
Consideration of Factors Affecting Nurses' Attitude of Pointing out Inter-professional Errors

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Abstract: In recent years, good communication and non-technical skills are recognized as critical to the delivery of high-quality patient care and to improving patient safety and clinical outcomes. The purpose of this study is to investigate the acquisition of non-technical skills by nurses and clarify the factors influencing nurses' behavior while pointing to the multi-professional errors in health care teams in relation to non-technical skills such as communication and leadership. A mail-in questionnaire survey was administered to 1,834 nurses who work for advanced treatment hospitals throughout Japan. The questionnaire consisted of 84 items, including a scale for measuring the nurses' attitude toward pointing out problems and non-technical skills. Multiple regression analyses were conducted, with the score on the scale for attitude toward pointing out problems as the objective variable and personal attributes, such as years of experience and job titles, and personality traits of individuals, such as non-technical skills, as separate explanatory variables (simultaneous forced entry). The number of responses to the questionnaire was 412. As a result of the multiple regression analyses, factors that affect nurses' attitudes toward pointing out problems were affected more strongly by "assertiveness" and "leadership," which fell under non-technical skills that are personality traits of individuals, than by basic attributes, which include years of experience and job titles. Nurses' non-technical skills, such as "assertiveness" and "leadership," which are personality traits of individuals, had an effect on their attitudes whereby they pointed out problems. These findings will be used in future intervention studies to improve these non-technical skills of leadership and self-assertion, improve communication and, as a result, reduce errors.

Keywords: Nurse, Medical Accident, Error, Attitudes Toward Pointing out Problems, Non-technical Skills

1. Introduction

Risk management in healthcare refers to minimizing organizational losses and ensuring quality healthcare through the prevention of accidents [1]. A single medical accident can cause tremendous harm to patients and their families, hospital visitors, and staff and can lead to both loss of trust in the hospital and economic loss. According to medical accident surveys conducted by the Japan Council for Quality Health Care, the number of medical accident reports is increasing every year [2]. Recently, in May of 2015, two hospitals had extremely serious medical accidents that led to their advanced treatment hospital certification being revoked.

Until the 20th century, medical accidents were considered

human mistakes, and the responsibility was placed on the individual. However, in 1999, the U.S. Institute of Medicine shocked the world when they published the report *To Err is Human*, which raised questions about the conventional way of thinking about mistakes [3]. Since the publication of this report, accident prevention measures have focused on developing strategies and systems that thoroughly address human error. Recently, it has become more common to focus on team performance and view medical accidents as the result of team error, rather than human error. This line of thinking emphasizes that to prevent medical accidents, it is important to overcome the barriers of job title and experience, to strengthen communication and other non-technical skills, and to increase team performance. One tool for increasing team performance is Team STEPPS[®]: Team Strategies and Tools to Enhance

Performance and Patient Safety, developed in 2005 in collaboration with the U.S. Agency for Healthcare Research and Quality. This tool has since been introduced in several other countries, including Japan, where it has been used at the Jikei University Hospital and other institutions since 2010.

Regarding ways inter-professional interactions contribute to team performance, past studies have found that nurses were able to prevent adverse events in patients by recognizing inter-professional errors and taking appropriate action [4, 5]. This is thought to be because, when providing bedside care, nurses interact more closely with patients than those in other medical professions, and nurses are therefore in the best possible position to detect errors that would lead to adverse events in patients.

Nonetheless, if a nurse witnesses an error but does not point it out, a medical accident may still occur. Okuyama et al. [6] found that medical professionals' behavior of pointing out errors is not only impacted by organizational factors (e.g., hospital policy, team relationships, attitudes of superiors) but also by individual factors (e.g., sense of responsibility toward pointing out errors, communication skills, educational background). In a separate study, Okuyama et al. [7] developed the Attitude Toward Pointing Out Problems Scale for Nurses (Japanese version), a scale measuring attitudes toward pointing out problems that assumes that sense of professional responsibility and anxiety are among the factors controlling such attitudes. Meanwhile, Flin [8] reported that non-technical skills are involved in improving behavioral patterns and can be acquired through training. This suggests that nurses do not need to have some special ability to point out an error when they see one; rather, they can learn how to do so with training. In other words, improving nurses' non-technical skills such that they can point out errors they witness will help them fulfill their vital role as nursing professionals, regardless of their job title, years of experience, or individual personality traits.

