

Original Article

Development of an Instrument to Measure Patient Perception of Information Privacy: Patients' Information Privacy Scale (PIPS) and Convenient Privacy Checklist (CPC)

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In this study, a Patients' Information Privacy Scale (PIPS) and a Convenient Privacy Checklist (CPC) were developed, and the validity and reliability of the instruments were examined. This study was conducted in 3 stages : 1) Developing the Patients Information Privacy Scale, 2) Developing Convenient Privacy Checklist, and 3) Conducting a main test to examine those scales. A total of 595 patients were selected from 37 facilities in three prefectures, as samples for the main study. Valid response rates were 40.2%. The PIPS was analyzed using factor analysis. As a result, four factors, "Treatment-Related Information," "Identification-Related Information," "Daily Life-Behavior Related Information" and "Personal Life-Related Information" were extracted (Chronbach' s $\alpha=0.978$). Through the examination of the criterion-related validity, construct validity, and stability, the PIPS was confirmed as a valid and reliable instrument. The CPC was analyzed by examination of representative nature of the items, the correlations between each CPC item and the factor of the PIPS, respectively. The result confirmed the efficiency of the checklist. This study shows that the PIPS and the CPC can be meaningful instruments in the evaluation of how to balance the right of information privacy against the practical needs for information sharing.

Key words : Patients' information, Scale, Convenient privacy checklist, Information privacy, Interdisciplinary communication

1. Introduction

Along with the challenges of an aging society in Japan, advances in our knowledge about the structure of complicated diseases and medical technologies available to treat them, healthcare professionals are required to continuously improve cost containment and high-quality care. Under these circumstances, in 2001, the Ministry of Health,

Labor and Welfare set an objective called, "Establishment of Healthcare Information System" as a core strategy to facilitate interdisciplinary communication by information sharing in order to provide better approaches to many of the problems facing the health care profession¹⁾. In working toward meeting the objective, an electronic medical health records (EMR) system has been implemented at hospitals with more than 400 beds.

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However, with rapid implementation of EMRs, a debate has ensued over whether information privacy is properly protected among healthcare professionals. At the same time, people's concern for information protection is markedly growing as news spreads about enforcement of the Personal Information Protection Law enacted in Japan in April 2005. Also, recent changes in attitudes about the right of privacy have been extended to include "the right to control personal information"²⁾. Thus, maintaining the balance between protecting the privacy of patients' information and adequately sharing patients' information for legitimate health care purposes has become a critical issue.

In order to strike a reasonable balance in this matter, investigations of patient perceptions and expectations about information privacy are warranted. Most studies to date related to patients' privacy have focused on daily life in a hospital³⁻⁵⁾, patients' information privacy as perceived by nurses⁶⁻⁸⁾, and security issues related to EMRs^{9,10)}. A review of the literature reveals very few studies focused on patients' perceptions and expectations regarding privacy. Also, there is no study that investigates patients' perception of information privacy using an objective instrument to collect and evaluate information. Therefore, a primary purpose of this study is to develop an instrument to measure patients' perception of information privacy, Patients Information Privacy Scale (PIPS), and to develop a Convenient Privacy Checklist (CPC) to identify patient expectations on information sharing and information privacy.

2. Theoretical Framework for Privacy

As the theoretical framework for this study, Katagiri's concept of privacy was employed¹¹⁾. Katagiri proposed an interactive model of privacy based on Goffman's theory. As he defined it, "personal space" consists of individual space, individual information, and individual belongings. He defined privacy as "the personal space which

arouses unpleasant feelings when invaded," and it is affected by relationships with others. Katagiri's concept of privacy offers an efficient framework to investigate perceptions of privacy, since patients' perceptions of privacy are directly affected by their relationships with healthcare professionals.

The concept of self-disclosure in Shimada's Self-disclosure Questionnaire (SSDQ) is defined as "the degree to which self-disclosed information express the areas private to the person making the disclosure,"¹²⁾ and a definition similar to the theoretical concept of privacy. Although SSDQ basically consists of questions to measure openness related to one's personal life, and not particularly in relation to health information, another instrument suited to the measure of patient openness and privacy can not be found in the Japanese literature. Therefore, SSDQ was used to examine the criterion-related validity of PIPS.

