Improving Clinical Nurses' Competency and Nursing Care Using the Research Process Model

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Abstract

Abstract

Background: Clinical nurses working in an acute neurosurgery ward and researchers conducted research using the research process model with the aim to improve nursing competency, nursing autonomy, work motivation, ethics, and actual nursing care content. The research clarified: (a) how clinical nurses in the neurosurgical ward changed and the process of improving nursing competence; (b) changes regarding clinical nurses' patient care autonomy, work motivation, and ethics; (c) changes in nursing care (rate of medical restraint, rate of manual removal of faeces, etc.) and (d) changes in patients' and families' degree of nursing care satisfaction.

Methods: Participants were a purposive sample of 12 (50%) ward nurses from a neurosurgery ward in a 500-bed hospital that had emergency care. Qualitative and quantitative data were from descriptions of the research process model and interviews, with the use of professional autonomy scale, work motivation scale, ethical behaviour scale, implementation rates of medical restraints and manual removal of faeces to inpatients, and by changes in nursing care and patient satisfaction. Data were collected before, during and at the completion of research. Analyses for quantitative data was done by unpaired t-test and ANOVA, and thematic analysis for qualitative data. Significance was set at ($p < 0.05$).

Results: Professional autonomy scores gradually increased after the start of research and were significantly higher at the midpoint . The ethical behaviour scores gradually increased from the starting point, but there was no significant difference . The work motivation scores gradually increased and had significantly increased at the end of the study period compared to the starting point. The rate of medical restraints on patients significantly decreased in the end compared to the beginning, while the rate of manual removal of faeces significantly decreased at the midpoint and in the end compared to the starting point. Families complained about nurses' response and care during the three-year period prior to the start of the research, but a year after the start of this research, no complaints were observed. The nurses improved nursing competence from Stage 1 : realization of individual nursing care anew; Stage 2: collaborating with various medical professionals; Stage 3: pursuit of specialized nursing; and Stage 4: promote competence of leadership and team building ability for all nurses. The research process model in this study improved nursing competency of the nurses participating in the study.

Conclusion: Going through the four stages, the clinical nurses working in the acute neurosurgery ward were able to improve their actual nursing care and increased their nursing competency.

Background:

Nurses in neurosurgical wards experience large psychological and physical burdens, because the patients' condition affects their mobility, consciousness, and communication. Neurosurgical nurses can also receive negative feedback from patients nursing in this area and this can be challenging and dissatisfying (Villanueva, Blank-Reid, Stewart-Amidei, Cartwright, Haymore, & Jones, 2008). Furthermore, short-term hospitalization makes it more difficult for nurses in acute -care hospitals to provide individual patient centered care maintaining the patients' Quality of Life.

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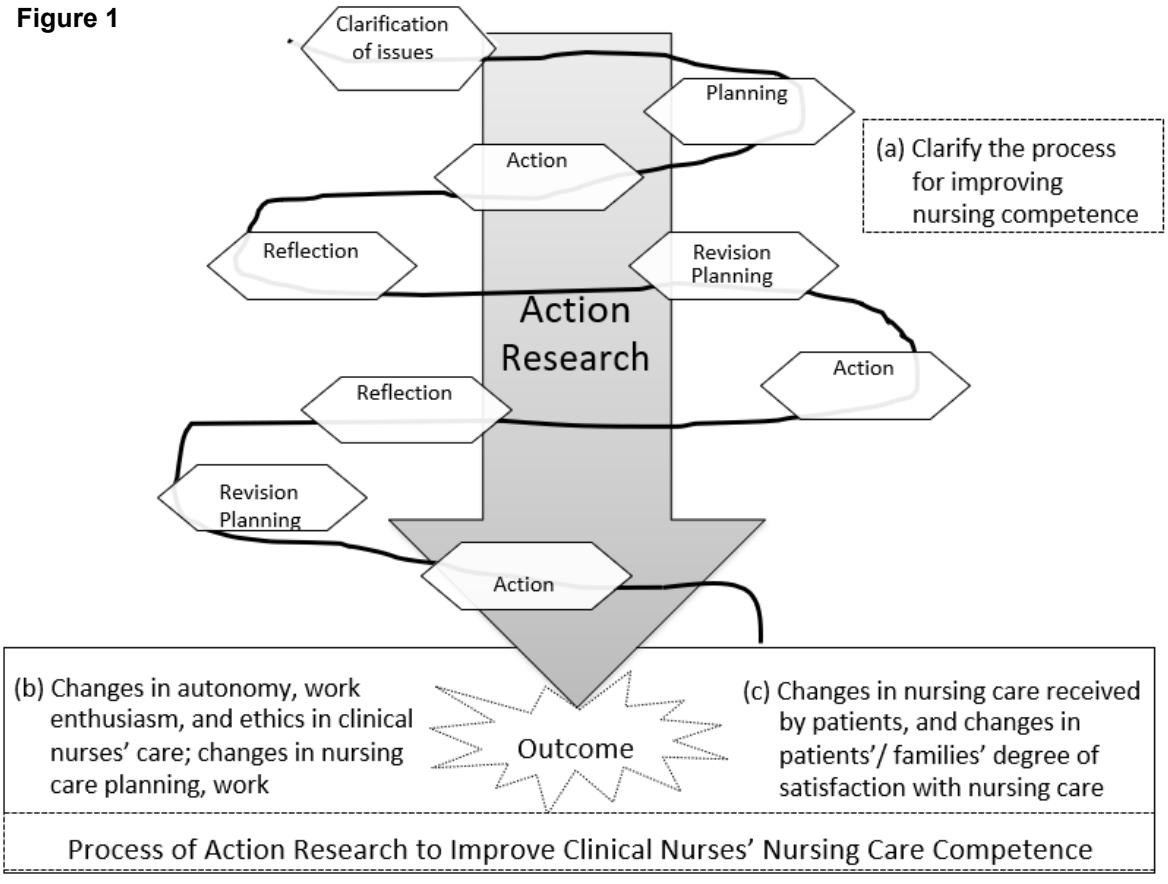
DOI: 10.21307/ajon-2021-005