This study examines the non-technical skills of nurses working for advanced treatment hospitals and identifies factors affecting nurses' behavior of pointing out inter-professional errors in medical teams based on relationships with non-technical skills such as communication and leadership.

1.1. Research Objective

To identify factors affecting nurses' behavior of pointing out inter-professional errors in medical teams.

1.2. Definition of Terms

1.2.1. Error

Error is defined as any behavior that may interfere with the safety of oneself or others, including deviation from standard rules (including unsafe behavior), honest mistakes, and any other event that causes concern about safety.

1.2.2. Behavior of Pointing out Problems

Okuyama et al. [7] define attitudes toward pointing out problems as "the readiness, mindset, and behavioral

tendencies of medical professionals toward pointing out problems that threaten patient safety to other members of the medical team." In this study, the behavior of pointing out problems is defined as nurses' recognition of unsafe behavior leading to inter-professional error, their acts and mindset before pointing the problem out, and submission of an incident report or accident report to their superiors.

1.2.3. Medical Team

Medical team is defined as the group of medical professionals involved in providing patient-centered medical care [8]. This study focused on nurses working for advanced treatment hospitals that provide high-level medical care and are comprised of inter-professionals.

1.2.4. Inter-professionals

Inter-professionals are defined as all medical personnel, including nurses, involved in team medicine at an institution or hospital with which they are affiliated.

1.2.5. Non-technical Skills

Non-technical skills are self-management and social skills that support technical skills and can be improved through training [8]. In this study, the researchers referenced and modified the Team STEPPS Teamwork Attitudes Questionnaire [10], which aims to visualize the different elements of teamwork, and Ochiai et al.'s [11] components of Team STEPPS, and they define non-technical skills as an individual's "leadership skills," "situation monitoring skills," "mutual support skills," "communication skills," and "assertiveness skills."

(i) "Leadership Skills"

Leadership skills refer to the ability to organize team members' activities by understanding team activities, sharing information with team members as it changes, and reliably supplying the necessary human and material resources.

(ii) "Situation Monitoring Skills"

Situation monitoring skills refer to the ability to continuously identify and analyze events within the team and communicate information to nearby members.

(iii) "Mutual Support Skills"

Mutual support skills refer to the ability to correct team members' inaccurate knowledge or inappropriate behavior and prevent mistakes.

(iv) "Communication Skills"

Communication skills refer to the ability to use appropriate expressions for the situation, remain consistent when speaking, and facilitate mutual understanding in interpersonal exchanges.

(v) "Assertiveness Skills"

Assertiveness skills refer to a communication skill that allows nurses to assert themselves while respecting others and to communicate and accept opinions without interruptions in inter-professional interactions. In this study, assertiveness was treated as a separate variable to measure the extent to which nurses were exerting assertiveness distinct from (iv)

“Communication Skills.”

2. Research Method

2.1. Research Participants

Nurses, excluding chief nursing officers and assistant chief nursing officers, working for advanced treatment hospitals throughout Japan.

2.2. Research Period

June 1 to August 31, 2016.

2.3. Survey Method

An anonymous, mail-in, self-administered questionnaire survey was used. We mailed survey forms and a letter of request to the chief nursing officers or supervisors of eligible institutions and asked whether their institution would be able to participate in the study. If the answer was yes, there was clear written instruction asking the nursing department supervisor to distribute the questionnaires to eligible nurses. Returning a questionnaire was considered providing consent. To ensure anonymity and prevent coercion from superiors, questionnaires were left anonymous and were submitted by individual respondents.

