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The Development of the "Monitoring Application for Inappropriate Expressions in Nursing Records" for PsyNACS©

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Abstract

Lengthening periods of hospitalization, increasing numbers of patients with age-related complications, and a shortage of nursing staff have been of great concern in medical psychiatry in Japan. Under these circumstances, countries such as Japan that face a super-aging society and a decline in the working-age population, have been recommended for use of advanced information and communications technology (ICT) to improve the efficiency of medical treatment and care. This study aims to develop the "Monitoring Application for Inappropriate Expressions in Nursing Records" for using PsyNACS©, which will enable psychiatric nursing plans to harness the advantages of ICT. The functions considered necessary are as follows: 1) identification of users who enter information; 2) a necessary database for lists of inappropriate expressions; 3) development of a matching function to recommend proper writing input and a warning function; and 4) a management function for an inappropriate expression list database. A demonstration experiment for developing the application in this study was conducted at a specialized psychiatric hospital. To introduce them to the application, nurses and nurse managers were informed about the system developed in this study, and a survey regarding their opinions on the functions of the application was conducted with ten nurse managers. The results were evaluated in terms of usefulness for nursing care, documentation, and the education of nurses from an ethical perspective. This study suggests that matching their input with an inappropriate expression database will allow nurses to record more appropriate expressions. From an ethical perspective, the ability to use appropriate expressions makes records more likely to withstand disclosure requests from patients and their families.

Keywords

PsyNACS©, Monitoring Application, Inappropriate Expressions, Nursing Records

1. Introduction

1.1. Present Situation in Psychiatry in Japan

Lengthening hospital stays, increasing numbers of patients with age-related complications, and a shortage of nursing staff have been of major concern in medical psychiatry in Japan [1] [2].

The "Restructuring Plan for Mental Healthcare and Medical Care" was implemented in 2004 by the Ministry of Health, Labor and Welfare to address the problem of prolonged hospitalization by implementing an outreach policy to promote a shift from hospital-based healthcare to community living. The aim was to discharge a total of 150,000 patients in the ten years from 2004 to 2013. However, the number of inpatients who were discharged was approximately 70,000, which did not meet the required goal [3] [4]. There are several reasons for the difficulties in supporting the required number of discharges. Psychiatric diseases are characterized by exacerbations and remissions [5] and are associated with a chronic course [6]. Furthermore, social stigma surrounding mental health negatively affects the quality of social support provided to patients [7] [8]. In particular, patients with schizophrenia, which accounts for the majority of psychiatric diseases, not only have subjective symptoms, such as hallucinations and delusions, but also dysfunction and disability [9] [10]. Social disadvantages are associated with these factors [11]. Considering these circumstances, the decisive factors for living in a community are appropriate medical treatment and care for age-related complications, adequate rehabilitation for discharge during hospitalization, and the readiness of communities to receive discharged patients.

As mentioned previously, direct psychiatric care for patients has become increasingly important [12]. However, a great deal of work by nursing staff, along with the increased amount of care, is a significant concern in psychiatry, as well as in other clinical settings, owing to the increased number of patients with aging-related comorbidities such as bone fractures, cancer, heart disease, and diabetes mellitus [13] [14]. Under these circumstances, countries such as Japan that face a super-aging society and a decline in the working-age population have been advocating for the use of advanced information and communications technology (ICT) to improve the efficiency of medical treatment and care [15] [16] [17] [18].

The introduction of electronic health records has also been promoted. The introduction ratio of electronic health records to large hospitals for general practice with 400 or more patient beds was 70.1% in 2015. The introduction ratio has increased annually. However, in 2020, the ratio of electronic health records introduction was less than 50% in hospitals with fewer than 200 patient beds [19] [20]. Especially, small hospitals face difficulties owing to the considerable cost of introducing an electronic health record system [21] [22].

To solve this problem, our investigation team developed the Psychiatric Nursing Assessment Classification System (PsyNACS©) [23] [24] in 2015, with the aim of computerizing and improving the quality of psychiatric nursing and

care. This system is available at a low cost and can be introduced by small hospitals.