The dilemma between wanting to respect patients' needs by providing individual care but not being able to do so, results in dissatisfaction for both the patients and the nurses and leads to diminished quality of nursing care. This is a concern in Japan and internationally (Hayashi, Hidaka, Onoda, & Fukura, 2014; Hickey, 2011; Kobayashi & Toume, 2010). For example, in Japan, there were hospitals where medical restraint was performed after neurosurgery to most unconscious patients with manual faecal evacuation also performed to prevent cerebral hypertension. Although these old practices were said to have good outcomes, there is limited (or no) evidence for this but some hospital practices remain. Nurses, knowing that these procedures are not necessary for all patients, tend to question the need for these practices.

Implementation of information exchange, considering nursing behaviors among nurses, and the introduction of certified nurses and certified nurse specialists, with training provided are recommended solutions for this situation (Villanueva, et al., 2008). However, in some cases, even with the existence of certified nurses or certified nurse specialists, if they only took in the leaders' instructions, improving the quality of care may be difficult depending on the custom or situations of the ward carried down (Leary, Crouch, Lezard, Rawcliffe, Boden, & Richardson, 2008). Therefore, it is important to aim for improvement in quality of nursing care with a team based on the situations, the needs, and the issues of the wards.. Allowing the nurses to take ownership for culture shift and ward improvements, means a successful outcome and satisfaction in their own work. Such initiatives are precisely what are needed to improve and maintain nursing care (Weston & Roberts, 2013). At present, previous research has been limited to elucidating issues of nursing care in wards and the outcomes of initiatives, but none thus far have clarified the process in changes (Bollini, Zaza, Bottani, & Lolli, 2006; Braungardt & Fought, 2008; Chang, Lee, Pearson, Kahn, Elliott, & Rubenstein, 2002; Lapotnikov, Samoïlenko & Poliakov, 2000; Trainotti, 1999).

The aim of this research was to examine whether using a research process model (Figure 1) improves clinical nurses' care competency by clarifying the following factors: (a) how clinical nurses in the neurosurgical ward changed and the process of improving nursing competence; (b) changes regarding clinical nurses' patient care autonomy, work motivation, and ethics; (c) changes in nursing care (rate of medical restraint, rate of manual removal of faeces, etc.); and (d) changes in patients' and families' degree of nursing care satisfaction.

Figure 1



Methods:

This research used mixed methods design and was conducted in a neurosurgical ward of a university hospital within the range of Tokyo metropolitan area. The hospital had 520 beds, all with private rooms and the average length of stay was 9.5 days. Over 90 % of the registered nurses employed had bachelor's degrees, and more than 30 nurses were certified nurses or certified nurse specialists. The neurosurgical ward had 38 beds, and 25 nurses (one stroke neurorehabilitation certified nurse) with the nurse-to-patient ratio of 1:7.

