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Discussion on the Application Value of Public Health Management in Infectious Disease Prevention Work

Songyan Lu*
Taowu Community Health Service Center, Hengxi Street, Jiangning District, Nanjing 210000, Jiangsu, China

Author to whom correspondence should be addressed.

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Abstract: *Objective:* To analyze the application value of public health management in the prevention of infectious diseases. *Methods:* March 2024 to March 2025 was the first phase of the study, which was set as the control group, and routine management was implemented; April 2025 to March 2026 was the second phase of the research, which was set as the experimental group. and public health management was implemented. Both groups included the same batch of staff from the Centers for Disease Control and Prevention (n = 29) as research subjects to explore the effects of the intervention in the two groups. *Results:* The experimental group had higher scores on knowledge of infectious diseases, higher professional quality scores, better job burnout scores, higher professional life quality scores, and higher satisfaction scores with management methods, $P < 0.05$. *Conclusion:* Public health management can improve the infectious disease prevention-related abilities and professional status of CDC staff, and provide strong support for the development of infectious disease prevention work.

Keywords: Public health management; Infectious disease prevention; Centers for Disease Control and Prevention; Professional quality

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1. Introduction

The prevention of infectious diseases is one of the core tasks to protect public health. On a global scale, the emergence of various new and re-emerging infectious diseases has brought continuous challenges to the prevention of infectious diseases [1]. As the main executive agency for infectious disease prevention, the Centers for Disease Control and Prevention (CDC) has a direct relationship with the overall effectiveness of infectious disease prevention and control through the professional capabilities, work status, and work quality of its staff [2]. Conventional management models mostly focus on task allocation and result assessment, and do not pay enough attention to the individual needs and ability growth of staff. Long-term high-pressure and single work patterns can easily lead to delayed knowledge updates and rusty operational skills of staff, and will also increase the risk of burnout [3]. To this end, this study integrates public health management concepts into the daily operation of infectious disease prevention work and analyzes its management effects, which are summarized as follows.

2. Materials and methods

2.1. General information

Research time: March 2024 to March 2025 was the first phase of the research, set as the control group; Research time: April 2025 to March 2026 was the second phase of the research, set as the experimental group. Both groups included the same batch of staff from the Centers for Disease Control and Prevention (n = 29) as research subjects, including 13 males and 16 females; the age range was 24–52 years old, and the mean was 36.72 ± 7.15 years old; The working experience ranges from 1 to 28 years, with an average of 12.45 ± 6.83 years; in terms of education, 3 people have a college degree or below, 22 people have a bachelor's degree, and 4 people have a master's degree or above; in terms of professional titles, 11 people are junior, 14 are intermediate, and 4 are senior. Comparison of baseline data between the 2 groups, $P > 0.05$.

Inclusion criteria: (1) Have been engaged in infectious disease prevention-related work in the CDC for 6 months or more; (2) Hold the corresponding professional qualification certificate; (3) Be able to cooperate in completing various investigations and evaluations during the research period.

Exclusion criteria: (1) Being away from work for more than 1 month due to vacation, transfer, etc.; (2) Serious physical illness; (3) Unwillingness to participate in this study.

2.2. Methods

The control group implemented routine management, assigned tasks related to the prevention of infectious diseases in accordance with established work processes, and organized centralized training on a regular basis. The training content is mainly based on the prevention and control knowledge of common infectious diseases. Work inspections are carried out once a month, and corresponding rewards and punishments are carried out based on the inspection results. When staff encounter problems, they report to their superiors and wait for unified arrangements to solve them.

The experimental group implemented public health management: (1) Professional ability improvement: The management team abandons a single theoretical training model and builds a scenario-based practical training platform to simulate real work scenarios such as infectious disease surveillance, epidemic management, and case identification, allowing staff to directly apply theoretical knowledge to practical operations and deepen knowledge understanding and memory in the process of solving practical problems. At the same time, a job rotation and pairing mutual assistance mechanism is implemented, and staff are arranged to participate in different types of infectious disease prevention and control work across positions to broaden business knowledge; the form of pairing assistance between old employees and new employees and key employees is used to promote the exchange and sharing of work experience and prevention and control skills, so that personnel can fully master core knowledge such as types, hazards, transmission routes, and prevention and control methods of infectious diseases. In response to problems that arise during actual operations, managers provide timely one-on-one guidance to help staff correct operational deviations and steadily improve professional skills. (2) Professional quality cultivation: Optimize the work evaluation method, no longer only based on work results, but also add process evaluation dimensions such as professional behavior, work attitude, professional ethics, and professional thoughts, guide staff to consciously standardize professional behavior, and establish correct professional concepts. Combined with the work requirements of infectious disease prevention and control, the professional code of conduct is refined, the awareness of responsibility and service is strengthened, so that staff can form good professional habits at work and improve their comprehensive professional quality. (3) Humanistic care: Focus on the physical and mental status and individual needs of staff, conduct regular heart-to-heart communication activities, promptly understand the work pressure and psychological distress of staff, and provide targeted guidance. Properly arrange time off and work schedules to avoid long-term high-pressure and overloaded work, and organize team building, cultural and sports activities, etc., to relieve work boredom and mental stress. Form a work mutual aid group to allow staff to support each other and cooperate in the advancement of tasks, reduce loneliness and negative emotions, and reduce the risk of burnout. (4) Management process and technology optimization: Simplify redundant work links, optimize the execution process of

