279(16.89%)	754(45.64%)	364(22.03%)	255(15.44%)	1652(100%)
wake up early	293(17.74%)	763(46.19%)	301(18.22%)	295(17.86%)	1652(100%)

The basic situation of the hospital where the ICPs were located

The second and third questionnaires are about the hospital and the hospital infection control department, so they are only filled out by the person in charge of the hospital infection control department, excluding 92 questionnaires that the hospitals above the second level with compiled beds < 100 sheets, and the second and third parts included 1265 valid questionnaires. The hospital ranks were: 420 (33.20%) were second class grade A, 282(22.30%) first class, 203(16.05%)class III grade B, 189(14.94%) class III grade A, and 171(13.52%) second class grade B. 731(57.79%) hospitals in Sichuan Province, 531(41.98%) hospitals in other provinces, and 8(0.6%) hospitals in Hubei Province. There were 430(33.99%) designated hospitals, 830 non-designated hospitals (65.61%).

The working situation of the hospital infection control departments during the epidemic of COVID-19

The number of trainings (including hospital-level and department) conducted by the hospital infection control department: 387(30.59%) conducted 5–10 times trainings, 314(24.82%) more than 20 times, 276(21.82%) 10–20 times and 23(18.50%) 1–5 times. Weekly on-site supervision days: 6–7 days at most, with 549(43.40%), 3–5 days with 463(36.60%), 1–2 days with 186(14.70%). Most of the hospital infection control departments were responsible for or participated in guiding personal protection, medical waste management, disinfection and isolation, formulating epidemic prevention control systems and processes, timely updating of systems and processes, building layout alteration, and reviewing the certificates of the protective equipment, there were 1196 (94.54%), 1190 (94.22%), 1188 (93.92%), 1175 (92.89%), 1133 (89.57%), 981 (77.55%) and 852 (67.35%) respectively. Some also were responsible for or participated in the qualification review of donated protective equipment, participated in the supervision that provincial and municipal organized, and participated in the formulation or review of provincial and municipal systems and processes, there were 613(48.46%), 288(22.77%) and 170(13.44%) respectively, see Table 8 and Table 9 for details. The person in charge of the the hospital infection control department believed that the hospital infection control department played a role in the prevention and control of the COVID-19 (the greater the score, the greater the effect, the full score is 10 points), and there were 947 (74.86%) people with a score above 8 points, 8.53 ± 1.80 points, see Table 10 for details.

Table 8
The content of work of the ICPs during the epidemic (n/%)

The content of work	Yes	No	No choice	Total
Whether to participate in the formulation or review of provincial/municipal system/process	170(13.44%)	1053(83.24%)	42(3.32%)	1265(100%)
Whether to participate in the supervision that provincial/municipal organize	288(22.77%)	933(73.75%)	44(3.48%)	1265(100%)
Whether to formulate the system and process of the prevention and control of the epidemic	1175(92.89%)	41(3.24%)	49(3.87%)	1265(100%)
Whether to update the system and process in time	1133(89.57%)	82(6.48%)	50(3.95%)	1265(100%)

Table 9
The content of work of the ICPs during the epidemic (n/%)

The content of work	Be responsible for	Participate	Do not Participate	No choice	Total
Building layout reconstruction	247(19.53%)	734(58.02%)	232(18.34%)	52(4.11%)	1265(100%)
Guidance on disinfection and isolation	954(75.42%)	234(18.50%)	22(1.74%)	55(4.35%)	1265(100%)
Guidance on medical waste management	907(71.70%)	283(22.37%)	24(1.90%)	51(4.03%)	1265(100%)
Guidance on personal protection	976(77.15%)	220(17.39%)	19(1.50%)	50(3.95%)	1265(100%)
Review of protective equipment documents	368(29.09%)	484(38.26%)	361(28.54%)	52(4.11%)	1265(100%)
Review of donated protective equipment qualification	204(16.13%)	409(32.33%)	584(46.17%)	68(5.38%)	1265(100%)

Table 10
The action of the hospital infection control department on the prevention and control of COVID-19 (n/%)