Nursing is characterized by the provision of interpersonal services by nurses. These processes and outcomes of nursing practice, the accurate recording and preservation of nursing care are required by the Enforcement Regulations on the Medical Care Act in Japan. Nurses display more stigmatization and dehumanization toward people with a psychiatric disorder than toward people without a psychiatric disorder. These perceptions are associated with poorer patient care and increased structural discrimination [25]. Therefore, if nurses have a strong dehumanization problem with patients with psychiatric disorders, it may be expressed as an inappropriate description in the nursing record.

Electronic health records enable the uniform management of a large volume of records. However, all the content in nurses' free writing forms is automatically preserved. At present, these medical records can be requested for disclosure by patients or their bereaved families. Therefore, terms and expressions in records must be ethical, professional, and precise.

1.2. Purpose of This Study

This study aims to develop the "Monitoring Application for Inappropriate Expressions in Nursing Records" for use with PsyNACS©, which will enable psychiatric nursing plans to harness the advantages of ICT.

2. Developmental Method

2.1. Structure and Usage of PsyNACS©

First, enter information such as basic patient information (patient name, disease name, complications, family structure, insurance type, etc.). Next, the PsyNACS© database was categorized into nine patient assessment data (PAD), with twoto five cluster assessment data (CAD) each. PsyNACS© is a classification of items assessing healthcare needs within the Japanese psychiatric nursing care environment. This system can also be used in various psychiatric patient care situations in all psychiatric units. Thirty-one CADs comprise the patient assessment data: (PAD1) "psychological symptom and stress," (PAD2) "information about treatment," (PAD3) "function of eating, intake and output," (PAD4) "life and value," (PAD5) "vital signs and health assessment," (PAD6) "self-care," (PAD7) "social support," (PAD8) "activity, sleeping, and mobility capability," and (PAD9) "sexual function and sexual behaviour." Additionally, nurses can use this information to create nursing care plans for each type of PAD.

2.2. Contents and Functions of the Monitoring Application against Inappropriate Expressions in Records for PsyNACS©

This logical system detects inappropriate terms and displays recommendations for appropriate terms.

    1) Identification of users who enter information.

2) A necessary database for lists of inappropriate expressions.

3) Development of a matching function to recommend proper writing input, and a warning function.

4) A management function for an inappropriate expression list database.

PsyNACS© has blank spaces for writing freely as shown below (Figure 1).

Required Functions of the Monitoring Application Software against Inappropriate Expressions in Records

1) Identification of users entering information:

This system was designed to have a login function; access is not permitted without entering a username on the PsyNACS© login screen by a nurse who inputs information on the computer. Thus, the person who has updated the patient record can be identified (Figure 2).

2) Creating a database necessary for inappropriate expression list applications:

Sometimes, there are several cases of inappropriate expressions, such as infringement of human rights and unsuitable usage for a medical professional. Consequently, three categories were created: human rights protection (ethics), unsuitable usage for a medical professional, and improper descriptive usage (abbreviations and others).

A database containing a list of inappropriate expressions was created using information from websites and meetings of development team members. Questionnaire surveys were conducted with 16 head nurses working for specialized psychiatric hospitals in the Shikoku district regarding the contents and expressions that had been written in nursing records and used in daily operations. The data were carefully examined and added to the database. Subsequently, a default database was created (Table 1).

3) Development of the matching function to recommend appropriate writing inputs and the warning function:

We decided that the warning function should cover all written expressions in all the free-text entry fields. Consequently, in addition to free text in the nursing plan, the medical history and symptoms fields were covered as check targets. The timing of the warning is as follows: a warning is shown twice at "confirmation" after writing text and at "screen transition" after input. The two warning messages can reinforce user recognition. However, even when users are warned, the system allows them to input their original expressions as necessary, without modification. In some cases, these expressions have been used to describe patient complaints. To properly assess changes in the mental condition of psychiatric patients, patient descriptions must be recorded without modifications.

The warning system is designed to function as follows: in the case of an inappropriate input, a warning message is shown in the display (Figure 3), and when the recommended terms are listed, these terms are shown.

