

ORIGINAL ARTICLE

Satisfaction Survey for Regional Clinical Pathway for Stroke Patients in Acute and Rehabilitation Hospitals in Japan

Shinichi Wada, MD, PhD^a Yoshitaka Iwanaga, MD, PhD^a Yoko Sumita,^a Yusuke Sasahara, PhD^a
Koshiro Kanaoka, MD, PhD^a Hidehiro Takekawa, MD, PhD^b Satoshi Sumita, MD, PhD^c
and Yoshihiro Miyamoto, MD, PhD^a

Objectives: We collected opinions about the use of a stroke-specific regional clinical pathway for facilitating collaboration between acute and rehabilitation hospitals in Japan. **Methods:** The study surveys were administered in acute hospitals designated as primary stroke centers and certified by the Japan Stroke Association (n=961) and in rehabilitation hospitals affiliated with the Kaifukuki Rehabilitation Ward Association (n=1237). The survey collected information on interfacility collaboration when caring for patients admitted during the acute phase following non-traumatic stroke from April 2020 to March 2021. We examined the pathway's usefulness and challenges relative to facility type using the χ^2 test. **Results:** Of 422 acute hospitals and 223 rehabilitation hospitals that responded to our survey, 259 (62.1%) acute hospitals and 164 (85.4%) rehabilitation hospitals used the pathway. Fewer rehabilitation hospitals than acute hospitals considered that the pathway was useful (52.0% vs. 63.8%, $P=0.02$). Fewer rehabilitation hospitals did not experience pathway-related problems when compared with acute hospitals (38.0% vs. 55.8%, $P<0.01$). **Conclusions:** Personnel at rehabilitation hospitals were less satisfied with the regional clinical care pathway than those in acute hospitals. These results suggest that the current stroke-specific regional clinical pathway could be improved.

Key Words: acute hospital; regional clinical pathway; regional medical collaboration; rehabilitation hospital; stroke

INTRODUCTION

Stroke is Japan's third leading cause of death (83.5 out of 100,000).¹⁾ Continuing rehabilitation and controlling the influence of stroke risk factors are important for preventing stroke, reducing the likelihood of recurrent stroke, and improving outcomes of patients.^{2,3)} Collaboration among acute hospitals, rehabilitation hospitals, long-term hospitals, and home doctors is important to ensure the continuity of care. Furthermore, the Japanese National Plan for Promotion of Measures against Cerebrovascular and Cardiovascular Diseases (October 2020) indicated that each Japanese prefecture should prioritize the creation of cooperative medical systems

for the consideration of individual medical conditions and information sharing.⁴⁾

Regional clinical pathways were created throughout Japan in 2008 as systems to improve the efficiency and coordination of patients' medical care.⁵⁾ Subsequent reports described pros and cons of the pathway system.⁶⁻⁹⁾ For example, one study found that clinical pathways helped shorten hospital stays and enhanced the continuity of care. Others found that clinical pathways were frequently abandoned over time because efforts to maintain data entry and the pathway could not be sustained.^{7,10)} Furthermore, rehabilitation hospitals—which receive patients from, and transfer patients to, other hospitals—often report receiving insufficient information.¹¹⁾

Received: March 2, 2023, Accepted: May 30, 2023, Published online: July 14, 2023

^a Department of Medical and Health Information Management, National Cerebral and Cardiovascular Center, Suita, Japan

^b Dokkyo Medical University Hospital, Stroke Center, Mibu, Japan

^c Kinkai Rehabilitation Hospital, Yonago, Japan

Correspondence: Shinichi Wada, MD, PhD, 6-1 Kishibe-Shinmachi, Suita, Osaka 564-8565, Japan, E-mail: wada.shinichi@ncvc.go.jp

Copyright © 2023 The Japanese Association of Rehabilitation Medicine



This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial No Derivatives (CC BY-NC-ND) 4.0 License. <http://creativecommons.org/licenses/by-nc-nd/4.0/>

Although differences in satisfaction with clinical pathways may exist between acute and rehabilitation hospitals, larger-scale examinations (particularly those that include rehabilitation hospitals) are rare.¹²⁾ We surveyed acute and rehabilitation hospitals across Japan to clarify their impressions of clinical pathways for facilitating continuity of care in acute and rehabilitation hospitals.

