—Original—

Usefulness of the Palliative Prognostic Index in Predicting Prognosis when Considering the Transition from Hospital to Home Care in Patients with Terminal Stage Cancer

Shiho Sakaguchi[1,2*], Masahiro Sakaguchi[2,3*], Shunsuke Honma[2,3], Tomohiro Yagi[2], Gakuji Osawa[4], Akira Hirano[1], Hiroki Yamaguchi[3], Takayuki Hisanaga[5] and Shunichi Shiozawa[6]

[1]Department of Breast Surgery, Tokyo Women's Medical University Adachi Medical Center, Tokyo, Japan
[2]Home Clinic Naginoki, Ibaraki, Japan
[3]Department of Hematology, Nippon Medical School, Tokyo, Japan
[4]Department of Palliative Medicine, Ouji Coop Hospital, Tokyo, Japan
[5]Department of Palliative Medicine, Tsukuba Medical Center Hospital, Ibaraki, Japan
[6]Department of Surgery, Tokyo Women's Medical University Adachi Medical Center, Tokyo, Japan

Background: No accurate prognostic tool is available for patients with cancer who spend their final days at home. In this study, we examined whether performance status (PS) and the palliative prognostic index (PPI), a well-known prognostic tool in palliative care units, could be used to predict prognosis in the home care setting at the time of intervention by home physicians.

Subjects and Methods: Using medical records, we conducted a retrospective analysis of 132 patients who were referred to the Home Clinic Naginoki for home care for terminal stages of carcinoma in situ. Based on the status at the time of the first visit, the PPI-Low group was defined as those scoring six or below and the PPI-High group as those scoring greater than six.

Results: The PPI-high group had a significantly poorer prognosis within 21 days than the PPI-low group (21-day-OS; Low 71.4% vs. High 13.2%; $p<0.001$). The Eastern Cooperative Oncology Group (ECOG) PS alone predicted better prognosis in the group with PS of one or two (21-day survival 90.1%), and the PPI score further significantly stratified the prognosis for patients with PS three or four, with a trend toward poor prognosis ($p \leq 0.005$).

Conclusion: ECOG PS 1 or 2 has a favorable prognosis and that using PPI in ECOG PS 3 or 4 leads to a more accurate prognosis prediction. PPI evaluated during the hospital-based treatment of patients with terminal cancer can also be used to predict prognosis if the patient is transitioned to a home care environment. (J Nippon Med Sch 2024; 91: 74–82)

Key words: home visitation, end-of-life care at home, timing to refer to a home physician, palliative prognostic index (PPI), patients with terminal cancer

Introduction

The primary purpose of home care following cancer treatment is to ensure that patients and their families spend precious time at home at the end of the patient's life. Japan has a super-aging society[1], and opportunities and demand for end-of-life care at home are increasing. However, in Japan, where most people die in hospitals, it is not easy to make the decision to shift from hospital care to end-of-life care at home, for a variety of reasons. Among the challenges frequently encountered is the diffi-

* Shiho Sakaguchi and MS contributed equally to this work.
Correspondence to Masahiro Sakaguchi, MD, PhD, Department of Hematology, Nippon Medical School, 1–1–5 Sendagi, Bunkyo-ku, Tokyo 113–8603, Japan
E-mail: m-sakaguchi@nms.ac.jp
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culty in determining and discussing when medical staff should shift terminally ill patients from a hospital-based environment to home care, as it is not easy to predict their prognosis in the home care environment.

Physicians "tend to be optimistic predictors" of their patients' life outcomes[2–6]. Accurate prognostic tools enable physicians to communicate stable and valid prognoses to patients and their families. If highly accurate prognostic tools are available in the home care environment for patients with terminal-stage cancer, healthcare professionals will be able to grasp realistic timing for proposing end-of-life care at home, which will provide a firm grasp of the current situation for patients and their caregivers. This will then lead to a natural shift in the subject of patient care from the hospital to end-of-life home care, which will result in a response that is more in line with the wishes of patients and their families.

There is a considerable lack of useful reports that have examined prognostic tools in the home care setting for terminally ill patients with cancer. As a result, the prognostic value of the home care environment for such patients remains in a state of limbo. On the other hand, scattered reports have examined the establishment of prognostic tools in patients with end-stage cancer in the inpatient setting[7–10]. Among them, Morita et al.[11] proposed a palliative prognostic index (PPI) that predicts short-term prognosis in a simple way. The PPI allows for a high probability of predicting death within 21 days in patients in the palliative ward. Subsequent follow-up studies on PPI have been conducted around the world and have proven to be highly accurate in predicting prognosis for 21 days[10,12].