Score	0	1	2	3	4	5	6	7	8	9	10	X ± S
number	2	5	10	12	13	46	65	107	200	254	493	8.53 ± 1.80
	(0.16%)	(0.40%)	(0.79%)	(0.95%)	(1.03%)	(3.64%)	(5.14%)	(8.46%)	(15.81%)	(20.08%)	(38.97%)	

Discussion

The international epidemic situation of the COVID-19 is not optimistic, and many HCWs are also infected. Most infections of HCWs are related to insufficient cognition of the contagious of SARS COV2 and inappropriate protection in the early stage of the outbreak^[6]. Some scholars believe that poor hospital infection control is an important reason for the outbreak of emerging infectious diseases including Middle East respiratory syndrome (MERS)^[7]. Hospital infection control is a key task in the prevention and control of the COVID-19, and ICPs are an important force in epidemic prevention and control. The overall situation of the hospital infection control team (including personnel composition, knowledge structure, working conditions, physical and mental health, etc.) may have an important impact on the result of epidemic prevention and control.

This survey shows that the majority of Chinese ICPs have been engaged in the hospital infection control work for less than 5 years, which is consistent with the survey result of Sun Hui^[8] and Zhang Yinghua^[9]. The reason is that Chinese ICPs are highly mobile. To a certain extent, it also reflects that as hospitals at all levels pay more attention to hospital infection control work^[10], more and more new infection control forces have joined them, and at the same time hospitals select personnel with higher professional title and more experience to engage in infection control work. Most of the ICPs were undergraduates, accounting for 54.66%, and the professional title was intermediate and above mostly, accounting for 75.42%, indicating that the education level and professional title of the ICPs are acceptable. 84.32% of ICPs graduated from nursing major, and most worked as nurses before engaging in infection control work, accounting for 76.09%, which is consistent with the result of multiple studies basically^[10-12]. So ICPs have the best knowledge of nursing knowledge, but other professional knowledge reserves are lacking, and the knowledge of clinical medicine, infectious diseases, antibacterial drugs and microbiology is very poor. Studies have shown that lack of knowledge and insufficient staff are common obstacles to the implementation of infection control work, which is not conducive to the development of infection control work^[13-15]. 98% of ICPs believed that hospital infection management/infection control discipline should be set up. It should be a cross-disciplinary subject with interdisciplinary content. It is difficult for any existing major in China to fully meet the needs of infection control work. Currently, nursing major dominates and can take advantage of nursing, but it is lacking in other aspects. Therefore, it is very necessary to set up a hospital infection control major or discipline. It can reserve full-time talents for the hospital infection control career, so that theoretical knowledge and basic skills of the hospital infection control can be more comprehensively infused to every medical student, laying a solid foundation for the hospital infection control work. With the discipline, ICPs can solve the problem of promotion of professional title, which is also a way to stabilize the infection control team. Qiao Fu and others also expounded the necessity of opening a hospital infection management undergraduate major^[10], and He Lei and others mentioned that this discipline can be established through scientific research and talent construction^[16]. At the same time, we call for the participation of multidisciplinary professionals in the construction of the infection control team, and let more HCWs with profession background such as clinical medicine preventive medicine, laboratory science and so on join the infection control team, so as to realize knowledge complementation, formulate more scientific infection control strategies, and improve the overall level of the infection control department^[16]. Some studies have found that the unreasonable major structure of the infection control team would directly affect hospital infection monitoring, risk identification, intervention, effect evaluation and continuous quality improvement^[17].

According to the survey, 33.9% of the ICPs could not be promoted in professional title. This is the overall data. It does not show whether the promotion time of the title is before or after entering the infection control department. Therefore, the promotion of the title of the ICPs is a common problem. It is understood that there is no hospital infection management major in the promotion of professional title in other places except Jiangsu Province in China. Promotion can only be based on the original professional series of titles, which leads to the loss of professional advantages of the ICPs and promotion of professional title is very difficult^[16]. It further confirms the necessity of promoting the construction of hospital infection management/infection control discipline or major, so that the ICPs have a counterpart major, and increase their opportunities for promotion. The daily income of most ICPs was lower than similar staff at the same level in the hospital, accounting for 62.65%, which affects their work enthusiasm to a certain extent. The factors such as high work pressure, low salary, and difficulty in promotion of title all affect the stability of the infection control team^[18]. Most of the ICPs in this survey have a weak sense of career belonging. Therefore, the nation should set the career development plan of the ICPs reasonably, formulate and continuously improve the promotion and salary policies of the ICPs, and provide strong and stable policy support and guarantee for the talent development of the infection control team and enhance the stability of the team^[19].