4) Management function for inappropriate expression list database:

Inappropriate items in the medical records, such as abbreviations and proper nouns, varied depending on the hospital department and hospital. From this
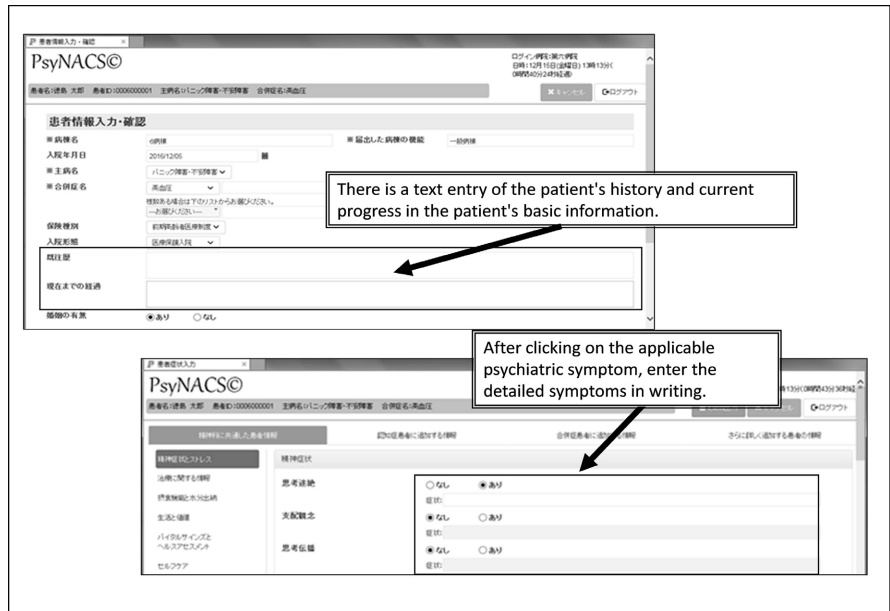
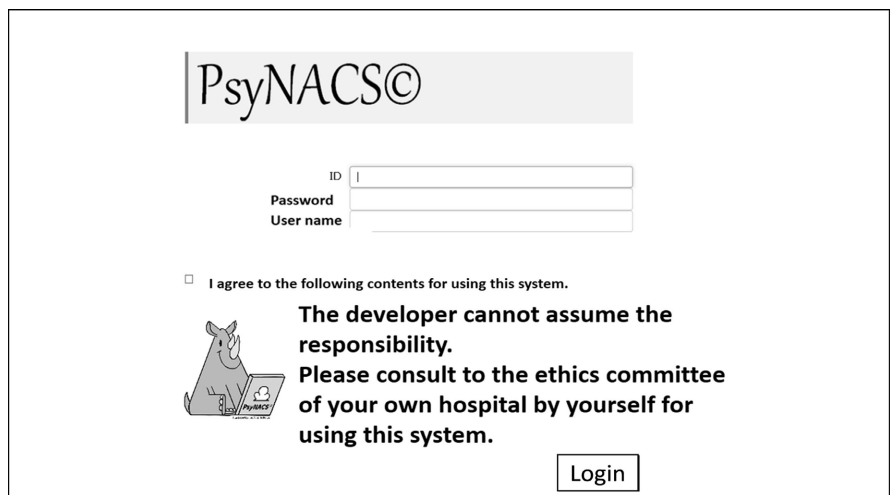**Figure 1.** Section in PsyNACS© where free writing is possible.

Figure 2. The login screen of PsyNACS©.

Table 1. A database containing a list of inappropriate expressions (example).

