Development of a model of factors influencing practical multidisciplinary collaboration skills in convalescent rehabilitation ward nurses: A structural equation modeling analysis

Original Article

Development of a model of factors influencing practical multidisciplinary collaboration skills in convalescent rehabilitation ward nurses: A structural equation modeling analysis

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Abstract

Objective: This study aimed to clarify the factors influencing nurses' practical multidisciplinary collaboration skills in convalescent rehabilitation wards and team outcomes through a questionnaire-based survey and structural equation modeling.

Methods: We conducted an anonymous, self-administered questionnaire survey of 401 nurses working in convalescent rehabilitation wards in nine prefectures located in the Shin-etsu, Hokuriku, and Tokai regions of Japan. The survey data were analyzed using structural equation modeling.

Results: A total of 170 nurses provided valid responses (a valid response rate of 42.4%). The mean length of the respondents' nursing experience was 18.9 years, with a standard deviation of ±10.7 years. The mean length of their nursing experience in a convalescent rehabilitation ward was 4.4 years, with a standard deviation of ±3.7 years. We found that the ability of nurses to collaborate with coworkers in a multidisciplinary team in convalescent rehabilitation wards was associated with sharing post-discharge lifestyle instructions at pre-discharge conferences, monitoring skills and communication skills, which in turn influenced the extent of collaboration and satisfaction with team activities.

Conclusion: Improving the multidisciplinary collaboration skills of nurses working in convalescent rehabilitation wards requires coordination and the support of other multidisciplinary team members to facilitate patients' discharge. The provision of support for the improvement of monitoring and communication skills is also necessary.

Introduction

Convalescent rehabilitation wards provide intensive rehabilitation for patients with cerebrovascular disease or spinal cord injury who have passed the acute stage with the aim of restructuring their lifestyle and allowing them to return home[1]. Patients with cerebrovascular disease, who account for roughly half of all patients in rehabilitation wards, may have multiple disabilities depending on the anatomic site affected, including motor dysfunction, disorders of consciousness, respiration, feeding, and swallowing, or higher-order brain dysfunction. The severity of these disabilities can pose difficulties in terms of supporting these patients while they restructure their lives. Moreover, although

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rehabilitation wards provide functional training, after a certain point patients start to realize that even with training they will not be able to return to their previous level of function[2] and may become confused, impatient, or reconciled to a limited ability to recover and lose motivation for training. Alternatively, they may try to train on their own and become depressed. In such situations, patients may even be at risk of suicide[3]. The physical and mental consequences of these disabilities are burdensome for patients and their families because of the stress imposed by social limitations, the economic burden of hospitalization, having to provide assistance with activities of daily living (ADL), and coming to terms with the patient's treatment and prognosis. Furthermore, if the patient is older, delays in functional recovery combined with caregivers also being older may present difficulties in terms of returning home[4]. Therefore, multidisciplinary collaboration is key to successful rehabilitation of patients with neurological conditions.

The team on a rehabilitation ward includes health care professionals from multiple disciplines, including doctors, nurses, physical therapists, occupational therapists, and speech therapists, who work together to achieve team success. Team success refers to a better outcome as a result of care provided by a multidisciplinary team that can be measured on the rehabilitation ward[5] in an objective manner. A health care professional from each discipline evaluates each individual patient and then shares this information at a conference. Each health care professional plans an approach toward a unified course or goal, with ongoing implementation, evaluation, and revision of their plan as they work to attain the goals of the entire team. One type of multidisciplinary team is the interdisciplinary model (IDM), whereby team members collaborate to set goals, provide treatment, make decisions, and solve problems to ensure a comprehensive approach and continuity of care. A multidisciplinary team in a rehabilitation ward can be considered an IDM[6]. An IDM that functions effectively not only enhances collaboration skills that promote continuity and achievement of goals but also improves patient-centered care[7]. However, there is also conflict concerning recognition of the expertise of each discipline. Past research concerning nurses' practical multidisciplinary

collaboration skills has identified interprofessional issues, including difficulty in the sharing of information between nurses and therapists[8], conflict, friction, opposition to collaboration between nurses and other health care professionals[9, 10], and increased overlap of roles and conflict among professionals due to increased involvement on the ward[11]. Other studies have found that communication skills and the need for opportunities to communicate are factors influencing the multidisciplinary collaboration skills of nurses on rehabilitation wards[12, 13]. Improvements in team competency in fields such as knowledge, skills, and attitude towards teamwork are thought to be important for attaining team goals and achieving success[14].