Based on the above background information, we wondered whether PPI could be used as a prognostic tool in the field of end-of-life care at home. However, it is known that performance status (PS) itself, which is also included in the PPI score, is a stand-alone prognostic factor[13], and it is quite possible that PS itself is a stronger prognostic factor than PPI. Thus, the purpose of this study is to examine the usefulness of PS and PPI as a prognostic tool for predicting prognosis after patients are transferred to home care, in cases where the patient has undergone end-of-life care at home after being treated for the primary illness at a medical institution.

Materials and Methods

Patients

Of the 136 patients with cancer who were referred by medical institutions to Home Clinic Naginoki (HCN) (Ibaraki, Japan) between March 2019 and December 2021 for end-of-life treatment and end-of-life care, four patients who were readmitted to the referring institution to receive end-of-life care were excluded. The remaining 132 patients who received end-of-life care at home were included in this study. All procedures were performed in accordance with the Declaration of Helsinki. This study was approved by the Ethics Committee of Tsukuba Medical Center Hospital (approval number: 2023-001).

Methods

We used medical records to retrospectively collect information on patients at the time of referral to HCN, to test the usefulness of PPI as a prognostic tool in the home end-of-life care setting. In addition to the PPI endpoints (PS, food intake, presence or absence of edema, presence or absence of dyspnea at rest, presence or absence of delirium), the age of each patient and primary focus of malignant tumor were evaluated. Presence or absence of dementia, history of cancer treatment (chemotherapy, surgery, radiotherapy), referring medical institution, number of days from referral to first intervention by HCN, and information on care givers were also collected. Further, time course data were collected, to examine mortality during the 21 days following the HCN intervention date.

If the patient's PS is poor, the PPI is likely to be high, and PS has been shown to be as an independent predictor of prognosis in a variety of settings[13]. There is a strong correlation between Karnofsky Performance Status (KPS) and Eastern Cooperative Oncology Group (ECOG) PS[14,15] and the Palliative Performance Scale (PPS)[16], which is a modification of the KPS in the area of palliative care and one of the PPI constituents. Since the ECOG PS can be easily evaluated, we tested whether it alone could predict prognosis in the home end-of-life care setting and compared its accuracy with that of the PPI. We also used the aforementioned patient information to test for differences in patient background between the 21-day survival and death groups from the HCN intervention. PPI scores were compared for each medical facility, with the goal of examining whether the timing of referrals differed among medical facilities.

Definitions

The PPI score of each patient was calculated based on the status on the date of the first HCN visit. Morita et al. reported that a PPI score above six is predictive of death within 21 days[11]. For this reason, we defined the PPI-High group as those patients with PPI >6 and the PPI-Low group as those with PPI ≤6 on the date of their first

visit to the HCN. Details of the items used in the PPI are presented in **Supplemental Table 1** (https://doi.org/10.1272/jnms.JNMS.2024_91-107).

The fifth version of the diagnostic and statistical manual of mental disorders (DSM-5)[17] was used to assess delirium, which is included in the PPI, and dyspnea was assessed based on the patient's own complaints. Patients on oxygen were considered to have dyspnea.

Overall survival (OS) was defined as the number of days from the date of the first HCN visit to the date of death. The group of patients who died within 21 days of the intervention was defined as the group of patients who died within 21 days (GPD), and the group of patients who survived beyond 21 days was defined as the group of patients who survived more than 21 days (GPS).

Palliative Care at HCN

Treatment for the underlying disease was continued, as long as internal medication was available. If the patient was found to be restless and dyspneic, a clonazepam suppository was initiated. If delirium was observed, quetiapine or other drugs were administered. When sedation was required, suppositories (bromazepam, phenobarbital) or injections (midazolam) were used for intermittent sedation, and continuous sedation was administered as needed. Pain control was achieved using oral, patch, injection, and suppository narcotic administration. In patients with poor oral intake, extracellular fluid of about 250-500 mL/day was sometimes administered subcutaneously, depending on the situation. Ceftriaxone was administered at the time of fever, when bacterial infections were suspected. If there was concern that the prognosis might be shortened due to infection, the patient was admitted to the hospital from which he or she was referred, taking the family's wishes into consideration. If the clinical course suggested tumor fever, acetaminophen or naxoprofen was administered, while betamethasone 4-8 mg/day was given if the prognosis was within one month.