2.4. Questionnaire Content

(i) Basic Attributes

A total of nine items, including sex, age (range), years of nursing experience, department, certifications, job title, and highest level of education completed.

(ii) Individual Factors

Comprised of three items concerning stress, fatigue and how it is managed, and incident report submissions. Participants were also asked whether they had ever attended non-technical skills training.

(iii) Organizational Factors

A total of 31 items, including the attitudes of superiors in various situations (three items, e.g., will they defend you if you make a mistake?); hospital policy concerning medical safety (three items, e.g., whether there is feedback on incident reports); reporting system (two items, e.g., anonymity); how incident reports are used (two items, e.g., shared among staff members); and workplace relationships (relationships with staff, superiors).

(iv) Measuring Nurses' Behavior of Pointing out Problems

We used the “Attitude Toward Pointing Out Problems Scale for Nurses (Japanese version: [7]).” This scale comprises the following four factors and 15 items: “resistance toward pointing out problems” (four items), “awareness of the importance of pointing out problems” (four items), negative attitude toward stating one’s own opinion to the medical team” (three items), and “dealing with problems that have been pointed out” (four items). Each item is rated on a 5-point scale ranging from “strongly agree” to “strongly disagree.” A higher score indicates a more positive attitude toward pointing out

problems. The scale’s reliability has been verified in a previous study by Okuyama et al.

(v) Non-technical Skills

Questions concerning “leadership,” “situation monitoring,” “mutual support,” and “communication” were drafted with reference to Ochiai et al.’s [11] components of Team STEPPS and a questionnaire from the U.S. Agency for Healthcare Research and Quality (AHRQ) measuring an individual’s mindset toward teamwork. Communication items examined the acquisition status of skills such as “check-backs (re-confirming)” and “call-outs (communicating in a loud voice).” Meanwhile, assertiveness was intended to measure communication ability, rather than skills, and items were created with reference to the Japanese version of the Rathus Assertiveness Schedule [12] and other related literature. “Leadership” consisted of seven items, “situation monitoring” of six items, “mutual support” of five items, “communication” of four items, and “assertiveness” of 10 items for a total of 32 items across the five areas. Each item was rated on a 5-point scale ranging from “always true (5 points)” to “never true (1 point).”

(vi) Construct Validity of the Non-technical Skills Scale

We administered a pre-test to 20 participants. We revised the wording of the questions so that they would be easily understood by respondents and ensured content validity under the supervision of an expert in medical safety management. Next, we calculated Cronbach’s α coefficient to investigate the scale’s internal reliability. Cronbach’s α coefficient for the non-technical skills scale as a whole was 0.90. Coefficients for each subscale were 0.80 for “leadership,” 0.68 for “situation monitoring,” 0.68 for “mutual support,” 0.77 for “communication,” and 0.66 for “assertiveness.”

2.5. Analysis Method

Basic statistics were calculated for attributes, individual factors, and organizational factors to understand the characteristics of survey participants. To explore factors influencing nurses’ behavior of pointing out problems, multiple regression analysis was conducted with score for attitude toward pointing out problems as the objective variable (significance level <5%). To identify influencing factors unrelated to years of experience or job title, basic attributes (years of experience, job title, education level) and individual personality traits and environmental factors (scores of all five non-technical skills, number of incident reports and reporting system, workplace relationships, and educational background) were entered as separate explanatory variables.

The qualitative variables “job title” and “education level” were each divided into binary categorical variables (general staff: 0, nurse supervisor, nurse manager, assistant nursing director, nursing director: 1; certified nursing assistant school, 2- or 3-year nurse training course: 0, 4-year college, graduate nursing program: 1).

For “the individual’s incident reports”; “organization background, hospital policy on medical safety, reporting system, and how incident reports are used”; and “workplace relationships,” answers of “yes” were given 1 point, and answers of “no” or “I don’t know” were given 0 points.

Concerning "stress management," for the question "do you feel stressed or fatigued?" answers of "all the time" or "sometimes" were given 1 point, and answers of "rarely" or "never" were given 0 points. For the question "are you able to relieve stress in appropriate ways?" answers of "always" or "usually" were given 1 point, and answers of "rarely" or "never" were given 0 points.