infectious disease prevention work, improve work operation efficiency, introduce public health management technology adapted to disease control work, assist in completing data monitoring, information reporting, and other tasks, and reduce the workload of personnel. The principle of humanized management is followed throughout the process, the subject status of staff is respected, and the balance between work advancement and family life is taken into consideration, so that management measures can better meet the actual needs of staff and ensure that staff can engage in prevention and control work in a good state.

2.3. Observation indicators

(1) Mastery of knowledge about infectious diseases: A self-made questionnaire on knowledge about infectious diseases is used for evaluation. The full score is 100 points. The higher the score, the better the knowledge is mastered.

(2) Professional quality: A self-made questionnaire on the professional quality of disease control staff is used to evaluate. The full score for each dimension is 100 points. The higher the score, the higher the professional quality.

(3) Occupational burnout: Use the Maslach Burnout Inventory (MBI) to evaluate. The higher the score on the emotional exhaustion and dehumanization dimensions, and the lower the score on the personal accomplishment dimension, the more serious the sense of occupational burnout.

(4) Quality of occupational life: A self-made questionnaire on the quality of occupational life of disease control workers is used for evaluation. Each dimension is scored from 10 to 100 points. The higher the score, the better the quality of occupational life.

(5) Satisfaction: Use a self-made management satisfaction questionnaire to evaluate, ranging from 0 to 100. The higher the score, the more satisfied you are with the management method.

All questionnaires were distributed to the research subjects at the end of each stage by uniformly trained investigators, who filled them out and collected them on site. A total of 58 questionnaires were distributed, and 58 valid questionnaires were collected, with an effective recovery rate of 100%.

2.4. Statistical methods

Data were analyzed using SPSS 26.0 statistical software. Measurement data were expressed as mean ± standard deviation (SD), and independent samples *t*-test was used for comparison between groups. $P < 0.05$ means the difference is statistically significant.

3. Results

3.1. Comparison of mastery of infectious disease knowledge

The experimental group scored higher on the knowledge of infectious diseases, $P < 0.05$ (Table 1).

Table 1. Comparison of the knowledge of infectious diseases between the two groups (mean ± SD, points)

Group	*n*	Common types of infectious diseases	Dangers caused by infectious diseases	Accurately identify infectious diseases	Common symptoms of infectious diseases	How infectious diseases spread	Prevent and treat infectious diseases accurately
Control group	29	72.34 ± 6.58	70.59 ± 7.21	68.76 ± 7.84	71.28 ± 6.93	69.45 ± 7.52	67.83 ± 8.16
Experimental group	29	88.62 ± 5.17	86.45 ± 5.83	84.21 ± 6.35	87.14 ± 5.46	85.38 ± 6.02	83.56 ± 6.74
t	-	10.477	9.211	8.247	9.681	8.906	8.004
P	-	0.000	0.000	0.000	0.000	0.000	0.000

3.2. Comparison of professional quality scores

The professional quality score of the experimental group was higher, $P < 0.05$ (Table 2).

Table 2. Comparison of professional quality scores between the two groups (mean ± SD, points)

Group	*n*	Professional behavior habits	Vocational skills	Professional ethics	Professional thought
Control group	29	73.52 ± 6.37	69.24 ± 7.65	76.81 ± 5.92	74.16 ± 6.73
Experimental group	29	89.17 ± 5.09	85.63 ± 6.18	90.34 ± 4.76	88.79 ± 5.32
t	-	10.336	8.975	9.592	9.184
P	-	0.000	0.000	0.000	0.000

3.3. Comparison of burnout scores

The scores of the emotional exhaustion and dehumanization dimensions of the experimental group were lower, and the score of personal accomplishment was higher, $P < 0.05$ (Table 3).

Table 3. Comparison of burnout scores between the two groups (mean ± SD, points)

Group	*n*	Emotional exhaustion	Dehumanization	Personal accomplishment
Control group	29	26.72 ± 5.34	11.36 ± 3.17	22.58 ± 4.69
Experimental group	29	18.45 ± 4.21	6.89 ± 2.54	31.72 ± 3.85
t	-	6.549	5.926	8.112
P	-	0.000	0.000	0.000

3.4. Comparison of professional life quality scores

The occupational life quality score of the experimental group was significantly better, $P < 0.05$. See Table 4.