These findings indicate a need for improvement that will enhance practical multidisciplinary collaboration skills among nurses. To make these improvements, we felt it was necessary to construct a model that would promote practical multidisciplinary collaboration skills among rehabilitation ward nurses based on team success. A model of practical collaboration skills would clarify how such skills are linked to the variables that influence them and the variables that they influence in turn. However, we were unable to find any studies that have modeled the effects of practical collaboration skills among multidisciplinary team members in rehabilitation wards or any reports that have examined the relationship with team success, including patient outcomes. The development of a model of practical multidisciplinary collaboration skills in rehabilitation ward nurses that can identify the impact of such skills on team success could lead to greater success for rehabilitation teams. Furthermore, a model that identifies factors that impact practical multidisciplinary collaboration skills could help to provide the educational support necessary to improve these skills.

The purpose of this study was to develop a practical model that can improve multidisciplinary collaboration skills among convalescent rehabilitation ward nurses via a structural equation modeling analysis.

Methods
Operational definition of terms
Based on the definition of Yoshie et al.[12], practical multidisciplinary collaboration skills were defined as the ability to demonstrate expertise as a rehabilitation

ward nurse while fulfilling the role of coordinating and collaborating with other disciplines in order to achieve the goals of the whole team. The extent of practical multidisciplinary collaboration was considered to reflect the degree of collaboration actually performed. Team structure was defined by the existence of a team leader to facilitate effective functioning of the multidisciplinary team and each discipline.

Conceptual framework of the study

The structure of the study was based on past research on multidisciplinary collaboration and team models. In order for a team to solve problems and achieve results, it is necessary to have collaborative practical skills, and these practical skills influence results while interacting with factors such as "team structure," "team approach," and "team competency"[14]. We selected variables related to these factors as well as basic attributes found to impact practical multidisciplinary collaboration skills among nurses in past studies[12, 13], as the factors influence these skills in rehabilitation ward nurses (Fig. 1). Furthermore, keeping in mind that effective teams are evaluated based on "team productivity," "team performance," and "member satisfaction,"[15] we selected "extent of practical multidisciplinary collaboration," "nurses' satisfaction with team activities," and two

outcome indices for rehabilitation ward inpatient hospital fees, namely, the "percentage of critically ill patients whose daily life function evaluation improved by 4 points or more (functional improvement rate)" and the "percentage of patients discharged from the convalescent rehabilitation ward to their homes (return-to-home rate),"[16] as factors influenced by practical collaboration skills.

Accordingly, our hypotheses were as follows. "Team structure," "team approach," "team competency," and "basic attributes" influence multidisciplinary collaboration skills, which in turn influence the success of a team ("extent of practical multidisciplinary collaboration," "satisfaction with team activities," "functional improvement rate," "return-to-home rate").

Study design

This hypothesis-testing study was conducted as a cross-sectional survey using an anonymized, self-administered questionnaire.

Study participants

All 185 hospitals that are full members of the Kaifukuki Rehabilitation Ward Association (listed on the association's website) in the nine prefectures of the Shinetsu, Hokuriku, and Tokai regions were invited to
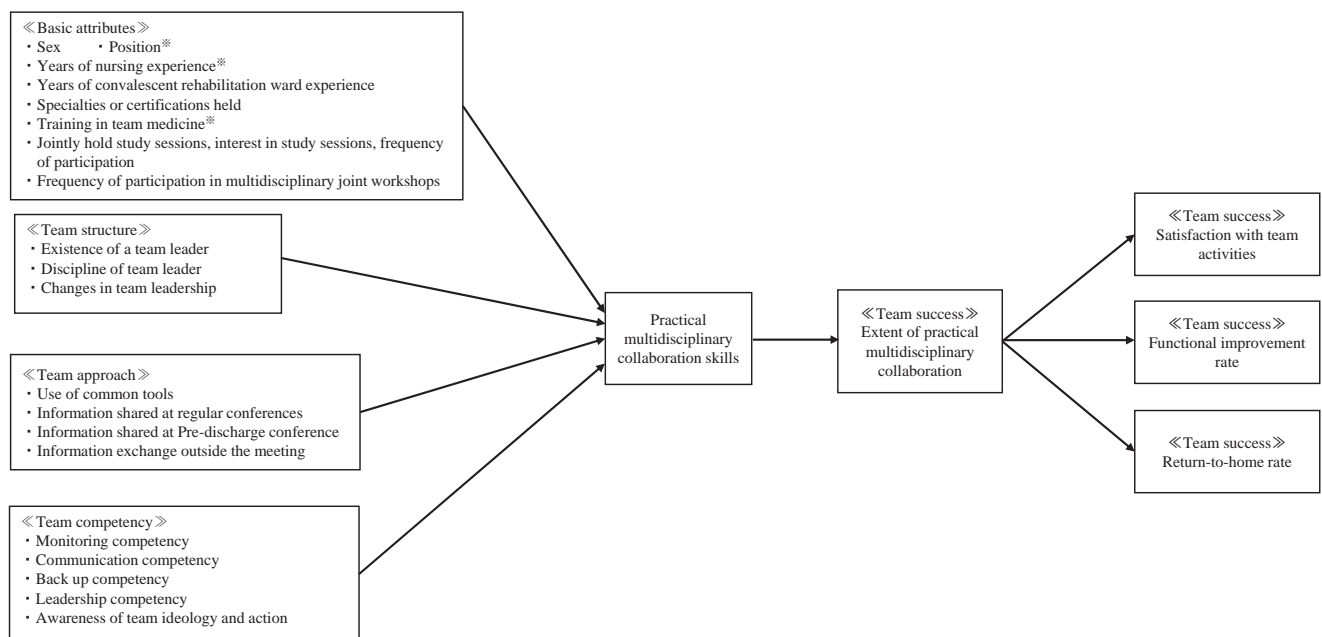
Note [※]Variables that have been clarified as influential factors in previous studies