3. Method

This study was conducted in 3 stages. In Stage 1 the instrument is developed, in Stage 2 the checklist is developed, while in Stage 3 a descriptive study is conducted to test the reliability and validity of the instrument and checklist. Ethics approval for this set of studies was obtained from the Ethics Review Committee of Nagoya University School of Medicine.

1) Stage 1 : Developing Patients' Information Privacy Scale

To develop the PIPS instrument, the following 5-step process was employed : 1) item pool, 2) 1st expert evaluation, 3) pilot study, 4) focus group meeting, and 5) completion of 2nd expert evaluation peer review.

As the first step of the PIPS development, semi-constructed interviews with 17 patients and 13 nurses were conducted using 2 facilities from 2 prefectures for the item pool. As a result of the content analysis of each interview, 74 sentences, which described information privacy, were extracted. The sentences were grouped by sentences with

similar content. As a result, the groups were categorized into 7 main themes, which included 18 items that related to information privacy. Also, based on a comprehensive review of the literature, nine items were added, which are considered to be private information that nurses generally collect in the course of providing patient care. Through the process, 27 items were finally defined as PIPS items, and the first draft version of the PIPS was developed. Then, to assure content validity of the instrument, an expert evaluation was conducted by three nursing experts whose area of expertise is privacy issues in nursing, and the instrument was then revised based on the evaluation.

As a next step, a pilot study was carried out to examine whether the PIPS appropriately measures perceptions of information privacy of hospitalized patients (convenient samples of 129 patients and 169 nurses).

Based on the pilot study, four factors were extracted : 1) Treatment-Related Information, 2) Identification-Related Information, 3) Daily Life Behavior-Related Information, and 4) Personal Life-Related Information (Cronbach' s coefficient alpha : Cronbach' s $\alpha=0.93\sim0.80$). For the further refinement of the PIPS, two focus group meetings consisting of three patients or five nurses were held

respectively, and then, the second expert evaluation was made. Finally, the PIPS was revised upward from 27 to 26 items, which were scored using a 6-point Likert scale.

2) Stage 2 : Developing Convenient Privacy Checklist

Since the PIPS basically measures the perception of patients' information privacy by asking the degree to which he/she would allow his/her privacy related information to be shared with hospital workers, it cannot measure patients' intentions with regard to whom he/she in particular wishes to share each item of information in the PIPS. Therefore, another tool would be needed to directly confirm patients' intention about information sharing. This additional tool must be readily applicable within the extremely busy clinical nursing setting, and must reflect the representative items of PIPS, which was developed based on the core framework of privacy. For the reasons stated above, development of the Convenient Privacy Checklist (CPC) suitable to clinical settings was attempted by simplifying the PIPS.

In the process of the CPC item selection, the representative items from the PIPS were determined by examining three conditions, 1) the degree of influence of Cronbach' s α , 2) representational validity of the item for each factor, and 3) ease of

Your medical records carry much information. As to information written under the using checklist (①~④), please enter 'NO' in all columns in which you do not wish to allow access by the relevant medical professionals

Profession	Professionals with Possible Access to Your Record	Information in Your Record			
		① Diagnosis	② Date of Birth	③ Sleeping Habits before Hospitalization	④ History of Family Disease
a. Doctor	1) Your attending doctor				
	2) Doctors involved in your treatment				
	3) Doctors never involved in your treatment				
b. Nurse	1) Your primary nurse				
	2) Nurses providing for your care				
	3) Nurses never providing for your care				
Nurse Aide	1) Nurse Aide in your unit				

Fig. 1 An Example of the Convenient Privacy Checklist

patients' understanding. Through the examination, "Diagnosis," "Date of Birth," "Sleeping Habits before Hospitalization," and "History of Family Disease" were defined as the items representative of each extracted PIPS factor.

Then, the CPC was finally developed as shown in **Figure 1**. Participants were asked to check "NO" in each column whenever he/she did not wish to share the information with professionals. The professions were categorized into doctors, nurses, nurse's aides, pharmacists, physical therapists (PT)/lab technicians (Lab Tec.), social workers (SW), and clerks. Each profession was further subdivided into 2 or 3 groups based on the relationship with patients.