Table 4. Comparison of occupational life quality scores between the two groups (mean ± SD, points)

Group	*n*	Mental health	Professional pride	Work initiative	Professional competence	Sense of family balance	Physical health
Control group	29	70.25 ± 7.43	68.47 ± 7.86	65.32 ± 8.21	67.91 ± 7.58	64.18 ± 8.65	72.56 ± 6.89
Experimental group	29	84.69 ± 6.12	83.24 ± 6.57	81.57 ± 7.03	82.86 ± 6.34	79.35 ± 7.26	85.12 ± 5.67
t	-	8.078	7.764	8.096	8.147	7.234	7.580
P	-	0.000	0.000	0.000	0.000	0.000	0.000

3.5. Comparison of satisfaction scores of management methods

The experimental group's satisfaction score with management methods was higher, $P < 0.05$ (Table 5).

Table 5. Comparison of satisfaction levels between the two groups of management methods (mean ± SD, points)

Group	*n*	Management philosophy	Management process	Administrative details	Management technology
Control group	29	67.34 ± 8.12	65.89 ± 8.47	63.72 ± 8.93	66.45 ± 8.26
Experimental group	29	85.76 ± 6.43	84.21 ± 6.78	82.54 ± 7.16	83.97 ± 6.59
t	-	9.577	9.093	8.855	8.929
P	-	0.000	0.000	0.000	0.000

4. Discussion

The prevention of infectious diseases is characterized by strong emergencies, heavy tasks, and heavy responsibilities. Therefore, CDC staff must have solid professional knowledge and skilled operational skills, and at the same time, they must also bear great psychological pressure. Under the conventional management model, most staff are in a state of passively accepting tasks, the speed of knowledge update is slow, and operational skills cannot be fully exercised. Moreover, long-term high-pressure work can easily lead to occupational burnout, which in turn affects the quality of infectious disease prevention work and personal career development [4].

The results of this study show that after the implementation of public health management, staff's knowledge of infectious diseases has been significantly improved. Thanks to the practical training in scenarios that closely integrate theoretical knowledge with practical operations, staff use the knowledge they have learned to solve problems in a simulated real environment, deepening their understanding and memory of knowledge. The method of job rotation and pairing allows staff to be exposed to the work content of different positions, broadens their knowledge, and promotes the exchange and sharing of knowledge and experience, so that staff have a more comprehensive grasp of relevant knowledge about infectious diseases [5].

The professional quality of the staff in the experimental group has been greatly improved. Analyzing the reasons, public health management pays more attention to the cultivation of staff capabilities and process guidance. Providing targeted guidance during practical training can help staff discover and promptly correct deficiencies in operations, thereby improving professional skills. A perfect work evaluation method can guide staff to develop good professional behavior habits and establish correct professional thoughts and ethics. When staff feel their own growth and progress at work, their sense of professional identity will also increase, and they will be able to more consciously regulate their own behavior and improve their professional quality [6].

Studies have shown that the sense of job burnout in the experimental group has been significantly reduced. Public health management pays attention to the individual needs of staff. Through heart-to-heart communication, time off arrangements, team building activities, etc., it can help staff relieve work pressure. Reasonable job rotation can avoid the boring feeling caused by staff working in a single job for a long time. The formation of mutual aid groups can allow staff to feel the support of the team at work and reduce loneliness [7].

The quality of professional life of the staff in the experimental group has been significantly improved. The key is that when the staff's psychological and physiological conditions are improved, work pressure is greatly relieved, allowing them to better balance the relationship between work and family. At the same time, the improvement of abilities and professionalism can make staff more confident at work, and their sense of professional competence and professional pride will also be improved, allowing staff to devote themselves to work in a better state, and their work initiative will also be enhanced, promoting the efficient development of infectious disease prevention work [8].

The staff in the experimental group were highly satisfied with the management method, indicating that the public health management measures are in line with the actual work of the Centers for Disease Control and Prevention and the needs of the staff. The management method is more humane. It not only respects the subject status of the staff, but also pays attention to the growth and development of the staff. Therefore, it has been recognized and supported by the staff. And higher management satisfaction helps to improve the work enthusiasm and compliance of staff, so that various management measures can be implemented smoothly [9].

5. Conclusion

In summary, public health management can improve the infectious disease prevention-related abilities and professional status of CDC staff and provide strong support for the development of infectious disease prevention work.

About the author

Lu Songyan, January 1993-, female, Han nationality, Sihong, Jiangsu, undergraduate, assistant researcher, health management.

Disclosure statement

The author declares no conflict of interest.

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