A purposive sample of 25 neurosurgical ward nurses with written consent were keen to make a change in their ward. Within this sample, 12 nurses (five leaders and seven members) were recruited voluntarily (Coghlan & Casey, 2001). In addition, two nurse researchers were voluntarily sent in as supervisors (one with a master's degree and one with a PhD, both from a different institution) to collect the data and to do interviews as instructed by the researcher, to reduce the risk of information bias. This research was conducted through a FY2014 St. Luke's Life Science Grant-in-Aid.

Measurements

Qualitative data was extracted using the research process model (Figure 1) and from interviews

with three day-shift nurses at a time, randomly selected by the researcher each month. Quantitative data was collected using (b-1) professional autonomy scale, (b-2) work motivation scale for nurses, (b-3) ethical behavior scale, and (c) changes in nursing care and patient satisfaction.

(b-1) Professional autonomy scale

The professional autonomy scale for nurses (Kikuchi, 1996) consists of 47 items rated on multiple five-point Likert scales from 1 (low: extremely disatisfied) to 5 (high: highly satisfied) targeting three dimensions including autonomy: (1) cognition (cognitive ability), (2) judgment (ability to make concrete judgments, abstract judgments, and independent judgments), and (3) performance (practical ability). Highest total scores were 235 points and the higher the points, the more positive judgements. Reliability was verified by Cronbach's alpha coefficient of 0.79–0.93 (Kikuchi, 1997). In this research, negative questions were converted at the time of analysis; the higher the total score, the greater the professional autonomy.

(b-2) Work motivation.

The work motivation scale consists of 15 items with a five-level rating (Sano, 2005). 75 points is the highest score; the higher the score, the higher the motivation to work. Reliability and coexistent validity was verified through Cronbach's coefficient alphas of 0.86 - 0.93 that included subscales "motivation for current work" and "motivation for future work". Correlation between job motivation subscales and job satisfaction 0.44 ($p < .001$) for the subscale "motivation toward current job" and 0.35 ($p < .001$) for "motivation toward future job. The correlation was 0.44 ($p < 0.001$) with the subscale "motivation for current work" and 0.35 ($p < 0.001$) with "motivation for future work ($p < 0.001$) (Sano, 2005).

(b-3) Ethical behavior scale

The ethical behavior scale (Ode, 2014) measuring the ethical behavior of nurses in clinical practice in Japan, composed of a total of 22 items with a six-level rating method. Reliability was verified with a Cronbach's alpha coefficient of 0.77 - 0.88 (Ode, 2014). This scale is consisting of three factors: respect for the patient's autonomy, justice for all patients, and beneficence - maleficence. This research converted the scale to a four-level rating, and positive questions items and negative questions items were modified to make a total score of 88 points; the higher the score, the better the ethical behavior toward nursing care. The Cronbach's alpha for the modified scoring was: respect for the patient's autonomy 0.78, justice for all patients 0.77, and do-no-harm – do good 0.80, with an overall reliability of 0.88 (Ode, 2014).

(c) Changes in nursing care and patient satisfaction

Changes in nursing care for neurosurgical patients (rate of medical restraints and rate of manual removal of faeces), and changes in the patients' and families' degree of satisfaction with nursing care were recorded. The comments about satisfaction with the care they received were left in comment boxes at the time of discharge and were collected then analyzed by the supervisors. The implementation rates of medical restraints and the manual removal of feces of were calculated by data from the nursing record.

Ethical Considerations

Approval was received from the research ethics committee at St. Luke's International University (approval no. 14-093). Written and oral explanations were given to both participants and supervisors as research participants sufficiently explained: the meaning of the research, the aim, the anticipated merits and demerits, that cooperation was voluntary, that the participants were able to discontinue even after the start of research. They also explained that cooperation or refusal to cooperate in the research would present no disadvantage, and that their participation would not infringe upon their rights or dignity. To Discontinue participation the participant provided a written notice of withdrawal. Non-cooperative members were also individually informed by written document and orally of the interview content and ethical considerations.

Participants were assured of confidentiality and anonymity. When interview data were recorded with consent, it was immediately erased after the verbatim transcript was done. Data were rendered anonymous to ensure that individuals and organizations could not be identified. Participants completing the questionnaire unsigned were asked to directly submit it to a specific box that the hospitals' Quality Indicator Center collected. Nursing records were also used, only to gather information necessary to the research. All collected data were used exclusively for research. Data were always stored in a place that was locked and carefully secured and will be stored for three years following academic presentations so that research results could be reproduced.