MATERIALS AND METHODS

Study Population

We administered an online questionnaire survey to medical personnel at acute and rehabilitation hospitals throughout Japan from October 2021 to December 2021. The questionnaire was distributed to personnel at 961 acute hospitals certified as primary stroke centers (PSCs) by the Japan Stroke Association and to personnel at 1237 hospitals affiliated with the Kaifukuki Rehabilitation Ward Association in Japan. The questionnaires included questions about pathway usefulness, challenges, and each facility's collaborations with other hospitals. To focus our analysis on stroke pathways, all questionnaire respondents were directly involved in stroke care and coordination with medical diagnostics for patients admitted within 7 days of nontraumatic stroke onset between April 2020 and March 2021. We did not collect any individual patient information; rather, personnel involved in the care of these patients provided their impression on the stroke care pathway.

Statistical Analysis

In the analysis of a clinical pathway's usefulness, acute hospitals that felt collaboration with other hospitals was useful were classified as "useful" hospitals. Rehabilitation hospitals that felt collaboration with acute hospitals, long-term hospitals, or home doctors was "very useful" or "sometimes useful" were also classified as "useful" hospitals. "Not useful" acute hospitals were those that felt inter-hospital collaboration was "inconvenient" or resulted in "no change." "Not useful" rehabilitation hospitals answered "seldom useful" or "no" when asked if collaborations with other acute hospitals, long-term hospitals, or home doctors were beneficial. "No problem" facilities were acute or rehabilitation hospitals that indicated there were no problems or points for improvement with the clinical pathway. "Problem" facilities were acute or rehabilitation hospitals that felt the stroke-specific regional clinical pathway provided "too much information" or "little information."

In analyzing the use of home doctors with the stroke

clinical pathway, hospitals that responded "very often" or "sometimes" were considered the "usage" group. The "no usage" group comprised those who indicated that they did not use the clinical pathway with home doctors or used patient education handbooks or pamphlets. We compared acute and rehabilitation hospitals using the χ^2 test. We also compared information sharing with other hospitals and patients/families in acute hospitals between the two groups (χ^2 test) to indicate pathway usage. Data were analyzed using STATA 16 software (StataCorp, College Station, TX, USA), and $P < 0.05$ was considered significant.

RESULTS

Responding Facilities

Representatives from 422 acute hospitals (43.9%) and 223 rehabilitation hospitals (18.0%) responded to the survey. No clear difference was found in response rates by region between acute and rehabilitation hospitals ($P=0.31$, **Table 1**). In categorizing acute hospitals by size, 16 (3.8%) had more than 1000 beds, 200 (47.4%) had 400–999 beds, 128 (30.3%) had 200–399 beds, and 78 (18.5%) had 199 or fewer beds. For rehabilitation hospitals, 1 (0.5%) had more than 1000 beds, 20 (9.0%) had 400–999 beds, 62 (27.8%) had 200–399 beds, and 140 (62.8%) had 199 or fewer beds. **Table 2** (acute hospitals) and **Table 3** (rehabilitation hospitals) show the questionnaires and responses used in the analysis.

Status and Evaluation of Regional Clinical Pathways

A significantly higher proportion of rehabilitation hospitals (85.4%) than acute stroke hospitals (62.1%) used the regional clinical pathway to collaborate with other hospitals (**Table 4**). Facilities that used the pathway for home doctors were more often rehabilitation hospitals; fewer rehabilitation hospitals answered "useful" and "no problem." Acute and rehabilitation hospitals that did not use the pathway for home doctors answered "useful" less often; however, the differences were insignificant (**Table 5**).

Respondents were asked why a clinical pathway was useful for facilitating collaboration with acute hospitals, and responses were obtained from personnel at 30 rehabilitation hospitals. Twelve hospitals felt the information was easy to obtain, and eight indicated that treatment progress could be easily monitored (**Table 6**). Similarly, when asked about collaborations with long-term hospitals or home doctors, personnel at rehabilitation hospitals felt that collaboration assisted with monitoring treatment progress. However, staff at

Table 1. Regional distribution of responding acute and rehabilitation hospitals

Region	Acute hospitals			Rehabilitation hospitals		
	Targeted hospitals	Responding hospitals	Response rate	Targeted hospitals	Responding hospitals	Response rate
Hokkaido	40	19	47.5%	49	10	20.4%
Tohoku	69	26	37.7%	73	9	12.3%
Kanto	262	109	41.6%	309	60	19.4%
Koushinetsu	49	19	38.8%	45	9	20.0%
Hokuriku	34	16	47.1%	30	4	13.3%
Tokai	93	45	48.4%	140	25	17.9%
Kinki	175	89	50.9%	221	34	15.4%
Chugoku	62	26	41.9%	95	21	22.1%
Shikoku	44	15	34.1%	64	12	18.8%
Kyushu	133	58	43.6%	211	39	18.5%
Total	961	422	43.9%	1237	223	18.0%

some rehabilitation hospitals felt the pathway was not useful for facilitating collaboration with acute hospitals, long-term hospitals, or home doctors because other useful documents were easier to understand.