3) Stage 3 : Main Study to Test Instrument Reliability and Validity

a. Sampling Method

All hospitals with more than 200 beds in A prefecture, G prefecture, and M prefecture, listed in a hospital list book in 2003-2004¹³⁾, were selected as samples. Among them, 37 hospitals (23 from A prefecture, 7 from G prefecture, and 7 from M prefecture) agreed to conduct the study, and a survey questionnaire was sent to these hospitals (with a total of 595 patients and 1770 nurses). Patient eligibility was limited to 20 years or older in whom cognitive or physical impairment would not prevent completion of the questionnaire.

Also, in order to develop an instrument and checklist applicable to patients in various settings, the widest array of patients possible were selected as samples without specifying sex, target age, categories of diseases, and treatment methods.

b. Study Design and Procedure

Respondents were asked to complete an anonymous self-administered survey questionnaire that included demographic items, the PIPS, the CPC, and Shimada's Self-disclosure Questionnaire (SSDQ) for criterion-related validity along with questions based on the theoretical framework of privacy (Privacy Questionnaire : PQ). The PQ consisted of seven questions involving situations in which patient

privacy was invaded in hospital life. The questionnaire was collected by a mailing method, and the data collecting period was from May 15, 2006 to June 30, 2006. To clarify PIPS reliability, a test-retest method was applied to participants who agreed to carry out re-test of the same questionnaire two weeks later.

Although respondents included patients and nurses, the purpose of the study was to examine reliability and validity of the instrument to measure patients' perception of information privacy. Therefore, data from only patient respondents were employed for analysis in the present study.

c. Methods of Analysis

An exploratory factor analysis, an unweighted least squares analysis with promax rotation, was performed, and Cronbach's α was used to determine internal consistency. For the analysis of criterion validity, construct validity, and stability (test-retest) of the PIPS, the Pearson correlation analysis was conducted. SPSS version 13.0 was used for analysis in the present study.

4. Result

The response rates were 46.9% (n=279) from patient respondents. Respondents with more than 3 missing PIPS values were dropped, and the final valid response rate was 40.2% (n=239).

1) Demographic Data

Respondents ranged in age from 20 to 91 years (mean 54.7 ± 15.6) ; 59% were male and 41% were female. Other demographics, educational background, occupation, hospitalized experience, diagnosis, duration of hospitalization, are shown in **Table 1**.

2) Result of Patients' Information Privacy Scale (PIPS)

a. Factor Analysis

Before the factor analysis, the PIPS data were examined on the distribution patterns, ceiling effect and floor effect. No item showed extreme-value distribution. Then, an unweighted least squares

Table 1 Demographics

Demographics	No.	%
(n=239)		
Sex		
Male	141	59.0
Female	98	41.0
Age	54.7±15.6 (20~91)yrs.	
Educational Background		
Junior High School	51	21.3
High School	106	44.4
Vocational School	24	10.0
Junior College	20	8.4
University	30	12.6
Missing	8	3.3
Occupation		
Employee	76	31.8
Self-Owned Business	39	16.3
Housewife	62	25.9
Unemployed	31	12.1
Other	29	13.0
Missing	2	0.8
Diagnosis		
Infectious Disease	6	2.5
Neoplasms	41	17.2
Diseases of the blood	7	2.9
Metabolic diseases	17	7.1
Diseases of the nervous system	11	4.6
Diseases of the eye & ear	7	2.9
Diseases of the circulatory & respiratory system	26	10.9
Diseases of the digestive system	37	15.5
Diseases of the skin & musculoskeletal system	49	20.5
Diseases of the genitourinary system	3	1.3
Pregnancy, childbirth and the puerperium	18	7.5
Other	5	7.1
Missing	12	5.0
Hospitalized Experience		
First Time	55	23.0
Second Time	64	26.8
More than Three Times	119	49.8
Missing	1	0.4
Duration of Hospitalization	28.4±46.9 (1~370)days	

analysis with promax rotation was performed. From the first analysis, the values of “Q 7 : Relationship with your family” and “Q 22 : Confidential talk with your doctor or nurse” showed cross-loadings and greater than 0.40. Therefore, Q 7 and Q 22 were dropped from the PIPS question items, and then the second factor analysis was performed on the remaining 24 items. As a result, four factors, which were the same as in the pilot study, were extracted.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.950. As shown in **Table 4**, factor 1 was defined by 9 of the items, and was labeled “Treatment-Related Information.” Factor 2 was defined by 6 of the items, and was labeled “Identification-Related Information.” Factor 3 was defined by 4 of the items, and was labeled “Daily Life Behavior-Related Information.” Then, lastly, Factor 4 was defined by 5 of the items, and was labeled “Personal Life-Related Information” (**Table 2**). Correlations among the four factors showed a relatively strong correlation (**Table 3**).

