Research Article

Community-Environmental patterns of daily living among the community- dwelling mental disorders based on community health nursing activities

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Abstract

The present study was to examine an environmental pattern regarding daily living among the community-dwelling mental disorders from a light of community health nursing fields. The primary questionnaire included the community-environmental assessment index was mailed to public health departments in every municipality in Japan as a nationwide investigation. Using data from this investigation, the statistical changed-amount of a mean deviation for each item was calculated and "Current Environmental Conditions" (CEC) and "Degree of Importance in Environment" (DIE) were drawn on a histogram with five bars. Five elements from the maximum and the minimum of CEC and DIE, respectively, were shown. The secondary questionnaire, which consisted of all graphs composed of 190 graphs derived from a mathematical permutation, was carried out to twenty subjects. The quantification method of the fourth type was performed to the data which were converted into the matrix of similarity in order to distinguish the shape of patterns. The phase classified into four patterns based on a

population scale on the two-dimensional space was extracted from the data. It was suggested that every pattern would be practical to assess and predict environmental conditions regarding daily living among the community-dwelling mental disorders.

INTRODUCTION

The law of Mental Health and Welfare enacted in 1995 in Japan has promoted practical activities in a community-based field on mental health and welfare. Every public health center in a community in Japan has been directly functioned as a worked organization regarding the mental health welfare activities. Furthermore, a section in charge of community-dwelling the mental disorders has been shifted from the public health centers to the municipal administrative organizations since 2002(Health and welfare statistics association, 2003). However Japan has about 1,800 municipalities, and it has been pointed out that they have large differences with respect to environmental conditions around the mental disorders in their communities (Ministry of Internal Affairs and Communications, 2009).

Previous studies which have dealt with the living environment and supported activities of the mental disorders have mainly focused on the individual assessment rather than community environmental assessment(Malm et al., 1981; Baker and Intagliata, 1982; Heinrichs et al., 1984; Lehman, 1988; Morita et al., 2004; Morita et al., 2006). We have pointed out that well-organized social services, community's consciousness toward people with mental illness, and appropriate environmental resources should interact to foster an independent living among the mental disorders based on the findings of the previous study (Morita et al., 2004). In order to assess the daily living from a viewpoint of the community environment, we have developed the community-environmental assessment index (Morita et al., 2004; Morita et al., 2006; Morita et al., 2006; Morita et al.,2008). This index consists of thirty-three items which are composed of two principal scales: "Current Environmental Conditions" (CEC) and "Degree of Importance in Environment" (DIE). It is likely that the index is capable of evaluating the easiness of daily living among the mental disorders in the community, and several pieces of information derived from the index will contribute to understanding of direction regarding community's mental health and welfare.

The purpose of the present study was to examine the characteristics of patterns of the current conditions and degree of importance in the environment based on the index regarding daily living among the mental disorders in a community from a practical viewpoint of public health and community health nursing activities.

METHODS

Analyzed data

Source of analyzed data

We used the data from the previous study (Morita et al., 2004), a nationwide investigation, for analyzing patterns of community environment among the mental disorders in the present study. In the community-environmental assessment index, for CEC, a five-point Likert-type scale has been adopted as follows:

1, not available; 2, poorly available; 3, unable to answer; 4, fairly available; 5, fully available. The ratings for DIE have been also made on the five-point scale as shown: 1, not important; 2, not so important; 3, unable to answer; 4, important; 5, absolutely important. In the nationwide investigation, the primary questionnaire included the index was mailed to public health departments in every municipality in Japan between September 25 and October 31, 2006(Morita et al., 2006). This was performed to 1,830 municipalities in Japan as a complete enumeration investigation. In total, 1,830 public health workers included public health nurse managers in charge of managing health care for the mental disorders received mailing.

Ethical consideration

Before mailing the questionnaire, the study was reviewed by a group of people, including the mental disorders and their families, to insure that there was no ethical conflict in this procedure. All procedures were done according to the Helsinki Declaration (The World Medical Association, 2009), and the necessary permits were granted by the Ethical Review Board of Yamaguchi University Graduate School of Medicine. A series of developed procedures of the community-environmental assessment index has reported in previous studies in detail(Morita et al., 2004; Morita et al., 2006; Morita et al., 2008).

Contents and methods of investigations

Outline of methods

A population scale in every municipality was classified into five categories because the scale should affect on conditions of daily living among the mental disorders. The municipalities were classified into five groups in quite-small-scale (under 5,000 persons), small-scale (under 10,000 more than 5,000 persons), medium-scale (under 30,000 more than 10,000 persons), semi-large-scale (under 100,000 more than 30,000 persons), and large-scale (over 100,000) based on the population scale. To examine the characteristics of current conditions concerning the community environment by population scale in municipalities, the changed-amount of mean deviations in CEC and DIE were represented in a histogram. In general, it has been known that a population scale of region has reflected the characteristics of conditions

with regard to services on health and welfare in a community in light of public health and community health nursing activities.

Contents of the secondary investigation

The CEC and DIE had 190 graphs with five bars according to a mathematical permutation for every item.   Five elements from the maximum and the minimum in mean scores, respectively was extracted due to the larger and smaller changes had more obviously distinctive information with respect to the community environment.   The secondary questionnaire consisted of 190 graphs was carried out to investigate into a pattern in light of its shape as the figure.