More rehabilitation hospitals than acute hospitals indicated that a lack of information was a problem with the current pathway (Table 7). In addition, of the hospitals that suggested further information in the free answer column, the most frequent request from acute and rehabilitation hospitals was for information on the social background of the patient.

The Need for Regional Clinical Pathways

We found that 158 acute hospitals did not use the clinical pathway because of a lack of need (n=65, including 31 with rehabilitation units) or inadequate regional medical conditions, despite the perceived need (n=49) (Table 8). Among rehabilitation hospitals, 93 of 223 expressed no need for a pathway to facilitate collaboration with acute or long-term care hospitals because “other documents are easier to understand” or “the usefulness of the pathway is not recognized” (Table 9).

Sharing Patient Information among Patients/families or Hospitals

Most acute hospitals reported favorable information sharing (always + usually) with rehabilitation hospitals (n=380; 90.0%), long-term hospitals (n=356; 84.4%), and home doctors (n=309; 73.3%) (Table 10). Similarly, most acute hospitals reported favorable sharing (always + usually) of outcomes for patients with physical disabilities (n=400; 94.8%) and higher-order brain dysfunction (n=381; 90.2%)

with patients or their families. The tendencies did not significantly differ relative to clinical pathway use.

A greater proportion of rehabilitation hospitals reported their current status on sharing information with long-term care hospitals or home doctors. Their sharing outcomes regarding physical disabilities or high brain dysfunction with patients/families were favorable (Table 3).

DISCUSSION

Responding Facilities

We defined “acute hospitals” as PSCs based on their provision of secondary care in Japan, where most patients with acute stroke are treated.¹³ In a survey of PSC bed numbers in Japan based on the Japan Medical Analysis platform, 29 hospitals (3.0%) had more than 1000 beds, 437 hospitals (45.5%) had 400–999 beds, 311 hospitals (32.4%) had 200–399 beds, and 184 hospitals (19.2%) had 199 or fewer beds.¹⁴ These data are similar to the trends observed in our study.

There are 1538 hospitals with rehabilitation units in Japan. The distribution of beds in hospitals with rehabilitation units was as follows: 3 hospitals (0.2%) had more than 1000 beds, 98 hospitals (6.4%) had 400–999 beds, 423 hospitals (27.5%) had 200–399 beds, and 1014 hospitals (65.9%) had 199 beds or fewer. This distribution was similar to that of the rehabilitation hospitals that responded to this survey; no significant bias was observed in terms of facility type.¹⁴

Impressions of Hospital Personnel in Clinical Pathways

Although multicenter surveys have previously examined

Table 2. Questionnaire for acute hospitals used in this analysis

Questionnaire for all acute hospitals		n=422
Do you have rehabilitation wards?		
Yes		100
No		322
Do you use a clinical pathway?		
Yes		259
No		158
Unknown/No response		5
Do you share medical information with rehabilitation hospitals?		
Always		182
Usually		198
Rarely		24
No		5
Unknown/No response		13
Do you share medical information with long-term hospitals?		
Always		145
Usually		211
Rarely		45
No		7
Unknown/No response		14
Do you share medical information with home doctors?		
Always		96
Usually		213
Rarely		70
No		11
Unknown/No response		32
Do you provide informed consent to patients/families regarding the outcome and prognosis of physical disability?		
Always		268
Usually		132
Rarely		15
No		1
Unknown/No response		6
Do you provide informed consent to patients/families about the outcome and prognosis of higher brain dysfunction?		
Always		223
Usually		158
Rarely		34
No		1
Unknown/No response		6
Do you have problems or points for improvement in the clinical pathway? (Multiple responses allowed)		
No		145
Too much information		126
Little information (possible to describe missing items)		33
We do not know because we do not use a clinical pathway		102
Unknown/No response		31
Questionnaire for acute hospitals using clinical pathway		n=259
Do you feel that use of the clinical pathway has facilitated cooperation among hospitals?		
Useful		153
Inconvenient		8
No change		79
Unknown/No response		19
Do you use a clinical pathway to collaborate with home doctors? (Multiple responses allowed)		
Very often		19
Sometimes		58
No		153
Use other patient education handbooks or pamphlets		24
Unknown/No response		21
Questionnaire for acute hospitals not using clinical pathway		n=158
Please indicate why you are not using a clinical pathway. (Multiple responses allowed)		
We are considering using a pathway, but the local medical system is inadequate		59
We do not see the merit of using the pathway		49
Other reasons (free column)		40
Unknown/No response		15

