Original Article
Influence of ability level principle based on human resource management on ward nursing quality and satisfaction in surgical nursing management

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Abstract: Objective: The aim of this study was to investigate the influence of ability level principle based on human resource management on quality and satisfaction of ward nursing in surgical nursing management. Methods: A total of 38 surgical nursing staff in the Affiliated Hospital of Jining Medical University were selected as subjects of study. Ability level management mode based on human resource management was adopted in surgical nursing from July to December 2017. Quality and satisfaction of surgical nursing were compared with those before implementation (January-June 2017). Results: Scores of basic nursing, disinfection and isolation, ward management, intensive care, document writing, nursing safety, and technical operation after implementation of ability level management were significantly higher than those before implementation (all p<0.001). Satisfaction scores of nurses and hospitalized patients after implementation of ability level management were remarkably higher than those before implementation (both p<0.001). Conclusion: Ability level principle based on human resource management can effectively increase surgical nursing quality, improve nurse job satisfaction and patient satisfaction, and facilitate the continuous improvement of nursing management.

Keywords: Human resource management, ability level principle, surgery, nursing management, performance appraisal

Introduction

Surgery departments are often dominated by surgical treatment, in which there are many patients with critical and difficult miscellaneous diseases. Staff turnover is high, as it is a multi-project, high-tech, and high-risk department with cumbersome and heavy nursing work [1]. In the management process, confusion regarding nursing work and poor nursing quality can easily occur. Although graded management of registered nurses is explicitly stipulated in Regulations on Registered Nurses in Hospitals, there remains such phenomena as high turnover rates of nursing staff, unclear job responsibilities, fuzzy career planning, and mismatching between job title and professional skills in public hospitals in China since its trial implementation. This has affected nurse enthusiasm

and patient nursing satisfaction, leading to lack of working passion and tension between doctors and patients [2].

Therefore, means of optimizing allocation of human resources, inspiring individual potential of nursing staff, and increasing the quality and efficiency of surgical nursing work in a reasonable and efficient manner have always been a research emphasis in nursing management [3]. With continuous innovation and improvement of the nursing model, the ability level principle based on human resource management has been applied in various clinical departments, gradually, obtaining good nursing effects [4]. In ability level management mode based on human resource management, nursing staff are divided into different ability levels according to professional skills. Job responsibilities, cor-

Table 1. Ability level criteria and responsibilities of each post

Post	Ability level	Qualification	Responsibility
Chief nurse	Senior or intermediate nurse	Bachelor's degree and above in nursing with working experience of more than 5 years, good professional knowledge of nursing, advanced professional skills, strong logical thinking, leadership and responsibility, good communication skills, and excellent organizational ability.	1) Responsible for processing and checking medical advice and checking and verifying the implementation regularly, 2) Responsible for bed scheduling, and monitoring and controlling the quality, 3) Responsible for rescuing critical patients and handling various emergencies in the department, and 4) Responsible for checking and managing medicines, such as the shelf life, and placing and sorting medicines, and checking records of drug delivery and storage regularly.
Charge nursing leader	Senior or intermediate nurse	Bachelor's degree and above in nursing with working experience of more than 5 years. Familiar with nursing quality control standards. Meticulous, careful and responsible in work with good communication skills, responsibility and coordination ability.	1) Responsible for dividing the work, supervising and guiding duty nurses; 2) Responsible for controlling the nursing quality in and among groups, handling various emergencies within the group, and managing the self-examination of nurses' satisfaction; 3) Responsible for nursing critical patients and guiding duty nurses in learning and mastering skills.
Duty nurse	Junior nurse and above	Junior college degree and above in nursing with working experience of more than 3 years, a high sense of responsibility and good communication and presentation skills.	1) Responsible for treating and nursing patients in the nursing ward during the whole course; 2) Cooperating with charge nursing leader in the daily health education.
Night nurse	Junior nurse and above	Junior college degree and above in nursing with working experience of more than 3 years, a high sense of responsibility and good communication and presentation skills.	Responsible for night shifts in the department, with the same duties as duty nurses.
General nurse 1	Junior nurse and above	Technical secondary school and above in nursing with working experience of more than 1 year. Careful and responsible in work, and familiar with medication in the department.	1) Responsible for replacing the drainage pack and drainage bottle for patients, placing the infusion bottle, and replenishing articles for the department in time; 2) Assist the master nurse in verifying the medical advice without the responsibility for managing the nursing ward.
General nurse 2	Junior nurse and nurses without practicing certificate temporarily	Without nurse qualification certificate	Responsible for reminding and guiding patient payment, communicating and collaborating with other departments without the responsibility for managing the nursing ward.