Data Collection.

Data were collected from June 2013 through January 2015. All members of the ward held regular meetings every two months with topics concerning their nursing practice. At the first meeting, cyclical-shaped research process model (Figure 1) was firstly explained by the researcher to all members, clarifying the problems/issues and then the repeating process: planning, action, reflection and revision, done until the desired out-come was achieved, or the project deadline came to an end.

At the end of the research, supervisors interviewed six nurses: three ward nurses who were not the cooperative members and three nurses who were cooperative members to determine if there were any changes in their nursing throughout the research period. The supervisors used an original resume for the nurses' demographic data (including age, sex, type of nursing license, qualifications, and if they had any period of work absence) and an interview guide made for this research. Throughout the research, the researcher kept an observation record regarding actual actions of daily nursing care and nursing work as a note.

Changes in nurses' autonomy, motivation, and ethics were measured three times: before, during (10 months after the start), and at the end (20 months after the start) of the research. Changes in nursing care (rate of medical restraints and rate of manual removal of faeces), and three periods (one year, two years, three years before the start of research) of changes in patients'/families' degree of satisfaction regarding nursing care were also provided by the Quality Indicator Center.

Data Analysis.

Continuous variables are presented as median with interquartile ranges (IQR) or mean and standard deviation (SD); with categorical data presented as counts and percentages. Univariable associations were tested by using chi-square tests or fishers' exact tests for categorical variables, two tailed t tests for normally distributed continuous variables and Mann-Whitney U tests for non-normally distributed continuous variables, with a p-value of <0.05 accepted as statistically significant. The level of significance was set for 0.05 using SPSS version 22. The medical restraint rate was calculated based on the number of hospitalized patients in the ward and the number of patients being medically restrained. The manual removal of faeces rate was also calculated based on the number of hospitalized patients in the ward and the number of actions done. The content of patients'/families' degree of satisfaction with nursing care was analyzed using the number of complaints in relation to the comments submitted at four periods: one year, two years, and three years before research and after research. Analysis of variance (ANOVA) repeated measures were used to examine differences in groups at three time points: before, during, and after the research. Qualitative data thematically analyzed by the verbatim transcript (Sandelowski, 2000) and the researchers' daily observational notes were coded, making the content of four stages and sub-categories clear. All 12 cooperative members and the supervisors were convinced of each four stages credibility and confirmability (Zhang & Wildemuth, n.d.).

Results

Demographic characteristics of participating nurses

The majority of the nurses had at least three years of experiences and were between 20 and 30 years of age. Approximately one-third (10/25) were considered to be expert nurses according to Benners (1984) schema (Table 1).

Stages of changes in nurses and the process increasing nursing care competencies

The following four stages were the outcomes of the thematic analysis interviewing the nurses about their experiences of care. Stages (Figure 2) reveal the changing percep-

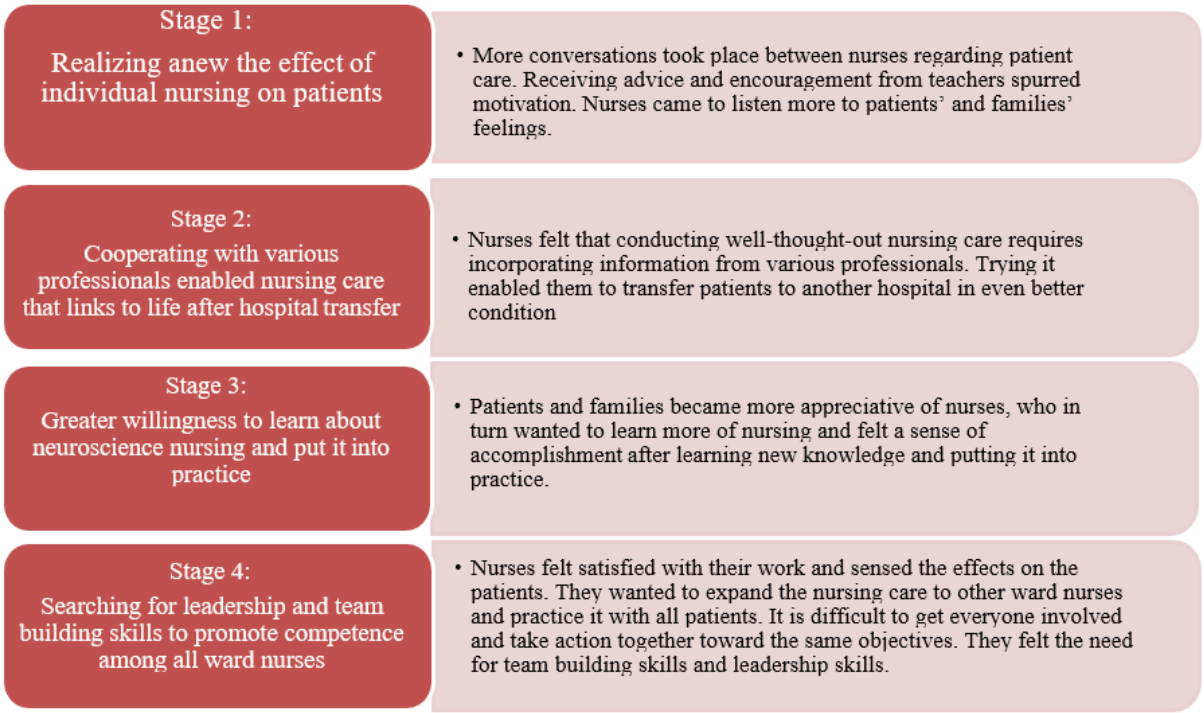
Table 1: Basic attributes of nurse participants (at the time of the preliminary survey)