Table 3. Questionnaire for rehabilitation hospitals used in this analysis

Questionnaire about collaboration with acute hospitals		n=223
What is the number of acute hospitals linked through the clinical pathway and those not linked?		
Do you feel that the clinical pathway is useful in facilitating cooperation among hospitals?		
Very useful		22
Sometimes useful		55
Seldom useful		77
No		35
Unknown/No response		34
Do you feel the need for a clinical pathway when collaborating with acute hospitals that do not use the pathway?		
Yes		38
No		128
We are working with all the acute hospitals on a clinical pathway		15
Unknown/No response		42
Questionnaire about collaboration with long-term hospitals		
Do you use the clinical pathway with long-term hospitals? (Multiple responses allowed)		
Very often		44
Sometimes		57
No		90
Use other patient education handbooks or pamphlets		6
Other		7
Unknown/No response		24
Do you feel that the clinical pathway is useful in facilitating cooperation among hospitals? (Reason can be described)		
Very useful		17
Sometimes useful		45
Seldom useful		77
No		44
Unknown/No response		40
Do you feel the need for a clinical pathway when collaborating with long-term hospitals that do not use the pathway? (Reason can be described)		
Yes		36
No		124
We are working with all long-term hospitals on a clinical pathway		10
Unknown/No response		53
Do you share medical information with long-term hospitals?		
Always		127
Usually		80
Rarely		5
No		1
Unknown/No response		10
Questionnaire about collaboration with home doctors		
Do you use the clinical pathway with home doctors? (Multiple responses allowed)		
Very often		40
Sometimes		53
No		106
Use other patient education handbooks or pamphlets		6
Others		2
Unknown/No response		23
Do you feel that the clinical pathway is useful in facilitating cooperation with home doctors? (Reason can be described)		
Very useful		10
Sometimes useful		36
Seldom useful		86
No		47
Unknown/No response		44

Table 3. Continued

Questionnaire about collaboration with home doctors		n=223
Do you feel the need for a clinical pathway when collaborating with home doctors that do not use the pathway? (Reason can be described)		
Yes		29
No		130
We are working with home doctors on a clinical pathway.		11
Unknown/No response		53
Do you share medical information with home doctors?		
Always		101
Usually		96
Rarely		13
No		3
Unknown/No response		10
Questionnaire about collaboration with patients/family at discharge		
Do you provide informed consent to patients/families regarding the outcome and prognosis of physical disability?		
Always		145
Usually		69
Rarely		5
No		1
Unknown/No response		3
Do you provide informed consent to patients/families about the outcome and prognosis of higher brain dysfunction?		
Always		138
Usually		73
Rarely		6
No		1
Unknown/No response		5
Regarding collaboration with all hospitals and patients/family		
Do you have problems or points for improvement in the clinical pathway? (Multiple responses allowed)		
No		59
Too much information		51
Little information (possible to describe missing items)		41
We do not know because we do not use a clinical pathway		38
Unknown/No response		43

Table 4. Usage and impression of the clinical pathway between acute and rehabilitation hospitals

	Acute hospitals (n=422)	Rehabilitation hospitals (n=223)	P-value
Clinical pathway usage			
Usage with any other hospitals	259/417 (62.1)	164/192 (85.4)	<0.01
Usage with home doctors*	71/238 (29.8)	79/153 (51.6)	<0.01
Clinical pathway impression			
Useful*	153/240 (63.8)	78/150 (52.0)	0.02
No problem*	139/249 (55.8)	52/137 (38.0)	<0.01

Data are presented as number (%). *Each percentage is relative to the number of hospitals using the clinical pathway.

Table 5. Hospital evaluation on use of clinical pathway with home doctors

	Using home doctors	Not using home doctors	P-value
Acute hospitals			
Useful	49/67 (73.1)	94/157 (59.9)	0.06
No problem	38/70 (54.3)	93/161 (57.8)	0.62
Rehabilitation hospitals			
Useful	43/74 (58.1)	30/68 (44.1)	0.10
No problem	27/70 (38.6)	22/60 (36.7)	0.82

Data are presented as number (%). Each percentage is relative to the number of hospitals using the clinical pathway.