responding to ability levels, are developed and ability levels and jobs are reasonably matched. Each staff member performs his/her own responsibility. Staff with different ability levels complement one another's advantages, thereby allowing everyone to fully display their talents, optimizing the allocation of human resources [5]. At the same time, ability levels and job requirements are publicly announced, making the career goal of nurses clear. Therefore, the working enthusiasm of each can be further mobilized.

On this basis, a systematic performance appraisal system corresponding to ability level was developed and formally implemented in Affiliated Hospital of Jining Medical University, beginning July 2017. The aim was to optimize surgical nursing management and provide higher-quality and safer nursing services for patients.

Materials and methods

General data

This study was approved by the Ethics Committee of Affiliated Hospital of Jining Medical University and all participants signed informed consent. Ability level management mode based on human resource management was adopted in surgical nursing in Affiliated Hospital of Jining Medical University from July to December 2017. A total of 38 in-service surgical nursing staff were selected as subjects of study. None of them had disturbances of consciousness, mental disorders, or other diseases affecting mental health. Of these, 13 staff graduated from the University, 17 staff from junior college, and 8 staff from technical secondary school. In terms of the years of working, there were 5 staff with working experience <1 year, 16 staff with working experience of 1-4 years, 10 staff with working experience of 5-9 years, 4 staff with working experience of 10-19 years, and 3 staff with working experience ≥20 years. There were 8 senior nurses, 10 intermediate nurses, 15 junior nurses, and 5 new nurses.

Methods

Before implementation, duty nurses and assistant nurses were the principals. In terms of the nursing model, duty nurses were grouped in charge of basic treatment and whole-course

nursing for the entire ward, including intensive nursing. Assistant nurses took day and night shifts in weekly rotation to assist duty nurses. Ability level management began to be implemented in the Affiliated Hospital of Jining Medical University in July 2017, for half a year.

Ability level and post based on human resource management: All nurses were classified into four levels (senior nurse, intermediate nurse, junior nurse, and new nurse), according to different education backgrounds, job titles, professional skills, and personal characteristics. Five posts (chief nurse, charge nursing leader, duty nurse, general nurse, and night nurse) were set in the department according to different duties and levels. These could be promoted and adjusted based on meeting qualifications. Nurses on the job cooperated with staff at all levels every day. Allocation of a post should be consistent with nurse abilities and responsibilities and the ability level should correspond to the post. Qualifications and responsibilities of each post are shown in **Table 1**.

Performance appraisal system based on human resource management: Individual performance of nursing staff = 30% post performance + 70% work performance + rewards and punishments. Monthly appraisal results were announced publicly on the fifth day of the next month.

1) Post performance = 30% * (total amount-amount of rewards and punishments) * post performance coefficient and post-performance coefficient = individual post performance points/total post performance points of all nursing staff. Post-performance points consisted of performance points of education background, years of working, ability level, and post. Individual post performance points of nurses were the sum of the above 4 performance points as shown in **Table 2**.