Fig. 1: Conceptual framework of the study

participate in the survey. Consent was obtained from 47 hospitals (25.4%). The study participants were 401 staff nurses (hereinafter, "nurses") or nurse managers/assistant nursing directors (hereinafter, "assistant directors") working in the rehabilitation wards of these hospitals. Answers to survey questions pertaining to functional improvement and return-to-home rates were requested from the 47 nursing directors of the rehabilitation wards.

Data collection

We mailed a form describing the study, questionnaire, and consent form to the director or chief nursing officer of each eligible hospital to request their participation. Consenting hospitals were then mailed forms describing the study and the questionnaires with return envelopes for use by the survey respondents. Chief nursing officers were asked to distribute documents to nursing directors, who were in turn asked to distribute documents to nurses and assistant directors. Responses were collected individually by mail. The survey period was from May to July 2018.

The outcome data, functional improvement rate, and return-to-home rate were used by docking with the data of multiple nurses.

Content of survey

Practical multidisciplinary collaboration skills

Practical multidisciplinary collaboration skills were measured using the Chiba Interprofessional Competency Scale (CICS29). The CICS29 comprises 29 items forming six subscales: "attitude and beliefs of the professional," "team management skills," "actions for accomplishing team goals," "providing treatment/care that respects patients," "attitudes and behaviors that improve team cohesion," and "fulfilling one's role as a professional." Responses were graded on a 5-point scale, with higher scores representing higher practical collaboration skills. The reliability and validity of the CICS29 have been established[17]. We obtained permission to use the scale from its developer.

Team structure

Team structure included the following three items: whether there was a team leader who played an important role in decision-making on behalf of the multidisciplinary team, their discipline, and whether the team leadership was static or had changed.

Team approach

Team approach included the following four items: whether the team uses a common tool for sharing information, information shared at regular conference and pre-discharge conference meetings held to share information, and whether there are opportunities to exchange information outside of conferences.

Team competency

Team competency was measured using the Teamwork Competency Scale[18], the reliability and validity of which have been confirmed. This scale includes five the following subscales: "team orientation competency," "monitoring competency," "communication competency," "back-up competency," and "leadership competency." In this study, "monitoring ability," "communication ability," "backup ability," and "leadership ability" were used as subscales of team competencies. Responses were graded on a 6-point scale, with a higher score indicating higher teamwork competency. We obtained permission to use the scale from the developer. We also established items related to the extent of action and awareness of team ideology as measures of management competency for achieving team goals.

Team success

Team success included the following four items: extent of practical multidisciplinary collaboration, satisfaction with team activities, patient functional improvement rate, and patient return-to-home rate. The two variables, extent of practical multidisciplinary collaboration and satisfaction with team activities, were created by the researchers. Respondents were asked to circle a number between 0 and 10 to indicate the extent of practical collaboration (0, none at all; 10, extremely high) and their satisfaction with team activities (0, not satisfied; 10, extremely satisfied). For functional improvement and return-to-home rates, respondents were asked to calculate the average values in the 3 months before they received the questionnaire.

Basic attributes

Basic attributes included the following nine items:

sex, position, years of nursing experience, years of rehabilitation ward experience, specialties or certifications held, whether training in team medicine had been received (location and content covered were not asked), whether study sessions are held jointly with other occupations in the ward, interest in study sessions, frequency of participation in study sessions.