The epidemic situation in China is mainly concentrated in Wuhan City, Hubei Province. The respondents of this questionnaire were mainly ICPs who were in non-Hubei area, most of which were Sichuan Province. As of March 30, 2020, there were 550 cases diagnosed in Sichuan Province. Only eight hospitals in Hubei Province participated in this investigation. Due to the busy work, the ICPs in Wuhan, Hubei Province had no time to participate in the investigation. This time China has achieved a major achievement of 42,000 HCWs assisting Wuhan with zero infection, which has an important relationship with the more than 400 ICPs assisting Wuhan. The success of epidemic prevention and control is also related to the ICPs. According to the survey result, the ICPs have done a lot of work in this epidemic, they needed to formulate and update the epidemic prevention control systems and processes timely, repeat training for different groups and content, and supervise various infection control measures on site and implement rectification in this epidemic. And they were responsible for guiding disinfection and isolation, medical waste management, personal protection, document review of prospective equipment and reconstruction of building layout. During the epidemic, 54.88% of the ICPs of the COVID-19 designated hospitals did not have rest days, 90.47% of them worked more than 9 hours a day, 37.23% of the min non-scheduled hospitals did not have rest days, and 85.79% of them worked more than 9 hours a day. The workload of infection control in non-epidemic key areas is already so huge, it can be seen that the work intensity and difficulty in key areas will be greater. In the face of the high contagious COVID-19 with various transmission routes, and the lack of early recognition of it, the ICPs suffered from huge psychological pressure. 79.3% of them had worse sleep quality than usual during the epidemic. Most ICPs were hard to fall asleep, easy to wake up and wake up early 1-2 times a week, and most felt tired, frustrated, feeling powerless frequently. The infection control department is an important guarantee for winning this epidemic prevention and control battle. Mental health is not only related to individual health, but also affects social function and professional ability^[20], so it is of great significance to pay attention to the physical and mental health of the ICPs and give corresponding psychological counseling and support. Faced with the problems of high work intensity, little rest time, poor sleep quality, poor salary, and difficulty in promotion of professional title, most of the ICPs did not complain or complained

occasionally, still fighting on the front line of anti-epidemic, and achieved gratifying results, which reflects out of the selfless dedication and lofty professionalism of the ICPs.

Conclusion

Difficulties in promotion of professional title, poor salary, wide knowledge requirements, high work intensity and high psychological pressure lead to the weak sense of career belonging of the Chinese ICPs, but few Chinese ICPs complain. They undertaken a lot of work in the prevention and control of this epidemic and made a huge contribution. The national should pay more attention to the construction of hospital infection control team, promote the development of hospital infection control discipline and major, allocate ICPs rationally, and formulate reasonable salary rewards and professional title promotion mechanisms to help them achieve self-worth in professional development. It will contribute to the stability of the hospital infection control team, the enhancement of the professional ability of the infection control and the continuous development of the infection control industry. In this way, we can complete the hospital infection control work and respond to public health emergencies better.

Abbreviations

ICP
infection control professional
COVID-19
the coronavirus disease 2019

Declarations

Acknowledgements

Not applicable

Authors' contributions

CL, QX, MZC, SHZ, LPC and YFL conceived and designed the study. CMZ, SHZ and LPC conducted statistics and analysis of the data. CL, QX, and YFL wrote and revised the manuscript. All authors contributed to the final manuscript. All authors read and approved the final manuscript.

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Availability of data and materials

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

This study was reviewed and approved by the Ethics Committee of the Affiliated Hospital of North Sichuan Medical College (File Number:2020ER(A)019), and it was agreed that the content of the study and the design of the experiment were in line with the ethical requirements. The data collected were analyzed anonymously, which effectively ensures that the privacy and personal information of the subjects are not disclosed and effectively guarantees the rights and interests of participants in the study. All participants signed informed consent. The authors promise that there will be no academic misconduct such as plagiarism, data fabrication, falsification, and repeated publication.

Consent for publication

Not applicable.

Competing interests

The authors have indicated they have no competing interests.

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