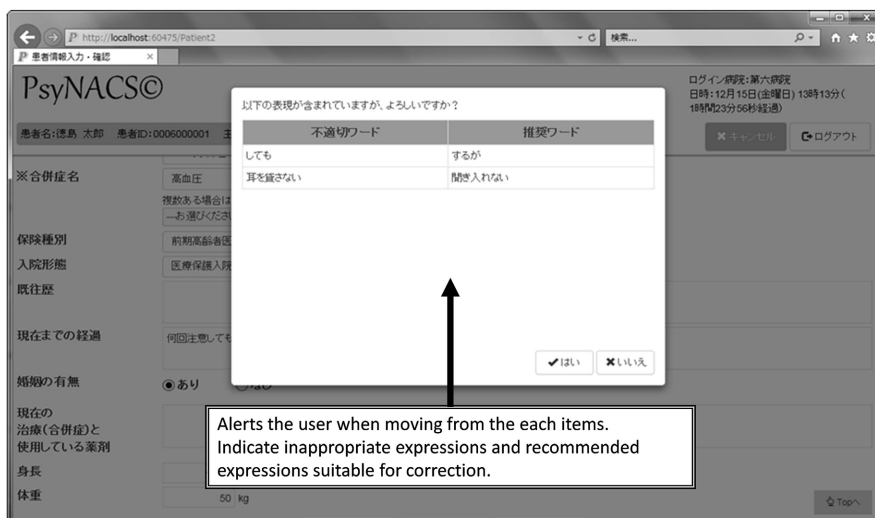| Human rights protection (Ethics)		Unsuitable as a medical professionals		Improper description usage (Abbreviation and others)	
Inappropriate expressions	Recommended terms	Inappropriate expressions	Recommended terms	Inappropriate expressions	Recommended terms
Dull	Poor response	Watch	Monitoring	GE	Glycerin enema
Stinky	Smell	Causative verb	Intransitive verb	VS	Vital sign
Fat	Obese	Disobedient	Not accepting	SW	Social worker
⋮	⋮	Insistent	Many times	S	Schizophrenia
⋮	⋮	⋮	⋮	Ns	Nurse
⋮	⋮	⋮	⋮	⋮	⋮

Figure 3. Example of alert that appears when inappropriate expressions are entered.

viewpoint, this application prepared a function to add information and revise the database by nursing managers and researchers or system administrators in the hospital using PsyNACS©. Another function was implemented to output the information enlisted for information management and educational use. By logging into the system on the display (**Figure 4**) with an exclusive ID and password, users can utilize the database customized for an individual hospital.

3. Pilot Clinical Introduction and Results

In February 2018, a demonstration experiment for the development of the application in the present study was conducted at a specialized psychiatric hospital in Kyushu District. Three notebook computers loaded with PsyNACS©, which had been installed with an inappropriate word database, were introduced and operated. This study was approved by the ethics committee of Tokushima University Hospital (Approval No. 2801). In principle, three types of PsyNACS© are possible: laptop; server-based; and cloud-based. However, this time the laptop type clients computers were used and no external device connection was made. This is because using a server requires an administrator to keep the connection secure, so it was easier to conduct the study without using a server.

To introduce them to the application, nurses and managers who are experienced in psychiatric nursing were informed about the system developed in this study, and a survey regarding their opinions on the functions of the application was conducted with ten nursing managers. The main responses were as follows:

Usefulness of the developed application

- The application's functions are necessary because inappropriate expressions are frequently observed in clinical settings.
- Our hospital uses many specialized abbreviations that are used only within our hospital. When managers enlist these abbreviations as inappropriate, medical staff can be encouraged to modify them. These functions are beneficial.

Figure 4. Management function for inappropriate expression list database.

- An advantageous usage in new nurses' education would be promising.
  Challenges of the developed application
- It would be difficult to use these functions effectively because some medical staff members are poor at text input with a personal computer.
- We would like to proceed with computerization smoothly, cooperating and sharing between groups of staff, with more proficient users assisting less proficient users.

4. Discussion

The Japanese Nursing Association [26] has three objectives for the nursing record: "Proving nursing performance," "Ensuring continuity and consistency of nursing performance," and "Improving the evaluation and quality of nursing performance". The nursing record is legally recognized as a record of care [27]. In particular, clinical and nursing records must not only be professional according to the law, but also based on ethical considerations. As a recent trend, medical records can be requested for disclosure not only by patients, but also by their guardians, lawyers, and life insurance companies [28]. In such cases, it is very important to record and preserve appropriate content that protects the human rights of patients. Engaging with patients based on appropriate records reduces conflicts between healthcare providers and patients [29]. The monitoring application against inappropriate expressions developed in this study will contribute to the development of future systems in the medical field.

The present study began with "the identification of users who enter information." From the viewpoint of clarifying responsibilities [30], this is an essential function that can detect who has written inappropriate expressions.

Subsequently, a database of inappropriate expressions, a matching function to recommend appropriate text input, and a warning function were developed. First, in psychiatry, nurses must serve as advocates of patients' rights [31].