2) Work performance appraisal was performed strictly according to job responsibilities. If the master nurse laid emphasis on assessment of implementation quality of medical advice and supervision of nursing safety in the wards, the charge leader focused on whether duty nurses were supervised and guided effectively. Duty nurses focused on ward nursing quality and satisfaction of patients. Work performance = 70% * (total amount-amount of rewards and

Table 2. Post-performance points for the nursing staff

Education	Postgraduate	Undergraduate	Junior college	Technical secondary school	
Performance points	1.2	1.0	0.8	0.6	
Years of working	≥20 years	10-19 years	5-9 years	1-4 years	<1 year
Performance points	1.3	1.2	1.0	0.8	0.6
Ability level	Senior	Intermediate	Primary	New nurse	
Performance points	1.2	1.0	0.8	0.6	
Post	Chief nurse	Charge nursing leader	Duty nurse	Night nurse	General nurse
Performance points	1.2	1.2	0.8	0.8	0.6

punishments) * work performance coefficient and work performance coefficient = score of work performance appraisal/total score in the department.

Specific operations: Monthly all-night shifts and overall rationing system of duty nurses were implemented in Affiliated Hospital of Jining Medical University, with two-class (A and N) rotation. Nurses in class A worked from 8:00 am to 17:30 pm, while those in class N worked from 17:30 pm to 8:00 am. Duty nurses were replaced with night nurses in turn once a month. Each group consisted of 1 charge nursing leader, 5 duty nurses, and 3 night nurses. A total of 3 charge nursing teams were established. Nurses voluntarily applied for the above posts. Head nurses assessed via the qualifications and preliminary overall performance (compared with the performance appraisal of the department last year) and proposed candidates. All staff in the department voted and nurses in each ability level were selected according to voting results. Nurses could voluntarily apply for the job through competition, semiannually, based on performance. The principle of "ability-based ability level, ability level-based post, and post-based salary" was strictly followed.

Observation indexes and evaluation criteria

Major observation indexes: Scores of nursing work quality, before and after implementation of ability level management, were compared. In nursing quality assessment, there were 7 monitoring indexes: basic nursing, disinfection and isolation, ward management, intensive care, document writing, nursing safety, and technical operation. Quality evaluation criteria were subject to criteria developed by the Nursing Department of Affiliated Hospital of Jining Me-

dical University. Basic nursing quality and ward management were mainly compared. The former included a total of 11 evaluation indexes (mainly including the cleanliness of ward environment, frequency of ward inspection, sanitary conditions of patients, implementation situations of morning and evening nursing, and health education). The latter included 8 evaluation criteria (mainly including whether duty nurses understood patient conditions, whether patients knew the duty nurses, patient service evaluations, and patient knowledge related to their disease) [6, 7]. According to requirements of the Nursing Department, at least 10 duty nurses were selected and tested for each item. Scores were deducted in case of disqualification according to detailed rules. The person in charge and score-deduction reasons were recorded. Total score was 100 points and scores ≥90 points indicated qualified.

Secondary observation indexes: Job satisfaction of nurses and satisfaction of patients before and after implementation of ability level management were compared. The satisfaction questionnaire formulated in the Affiliated Hospital of Jining Medical University was used to survey hospitalized patient satisfaction. This questionnaire was anonymously filled out by patients and issued and collected by the charge nursing leader at discharge. Inclusion criteria of patients involved in the survey: patients with the length of hospital stay ≥7 days, patients with clear consciousness and no mental disturbance, and patients without dispute unrelated to nursing service during hospitalization [8]. Patients with critical diseases and patients that refused to accept the questionnaire survey were excluded. The self-evaluation scale, developed by the School of Nursing of Second Military Medical University, was adopted for the survey of job satisfaction of nurses [9]. The

Table 3. Comparison of nursing work quality scores before and after implementation of ability level management ($\bar{x} \pm$ sd; score)