If the patient required or desired continuous blood transfusion, he/she was readmitted to the hospital from which he/she was referred. In such cases, the patient was not included in this study because this was not end-of-life at-home care.

Statistical Analysis

The χ-square test was used to analyze the nominal variables. If there were fewer than five values in any column of the 2 × 2 table, Fisher's exact test was used in the analysis. The nonparametric Mann-Whitney U test was used to determine the statistical significance of differences in median values. All statistical tests were performed with two-tailed tests. The Kaplan-Meier method and log-rank test (the decrease method using the p value) were used to analyze OS. Events at a significance level of $p < 0.05$ were considered statistically significant.

Statistical analyses were performed using GraphPad Prism (version 7.05 for windows, Graphpad Software, La Jolla California) and EZR (version 1.54; Saitama Medical Center, Jichi Medical University, Saitama, Japan)[18].

Results

Patient Background

The patient backgrounds of the 132 patients who were included in this study are shown in **Table 1** and **Supplemental Table 2** (https://doi.org/10.1272/jnms.JNMS.2024_91-107). The median patient age was 77 years (range 3-96), and our analysis included 68 men and 64 women. By primary site, lung cancer was the most common, with 21 patients (15.9%), followed by stomach cancer (12.1%), pancreatic cancer (10.6%), and colon cancer (9.8%). Seventy-two (54.5%) had a history of chemotherapy, 39 (29.5%) had a history of radiation therapy, and 46 (34.8%) had a history of surgery. In addition, 26 patients (19.7%) had dementia. The ECOG PS was significantly higher in the PPI-High group, in which breast cancer was significantly more frequent (p=0.034), while hepatobiliary pancreatic carcinoma was significantly more frequent in the PPI-Low group (p=0.028). There were no significant differences between the PPI-Low and PPI-High groups in the other parameters, including the number of days required for HCN to intervene from the time of referral.

The main caregiver characteristics included a significantly higher proportion of men in the PPI-High group (p=0.039) and a significantly higher proportion in their 70 s (p=0.042). Otherwise, there were no significant differences between the PPI-Low and PPI-High groups in terms of the number of caregivers, their age, or their relationship to the patients themselves.

Comparison of Survival with PPI Score for Patients Receiving Home Visit Intervention

The OS of all 132 referred patients is shown in **Figure 1A**. The median survival was 19 days (range 0-401 days).

OS values stratified into PPI-High and PPI-Low cohorts are summarized in **Figure 1B and C**. The PPI-High group had a significantly shorter prognosis than the PPI-Low group (median survival: 41 days in PPI-Low group vs. 7 days in PPI-High group; overall follow-up: HR 11.66, 95% CI 6.84-19.87, p<0.001; 30-day termination: HR

Table 1 Backgrounds of Patients and the Bereaved Families

	Total		PPI-High		PPI-Low		*p* value (PPI-Low vs. PPI-High)
	No.	%	No.	%	No.	%	
Patients	132	100.0	55	100.0	77	100.0	
Days from referral to first visit, median (range)	3 (0-65)		1 (0-65)		4 (0-64)		0.290
Age, median (range)	77 (3-96)		77 (32-92)		78 (3-96)		0.897
Sex (male/female)	68/64		27/28		41/36		0.638
Performance status (ECOG)							
0	0	0.0	0	0.0	0	0.0	1.000
1	8	6.1	0	0.0	8	10.4	0.021
2	14	10.6	0	0.0	14	18.2	<0.001
3	43	32.6	12	21.8	31	40.3	0.038
4	67	50.8	43	78.2	24	31.2	<0.001
Primary tumor sites							
Gastrointestinal	45	34.1	20	36.4	25	32.5	0.642
Hepatobiliary Pancreatic	32	24.2	8	14.5	24	31.2	0.028
Lung	21	15.9	12	21.8	9	11.7	0.117
Breast	9	6.8	7	12.7	2	2.6	0.034
the Others	25	18.9	8	14.5	17	22.1	0.276
Chemotherapy history	72	54.5	30	54.5	42	54.5	1.000
Radiotherapy history	39	29.5	16	29.1	23	29.9	0.923
Surgical history	46	34.8	22	40.0	24	31.2	0.294
Dementia	26	19.7	10	18.2	16	20.8	0.711
Bereaved families							
Number of people							
0	3	2.3	0	0.0	3	3.9	0.265
1	33	25.0	10	18.2	23	29.9	0.126
2	47	35.6	22	40.0	25	32.5	0.373
≥3	49	37.1	23	41.8	26	33.8	0.345
Key person							
Age							
<50	28	21.2	11	20.0	17	22.1	0.773
50-59	29	22.0	9	16.4	20	26.0	0.189
60-69	32	24.2	15	27.3	17	22.1	0.131
70-79	33	25.0	19	34.5	14	18.2	0.042
≥80	3	2.3	0	0.0	3	3.9	0.265
NA	7	5.3	1	1.8	6	7.8	0.238
Sex (male/female)	32/93		19/35		13/58		0.039