	N = 25 (%)
No. of years in the nursing profession1	
Novice (less than 1 yr.)	4 (16%)
Competent (2–3 yrs.)	4 (16%)
Proficient (3–5 yrs.)	7 (28%)
Expert (5 yrs. or more)	10 (40%)
Age	
20s	21 (84%)
30s	4 (16%)
40s	0 (0.0%)
50s and older	0 (0.0%)
Inclusion of action researchers	
Insider researchers2	12 (48%)
Other researchers	13 (52%)

1 The categories for the number of years of experience were grouped based on the five stages of nursing clinical competence as defined by Benner (1984).

2 Insider researcher = nurse employed by the hospital

Figure 2



tions of their care from the beginning to the end of the study using the Research Process Model (Figure 1).

Stage 1: Realising the effect of individual nursing on patients anew.

Several cooperative members made the following comments:

"We cannot provide nursing care pursuing individuality, because we have only a few opportunities to care for long term patients. I am only able to provide standard care even though there are many patients with multiple disadvantages requiring advanced care." "There is no satisfaction or sense of accomplishment in nursing care. I would like to study specialized neurosurgery nursing to improve quality of care and provide individualized care."

A chronically severe but stable first patient was selected by the cooperative nurses. With the desire to improve quality of nursing care in the neurosurgery ward, nurses together with the supervisors, discussed and created a nursing plan. The cooperative members repeatedly assessed the nursing plan, care outcome, and revised the plan, passing on notes to other members using the patients' clinical nursing records. The selected patient was quadriplegic due to a cerebellar hemorrhage, with a tracheostomy and was tube fed. He communicated by tracking with his eyes. To prevent an increase in intracranial pressure, the head was kept high and rehabilitation was provided in bed due to his immobility. The patients' condition was reassessed, and the problem of nursing highlighted the risk that the mobility may worsen due to insufficient use of the remaining function. The nursing objectives were decided as (1) increase ability to tolerate in a sitting position, (2) creating time to sit with family, (3) reconsider communication means, and (4) achieving mutual understanding. Specific nursing care included, proactive wheelchair transfer, implementation of sitting without backrest support (Okubo 2012), and giving stimulation by hand massage / foot bath massage while sitting in an upright position. Weight loss was considered to be caused by fatigue, so the nutrition was increased and an adjustment of the balance between activity and rest was made. Also, communication was reconsidered with a speech therapist and family members sharing information to ensure it was effective. The supervisors were there to give advice and support the planned nursing care with the nurses in charge of the patient daily. As a result of repeated intervention using the model, three hours in the wheelchair was eventually possible, and consciousness lasted longer, enabling to stroll around with the family. For better mutual understandings, communication was reassessed making full use of the remaining functions through means such as a communication board, gripping-releasing of hands, and nodding. In the end, the patient was able to communicate firmly with family and nurses by opening and closing his eyes.