Statistical analyses were performed in IBM SPSS Statistics ver. 25.

2.6. Ethical Considerations

This study was performed after approval by the ethics committee of Aichi Medical University (approval no.: 104). Along with the research plan and questionnaire form, participants received a letter of request that clearly stated the following: 1) participation or non-participation in the study is voluntary and can be stopped at any time, 2) these will not result in any disadvantages in the workplace, 3) data will be statistically processed such that individual participants cannot be identified, and 4) research results will be publicly presented at relevant academic conferences. Questionnaires were anonymous and submitted by individual participants.

Returning the questionnaire was considered providing consent. Data were strictly managed.

3. Results

A total of 1,834 questionnaires were distributed and 412 responses collected (response rate 22.5%). Responses missing data for job title, age, or sex were excluded, leaving a total of 400 valid responses (valid response rate: 97.1%) that were used for analysis.

3.1. Participants' Basic Attributes

Most participants were women (n=356, 89.0%). Concerning job title, 117 participants (29.3%) were in managerial positions of nurse supervisor or above, and 283 participants (70.8%) were general staff members in non-managerial positions. The most common age group was 30–39 years old, comprising 155 participants (38.8%), followed by 20–29 years old, with 131 participants (32.8%). Participants had an average of 12.7±8.7 years of nursing experience (mean ± standard deviation). Of all the participants, 31.5% had attended non-technical skills training (Table 1).

Table 1. Basic attributes.

		n	N=400 %
Sex	Female	356	89.0
	Male	44	11.0
Job title	General staff	283	70.8
	Nurse supervisor, nurse manager, assistant nursing director	86	21.5
	Nursing director	31	7.8
Age	20–29	131	32.8
	30–39	155	38.8
	40–49	81	20.3
	50+	33	8.3
Years of nursing experience	Mean (standard deviation)	12.7 (8.7) years	
Department	General ward	244	61.0
	Outpatient	38	9.5
	Intensive care unit (*ICU,**HCU,**CCU), emergency room, operating room	92	23.0
Highest level of education completed (nursing)	3-year nurse training course	202	50.5
	4-year college degree	144	36.0
Experience with team medicine	Graduate nursing program	16	4.0
	No	270	67.5
Non-technical skills training	Yes	128	32.0
	Has attended non-technical skills training	126	31.5
	Has not attended non-technical skills training	264	66.0
	No response	10	2.5

*ICU: Intensive care unit;
 **HCU: High care unit;
 ***CCU: Cardiac care unit.

3.2. Acquisition Status of Non-Technical Skills

Table 2 shows participant scores for each non-technical skill. The overall score was 115.5±11.6 points (mean ± standard deviation) or 72.1%. Cronbach's α coefficient for all 32 items was 0.9. Scores for each item ranged from 69.0–73.6%.

Next, we will look at the mean scores out of 5 points for each item. For "leadership," the highest mean score was for the item "I understand my duties at work and can approach

them positively" (3.9 points), and the lowest mean score was for the item "I can reflect on what went well and what went poorly at the end of the work day and apply it next time to help the team continue to grow" (3.4 points). For "assertiveness," the highest mean score was for the item "when the doctor's instructions are hard to understand, I ask for them to be reiterated" (4.0 points), and the lowest mean score was for the item "I hesitate to do patient reports at night when the doctor on duty is taking a nap" (3.1 points).

Table 2. Acquisition status of non-technical skills.