	Before implementation	After implementation	t	P
Basic nursing	93.12±1.26	98.46±1.20	18.918	<0.001
Disinfection and isolation	92.88±3.08	98.13±1.67	9.237	<0.001
Ward management	90.24±2.36	97.12±2.25	13.007	<0.001
Intensive care	91.45±2.85	97.62±2.06	10.816	<0.001
Document writing	91.10±3.50	97.25±2.56	8.743	<0.001
Nursing safety	91.64±2.59	98.25±2.60	11.103	<0.001
Technical operation	92.36±2.80	98.24±1.56	11.309	<0.001
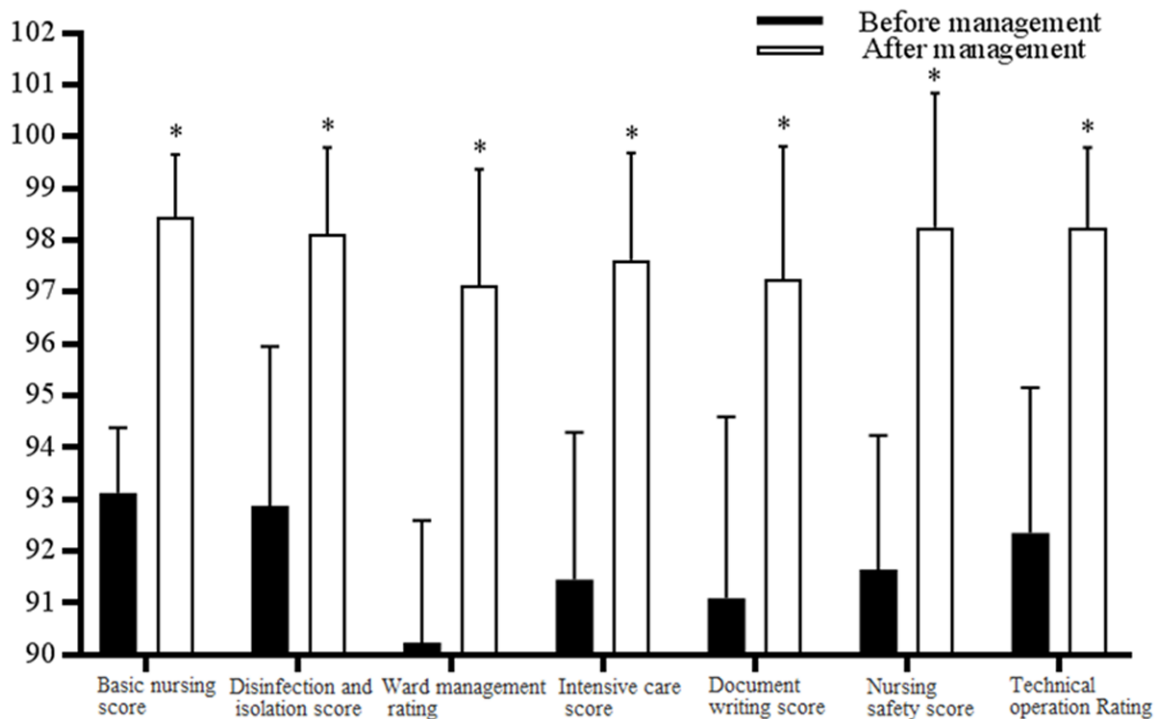
Figure 1. Comparison of quality of nursing work before and after ability level management. Compared with before management, *P<0.001.

total Cronbach's alpha of the scale was 0.81, including 38 items. The full score of each item was 5 points. Likert 5-level scoring method was adopted. Higher scores indicated higher job satisfaction.

Statistical methods

SPSS 21.0 software was used for analyses of all statistical data. Measurement data are presented as mean ± standard deviation ($\bar{x} \pm$ sd). Paired t-test was used for comparison of measurement data, such as scores of nursing work quality and satisfaction. All enumeration data are presented as rate (%) and Chi-square test was used for comparison of differences among groups. P<0.05 suggests that differences are statistically significant.

Results

Comparison of nursing work quality scores before and after implementation of ability level management

Scores of basic nursing, disinfection and isolation, ward management, intensive care, document writing, nursing safety, and technical operation after implementation of ability level management were significantly higher than those before implementation (all p<0.001) as shown in **Table 3** and **Figure 1**.