After this research practice, cooperative members took time for reflection. The following comments were noted:

"I used medical restraint gloves while inserting the feeding tube and I regret it, because it interfered with communication. I did so to prevent the patient from removing the tube, but I realized that it was not a right thing to do. At first, I was very concerned about not using the medical restraints and was afraid the patient would remove the tube, but there were no incidents and so my way of thinking changed. Even if the patient pulls out the feeding tube, it is not a matter of life or death."

"By assessing the remaining functions and taking it into consideration with all the nurses involved, consciousness was stimulated, and the patient was able to move in a wheelchair. I was happy that both the patient and family were very pleased with this achievement. From now on, I hope to effectively continue collaboration and information sharing with various medical professionals."

Stage 2: Actively collaborating with various medical professionals and being able to provide nursing care that corresponds to the life of the patient after discharge.

This research into clinical practice brought recognition of the importance of moving forward with care in collaboration with various medical professionals, but since it was not actively implemented, in the following clinical practices, the next target task was to develop nursing care collaborating with other professionals. Since the patient with a mild hemiplegia's need was to have better bowel movements before discharge, collaboration with the physical therapist to implement activities done during rehabilitation was shared in the ward and practiced in nursing care. Furthermore, activities to independently use the restroom was uniformly practiced. In addition, the degree of disfunction of the patient with dysphagia and assistance training were shared with speech therapists and the nutrition support team, to be able to practice it at

dinner time by nurses. Having feedback of the patients' situation led to improvement of swallowing, transition to regular diet, and the feeding tube was removed soon after.

To communicate with the aphasiac patient, details of the patients' condition was shared with speech therapists to create a letter board, making communication better between the patient and nurses. All the patient information and practices of nursing care were passed on to the hospital where the patient was transferred after discharged. After these clinical practices using the research progress model were done, the following comments were received from the cooperative research members during the reflection.

"*It was overwhelming to know the recovery of the bowel movement and to see the improvement of the patient using the restroom. If he had been transferred to another hospital while still using incontinence pads in bed, assistance by nurses or family members would have been necessary overnight. Hence, by informing that the patient is able to use the toilet to the transferred hospitals, there will be no need for incontinence care and it will contribute to improving the patients' quality of life."*

"*As for the patient with dysphagia, if he had been transferred to another hospital with or without the feeding tube, I think that the care required would have been very different. This was a satisfying nursing care accomplishment as a nurse."*

Nurses also pointed out regrets such as, "*I am ashamed that until now, we have simply gone about our work without giving it thought about the meaning of the care done. I want to continue learning more about specialized nursing care*."

Stage 3: Greater motivation to learn about specialized neuroscience nursing and putting it into practice.

Educational approaches were included in the research where nurses learned specialized neurosurgical nursing theory and practices. Their nursing was then, not just a part of a typical routine day to day work because the wider knowledge gave meaning to each clinical action they made. Pathophysiology, the level of spinal injury and disorder of movement/sensory nerves connection, physical assessment by dermatome of corresponding peripheral nerves, and improving knowledge to evaluate results applicating the dermatome were included as nursing care sessions. Patients with spinal cord injuries who need relatively frequent hospitalization were selected to implement the research progress model as learning experiences of nursing care and it was carried out with three patients. In areas where pain sensation was dull, body positioning was fundamental to prevent skin injuries. In areas where heat sensation still remained, with a purpose to relieve stress, care was consciously provided to give comfort by warming and bathing methods. Nursing care was planned to use the results of physical assessment with dermatome for two other patients with the same kind of conditions. Since both upper limbs and fingers had minimal muscle strength left, patients practiced pushing the nurse call button and performed actions they were capable of doing independently such as changing their own body position. When taking baths, the patients' smiled and thought about how many years it had been since they last took a bath in the tub and how good it felt. One patient was eager to help change body position, saying, "I want to help make it easier for her as possible when my wife takes care of me".

In the reflection that took place after the nursing practice, a cooperating research member nurse said,

"I was able to acquire knowledge and skills I did not know of and was able to practice highly specialized nursing. Nursing to patients with spinal cord injuries with all assistance needed was done only as a routine correspondence until now, and was only a heavy burden, but through this nursing practice I felt a sense of satisfaction."

Stage 4: Exploring to promote competence of leadership and team building ability for all nurses.

In order to expand highly specialized nurses to nurses other than the cooperating research members, the need to disseminate the power of leadership skills and team building became clear from examining the work of cooperative members.

"I would like to expand this process of nursing care to all nurses in the ward and practice it together. The quality of nursing in the ward as a whole will not improve ultimately unless it is widely spread and used by all members."