Statistical analysis

After calculating descriptive statistics for all variables, we confirmed the normality of the data using the Kolmogorov-Smirnov test. Next, we calculated Cronbach's α coefficients for the two scales used to confirm the reliability of our data. Second, the dependent variable was CICS29, and the independent variables were variables for basic attributes, team structure, team approach, and team ability. The relationship between the two variables was analyzed by the t-test and a one-way analysis of variance (one-way ANOVA). We then used Pearson's product moment correlation coefficient to calculate the correlation between the actual collaboration skill and all other variables (monitoring ability, communication ability, backup ability, leadership ability, interdisciplinary practice, and team activity satisfaction score). We conducted multiple regression analysis (stepwise method) using the CICS29 score as the dependent variable and the variable showing a significant difference in the univariate analysis as the independent variable, and the factors that influence the actual collaboration skills were confirmed.

The dependent and independent variables were entered using dummy variables (yes, 1; no, 0) for the nominal scale, and the interval and order scales were entered using the actual values. Finally, we created a model demonstrating the effects of practical multidisciplinary collaboration skills in rehabilitation ward nurses on team success following our conceptual framework. We calculated the fit of the data using structural equation modeling. Statistical analyses were performed using IBM SPSS Statistics version 28.0 for Windows and Amos version 28.0 (IBM Corp., Armonk, NY, USA). The significance level was set at $p < 5\%$.

Missing values were dealt with by "removal by list" in t-test, one-way ANOVA, and multiple regression analysis and by "Bayesian substitution" in covariance structure analysis.

Ethical considerations

This study was approved by the Medical Ethics Review Committee of Kanazawa University (review no.:827-2). Study participants were informed of the following in writing: purpose of the study, methods used, expected benefits and disadvantages, how these potential disadvantages would be prevented or addressed, publication of results, the voluntary nature of participation, and protection of personal information. The completion and returning of a complete questionnaire form indicated consent to participate in the study.

Results
Characteristics of study participants

Responses were received from 184 nurses and assistant directors (response rate, 45.9%). Invalid responses were excluded, leaving a total of 170 responses for analysis (valid response rate, 42.4%). Responses were received from 38 nursing directors (80.9%), all of which were used for analysis (valid response rate, 80.9%). Respondents had an average of 18.9 ± 10.7 (standard deviation) years of nursing experience and 4.4 ± 3.7 years of experience on a rehabilitation ward. In terms of position, 131 (76.9%) were nurses and 39 (23.1%) were assistant directors. Nineteen (11.3%) participants had a specialty or certification and 32 (19.6%) had received training in team medicine (Table 1).

Reliability of scale data

Cronbach's α coefficient for the entire CICS29 was 0.957, and coefficients for the subscales of the teamwork competency scale were 0.948, 0.936, 0.683, and 0.948 for monitoring competency, communication competency, backup competency, and leadership competency, respectively.

Comparison of each variable with practical interdisciplinary collaboration skills

The relationship between each independent variable and the CICS29 score was analyzed using the t-test and the one-way ANOVA. As a result, the variables "position" (p=.005), "specialties or certifications held" (p=.006), "training in team medicine" (p=.002),

Table 1: Comparison of each variable with practical interdisciplinary collaboration skills