However, in psychiatric nursing, nurses are required, in some cases, to record expressions which would be regarded as inappropriate in a social context. The expressions used in patient complaints must be recorded as necessary for medical treatment. Under these circumstances, the monitoring system issues warnings, but does not necessarily demand modifications.

In psychiatric nursing, patient narratives are important for nursing interventions and for building trust with patients [32]. It is important for clinical nurses to understand patients' actions and thoughts, and to record their behavior accurately. An important part of the application developed in this study is to encourage the nurses who record the information to think about whether they are expressing it correctly.

A function that proposes alternative terms for modification will be helpful for efficient nursing care. In addition, an automatic counting function for matched words was developed, which plays an educational role to psychiatric nurses through the integration of information based on individual hospitals. The researchers hope that PsyNACS© with the newly developed program will promote more ethical intervention for patients hospitalized in psychiatric units and help them to live in the community at an early stage.

5. Conclusions

Checking against a database of inappropriate phrases allows nurses to record more appropriate expressions. In addition, the nature and characteristics of each hospital and ward can be analyzed by determining what information is flagged and how often.

From an ethical perspective, the ability to use appropriate phrases makes records more likely to withstand disclosure requests from patients and their families. Additionally, an educational effect for new nurses can be expected based on a function that recommends appropriate expressions. However, the investigators of this study believe that it is difficult to generalize the findings of this pilot clinical implementation because it was only objectively evaluated by 10 clinical experts.

Recently, information security has become a major concern [33] [34]. The results of interviews with nurses and managers indicated that some psychiatric nurses were not proficient in using computers and other systems. It is also true that server management and information literacy within hospitals involve user education and appropriate management, so there are risks involved.

In the future, we would like to develop a cloud system to enhance functionality and complement information security, and study how to introduce PsyNACS© to establish a relationship between safe information sharing, communication channels (in-hospital servers, laptops, etc.), and clients. PsyNACS© is not for sale and is currently only in prototype development. The delay in the adoption of electronic medical records in Japan is due to the high cost [35] [36], and PsyNACS© is equipped with only the necessary functions for academic purposes and can be widely used at a low cost.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Okayama, T., Usuda, K., Okazaki, E. and Yamanouchi, Y. (2020) Number of Long-Term Inpatients in Japanese Psychiatric Care Beds: Trend Analysis from the Patient Survey and the 630 Survey. *BMC Psychiatry*, **20**, Article No. 522. https://doi.org/10.1186/s12888-020-02927-z

[2] Morikawa, T., Maeda, K., Osaki, T., Kajita, H., Yotsumoto, K. and Kawamata, T. (2017) Admission of People with Dementia to Psychiatric Hospitals in Japan: Factors That Can Shorten Their Hospitalizations. *Psychogeriatrics*, **17**, 341-347. https://doi.org/10.1111/psyg.12244

[3] Kumazawa, T. (2015) Problems on and Policies for Transitions Support for People with Mental Disabilities from an Institution to Community Setting (1). *Takasaki City University of Economics the Society of Regional Policy*, **17**, 81-91. (In Japanese)

[4] Ministry of Health, Labour and Welfare (2011) Social and Assistance Stations Disorder Ministry of Health and Welfare, Guidance of Persons with Mental Disabilities Outreach Promotion. (In Japanese). http://www.mhlw.go.jp/bunya/shougaihoken/service/dl/chiikiikou_03.pdf

[5] Catapano, F., Perris, F., Masella, M., Rossano, F., Cigliano, M., Magliano, L. and Maj, M. (2006) Obsessive-Compulsive Disorder: A 3-Year Prospective Follow-Up Study of Patients Treated with Serotonin Reuptake Inhibitors OCD Follow-Up Study. *Journal of Psychiatric Research*, **40**, 502-510. https://doi.org/10.1016/j.jpsychires.2005.04.010

[6] Angst, J., Gamma, A., Endrass, J., Goodwin, R., Ajdacic, V., Eich, D. and Rössler, W. (2004) Obsessive-Compulsive Severity Spectrum in the Community: Prevalence, Comorbidity, and Course. *European Archives of Psychiatry and Clinical Neuroscience*, **254**, 156-164. https://doi.org/10.1007/s00406-004-0459-4