Changes regarding clinical nurses' patient care autonomy, work motivation, and ethics (Table 2) (b-1) Changes in autonomy as a nursing professional

Table 2: Changes in autonomy, work enthusiasm, and ethics in clinical nurses' caring for patients during action research ***p < 0.05**

Scales		Points	Scores (average scores ± standard deviation)		
			Start(N=19)	Midpoint (N=19)	Conclusion (N=13)
Ethical behavior	Total	88	69.0 ± 6.5	69.3 ± 9.5	71.4 ± 9.3*
	Respect for autonomy	36	27.6 ± 2.8	29.7 ± 3.1	29.5 ± 3.7
	Justice	16	10.5 ± 1.7	11.2 ± 2.2	11.0 ± 2.5
	Do no harm	36	30.4 ± 2.8	31.2 ± 2.8	30.5 ± 3.6
Professional autonomy	Total	235	147.6 ± 42.4	173.0 ± 20.3*	167.4 ± 28.0
	Ability to make abstract judgments	35	31.8 ± 9.7	37.1 ± 4.9	36.8 ± 7.6
	Ability to make concrete judgments	35	28.3 ± 8.9	32.5 ± 4.4	30.9 ± 5.0
	Cognitive ability	70	36.8 ± 9.7	43.3 ± 4.3*	42.6 ± 6.8*
	Practical ability	70	7.1 ± 2.3	8.3±1.4	7.5 ± 1.4
	Ability to make independent judgments	25	17.1 ± 5.2	20.3 ± 3.0*	19.2 ± 3.8
Work enthusiasm	Total	75	54.5 ± 12.4	56.2 ± 12.6	60.2 ± 12.1*
	Enthusiasm for current work	50	34.5 ± 9.5	35.7 ± 8.7	37.7 ± 7.7*
	Enthusiasm for future work	25	20.1 ± 3.5	21.4 ± 3.4	20.5 ± 3.5

The total score of autonomy rose from an average of 147.6 ± 42.4 points at the beginning of the research, 172.95 ± 20.3 points at the midpoint, and 167.4 ± 28.0 points in the end. Notably, it was significantly higher at the midpoint, but all factors similarly increased, even when it was examined by factors. "Cognitive ability" factor in particular, rose from 36.8 ± 9.7 points at the beginning to 43.3 ± 4.3 points at the midpoint, and 40.7 ± 7.8 points at the end. It was significantly higher at the midpoint. In addition, the question content "I can directly extract psychological problems from patients" showed significant difference, only among the cooperative research members with 3.0 ± 0.7 points at the beginning, 4.1 ± 0.7 points at the midpoint, and 4.0 ± 0.6 points at the end. It significantly increased at the midpoint than the beginning of the research.

(b-2) Changes in work motivation

The average score was 54.5 ± 12.4 points at the beginning of the research, 56.2 ± 12.6 points at the midpoint, and 60.2 ± 12.1 points in the end, with a significant increase at the end compared to the start. In particular, the total score of the cooperative research members had an average of 54.2 ± 15.4 points at the beginning of the research, 53.8 ± 13.3 points at the midpoint, and 65.8 ± 8.9 points in the end. It showed a significant increase in the end as well, compared to the start. Examining it by factors, the average score of "motivation for current work" was 34.5 ± 9.5 points at the beginning of the research, 35.7 ± 8.7 points at the midpoint, and 37.7 ± 7.7 points in the end, again with a significant increase in the end compared to the start.

(b-3) Changes in nursing ethics

The total score for ethics rose from an average of 69.0 ± 6.5 points at the beginning of

Table 3. Longitudinal data of patients with restraints and stool extractions

Period	No. of hospitalized patients	No. restrained	Percent restrained	Patients eligible for stool extraction	Percent with stool extractions
Prior to R	106	39	36.8%	19	17.9%
Midpoint	132	41	31.1%	9	6.8%＊
Conclusion	83	18	21.7%*	6	7.2%＊

＊p < 0.05, compared to before research
R = Research

the research to 69.3 ± 9.5 points at the midpoint, and 71.4 ± 9.3 points in the end. Although it was highest in the end, there was no significant difference. Examining this by factors, it revealed that scores for all factors increased from the beginning of the research, at either the midpoint or in the end, but there was no significant difference. A significant difference was recognized only among cooperative research members for the question content, "I can develop a care plan in accordance with the patients' wishes and feelings." The score was 2.0 ± 0.1 points at the beginning of research, 2.8 ± 0.4 points at the midpoint, and 3.0 ± 0.6 points in the end, with a significant increase in the end of the research compared to the start.