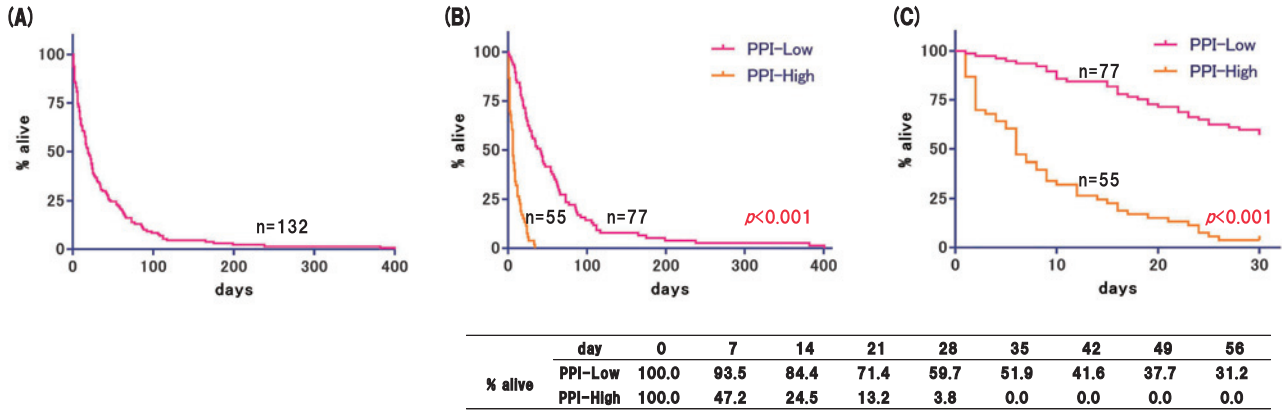
Abbreviation: PPI; Palliative Prognostic Index, ECOG; Eastern Cooperative Oncology Group, NA; not available.
※ Some items have missing values due to retrospective analysis.

10.38, 95% CI 6.08-17.74, $p<0.001$). The sensitivity for 21-day death was 69.1%, and the specificity was 87.5%. Thus, the PPI score adequately predicts patient prognosis for 3-4 weeks in the at-home end-of-life care setting as well as in the palliative ward.

Impact of PPI on OS Based on ECOG PS

Since ECOG PS was significantly higher in the PPI-High group, we examined the prognostic impact of the PS itself. First, OS was analyzed by stratifying the entire patient population by ECOG PS (**Fig. 2A**). All patients with an ECOG PS of 1 or 2 were represented in the PPI-Low group and had a good prognosis (median survival not reached within 30 days; 21-day survival 90.1%). Compared to this group, the ECOG PS 3 and 4 groups had a significantly poorer prognosis (median survival: PS 3 group 24 days vs. PS 4 group 9 days; 21-day survival: PS 3 group 55.8% vs. PS 4 group 27.7%).

In the ECOG PS 3 group, the PPI-High group had a significantly poorer prognosis than the PPI-Low group (HR 4.44, 95% CI 1.57-12.53, $p=0.005$) (**Fig. 2B**). The same observation was identified for the ECOG PS 4 group, in which the PPI-High group had a significantly worse prognosis than the PPI-Low group (HR 5.35, 95% CI 2.98-9.59, $p<0.001$) (**Fig. 2C**).



	day	0	7	14	21	28	35	42	49	56
% alive	PPI-Low	100.0	93.5	84.4	71.4	59.7	51.9	41.6	37.7	31.2
	PPI-High	100.0	47.2	24.5	13.2	3.8	0.0	0.0	0.0	0.0

Fig. 1 Overall survival.