[7] Gray, A.J. (2002) Stigma in Psychiatry. *Journal of the Royal Society of Medicine*, **95**, 72-76. https://doi.org/10.1177/014107680209500205

[8] Byrne, P. (2001) Psychiatric Stigma. *British Journal of Psychiatry*, **178**, 281-284. https://doi.org/10.1192/bjp.178.3.281

[9] Corrigan, P.W., Green, A., Lundin, R., Kubiak, M.A. and Penn, D.L. (2001) Familiarity with and Social Distance from People Who Have Serious Mental Illness. *Psychiatric Services*, **52**, 953-958. https://doi.org/10.1176/appi.ps.52.7.953

[10] Crisp, H., Gelder, M.G., Rix, S., Meltzer, H.I. and Rowlands, O.J. (2000) Stigmatisation of People with Mental Illnesses. *The British Journal of Psychiatry*, **177**, 4-7. https://doi.org/10.1192/bjp.177.1.4

[11] WHO (2023) Disability. WHO, 7 March 2023.
http://www.who.int/mediacentre/factsheets/fs352/en/

[12] Petrucci, C., Marcucci, G., Carpico, A. and Lancia, L. (2014) Nursing Care Complexity in a Psychiatric Setting: Results of an Observational Study. *Journal of Psychiatric and Mental Health Nursing*, **21**, 79-86. https://doi.org/10.1111/jpm.12049

[13] Nojiri, S., Itoh, H., Kasai, T., *et al.* (2019) Comorbidity Status in Hospitalized Elderly in Japan: Analysis from National Database of Health Insurance Claims and Specific Health Checkups. *Scientific Reports*, **9**, Article No. 20237.
https://doi.org/10.1038/s41598-019-56534-4

[14] Goulter, N., Kavanagh, D.J. and Gardner, G. (2015) What Keeps Nurses Busy in the Mental Health Setting? *Journal of Psychiatric and Mental Health Nursing*, **22**, 449-456. https://doi.org/10.1111/jpm.12173

[15] Goo, J., Huang, D. and Koo, C. (2015) Learning for Healthy Outcomes: Exploration and Exploitation with Electronic Medical Records. *Information & Management*, **52**, 550-562. https://doi.org/10.1016/j.im.2015.04.002

[16] Vogt, G. and König, A.S.L. (2023) Robotic Devices and ICT in Long-Term Care in Japan: Their Potential and Limitations from a Workplace Perspective. *Contemporary Japan*, **35**, 270-290. https://doi.org/10.1080/18692729.2021.2015846

[17] Obi, T., Ishmatova, D. and Iwasaki, N. (2013) Promoting ICT Innovations for the Ageing Population in Japan. *International Journal of Medical Informatics*, **82**, e47-e62. https://doi.org/10.1016/j.ijmedinf.2012.05.004

[18] Sharma, L., Chandrasekaran, A., Boyer, K.K. and McDermott, K.M. (2016) The Impact of Health Information Technology Bundles on Hospital Performance: An Econometric Study. *Journal of Operations Management*, **41**, 25-41.
https://doi.org/10.1016/j.jom.2015.10.001

[19] Yoshihara, H. (1998) Development of the Electronic Health Record in Japan. *International Journal of Medical Informatics*, **49**, 53-58.
https://doi.org/10.1016/S1386-5056(98)00010-0

[20] Trends in the Diffusion of Electronic Medical Record Systems Section Ministry of Health, Labour and Welfare (2020) Survey of Medical Facilities.
https://www.mhlw.go.jp/content/10800000/000938782.pdf

[21] Yasunaga, H., Imamura, T., Yamaki, S. and Endo, H. (2008) Computerizing Medical Records in Japan. *International Journal of Medical Informatics*, **77**, 708-713.
https://doi.org/10.1016/j.ijmedinf.2008.03.005

[22] Ito, Y. (2012) Importance of the Development of an Electronic Medical Record System as an Information Infrastructure: A Finding from a Physicians' Survey. *Journal of Information Processing and Management*, **55**, 647-661. (In Japanese)
https://doi.org/10.1241/johokanri.55.647