N=400		Median	Mean (Standard deviation)	Score (%)
	Overall non-technical skills score	116.5	115.5 (11.6)	72.1
	Leadership	26.0	25.3 (3.1)	72.3
1	I understand my duties at work and can approach them positively.	3.9		
2	I can actively speak up about things I notice in order to mobilize team action.	3.6		
3	I can put patient safety first and always model appropriate behavior for other team members.	3.5		
4	I can speak to patients and other team members while being considerate of their feelings.	3.7		
5	I can discuss patient-specific plans with fellow team members and make plans to achieve better results.	3.6		
6	I can take into account other team members' workloads and divide up or delegate duties so that team members can support one another as needed.	3.7		
7	I can reflect on what went well and what went poorly at the end of the work day and apply it next time to help the team continue to grow.	3.4		
	Situation Monitoring	21.0	20.7 (2.9)	69.0
1	I can speak up without hesitation if I feel that pointing something out could save a patient, even if I am not directly participating in their care.	3.5		
2	I strive to create an environment where it is easy for other team members to mention things they notice and to be open to other team members' opinions.	3.6		
3	I can pick up on other team members' emotional (e.g., feeling down, angry) and physical (e.g., feeling unwell, lack of sleep, signs of fatigue) states.	3.8		
4	If I'm feeling unwell or stressed when performing a task, I can ask other team members for assistance without hesitation.	3.1		
5	I can say "I can't" if I'm asked to do a task that is beyond my abilities.	3.1		
6	When I'm observing another team member's behavior and feel something is "inappropriate" or "wrong," I can speak up while being considerate of their perspective.	3.5		
	Mutual Support	19.0	18.4 (2.6)	73.6
1	If I feel that there is a risk to the patient that requires urgent treatment, I can say so to other team members without hesitation.	3.6		
2	If I feel that there is a risk to the patient that requires urgent treatment, I can speak up again if my first comment is ignored.	3.7		
3	If my opinion is not readily accepted, I can say "I'm worried" or "please wait a minute" out of necessity.	3.7		
4	If my opinion is not readily accepted, I can take stronger action like envisioning next steps and speaking with a supervisor.	3.7		
5	I do not engage in personal emotional disputes (e.g., disliking, not getting along) among team members because it negatively affects patient safety.	3.8		
	Communication	15.0	14.6 (2.2)	73.0
1	If I feel that there is a risk to the patient that requires urgent treatment, I can reliably and effectively communicate information to team members by dividing it into what is happening, the patient's clinical background, my thoughts on the problem, and my suggestions.	3.6		
2	When handing off a patient, I can communicate important information in a concrete manner using checklists and information appliances.	3.7		
3	When handing off a patient, I can communicate information in a reliable manner by giving the other person an opportunity to clarify anything that is unclear and having them recite important information back to me.	3.7		
4	If I encounter an extremely important or dangerous situation, I can speak up in a loud voice to communicate that information or circumstance to all team members in the area.	3.7		
	Assertiveness	36.0	36.4 (3.7)	72.8
1	When the doctor's instructions are hard to understand, I ask for them to be reiterated.	4.0		
2	If a doctor asks me to assist with a procedure for a patient when I am providing care to a different patient, I can negotiate to find a better time if I feel that the procedure is not urgent.	3.8		
3	I try to express my opinions based on the premise that each person has different values.	3.9		
4	Even though I have decided not to assert my opinions at care conferences, I will do so if I'm called upon and I sometimes regret it later.	3.4		
5	I hesitate to do patient reports at night when the doctor on duty is taking a nap.	3.1		
6	When a medication I requested is not delivered, I strive to use expressions that bear in mind the other person's situation (e.g., "I'm sure you're busy") when putting in the request a second time.	3.9		
7	When I see an inter-professional who I get along well with acting in an unsafe way, I voice my concern about how it will affect patient safety.	3.6		
8	When I see an inter-professional who ranks higher than me or a colleague acting in an unsafe way, I voice my concern about how it will affect patient safety.	3.4		
9	If I notice a problem in patient care during an assessment of patient condition, I will speak up about it, regardless of who it will impact.	3.4		
10	When I feel unsure, I always ask.	3.9		

3.3. Factors Affecting Behavior of Pointing Out Problems

Multiple regression analysis results (Table 3) show that nurses' behavior of pointing out problems was significantly associated with the individual characteristics of job title (general staff or managerial position of nurse supervisor or higher) and years of nursing experience (adjusted R²= .20). Meanwhile, an examination of non-technical skills and

environmental factors (Table 4) shows significant associations for "assertiveness," "leadership," and relationships (adjusted R²= .48). These results demonstrate that, for nurses, the behavior of pointing out problems is more strongly impacted by non-technical skills and environmental factors than years of experience or job title.