Variable		n	%	missing value	mean±SD	p ※1
		Total			CICS29	
Sex	Male	10	5.9	-	103.3±8.2	.416 a)
	Female	160	94.1		107.2±14.9	
Position	Staff nurse	116	68.6		106.6±14.8	
	Reader nurse	14	8.3	1	109.2±15.8	.005 b)
	Deputy nurse chief	39	23.1		113.2±12.0	
Years of nursing experience	Less than 5 years	17	10.4		98.8±20.6	
mean±SD : 18.9±10.7 (years)	5 to 10 years	23	14.0	6	105.7±12.5	.075 b)
	10 to 20 years	40	24.4		108.4±12.6	
	Over 20 years	84	51.2		108.5±14.1	
Years of convalescent rehabilitation ward experience	Less than 3 years	82	49.1		105.4±16.2	
mean±SD : 4.4±3.7 (years)	3 to 5 years	29	17.4	3	112.5±13.1	.151 b)
	5 to 10 years	38	22.6		106.6±15.5	
	Over 10 years	18	10.8		110.4±8.7	
Specialties or certifications held	Yes	19	11.3	2	115.6±10.5	.006 a)
	No	149	88.7		105.8±14.8	
Training in team medicine	Yes	32	19.6	7	114.1±13.1	.002 a)
	No	131	80.4		105.3±14.6	
Held in multidisciplinary joint workshops	Yes	141	83.4	1	107.9±15.1	.091 a)
	No	28	16.6		102.7±11.4	
Frequency of participation in multidisciplinary joint workshops	Every time	58	41.2		111.5±14.1	
	Sometimes	80	56.7	29	105.3±15.6	.026 b)
	Not at all	3	2.1		104.7±12.7	
Existence of a team leader	Yes	101	65.2	15	108.4±13.9	.559 a)
	No	54	34.8		106.9±16.1	
Changes in team leadership	Not going to change	60	51.7		110.0±14.2	
	Change according to the situatio	18	15.5	54	107.1±13.7	.284 b)
	Change every day	38	32.8		105.6±12.7	
Information shared at regular conferences						
General condition	Yes	126	75.9	4	108.3±12.9	.149 a)
	No	40	24.1		104.5±18.8	
ADL ability in the ward	Yes	154	92.8	4	107.0±14.6	.317 a)
	No	12	7.2		111.4±14.8	
Acceptance status of the person / family	Yes	115	69.3	4	107.8±15.3	.529 a)
	No	51	30.7		106.3±13.0	
Hope of the person / family	Yes	136	81.9	4	107.4±14.0	.994 a)
	No	30	18.1		107.4±17.2	
Information shared at Pre-discharge conference						
General condition	Yes	119	73.0	7	108.5±13.3	.165 a)
	No	44	27.0		104.9±17.6	
ADL ability in the ward	Yes	135	82.8	7	107.5±14.3	.915 a)
	No	28	17.2		107.2±16.5	
Acceptance status of the person / family	Yes	122	74.8	7	108.2±12.7	.314 a)
	No	41	26.2		105.5±19.4	
Remaining issues	Yes	126	77.3	7	109.5±12.9	.001 a)
	No	37	22.7		100.6±18.0	
Content of post-discharge lifestyle instructions	Yes	153	93.9	7	108.7±13.0	.036 a)
	No	10	6.1		89.4±24.7	
Information exchange outside the meeting	Yes	163	97.6	3	107.9±13.4	.216 a)
	No	4	2.4		80.8±34.6	
Use of common tools	Yes	163	95.9	-	107.5±13.4	.342 a)
	No	7	4.1		95.1±31.6	
Monitoring competency	high score group ※2	81	48.2	2	113.6±12.6	<.001 a)
mean±SD : 52.3±7.5 (range : 12-72)	low score group ※3	87	51.8		101.1±13.9	
Communication competency	high score group ※2	67	40.9	6	113.1±16.0	<.001 a)
mean±SD : 65.2±6.4 (range : 50-89)	low score group ※3	97	59.1		103.3±12.3	
Back up competency	high score group ※2	76	45.8	4	114.3±11.9	<.001 a)
mean±SD : 64.5±8.6 (range : 46-90)	low score group ※3	90	54.2		101.2±14.1	
Leadership competency	high score group ※2	46	40.0	55	118.7±12.0	<.001 a)
mean±SD : 60.4±10.2 (range : 34-87)	low score group ※3	69	60.0		102.8±14.3	

Note CICS29 : Chiba Interprofessional Competency Scale
※1 a) t-test b) one wey analysis of variance
※2 high score group (Over average)
※3 low score group (Less than average)

"frequency of participation in multidisciplinary joint workshops" (p=.026), "information shared at the pre-discharge conference: remaining issues" (p=.001), "information shared at pre-discharge conference: content of post-discharge lifestyle instructions" (p=.036), "monitoring ability" (p<.001) , "communication" (p<.001), "backup ability"(p<.001), and "leadership ability"(p<.001) were different (Table 1).

Correlations between practical collaboration skills and each scale

The correlation coefficients (r) between the CICS29 score and scores for monitoring competency, communication competency, back-up competency, leadership competency, extent of practical collaboration, and satisfaction with team activities ranged from 0.309 to 0.776; there was no multi-collinearity (Table 2).

Factors influencing practical collaboration skills

The analysis was performed using the following independent variables: "position," "specialties or certifications held," "information sharing at pre-discharge conference: remaining issues," "information sharing at pre-discharge conference: content of

post-discharge lifestyle instructions," "monitoring ability," "communication ability," "backup ability," and "leadership ability." The results of the multiple regression analysis with the CICS29 score as the dependent variable identified the following factors as influencing practical collaboration skills: information sharing at the pre-discharge conference, "content of post-discharge lifestyle instructions" (β=.218), "monitoring competency" (β=.494), and "communication competency" (β=.236) (adjusted R2 = 0.452; Table 3).