Table 6. Reasons that the clinical pathway is useful or not useful in rehabilitation hospitals using the pathway

Collaboration with acute hospitals			
Useful	n=30	Not useful	n=42
Required information is easy to obtain	12	Other documents are easier to understand	13
Treatment progress is easily monitored	8	Usefulness of the pathway is not recognized	11
The format is standardized among hospitals	3	Required information is not available	9
Other	7	There are many blank columns	4
		The pathway is not used in other collaborating hospitals	4
		Feedback is not available	2
		Other	1
Collaboration with long-term hospitals			
Useful	n=18	Not useful	n=23
Treatment progress is easily monitored	12	Usefulness of the pathway is not recognized	8
Using the pathway allows information from acute hospitals to be sent directly	3	Other documents are easier to understand	7
Using the pathway enables smooth coordination of patient transfer	2	The pathway is not used in other collaborating hospitals	4
Other	1	Description in the pathway alone do not accurately reflect condition	2
		Required information is not available	2
		Other	1
Collaboration with home doctors			
Useful	n=9	Not useful	n=27
Treatment progress is easily monitored	3	Usefulness of the pathway is not recognized	12
Using the pathway allows information from acute hospitals to be sent directly	2	Other documents are easier to understand	9
Using the pathway enables smooth coordination of patient transfer	2	The pathway is not used in other collaborating hospitals	3
Other	2	Other	3

Multiple responses allowed.

the use of clinical pathways, this study was unique in that the investigation considered the levels of satisfaction with the pathways as reported by personnel at acute and rehabilitation hospitals.¹⁵⁾ Our results highlight differences between the facility types and clarify pathway-related issues.

Whereas most acute hospitals expressed high satisfaction with their current clinical pathway, fewer rehabilitation hospitals felt it was useful. In addition, rehabilitation hospitals did not perceive a future need for a regional clinical pathway. Although we cannot directly compare acute and rehabilitation hospitals because the questionnaires issued to each type of facility differed, our results suggest that acute and reha-

bilitation hospitals evaluate these pathways differently.

Clinical pathways seek to shorten the length of stay, streamline patient care, and improve functional outcomes through aggressive rehabilitation beginning during early recovery.^{16–18)} Discrepant pathway evaluations could result from the exclusion of essential rehabilitation-related information, like a patient's social profile and level of physical activity. Moreover, rehabilitation hospital personnel require detailed information from the transferring acute hospital to carry out the rehabilitation plan. Without a clear clinical treatment pathway, many rehabilitation hospital personnel turned to other sources of information, such as medical referrals. In

Table 7. Clinical pathway problems

	Acute hospitals (n=248)	Rehabilitation hospitals (n=127)	P-value
Too much information	80 (32.3)	38 (29.9)	0.65
Little information	29 (11.7)	37 (29.1)	<0.01
Lack of information	16	14	
Social background	4	8	
Treatment in acute hospitals	4	1	
Outcome	3		
History		2	
Current condition	2	2	
Treatment plan	1		
Examination	1	1	
Rehabilitation	1		

Data are presented as number (%). Percentage is for responses of hospitals using regional clinical pathway, except for hospitals that answered "other reasons/unknown" or did not respond (11 acute hospitals and 37 rehabilitation hospitals). Multiple responses allowed.

Table 8. Reasons for not using the clinical pathway in acute hospitals

Reason	n
We do not see the merit of using the pathway	65
Acute hospital with rehabilitation wards	31
We are considering using the pathway, but the local medical system is inadequate	49
Other reasons (free column)	40
Pathway was previously used but discontinued because of changes in healthcare system	7
Pathway was previously used but discontinued because of large effort	7
Pathway was previously used but discontinued (reason unknown)	4
Using the pathway is under consideration	4
The hospital system is not in place	2
We have insufficient coordination with nearby hospitals	2
Other	8

Multiple responses allowed.

some circumstances, the failure to complete all information fields on a patient record, which may occur because of a sudden decision to transfer from an acute hospital, may lead to low staff satisfaction at the rehabilitation hospital.¹¹⁾ The lack of opportunities for interactive information exchange might leave rehabilitation hospital personnel with a more negative outlook on pathway usefulness. If a patient or a patient's legal advocate does not wish to continue aggressive treatment upon transfer, then acute hospital information would likely be less useful. Pathway quality might improve given more attention to required information/items for patients that are under consideration for a particular clinical pathway. Bi-directional feedback between facilities may be useful for streamlining treatment and ensuring continuity of care.¹⁹⁾

Some facilities that previously used the pathway stopped when the regional collaborative medical care plan management fee was eliminated by the 2016 medical fee revision.²⁰⁾ However, in these regions, the collaborative relationships developed during the management fee era persist to the present day.