Table 3. Multiple regression analysis for behavior of pointing out problems (associations with years of nursing experience, job title, and education level).

	Standardized Coefficients	t	Significance	B 95.0% Confidence Interval	
	Beta			Lower Bound	Upper Bound
(Constant)		42.144	<.001	47.717	52.388
Years of nursing experience	.260	4.568	<.001	.472	1.185
*Job title	.291	5.660	<.001	2.745	5.666
**Education level	.048	0.937	.349	-.708	1.996

*General staff was assigned a value of 0. Nurse supervisor, nurse manager, assistant nursing director, and nursing director were assigned a value of 1.

**Certified nursing assistant school and 2- or 3-year nurse training course were assigned a value of 0. Four-year college and graduate nursing program were assigned a value of 1.

Multiple regression analysis: Simultaneous forced entry, adjusted R²= .20, analysis of variance: p<0.001, Durbin-Watson=1.97.

Table 4. Multiple regression analysis for behavior of pointing out problems (associations with non-technical skills, environmental factors).

	Standardized Coefficients	t	Significance	B 95.0% Confidence Interval	
	Beta			Lower Bound	Upper Bound
(Constant)		2.243	.025	1.341	20.411
Stress	-.038	-.962	.337	-6.569	2.253
Stress management	.057	1.454	.147	-.311	2.079
Report submission	.043	1.024	.307	-1.387	4.397
Superiors' attitudes	.013	.305	.761	-.647	.884
Hospital policy	.024	.590	.555	-.748	1.390
Reporting system	-.028	-.733	.464	-1.411	.645
Use of reports	-.121	-2.980	.003	-3.096	-.634
Relationships	.149	3.523	<.001	.529	1.867
Educational background	.057	1.421	.156	-.511	3.173
Leadership	.205	3.579	<.001	.191	.656
Situation monitoring	.074	1.436	.152	-.062	.397
Mutual support	.086	1.694	.091	-.035	.474
Communication	.063	1.174	.241	-.128	.507
Assertiveness	.340	6.487	<.001	.413	.773

Multiple regression analysis: Simultaneous forced entry, adjusted R²= .48, analysis of variance: p<0.001, Durbin-Watson=1.97.

4. Discussion

This study is the first to identify the extent to which nurses' years of experience, job title, individual personality traits, and environmental factors impact their behavior of pointing out inter-professional errors. Below, we discuss the status of non-technical skills among nurses working for advanced treatment hospitals and factors impacting nurses' behavior of pointing out inter-professional errors.

4.1. Acquisition Status of Non-technical Skills

Participants of the present survey were primarily mid-level nurses in their 30s who did not have a job title. Nurses in this age group are in leadership positions and interact with inter-professionals in various settings. Regarding non-technical skills, this group was characterized by scores of around 70%, with almost no variation for all items of

"leadership," "situation monitoring," "mutual support," "communication," and "assertiveness."

Although it has been more than 10 years since the concept of non-technical skills was introduced to Japan, our survey found that only 30% of participants had attended a training course on the topic, which suggests that awareness of non-technical skills remains low. This result indicates a relative lack of awareness of safety.

According to Soma [9], non-technical skills are hierarchical, and an individual's entire skillset can be represented using a cone-shaped diagram. Technical skills form the cone's tip, while non-technical skills are found toward the bottom sitting atop a base of self-management and social skills. In other words, while "situation monitoring" and "decision making" require a high level of expertise and are thus found higher up on the cone, "assertiveness" and "leadership" are skills found lower on the hierarchy, close to the social skills that any working adult can easily acquire. These findings suggest that because the participants in this study were mid-level nurses,

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