Effect of the model on practical multidisciplinary collaboration skills

The path diagram was repeatedly modified and tested with reference to the correlations between scales in the conceptual framework (Fig. 1) until the model's goodness of fit improved. Significant standardized estimates were obtained for all factors. The path coefficients are shown in parentheses (Fig. 2). The factor that influenced practical collaboration skills was sharing on the content of post-discharge lifestyle guidance at pre-discharge meetings (0.218), monitoring competency (0.494), and communication competency (0.236). Meanwhile, practical collaboration skills

Table 2: Correlations between practical multidisciplinary collaboration skills and each variable

	CICS29	Monitoring competency	Communication competency	Back-up competency	Leadership competency	Extent of practical multidisciplinary collaboration
Practical multidisciplinary collaboration skills (CICS29[※])						
Monitoring competency	.606					
Communication competency	.421	.325				
Back up competency	.544	.624	.473			
Leadership competency	.544	.602	.456	.776		
Extent of practical multidisciplinary collaboration	.484	.417	.421	.544	.420	
Satisfaction with team activities	.309	.311	.333	.401	.390	.561

Pearson product-moment correlation coefficient (all significant at *p* < .01)

**Note**[※] CICS29: Chiba Interprofessional Competency Scale

Table 3: Results of the multiple regression analysis with CICS29 as the dependent variable

		CICS29				
		Standard partial regression coefficient			Collinearity	
	Selected independent variable	β	*t*	*p*	Tolerance	VIF[※1]
Team approach	Information sharing at pre-discharge conference :Content of post-discharge lifestyle instructions	.218	3.655	<.001	.974	1.027
Team competency	Monitoring competency	.494	8.141	<.001	.879	1.137
	Communication competency	.236	3.917	<.001	.894	1.119

Adjusted R[2]	.452	
F (*p*)	47.461 (*p*<.001)	

Note CICS29 : Chiba Interprofessional Competency Scale

Multiple regression analysis (stepwise method)

[※1] VIF: variance inflation factor
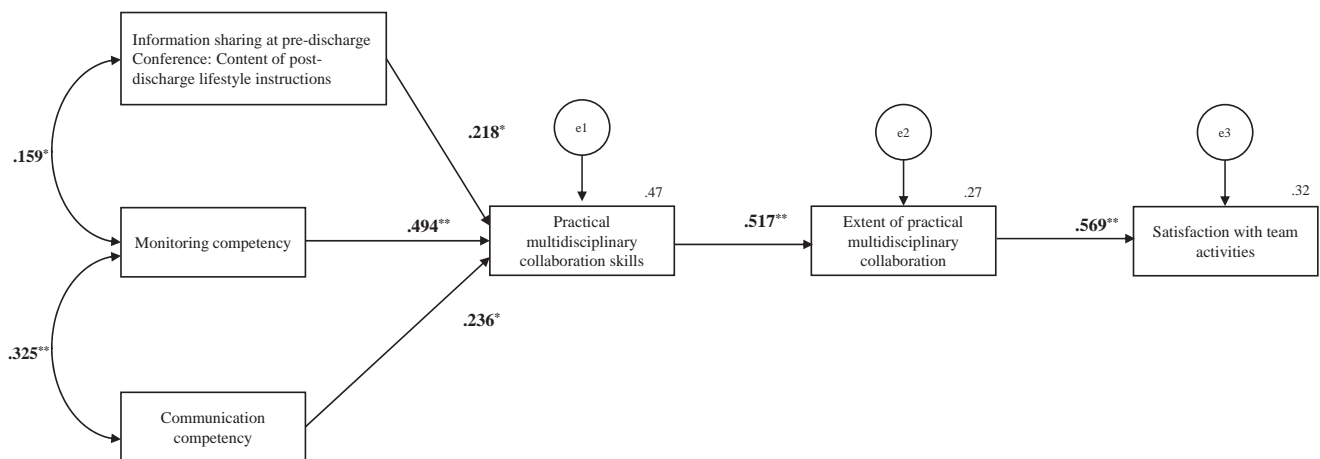
Notes) Model goodness of fit; χ2=17.420, degrees of freedom=7, *p* =.015
CFI (Comparative Fit Index)=.955, RMSEA (Root Mean Square Error of Approximation)=.094
AIC (Akaike's Information Criterion)=57.420
Path coefficients are standardized estimates and curve values are correlation coefficients (r). The significance level is 5%.
e1-e5 are error variables.