Table 4. Comparison of satisfaction scores before and after implementation of ability level management

	Job satisfaction of nurses (n = 38)	Patient satisfaction (n = 200)
Before implementation	122.24±9.56	92.03±1.26
After implementation	134.23±10.23	97.25±1.65
t	5.279	35.558
P	<0.001	<0.001
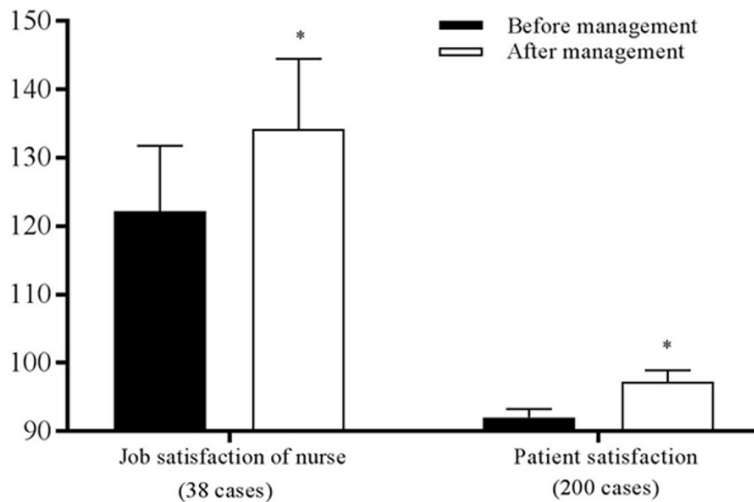
Figure 2. Satisfaction scores comparison before and after ability level management. Compared with before management, *P<0.001.

Comparison of satisfaction scores before and after implementation of ability level management

Satisfaction scores of nurses and hospitalized patients after implementation of ability level management were remarkably higher than those before implementation (all p<0.001) as shown in **Table 4** and **Figure 2**.

Discussion

In developing countries, work levels and divisions of labor are generally not clear in the nursing industry. Surgical nursing management is no exception. These problems are mainly manifested in the fact that, except for teaching and scientific research tasks, there are no differences in ability levels and job titles of senior/intermediate nurses and primary nurses in clinical nursing work. If things continue this way, senior nursing staff will lose working enthusiasm with an unclear career development plan. Occupational burnout will occur easily within

3-5 years, directly resulting in the outflow of highly-educated and highly-qualified senior/intermediate nurses [10]. For example, 3 nurses with bachelor's degrees and above resigned in 2016 in our hospital. According to their descriptions, the main reasons for resignation were unclear. How to improve the overall quality of nursing teams remains a core problem in surgical nursing management [11]. With ability level principle based on human resource management, nurses are divided into different ability levels according to seniority, job titles, education background, and personal abilities. The principle of ability-based ability level, ability level-based post, and post-based salary is strictly followed. Thus, nurses at different levels can cooperate with each other to increase the confidence of the nursing team, greatly improving nursing quality [12]. However, this management model has not been widely used in surgical nursing management.

The ability level nursing model, a new nursing model, avoids such problems as confusing posts, uneven distribution of manpower, and heavy work of nursing staff found in the traditional management mode [13]. In this study, ability level nursing model was adopted. The management system was improved in various aspects, such as setting the ability level posts, clarifying job responsibilities, and level performance system. Nursing work quality is a core standard to measure the management level of the department. To continuously improve overall quality and staff quality in the department, nursing quality was evaluated according to requirements of the Nursing Department in Affiliated Hospital of Jining Medical University, mainly from basic nursing, ward management, nursing safety, and technical operation. In the traditional ward accountability nursing model, duty nurses need to be responsible for the treatment and nursing of all patients. Staff are