(c) Changes in nursing care (rate of medical restraint, rate of manual removal of feces, etc.) The rate of restraint for hospitalized neurosurgery/neurology patients was 36.8% at the start of the research, 31.1% at the midpoint, and 21.7% at the conclusion for a significant drop at the conclusion compared to the start. The rate of stool extraction was 17.9% at the start of the research, 6.8% at the midpoint, and 7.2% at the conclusion for a significant drop at the midpoint and conclusion compared to the start (Table 3).

(d) Changes in nursing care and patient satisfaction. (Table 4)

Three years prior to the start of the study, "complaints" of nurses' response and poor care were one out of four comments; two years prior was four out of 11, and one year prior was four out of nine. However, after the research began, there were 11 comments in a year, but there were no "complaints". There were only comments of "appreciation" toward the nurses' response and care.

Discussion:

Through the cyclical research process model, repeating the planning, implementing, assessing, and reflecting on goal-oriented interventions significantly increased scores for the professional autonomy scale and work enthusiasm scale at the midpoint or in the end of the research. Although there was no significant difference in scores for the ethical behavior scale, it rose in the end of the research. Moreover, within the research process model, through repeated practice and reflection on their own nursing care, the nurs-

Table 4. Longitudinal data of comments and the content of family complaints about nursing

	No. of comments	No. of complaints	Content of complaints
3 years prior	4	1	Method of nurses' care of patients
2 years prior	11	4	Method of nurses' care of and attitude toward patients
1 year prior	9	4	Nurses' attitude toward patients and families
1 year after the start of research	11	0	None

es gradually began to focus on their care with a wider perspective, shifting from stage one "realization of individual nursing anew" to stage two "collaborating with various medical professionals", then to stage three "pursuit of specialized nursing", and finally to stage four, "promote competence of leadership and team building ability for all nurses". In addition, as a change in actual nursing care, the implementation rate of medical restraints and manual removal of feces, and the content of the patient / family comments, the outcomes revealed improvement. Based on these findings, it is considered that the nursing ability of the acute neurosurgery ward at the participating facility was improved. However, although the improved nursing care resulting from this research cannot be emphatically stated since it is assumed that the resulting improvements in nursing care included various effects of other factors (patient pathology, differences in severity of illness, etc.), it is reasonable to state that this research did not negatively affect nursing care. Even without the consideration of the improved nursing care outcomes, given that the autonomy, ethics, and work motivation of the participating nurses improved, improvement of nursing competence was contributed by this research. Cheung, Aiken, Clarke and Sloane (2008) presented research indicating that autonomy, including decision-making of nurses, were factors that facilitated the best patient outcomes. They reported that autonomy increased the quality of nursing care providing good nursing to patients, and facilities that can maintain autonomy of nurses had resulted in better patient outcomes. Based on these facts, it can be inferred that this research, which has increased autonomy, is likely to influence the quality of nursing care amongst the subject nurses.

Development of the four stages shown earlier, also applies to the definition of professionalism in "human service organizations" stated by Tao (1995). This research can be thought of as having contributed to the development of professional awareness to participating nurses. Furthermore, as Shijiki (1995), Tajima (1995), and Kikuchi (2013) states that ethics and work motivation are necessary requirements for professionals, in this research, improvement of ethics and work motivation can contribute to nurses' professional consciousness. In addition, we believe that nurses' confidence in their ability to care for patients without restraints was helpful in terms of the ethics involved in the use of restraints and patient consent. A further aim of this research is to examine the measurement tools and method to objectively measure the improvement of the actual nursing care given and increase the accuracy of effect verification.

Conclusion

The aim of this research was to improve nursing skills of clinical nurses working in an acute neurosurgery ward. The process of enhancing nursing skills, changes in autonomy, work motivations, ethics of the nurses, and changes in nursing care along with patients/families' degree of satisfaction were analyzed. As a result, of reflecting on the four stages, the clinical nurses increased the contents mentioned above and improved the actual nursing care rates. Based on these outcomes, this study confirmed the improved nursing competency working in the acute neurosurgery ward. For future research, research design should be considered to objectively assess evaluate changes in nursing care. In addition, we believe that nurses' confidence in their ability to care for patients without restraints was improved in terms of the ethics involved in the use of restraints and patient consent.

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