Fig. 2: Influence model of practical multidisciplinary collaboration skills among rehabilitation ward nurses

influenced the extent of practical collaboration (0.517), and paths were found between the extent of practical collaboration to satisfaction with team activities (0.569). The goodness of fit for the final model was χ 2 =17.420, degrees of freedom=7, p=.015, comparative fit index =.955, root mean square error of approximation =.094, and Akaike information criterion =57.420.

Discussion

The findings of this study regarding the ability of convalescent rehabilitation ward nurses to collaborate with multiple occupations are novel.

Variables influencing practical collaboration skills

Practical multidisciplinary collaboration skills in rehabilitation ward nurses were influenced by sharing post-discharge lifestyle instructions at pre-discharge conferences, monitoring competency, and communication competency.

Conferences have been established as the place to unite the professional evaluations of each discipline in the rehabilitation ward with patient rehabilitation goals and to verify whether patient-centered rehabilitation objectives have been set. Rehabilitation nursing focuses on preventing the worsening of functional impairments in ADL and supporting independence to restructure the patient's lifestyle. Thus, nurses focus on the patient's everyday functioning and also participate in

conferences with information about rehabilitation goals, including health conditions and physical functions that determine activity, mental and physical status, and the patient's wishes, which they share with other conference members. Rehabilitation ward nurses also educate patients on how to control chronic illness to prevent recurrence and modify environments with safety in mind, with the aim of returning home while respecting the patient's pre-hospitalization lifestyle and values. Considering that patient education is one of the most important roles of a nurse, we speculate that rehabilitation ward nurses can improve their practical collaboration skills by proposing innovations and methods that align with the patient's residual function and coordinating with and supporting multiple disciplines when necessary to help patients return home.

Communication, which is the bidirectional conveyance and sharing of information, is an important element of multidisciplinary collaboration[19]. Accurate and timely information sharing is indispensable for practical multidisciplinary collaboration in rehabilitation wards. However, rehabilitation ward professionals are trained through different curricula; each profession collects and organizes information based on different knowledge and skillsets and provides treatment and care from that perspective. Medical professionals are highly specialized and tend to lack interest in or

understand each other's work. Therefore, we believe that deepening the understanding of other members' disciplines, specialties, and circumstances as well as understanding and respecting the expertise of others promotes a feeling of solidarity that transcends one's own discipline, thereby impacting practical collaboration skills.

Monitoring competency refers to the ability to grasp the situation one's team is in, observe how other members are doing, check one's own behavior in response, and adjust according to the circumstances[18]. It also refers to actions that lead to feedback and support, such as communicating what monitoring has shown to other team members and exchange information and suggestions on how to solve any problems that are identified, making it an important process for demonstrating success as a team[20]. For rehabilitation ward nurses, teamwork is essential from the moment a patient enters the ward in order to identify, verify, and provide safe and effective care[11]. Our results suggest that, among the aspects of teamwork competency, clear division of roles and responsibilities and monitoring competency, that is, determining the need for mutual support, increases practical multidisciplinary collaboration skills for achieving goals. Moreover, it has been said that "it is essential to evaluate whether there are trusting relationships that can predict team movements" in order to promote multidisciplinary collaboration.[21] Therefore, we speculate that increased monitoring competency leads to formation of trusting relationships between team members, which in turn impacts practical collaboration skills.

Collaborative practical ability is a learnable ability, which is comprehensive and dynamic, conceptualized in the relationship that is realized by individual actions in a specific situation[22]. In other words, professional learning is the act of developing and practicing collaborative practice skills; although obtaining these skills is complimentary to other nursing skills, the pursuit of professional cooperation skills differs from gaining clinical nursing experience.

Variables influenced by practical collaboration skills

Practical collaboration skills influenced the extent of practical collaboration, satisfaction with team activities. Concerning the extent of practical collaboration, we believe that practical collaboration is realized to a greater extent because higher practical collaboration skills result in the IDM functioning effectively and ensures continuity of approach.

Satisfaction with team activities relates to job satisfaction, namely, an individual's overall attitude towards their career. Having a career that is meaningful, fairly compensated, provides supportive working conditions, and has co-worker support are important determinants of job satisfaction[15]. In practical multidisciplinary collaboration in the rehabilitation ward, division of roles and responsibilities is clear, and members strive for smooth communication and collaboration to achieve team goals while complementing one another. Therefore, we believe that when team members feel that they are supported by their co-workers, they are more likely to derive satisfaction from team activities. Moreover, Komori et al. suggested that differences in the pervasiveness of employee management policies are involved in the relationship between perceptions of multidisciplinary collaboration and perceptions of job satisfaction among employees working in clinics and small hospitals[23]. Rehabilitation wards have the clear goals of restructuring the patient's lifestyle and allowing them to return home. Dedicated rehabilitation doctors, nurses, and therapists share these goals and structure their approach around their respective roles and responsibilities. We speculate that this leads to finding meaning in one's work.