b. Internal Consistency Reliability

The internal consistency for the PIPS and each factor was estimated using Cronbach's α . The computed values of Cronbach's α for the PIPS, Factor 1, Factor 2, Factor 3, and Factor 4 were 0.978, 0.962, 0.953, 0.947, and 0.894, respectively.

c. Construct and Criterion Validity

For construct validity, the Pearson correlation coefficients between the average of the PIPS score and seven questions derived from the theoretical framework of privacy (PQ) were calculated. Significant correlations were found between the average score of the PIPS and the average score of PQs ($r=0.387$, $p<0.000$). Also, the average PIPS score and each PQ were significantly correlated, respectively ($r=0.230\sim 0.351$, $p<0.01$).

The correlations between the PIPS and SSDQ were calculated. Significant correlations were found between Factor 4 of the PIPS and Factor 1 of SSDQ ($r=0.212$, $p<0.01$), and Factor 4 of the PIPS and Factor 2 of SSDQ ($r=0.166$, $p<0.05$).

d. Test-Retest Correlations (Reliability of PIPS Stability)

A retest was conducted for 90 participants who agreed to take the same test 2 weeks later. The response rate was 70.0% ($n=63$), and more than 3 missing PIPS values were dropped, for a final valid response rate of 62.2% ($n=56$). A test-retest correlation was performed, and as shown in **Table 4**, correlations between the test and the retest of each

Table 2 Factor Analysis (with Internal Consistency)(n=239 ; KMO : $\alpha=0.950$)

Q No.	Item	Factor Loadings				Communality
		Factor1	Factor2	Factor3	Factor4	
Factor 1 : Treatment-Related Information (Cronbach's $\alpha=0.9623$)						
14	Laboratory Results	0.872	-0.131	0.036	0.114	0.779
15	Medication	0.836	-0.085	0.277	-0.091	0.854
16	Medical History	0.768	0.018	0.213	-0.045	0.829
17	Physical Disabilities	0.751	0.000	0.134	0.035	0.763
12	Progress of Treatment	0.675	0.335	-0.033	-0.025	0.825
11	Diagnosis	0.664	0.396	-0.050	-0.072	0.822
21	Toilet Habits	0.577	-0.115	0.282	0.215	0.762
13	Infection Data	0.521	0.061	-0.095	0.340	0.600
10	Worries during Hospitalization	0.511	0.156	-0.097	0.308	0.664
Factor 2 : Identification-Related Information (Cronbach's $\alpha=0.9533$)						
2	Name	0.018	0.988	0.034	-0.166	0.834
3	Date of Birth	-0.003	0.944	0.085	-0.092	0.872
4	Occupation	0.014	0.753	0.190	-0.011	0.788
1	Address/Telephone No.	0.057	0.710	-0.040	0.155	0.711
6	Family Structure	-0.081	0.686	0.021	0.341	0.826
5	Educational Background	-0.097	0.604	0.132	0.300	0.740
Factor 3 : Daily Life Behavior-Related Information (Cronbach's $\alpha=0.9468$)						
20	Sleeping Habits	0.159	0.092	0.786	-0.030	0.898
19	Diet	0.046	0.079	0.760	0.099	0.831
18	Allergy	0.256	0.155	0.640	-0.070	0.818
23	Alcohol or Smoking Habits	0.181	0.060	0.618	0.054	0.696
Factor 4 : Personal Life-Related Information (Cronbach's $\alpha=0.8941$)						
26	Sexual Life	0.082	-0.104	0.028	0.742	0.555
24	Personal Value	-0.041	0.034	0.226	0.684	0.699
25	Leisure Activity	-0.167	-0.094	0.543	0.633	0.760
9	Financial Problem	0.280	0.194	-0.172	0.590	0.723
8	History of Family Disease	0.185	0.306	-0.080	0.463	0.649
*Contribution Ratio		65.5	5.8	4.7	4.2	
*Accumulated Contribution Ratio		65.5	71.2	75.9	80.2	

*Accumulated Contribution Ratio based on Initial Eigenvalues
(Extraction Method: Unweighted Least squares-Promax Rotation)