[23] Ito, H., Miyagawa, M., Kazuhiro, O., Tanioka, T., Yasuhara, Y., Mutsuko, K., Beth, K., Tomotake, M. and De Castro Locsin, R. (2015) The Development of the Japanese Psychiatric Nursing Assessment Classification System (PsyNACS©). *Open Journal of Psychiatry*, **6**, 20-33. https://doi.org/10.4236/ojpsych.2016.61003

[24] Ito, H., Miyagawa, M., Kazuhiro, O., Tanioka, T., Yasuhara, Y., Mutsuko, K., Beth, K., Tomotake, M. and De Castro Locsin, R. (2016) Prioritizing Patient Assessment Data (PAD) Using the Japanese Psychiatric Nursing Assessment Classification System (PsyNACS©). *Open Journal of Psychiatry*, **6**, 218-227.
https://doi.org/10.4236/ojpsych.2016.63027

[25] Fontesse, S., Rimez, X. and Maurage, P. (2021) Stigmatization and Dehumanization Perceptions towards Psychiatric Patients among Nurses: A Path-Analysis Approach.

Archives of Psychiatric Nursing, **35**, 153-161.
https://doi.org/10.1016/j.apnu.2020.12.005

[26] Guidelines for Nursing Records, Japan Nurses Association, 2018. (in Japanese)
https://www.nurse.or.jp/nursing/home/publication/pdf/guideline/nursing_record.pdf

[27] Eizen, K. and Satoshi, U. (2020) Trends in Health Information and Communication
Standards in Japan. *Journal of the National Institute of Public Health*, **69**, 52-62.

[28] Shigeo, N. (2012) The Disclosure of Medical Records to Patients—The Japanese
Experience. *Journal of Philosophy and Ethics in Health Care and Medicine*, **6**,
39-61.

[29] D'Costa, S.N., Kuhn, I.L. and Fritz, Z. (2020) A Systematic Review of Patient Access
to Medical Records in the Acute Setting: Practicalities, Perspectives and Ethical
Consequences. *BMC Medical Ethics*, **21**, Article No. 18.
https://doi.org/10.1186/s12910-020-0459-6

[30] Ngo, E., Patel, N., Chandrasekaran, K., Tajik, A.J. and Paterick, T.E. (2016) The
Importance of the Medical Record: A Critical Professional Responsibility. *The
Journal of Medical Practice Management*, **31**, 305-308.

[31] Toda, Y., Sakamoto, M., Tagaya, A., Takahashi, M. and Davis, A.J. (2014) Patient
Advocacy: Japanese Psychiatric Nurses Recognizing Necessity for Intervention. *Nursing Ethics*, **22**, 765-777. https://doi.org/10.1177/0969733014547971

[32] Kirkpatrick, H. (2008) A Narrative Framework for Understanding Experiences of
People with Severe Mental Illnesses. *Archives of Psychiatric Nursing*, **22**, 61-68.
https://doi.org/10.1016/j.apnu.2007.12.002

[33] Boonstra, A. and Broekhuis, M. (2010) Barriers to the Acceptance of Electronic
Medical Records by Physicians from Systematic Review to Taxonomy and Interventions. *BMC Health Services Research*, **10**, Article No. 231.
https://doi.org/10.1186/1472-6963-10-231

[34] Hsieh, P.-J. (2015) Physicians' Acceptance of Electronic Medical Records Exchange:
An Extension of the Decomposed TPB Model with Institutional Trust and Perceived Risk. *International Journal of Medical Informatics*, **84**, 1-14.
https://doi.org/10.1016/j.ijmedinf.2014.08.008

[35] Yoshida, Y., Imai, T. and Ohe, K. (2013) The Trends in EMR and CPOE Adoption
in Japan under the National Strategy. *International Journal of Medical Informatics*,
82, 1004-1011. https://doi.org/10.1016/j.ijmedinf.2013.07.004

[36] Takabayashi, K., Doi, S. and Suzuki, T. (2011) Japanese EMRs and IT in Medicine:
Expansion, Integration, and Reuse of Data. *Healthcare Informatics Research*, **17**,
178-183. https://doi.org/10.4258/hir.2011.17.3.178