The overall median OS was 19 days. (A) Overall survival. (B) Analysis during the entire follow-up period, with patients stratified into PPI-Low and PPI-High groups. (C) Analysis of 30-day termination of home visit intervention, with patients stratified into PPI-Low and PPI-High groups.

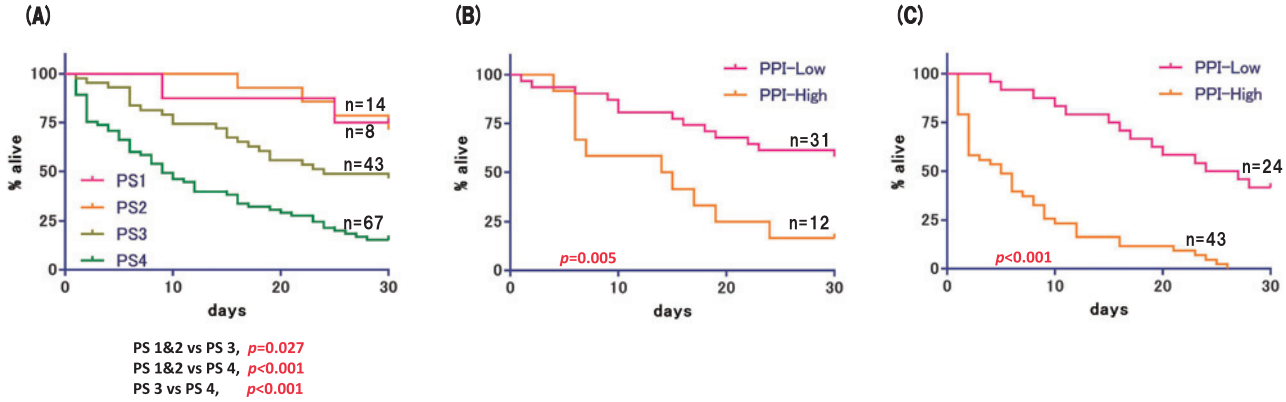


Fig. 2 Effect of ECOG PS on OS.

(A) Results for the patient cohort as a whole. (B) The effect of PPI on OS in the ECOG PS 3 group. (C) The effect of PPI on OS in the ECOG PS 4 group.

Comparison of Clinical Characteristics between the GPD and the GPS Cohorts

Table 2 and **Supplemental Table 3** (https://doi.org/10.1272/jnms.JNMS.2024_91-107) show the patient background, and ECOG PS was generally worse in the GPD group than in the GPS group. The proportion of patients with PPI-High scores was significantly higher in the GPD group than in the GPS group (p=0.011), significantly more patients had gastrointestinal cancer (p=0.031), significantly more patients had three or more caregivers (p=0.001), and significantly more patients had key persons in their 70s (p=0.027). No significant differences were found between the GPD and GPS groups in other items that were investigated in this study.

Comparison of PPI of Referred Patients per Referring Medical Facility

The PPI of referred patients is summarized for each medical institution and is shown in **Table 3**. Among institutions with a referral history of five or more patients, three facilities had more than half of the patients with PPI-High. In some institutions, especially in Facility G, the number of patients who were PPI-High exceeded 70%. There was no difference in the percentage of individuals who were classified as PPI-High among referred patients, depending on whether each facility had a palliative care team.

Discussion

This study included 132 patients who were referred from other institutions for end-stage carcinoma, and the findings allowed us to analyze a patient population with no significant bias in patient background. In predicting 21-day prognosis in the field of end-of-life home care for patients with cancer, the PPI was shown to be a useful prognostic tool in the fields of home care and home end-of-life care. On the other hand, as shown in **Figure 1**, the

Table 2 Backgrounds of Patients and the Bereaved Families (GPD vs GPS)