Table 3 Correlations among Factors

Factor	1	2	3	4
1	1.000			
2	0.736	1.000		
3	0.689	0.628	1.000	
4	0.671	0.697	0.605	1.000

factor showed moderate significant correlations ($r=0.555\sim0.693$: $p<0.001$). Correlations between the test and the retest of each item also showed moderate significant correlations ($r=0.388\sim0.669$: $p<0.001$, $p<0.0001$).

e. Differences in PIPS Score according to Demographics, Size and Regions of Hospitals

An independent t-test, ANOVA, and Pearson correlation coefficients were used to examine the differences or relationships of the PIPS score among

demographics, size and regions of hospitals.

Significant but weak correlations were found between age and Factor 1 ($r=0.167$, $p<0.01$), Factor 3 ($r=0.130$, $p<0.01$), and total average PIPS scores ($r=0.145$, $p<0.01$).

'Female' showed a significantly lower score than 'male' for Factor 1, Factor 2, and total average PIPS scores ($p<0.05$). Among "Occupation" categories, patients in the group of 'housewife' showed a significantly lower score than 'self-owned business' and 'unemployed' for Factor 1, Factor 3, Factor 4 and a total average PIPS scores ($p<0.05$). Also, the group of 'housewife' patients showed a significantly lower score than 'unemployed' for Factor 2 ($p<0.05$).

Among "Hospitalized Experience" categories,

Table 4 Test-retest Correlations (n=56)

Factor	Pearson correlation (r)
Factor 1	0.678 ***
Factor 2	0.555 ***
Factor 3	0.641 ***
Factor 4	0.693 ***
Total	0.656 ***

***:p<0.0001

Table 5 Correlations between Representative Items and Factors

	Factor 1	Factor 2	Factor 3	Factor 4
Diagnosis	-0.230 **	-	-	-
Date of Birth	-	-0.185 *	-	-
Sleeping Habits before Hospitalization	-	-	-0.164 *	-
History of Family Disease	-	-	-	-0.232 **

*p<0.05 ; **p<0.01

patients with 'more than three times' showed a significantly higher score than 'first time' for Factor 1 (p<0.05), Factor 2 (p<0.05), Factor 3 (p<0.01), and a total average PIPS scores (p<0.05).

No significant differences were found among "Education background," "Diagnosis," "Size of Hospitals," and "Regions of Hospitals" categories, and no correlation was found between 'Duration of Hospitalization' and average PIPS scores.

3) Result of Convenient Privacy Checklist (CPC)

As a result of the factor analysis of the main test, the items composing four factors were almost the same as in the pilot study. Each of the checklist item, (1) Diagnosis, (2) Date of Birth, (3) Sleeping Habits before Hospitalization, and (4) History of Family Disease, was included in each of the 4 PIPS factor.

Using Pearson correlation coefficients, significant correlations were found between Factor 1 and (1) Diagnosis, Factor 2 and (2) Date of Birth, Factor 3 and (3) Sleeping Habits before Hospitalization, and Factor 4 and (4) History of Family Disease were found (Table 5). A significant negative correlation was also found between the average PIPS score and the total CPC score (r=-0.294, p=0.000).

5. Discussion

1) Construction of Patients' Information Privacy Scale (PIPS)

As a result of exploratory factor analysis of the PIPS (Table 4), patients' perceptions of information privacy was confirmed to be composed of four factors, "Treatment-Related Information," "Identification-Related Information," "Daily Life Behavior-Related Information," and "Personal Life-Related Information." The items included in each extracted factor are considered very important information in the range of care provided by all healthcare professionals. In particular, nurses not only use medical information, but also various other types of information related to life at home in order to provide nursing care. Therefore, the proven four factors relating to information privacy are considered to be very meaningful for the collection, use, and sharing of patients' information for treatment as well as protecting the hospitalized patients' information privacy.

2) Reliability, Validity, and Versatility of Patients' Information Privacy Scale (PIPS)

As a result of the factor analysis, each extracted factor consisted of more than four items with no cross-loadings among factor loadings, so no analytical problem was found. The accumulated contribution ratio based on Initial Eigenvalues was 80.2%, which was exceptionally high as a scale.