Collaboration with Long-term Hospitals and Home Doctors

Only a few acute and rehabilitation hospitals used the pathway to collaborate with home doctors. One of the reasons given is that activities for patients expand when moving from hospital to home, making it particularly important to consider their social backgrounds.¹⁶⁾ In addition, home doctors

Table 9. Reasons that a clinical pathway is needed or not needed for collaboration with other hospitals that do not use the pathway for all responding rehabilitation hospitals

For acute hospitals			
Needed	n=20	Not needed	n=79
Required information is easy to obtain	10	Other documents are easier to understand	45
Treatment progress is easily monitored	5	Usefulness of the pathway is not recognized	20
The format is standardized among hospitals	3	Required information is not available	5
Other	2	Seldom used	4
		Required information cannot be obtained easily	2
		Other	3
For long-term hospitals			
Needed	n=21	Not needed	n=62
Using the pathway enables smooth coordination of patient transfer	6	Other documents are easier to understand	48
Treatment progress is easily monitored	4	Seldom used	8
Required information is easy to obtain.	4	Other	6
Pathway allows for efficient information transfer	3		
The format is standardized among hospitals	2		
Other	2		
For home doctors			
Needed	n=13	Not needed	n=55
Using the pathway enables smooth coordination of patient transfer	6	Other documents are easier to understand	31
Required information is easy to obtain	3	Usefulness of the pathway is not recognized	18
The format is standardized among hospitals	2	Other	8
Other	2		

Multiple responses allowed.

treat elderly patients that have multiple comorbid chronic diseases and require considerable patient information.²¹⁾ Therefore, stroke-specific pathways would be less useful to home doctors.

In terms of information availability and exchange, an increase in labor resources in acute hospitals to input further information into the pathway should be considered. Recently, some regions have promoted the use of automated data sharing among hospitals.^{22,23)} Given that no previous report has examined doctors' opinions on the clinical care pathway, further rigorous investigations are needed, particularly those that include feedback from the medical personnel of other facilities, such as long-term hospitals and home doctors.

Collaboration with Patients and Families

Most acute and rehabilitation hospitals had favorable perceptions of information sharing among patients, families, and other medical institutions. In acute hospitals, differences were not observed relative to pathway use. No previous

report has demonstrated the usefulness of the pathway for sharing information with patients or their families. A favored characteristic of pathway use for patients and their families in stroke care is that it simplifies explanations for patients by creating treatment plans from stroke onset to home rehabilitation.¹⁶⁾ This study also showed that many medical personnel tried to engage in sharing information with patients or their families, regardless of pathway usage.²⁴⁾ However, differences in satisfaction between use and non-use of the clinical pathway should be assessed from other participants in the pathway, such as long-term hospitals, home doctors, or patients and their families. Therefore, we could not conclude that the clinical pathway was not useful for sharing information overall.

Limitations

The present study had some limitations. First, we did not collect objective patient care indicators like length of hospital stay or treatment outcomes. Furthermore, we did not seek

Table 10. Current status of patient information sharing in acute hospitals

	Overall (n=422)	Using pathway (n=259)	Not using pathway (n=158)	P-value
Sharing clinical information and care process				
With rehabilitation hospitals ^a				
Always	182 (43.1)	107 (41.3)	74 (46.8)	0.24
Usually	198 (46.9)	129 (49.8)	68 (43.0)	
Rarely	24 (5.7)	15 (5.8)	8 (5.1)	
No	5 (1.2)	1 (0.4)	4 (2.5)	
Unknown/No response	13 (3.1)	7 (2.7)	4 (2.5)	
With long-term hospitals				
Always	145 (34.4)	88 (34.0)	56 (35.4)	0.17
Usually	211 (50.0)	126 (48.7)	85 (53.8)	
Rarely	45 (10.7)	34 (13.1)	10 (6.3)	
No	7 (1.7)	3 (1.2)	4 (2.5)	
Unknown/No response	14 (3.3)	8 (3.1)	3 (1.9)	
With home doctors				
Always	96 (22.8)	54 (20.9)	41 (26.0)	0.49
Usually	213 (50.5)	134 (51.7)	79 (50.0)	
Rarely	70 (16.6)	48 (18.5)	21 (13.3)	
No	11 (2.6)	7 (2.7)	4 (2.5)	
Unknown/No response	32 (7.6)	16 (6.2)	13 (8.2)	
Sharing information on outcomes of physical disorders with patients or families				
Always	268 (63.5)	161 (62.2)	105 (66.5)	0.60
Usually	132 (31.3)	85 (32.8)	46 (29.1)	
Rarely	15 (3.6)	10 (3.9)	5 (3.2)	
No	1 (0.2)	0 (0)	1 (0.6)	
Unknown/No response	6 (1.4)	3 (1.2)	1 (0.6)	
Sharing information on outcomes of high brain dysfunction with patients or families				
Always	223 (52.8)	129 (49.8)	92 (58.2)	0.23
Usually	158 (37.4)	102 (39.4)	55 (34.8)	
Rarely	34 (8.1)	25 (9.7)	9 (5.7)	
No	1 (0.2)	0 (0)	1 (0.6)	
Unknown/No response	6 (1.4)	3 (1.2)	1 (0.6)	

Data are presented as number (%).