	Total		GPD		GPS		*p* value (GPD vs. GPS)
	No.	%	No.	%	No.	%	
Patients	132	100.0	70	100.0	62	100.0	
Days from referral to first visit, median (range)	3 (0-65)		2 (0-65)		4 (0-28)		0.744
Age, median (range)	77 (3-96)		77 (28-92)		79 (3-96)		0.617
Sex (male/female)	68/64		36/34		32/30		0.983
Performance status (ECOG)							
0	0	0.0	0	0.0	0	0.0	1.000
1	8	6.1	1	1.4	7	11.3	0.026
2	14	10.6	1	1.4	13	21.0	<0.001
3	43	32.6	19	27.2	24	38.7	0.157
4	67	50.8	49	70.0	18	29.0	<0.001
PPI							
≤6	55	41.7	22	31.4	33	53.2	0.011
>6	77	58.3	48	68.6	29	46.8	
Primary tumor sites							
Gastrointestinal	45	34.1	18	25.7	27	43.5	0.031
Hepatobiliary Pancreatic	32	24.2	18	25.7	14	22.6	0.675
Lung	21	15.9	13	18.6	8	12.9	0.374
Breast	9	6.8	6	8.6	3	4.8	0.500
the Others	25	18.9	15	21.4	10	16.1	0.438
Chemotherapy history	72	54.5	41	58.6	31	50.0	0.324
Radiotherapy history	39	29.5	22	31.4	17	27.4	0.614
Surgical history	46	34.8	26	37.1	20	32.3	0.557
Dementia	26	19.7	11	15.7	15	24.2	0.222
Bereaved families							
Number of people							
0	3	2.3	0	0.0	3	4.8	0.063
1	33	25.0	10	14.3	23	37.1	0.003
2	47	35.6	25	35.7	22	35.5	0.978
≥3	49	37.1	35	50.0	14	22.6	0.001
Key person							
Age							
<50	28	21.2	13	18.6	15	24.2	0.430
50-59	29	22.0	13	18.6	16	25.8	0.316
60-69	32	24.2	17	24.3	15	24.2	0.990
70-79	33	25.0	23	32.9	10	16.1	0.027
≥80	3	2.3	1	1.4	2	3.2	0.600
NA	7	5.3	3	4.3	4	6.5	0.579
Sex (male/female)	32/93		21/46		11/47		0.115

Abbreviation: GPD; Group of patients who died within 21 days, GPS; Group of patients who survived more than 21 days, PPI; Palliative Prognostic Index, ECOG; Eastern Cooperative Oncology Group, NA; not available.
※ Some items have missing values due to retrospective analysis.

21-day survival rate in the PPI-Low group was 71.4%, and about 30% of the patients in this cohort died within the study window. Complementing that problem, patients with an ECOG PS of 1 or 2 had a better prognosis, with a 21-day survival rate of 90.1%. This study shows that ECOG PS 1 or 2 has a favorable prognosis (by itself) and that using PPI in ECOG PS 3 or 4 leads to a more accurate prognosis prediction than using ECOG PS alone. Such a highly accurate prognosis will stimulate the need for prompt discussion of end-of-life care at the time of evaluation. Notably, a prompt accurate diagnosis also allows the patient himself/herself the opportunity to think about where he/she would desire to choose as his/her place of care at the time of death. The results of this study should help terminally ill patients with cancer make decisions about how to spend their final days.

The PPI naturally fluctuates daily, depending on the patient's condition. Therefore, as medical institutions

Table 3 Correlation between referring hospital and Patient PPI

Medical institution	Availability of palliative care team	Number of patients referred	PPI (Low/High)	Percentage of PPI-High cases
A	yes	25	13/12	48.0
B	no	24	12/12	50.0
C	no	17	12/5	29.4
D	yes	15	6/9	60.0
E	yes	14	10/4	28.6
F	yes	9	6/3	33.3
G	yes	7	2/5	71.4
H	no	6	5/1	16.7
I	no	3	1/2	66.7
J	yes	2	1/1	50.0
K	yes	1	1/0	0.0
L	no	1	1/0	0.0
M	no	1	1/0	0.0
N	yes	1	1/0	0.0
O	yes	1	1/0	0.0
P	yes	1	1/0	0.0
Q	yes	1	0/1	100.0
NA	NA	3	3/0	0.0

Abbreviation: PPI; Palliative Prognostic Index, NA; not available.

shift the focus of patient care to the home environment, the timing of prognostic evaluation using PPI is extremely important. As shown in **Table 1**, the time from medical referral to the first HCN intervention did not significantly different between the PPI-Low and PPI-High groups. In patients with rapid systemic deterioration, the PPI may change over a short period of time; however, such situations are unlikely to occur frequently patients. Furthermore, the current state of medical institutions' inability to accurately predict the prognosis of patients in the terminal stages of cancer is also apparent. One reason for this may be that the use of prognostic tools such as PPI to predict prognosis is not yet widespread in the medical field. In addition, certain situations that involve the shifting the patient care from the hospital to home care may not proceed as smoothly as expected, such as when patients and their caregivers have limited understanding or when problems arise in preparing and adjusting the care environment. Thus, it is difficult to establish specific criteria for when PPI-based evaluations should be performed at medical institutions. In addition, the conscious and continuous evaluation of the patient's condition with PPI is required in cancer treatment field.