The return-to-home rate and improvement in ability to perform ADL was introduced as an outcome index (an indicator of the quality of medical care) for rehabilitation ward inpatient hospital fees in the 2008 financial year. Improvement in ability to perform ADL is said to be a clinical indicator of the efficacy of the rehabilitation ward, where a team approach improves patients' functional abilities, such as ADL and walking, shortens hospital stays, and increases the return-to-home rate[24]. In the present study, practical collaboration skills in rehabilitation ward nurses influenced the extent of practical collaboration. We assumed that by promoting more practical collaboration, an advanced team approach would be realized, and functional improvement and return to home would be enhanced, but the results were invalid. The factors that determine

discharge from the rehabilitation ward include neurological symptoms, improvement of ADL between admission and discharge[25], and levels of mobility and cognitive impairment[26]. It is possible that our result was affected by not adjusting for variables of patient factors.

Implications for practice

This study revealed that improving practical multidisciplinary collaboration skills in rehabilitation ward nurses enhances nurses' satisfaction with team activities and improves functional improvement and return-to-home rates in patients, which are two key aims in rehabilitation wards. Improving practical collaboration skills requires suggesting improvisations and methods for returning home that are tailored to each patient's residual function at conferences and actively coordinating with and assisting other disciplines. In addition, it is necessary to increase communication competency in order to share accurate and timely information and increase monitoring competency to determine the need for mutual support. For an IDM to function effectively, it is necessary for the different disciplines to understand and respect one another's expertise and for wards to practice collaboration daily through conferences to provide support that enhances their respective competencies.

Limitations and future directions

The survey response rate was 45.9%, which is low. Going forward, it will be necessary to confirm our results at other institutions and with larger numbers of respondents. Furthermore, the Cronbach's α coefficient for back-up competency was 0.683, and the correlation coefficients between practical collaboration skills and each scale showed that 5 of 21 variables were within the acceptable range, but were less than 0.4. This suggests that the reliability of our data is low, which may have impacted our results and be a limitation of the study. Moreover, missing values, the fact that the data was based on the self-evaluation of nurses, and patient background factors (age, symptoms, disability level, etc.) were not taken into consideration. This may have affected our findings. In the future, it will be necessary to improve the model by considering background factors, objective evaluations, and latent variables.

Conclusions

We have developed a model that can be used to assess practical multidisciplinary collaboration skills among rehabilitation ward nurses, identify factors that impact these skills, and determine what aspects of team success these skills also influence. Practical multidisciplinary collaboration skills among rehabilitation ward nurses were influenced by sharing post-discharge lifestyle instructions at pre-discharge conferences, monitoring competency, and communication competency. Practical collaboration skills influenced the extent of collaboration and satisfaction with team activities.

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回復期リハビリテーション病棟看護師の多職種との連携実践力に関する影響モデルの開発：構造方程式モデリングを用いた分析

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要　旨

目的：回復期リハビリテーション病棟における看護師の多職種との連携実践力が何に影響を受け，チーム成果の何に影響を与えるのかを明らかにするために，回復期リハビリテーション病棟看護師の多職種との連携実践力に関する影響モデルを開発した。

方法：信越・北陸および東海の 9 県の回復期リハビリテーション病棟に勤務する看護師 401 人を対象に無記名自記式質問紙調査を行い，構造方程式モデリングで検証した。

結果：有効回答数は 170 人（有効回答率 42.4%），平均看護経験年数は 18.9 ± 10.7 年，回復期リハビリテーション病棟での平均経験年数は 4.4 ± 3.7 年であった。回復期リハビリテーション病棟看護師の多職種との連携実践力が影響を受けていたのは，退院前カンファレンスにおける退院後の生活指導内容の共有，モニタリング能力およびコミュニケーション能力で，影響を与えていたのは連携実践度，チーム活動に対する満足度であった。

結論：回復期リハビリテーション病棟の多職種との連携実践力を向上させるためには，日々実践が行われている病棟で，在宅復帰にむけて積極的に多職種との調整・支援を行うこと，モニタリング能力およびコミュニケーション能力を高める支援をする必要があることが示唆された。