^a Rehabilitation unit or community comprehensive care unit.

responses from personnel at long-term hospitals or from home doctors, patients, or family members. Second, the low response rate of rehabilitation hospitals likely indicates that our data for rehabilitation hospitals should be interpreted with care. Indeed, the low rate could indicate poor awareness of clinical pathways. Finally, regional differences in clinical pathways should be considered when interpreting our results. In fact, some regions may be satisfied with existing clinical pathways in acute and rehabilitation hospitals. An example of this is in areas where acute and rehabilitation hospitals

regularly hold face-to-face and online meetings to facilitate smooth cooperation.¹⁶⁾ Region-specific examinations of these clinical pathways may inform future collaborative care pathway improvements in Japan.

CONCLUSIONS

We found discrepancies in how acute and rehabilitation hospitals evaluated regional clinical pathways, indicating room for improvement. Regardless of the setting, successful implementation of care pathways requires high motivation

for sharing information.

ACKNOWLEDGMENTS

This work was supported by a Labour Research Grant from the Ministry of Health, Labour, and Welfare of Japan (21FA1012). We thank all primary stroke centers certified by the Japan Stroke Association and all rehabilitation hospitals belonging to the Kaifukuki Rehabilitation Ward Association in Japan for collaborating with our questionnaire.

CONFLICTS OF INTEREST

Hidehiro Takekawa received compensation from Pfizer Japan and Daiichi Sankyo. Yoshihiro Miyamoto received compensation from Kowa and research funds from Meiji Yasuda Research Institute, Softbank, Tokio Marine Nichido, Saraya, and Bristol Myers Squibb. The remaining authors declare no conflict of interest.

REFERENCES

1. Ministry of Health Labour and Welfare of Japan: Overview of the system and the basic statistics: general welfare and labour. Annual health, labour, and welfare report. Ministry of Health Labour and Welfare of Japan. 2021. <https://www.mhlw.go.jp/english/wp/wp-hw14/dl/01e.pdf>. Accessed 26 Aug 2022.
2. Le Dancœur M: Stroke rehabilitation. *Crit Care Nurs Clin North Am* 2020;32:97–108. <https://doi.org/10.1016/j.cnc.2019.11.004>, PMID:32014164
3. Hankey GJ: Secondary stroke prevention. *Lancet Neurol* 2014;13:178–194. [https://doi.org/10.1016/S1474-4422\(13\)70255-2](https://doi.org/10.1016/S1474-4422(13)70255-2), PMID:24361114
4. Kuwabara M, Mori M, Komoto S: Japanese national plan for promotion of measures against cerebrovascular and cardiovascular disease. *Circulation* 2021;143:1929–1931. <https://doi.org/10.1161/CIRCULATIONAHA.120.052737>, PMID:34085868
5. Ikenaga Y. Effect of integration of a regional cooperation clinical pathway for strokes into ID Link for work efficacy of nurses [in Japanese]. *J Jpn Soc Clin Pathway*. 2020;22:176–81. https://doi.org/10.50842/jjscp.22.3_176
6. Chawla A, Westrich K, Matter S, Kaltenboeck A, Dubois R: Care pathways in US healthcare settings: current successes and limitations, and future challenges. *Am J Manag Care* 2016;22:53–62. PMID:26799125
7. Fujino Y, Kubo T, Muramatsu K, Murata A, Hayashida K, Tomioka S, Fushimi K, Matsuda S: Impact of regional clinical pathways on the length of stay in hospital among stroke patients in Japan. *Med Care* 2014;52:634–640. <https://doi.org/10.1097/MLR.000000000000146>, PMID:24926711
8. Mine Y, Fujino Y, Sabanai K, Muramatsu K, Otani M, Kubo T, Fushimi K, Matsuda S: Effectiveness of regional clinical pathways on postoperative length of stay for hip fracture patients: a retrospective observational study using the Japanese Diagnosis Procedure Combination database. *J Orthop Sci* 2020;25:127–131. <https://doi.org/10.1016/j.jos.2019.02.002>, PMID:30799165
- [9] Tokunaga M, Tokisato K, Katsura K, Watanabe S, Sannomiya K, Kurotsuchi T, Kawano S, Minoda S, Hashimoto Y: Recommendation for the study on stroke liaison critical pathway [in Japanese]. *Sogo Rehabil* 2014;42:1087–93. <https://doi.org/10.11477/mf.1552200054>
10. Honda S, Tokunaga M, Watanabe S, Takita T, Otsuka T, Yonehara T, Nishi T, Terasaki T, Miura M, Hirata Y, Yamaga M, Hashimoto Y: Survey of stroke types in acute hospitals and Kaifukuki rehabilitation wards: nine years of Kumamoto Stroke Liaison Critical Pathway data [in Japanese]. *Nosotchu* 2018;40:343–349. <https://doi.org/10.3995/jstroke.10569>
11. Maeshima S, Osawa A, Ishihara S, Satoh A, Tanahashi N: The clinical pathway for stroke rehabilitation and convalescence rehabilitation ward: from the standpoint of the acute hospital [in Japanese]. *Nosotchu* 2010;32:357–364. <https://doi.org/10.3995/jstroke.32.357>
12. Koga M, Uehara T, Nagatsuka K, Yasui N, Hasegawa Y, Okada Y, Minematsu K: Current role of acute hospitals in community-based stroke care system in Japan [in Japanese]. *Nosotchu* 2009;31:67–73. <https://doi.org/10.3995/jstroke.31.67>
13. Miyamoto S, Yamada K: Paradigm shift in the stroke medical care system [in Japanese]. *Jpn J Neurosurg* 2021;30:194–198. <https://doi.org/10.7887/jcns.30.194>
14. Japan Medical Association: Japan medical analysis platform. Japan Medical Association. 2022. <https://jmap.jp>. Accessed 29 Nov 2022.
15. All Japan Hospital Association: All Japan Hospital Association home page. All Japan Hospital Association. 2023. <https://www.ajha.or.jp>. Accessed 11 April 2023.