An examination of the percentage of patients who were PPI-High by each referring medical institution indicated that several medical institutions that referred patients who were PPI-High more frequently than others (**Table 3**). Moreover, whether or not the institution had a palliative care team did not relate to the percentage of individuals who were PPI-High among the referred patients. There are various possible causes for this beyond the realm of speculation. Such problems may include a more optimistic prognosis than reality provided by the health care provider, health care providers not providing and sharing information to patients and caregivers who do not envision end-of-life care options at an early stage, and insufficient coordination between the palliative care team and the discharge coordination department. If medical staff and referring physicians thoroughly consider our study results, they will undoubtedly become enabled to make improved end-of-life care decisions and prognoses in a more timely manner as the primary focus of patient care shifts from hospital to at-home settings. This will help ensure that patients spend as much of their precious time as possible at home with their families.

A systematic review has shown that delirium is an important prognostic factor in patients with advanced cancer. Notably, a study by Morita et al.[11] reported that 38% of patients presented with delirium. Additionally, a Japanese multicenter study[19] found that the prevalence of delirium (based on DSM-4 diagnostic criteria) at the initial presentation in patients with advanced cancer admitted to a general ward and referred to a palliative care team, in patients with advanced cancer admitted to a palliative care ward, and in patients with advanced cancer treated

at home was 22.6%, 28.3%, and 13.6%, respectively. In this study, delirium diagnosed according to DSM-5 criteria was observed in 32 of 132 patients (24.2%). Previous studies have pointed out the risk of misinterpreting the assessment of delirium using PPI due to the skill of the evaluator. In the home visit setting, where only temporary patient observation and not sustained patient observation is performed, the assessment of delirium can be ambiguous. Based on the frequency of delirium similar to previous reports, we believe that the evaluation of delirium at HCN was performed appropriately. To ensure the accuracy of PPI, a thorough assessment of delirium is necessary, that involves close information sharing with the referring institution and caregiver.

In addition to the PPI, the other prognostic tools in the palliative ward are widely known and include the palliative prognostic score (PaP score)[20] and the prognosis in palliative care study predictor models (PiPS)[8]. Compared to PPI that can be used simply, these prognostic tools require the collection of additional clinical information, such as imaging findings, tumor characteristics, and blood test results. In this study, we were limited in our ability to collect this information due to the retrospective analysis. In the future, we would like to reexamine the usefulness of these prognostic tools in the field of end-of-life at-home care, with the cooperation of collaborating medical institutions.

In the caregiver study, the proportion of caregivers in their 70s was significantly higher in the GPD group than in the GPS group. We believe that this is because the GPD group included many PPI-High cases (of course with poor prognosis), and the PPI-High group originally included many care givers in their 70s. The high percentage of elderly patients who are care givers in the overall patient population analyzed in this study may be indicative of the current aging of the Japanese society. The number of patients who were included this study was 132, which is insufficient, and additional studies are needed to further verify our findings and confirm the influence of caregivers among diverse populations of patients with cancer.

A limitation of this study is that the satisfaction of the patients themselves and their caregivers could not be tracked due to the fact that this was a retrospective analysis. The caregiver's acceptance of reality is considered differ immediately after death and after a certain period of time has elapsed. For the sake of convenience, this study was conducted using 21 days after the home-visit intervention as a delimitation. However, we have not been able to evaluate whether this 21-day period spent in the home care environment is appropriate. In the future, aim to collect patient and caregiver satisfaction data prospectively, and in addition to prognosis prediction, we would like to further examine the requirements for end-of-life care in the home environment. We believe that the combined analysis of these studies and prognostic predictions, such as those in this study, will enable us to propose the appropriate timeframe for the introduction of end-of-life at-home care.

In the setting of end-of-life at-home care for patients with carcinoma, prognosis prediction based on PPI is sufficiently useful and can be made more accurate by taking into account that an ECOG PS of 1 or 2 alone is associated with a good prognosis. When a medical institution is dealing with a patient with terminal stage cancer who may be referred to home care, it is important to continuously assess the patient's condition and predict prognosis based on PPI, from as early a stage as possible.

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