relatively permanent and nurses in other posts do not participate, thus patients can only seek help from duty nurses. Problems cannot be solved in time, inevitably making patients anxious, reducing the degree of satisfaction and intensifying the trivial busy work of duty nurses. Some nursing work for patients becomes formalistic and the effects cannot be guaranteed. After implementation of ability level management, duty nurses cooperate with night nurses in whole-course tracking and nursing of patients from admission to discharge under the management of charge nursing leader. This not only realizes the seamless connection of nursing work, but also ensures coherent nursing file writing. Moreover, management work is implemented from the details and basic nursing and file writing levels are improved. In case of emergencies, duty nurses can seek advice from master nurses and team leaders at any time. They can solve patient problems in a timely manner, thereby ensuring nursing safety and improving nursing satisfaction. Staff at all levels cooperate with one another. Therefore, team leaders can spend more time on propaganda and education, mastering treatment and nursing effects, and other basic conditions. Communication with doctors in a timely manner and solving problems for patients at any time are helpful in improving ward management. Moreover, efficient cooperation among ability levels within the group increases nursing quality within the group. It also reflects the management ability of the charge nursing leader. Competition among groups plays a role as exercise and supervision, further improving the overall quality of the department [14]. In terms of quality control before implementation of ability level management model, it was performed by the head nurse for 3 charge nursing teams every week, according to standard quality assessment items. After implementation of ability level management, quality control of the department was assigned by the head nurse to the charge nursing leader. The charge nursing leader, under supervision of the head nurse, performs cross-quality control every week based on assessment items. Assessment methods include on-site checking of nursing progress and inquiries into patient satisfaction. Under supervision of the master nurse, the charge nursing leader performs quality control regularly, ensuring that nursing staff in the department, at all levels, can perform their own duties. They also ensure that nursing work can be done in an orderly fashion, improving the professional and technical levels of nursing staff, guaranteeing nursing quality and safety in the department [15]. In this present study, the performance appraisal system corresponding to ability level was set up. Nursing staff at each ability level obtained motivation and discovered room for improvement. Working enthusiasm was improved and career planning was also promoted. According to statistics, there are 6 nurses determined to improve education via the on-the-job postgraduate course and self-study undergraduate course, currently. Only 1 new nurse had resigned as of December 2017, in sharp contrast to before implementation. In post performance, the importance of educational background and seniority is fully recognized while ensuring excellent pay for excellent work [16].

The nursing management model aims to improve nursing quality in the hospital. Patient satisfaction is one of the most important criteria for measuring nursing quality [17]. After implementation of ability level management model, the charge nursing leader personally participated in and guided the nursing of critical patients, while primary nurses were directly responsible for mild patients. In this manner, reasonable planning and allocation of human resources are realized [18]. Moreover, night duty nurses become regular in the monthly night-shift system, hence poor understanding of patient conditions due to frequent shift changes is avoided and time and opportunities for nurse-patient communication are increased. Duty nurses can provide whole-course nursing for patients in time, patients can feel humanistic care from nursing staff, satisfaction of patients is promoted, and the nurse-patient relationship becomes more harmonious. As a result, nursing work can be done smoothly and job satisfaction of nursing staff can also be increased, complementing each other [19]. According to results of this study, scores of basic nursing, disinfection and isolation, ward management, intensive care, document writing, nursing safety, and technical operation after implementation of ability level management were significantly higher than those before implementation. Satisfaction scores of nurses and hospitalized patients after implementation of ability level manage-

ment were remarkably increased compared with those before implementation, suggesting that ability level management could effectively improve nursing quality and increase satisfaction. For this present study, the management model with ability level corresponding to post and corresponding post to performance was applied in surgical nursing management for the first time. This model ensured the working enthusiasm of nursing staff, improved overall nursing quality, and made nursing management more scientific and effective [20]. However, this study focused on the adjustment and assessment of ability levels of primary nurses and above. Therefore, management and training of new nurses are worthy of study in the future.

In conclusion, the ability level principle based on human resource management can effectively increase surgical nursing quality, improve nurse job satisfaction and patient satisfaction, and facilitate continuous improvement of nursing management.

Disclosure of conflict of interest

None.

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