16. Hashimoto Y, Watanabe S, Hirata Y, Hirano T: Referral system and liaison critical pathway for stroke [in Japanese]. *Nosotchu* 2009;31:491–496. <https://doi.org/10.3995/jstroke.31.491>
17. Saitoh M, Takahashi A, Yonemasu Y, Homma T, Shibata K: On site educational seminars and a common stroke critical path for a region provided by a stroke team for the treatment of acute and subacute stroke at non-specialized hospitals [in Japanese]. *Nosotchu* 2007;29:493–501. <https://doi.org/10.3995/jstroke.29.493>
18. Gagnon D, Nadeau S, Tam V: Ideal timing to transfer from an acute care hospital to an interdisciplinary inpatient rehabilitation program following a stroke: an exploratory study. *BMC Health Serv Res* 2006;6:151. <https://doi.org/10.1186/1472-6963-6-151>, PMID:17123438
19. Huang L, Jiang L, Xu Y, Ma Y: Design and implementation of informatization for unified management of stroke rehabilitation in urban multi-level hospitals. *Front Neurosci* 2023;17:1100681. <https://doi.org/10.3389/fnins.2023.1100681>, PMID:36875673
20. Ministry of Health Labour and Welfare of Japan: Individual items for revision [in Japanese]. Ministry of Health Labour and Welfare of Japan. 2016. <https://www.mhlw.go.jp/file/05-Shingikai-12404000-Hokenkyoku-Iryouka/0000112306.pdf>. Accessed 26 Nov 2022.
21. Azuma K, Ohta S: Relations with emergency medical care and primary care doctor, home health care [in Japanese]. *Jpn J Clin Med* 2016;74:203–214. PMID:26915240
22. Gustavsson M, Ytterberg C, Guidetti S: Exploring future possibilities of using information and communication technology in multidisciplinary rehabilitation after stroke—a grounded theory study. *Scand J Occup Ther* 2020;27:223–230. <https://doi.org/10.1080/11038128.2019.1666918>, PMID:31545665
23. Takao H, Sakai K, Mitsumura H, Komatsu T, Yuki I, Takeshita K, Sakuta K, Ishibashi T, Sakano T, Yeh Y, Karagiozov K, Fisher M, Iguchi Y, Murayama Y: A smartphone application as a telemedicine tool for stroke care management. *Neurol Med Chir (Tokyo)* 2021;61:260–267. <https://doi.org/10.2176/nmc.0a.2020-0302>, PMID:33716234
24. Uchida K, Aoki K: Supporting mutual agreement among family members of stroke patients on selecting the place of treatment after acute care and related factors [in Japanese]. *Nihon Kango Kagakkaishi* 2021;41:201–210. <https://doi.org/10.5630/jans.41.201>