The computed values of Cronbach's α for the PIPS were 0.978 (0.894~0.962). Thus, the result showed a strong internal consistency for the PIPS. Also, the result of a test-retest showed significant correlations between each test-retest item average PIPS score (r=0.388~0.669, p<0.001, p<0.0001) as well as test-retest total average PIPS scores (r=0.697). Thus, the PIPS had relatively high stability.

The results showed significant correlations between the average PIPS score and the average score of the seven questions derived from the

theoretical framework of privacy¹¹⁾(PQ : questions considered to be situations in which privacy is invaded in hospital life), and also the total average PIPS score and each PQ item were significantly correlated ($r=0.230\sim 0.351$, $p<0.01$). As a result, the construct validity of the PIPS was confirmed.

The result showed significant correlations between Factor 4 of the PIPS and Factor 1 of Shimada's Self-Disclosure Questionnaire : SSDQ ($r=0.212$, $p<0.01$), and Factor 4 of the PIPS and Factor 2 of SSDQ ($r=0.166$, $p<0.05$). Originally, the basic concept of "self-disclosure" was defined as "the degree to which self-disclosed information express the areas private to the person making the disclosure."¹²⁾ Thus, items included in SSDQ were primarily related to daily and personal life. Although Factor 3 of the PIPS was named "Daily Life Behavior-Related Information" (Table 4), the items in Factor 3, including sleeping habits, allergy, diet, and alcohol or smoking habits, may have been considered lifestyle habits related to their health problems for patients. This is supported by the pilot study results from nurses that the items, such as allergy, are included in Factor 1 (Treatment-Related Information). Therefore, it was expected that no significant correlation would be found between Factor 3 of the PIPS and SSDQ, and a certain level of criterion validity was thereby confirmed.

Thus, all of the foregoing results establish the sufficient reliability and validity of the PIPS from various aspects.

In order to develop an instrument applicable in general to patients in various settings, samples were selected from as wide an array of patients as possible. As a result of the examination of differences or the relationship of the PIPS score to demographics, size and regions of hospitals, no significant relationships or differences were found except for age, sex, occupation, and hospitalized experience. The result indicates, as an instrument, PIPS is the instrument that may not be influenced by specific patients' conditions.

Although age and sex showed significant differences, Back⁴⁾ and Parrot⁵⁾ reported the same results from their previous studies on patients' privacy. This fact indicates that age and sex are indeed factors that affect patients' privacy perception ; therefore, it is safe to say that the PIPS could accurately measure those factors. As mentioned above, the PIPS could measure factors impacting patients' perception of privacy without influences of specific patient conditions, and, thus, a certain degree of generality (versatility) was assured. However, further investigation will be needed to determine the universality of the PIPS.

3) Usefulness of Convenient Privacy Checklist (CPC)

As shown in the results, four CPC items were confirmed to represent the PIPS because of matching to each factors and correlations between the factors and the CPC items. In addition, a significant negative correlation was found between average PIPS score and total CPC score ($r=-0.294$, $p=0.000$). This result indicated the efficiency of the CPC for reflecting patients' perceptions of information privacy and patients' intentions about information sharing. Hence, the CPC may be very useful in clinical settings to conveniently determine patients' expectations concerning information sharing.

Where EMRs have been rapidly implemented, the access to EMR is generally authorized by healthcare professionals. However, under the recent concept of privacy, "the right to control personal information" is very important for patients to decide with whom he/she finds it acceptable to share information in his/her medical record in order to protect patients' privacy. Also, recently, patients' awareness of privacy has been growing. Thus, helping patients to decide with whom their information may be safely shared is a very important aspect of protecting each individual' s right to control personal information. In the near future, a system which reflects patients' intentions about the right of information control will

be needed. From this point of view, the CPC is expected to assist professionals in the development of such a new system.

6. Conclusion

1) A valid and reliable instrument was developed to measure information patient perception of information privacy, the Patients Information Privacy Scale (PIPS), was developed.

2) An efficient and useful checklist, the Convenient Privacy Checklist (CPC), was developed.

3) The CPC is expected to be used as the basis for a new system that will reflect patients' intentions about the right to information control.

4) The PIPS and the CPC can be meaningful instruments for clinicians to discuss how to balance the right of information privacy against necessary information sharing.

Although the sample in the present study was large enough to perform a factor analysis, the samples were collected from only three prefectures by a convenient sampling method. Therefore, the PIPS needs to be verified at the national level to improve its validity and reliability.

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