Analysis

Twenty subjects replied to the secondary questionnaire with the dummy variable on the similarity.   The quantification method of the fourth type was performed to the matrix of similarity which was converted into the data for this analysis in order to distinguish patterns as figure's shapes (Hayashi, 1985).   Simple statistics such as the mean score and standard deviation were obtained from the data on CEC and DIE in every population group.   Excel 2006 Statistics for Windows (Microsoft Corp., Redmond, WA, USA) was used to analyze the data.

RESULTS

Simple statistics

As the data resources for the analysis, of the total 1,830 municipalities in Japan, 1,357 samples were eligible, and population scale components were 196 municipalities as quite-small-scale group, 241 municipalities as small-scale group, 412 municipalities as medium-scale group, 336 municipalities as semi-large scale group, and 172 municipalities as large-scale group.   The attributable and fundamental features of 20 subjects were the following: 1) the mean age was 31.2±11.78 (years), 2) all subjects were female, and 3) the average of responded time was 542.0±292.19 (seconds).

   As shown in Table 1, the items with high mean scores were related to the availability of healthcare professionals who can consult well or help with household chores, and low rated items were related to the system, services, and opportunities for the mental disorders in CEC.   In DIE, the items with high mean scores were related to healthcare professionals, opportunities, and places with respect to the consult, and the lower mean scores were related to the utilization of facilities and services by the mental disorders (Table 1).

Table 1. Highest and lowest means in CEC and DIE

Item	Mean	S.D.
#CEC27. Public health nurses who can consult well	3.50	0.833
CEC28. Availability of persons who help with household chores	3.34	1.125
CEC 8. Opportunities and places for the families to consult	3.33	0.935
CEC15. Community welfare volunteers who can consult well	3.19	0.798
CEC 3. Places to meet their friends (peers) or support groups for disabled persons	3.13	1.194
##CEC32. Able to choose a day care service suitable for disabled persons	2.17	0.957
CEC30. Opportunity to learn occupational skills and job interview skills	2.11	1.073
CEC 9. Flexible job opportunities according to capability in the community	1.90	0.833
CEC19. Free or low-cost food service for disabled persons	1.89	1.131
CEC11. System to resume a school education when interrupted by the onset of a mental disorder	1.49	0.794
###DIE 7. Hospital's psychiatrist or physician who can consult well	4.40	0.577
DIE 8. Opportunities and places for the families to consult	4.38	0.538
DIE 3. Places to meet their friends (peers) or support groups for disabled persons	4.26	0.604
DIE 9. Flexible job opportunities according to capability in the community	4.25	0.562
DIE12. Volunteers who can actively help disabled persons	4.18	0.560
####DIE26. Priority of public housing for disabled persons	3.82	0.686
DIE17. Subsidies of the transportation expenses for social participation	3.72	0.754
DIE19. Free or low-cost food service for disabled persons	3.72	0.701
DIE11. System to resume a school education when interrupted by the onset of a mental disorder	3.56	0.694
DIE23. Low-priced delicatessens that have many choices	3.54	0.698

#: The highest 5 scored items of the current environmental conditions (CEC) in the assessment-environmental assessment index.

##: The lowest 5 scored items of CEC in the assessment-environmental assessment index.

###: The highest 5 scored items of the degree of importance in the environment (DIE) in the assessment-environmental assessment index.

####: The lowest 5 scored items of DIE in the assessment-environmental assessment index.

Pattern of community environment based on the community-environmental assessment index

An amount of change in mean deviation by population scale represented a visualized feature as a pattern of community environment concerning daily living among the mental disorders.   In light of a marked difference, the author took each

the highest and lowest five scored items of CEC and DIE as the object of an illustration.   A model of pattern concerning the change of mean deviation by population scale was shown in Figure 1.
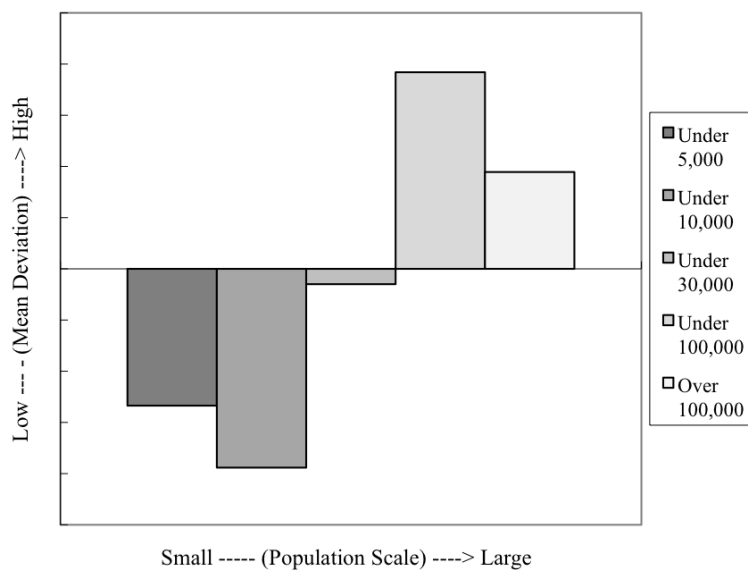

Figure 1. Pattern of the change of mean deviation by population scale as a model

In this figure, a horizontal line indicated a level of the total mean.   Each bar by population scale indicated amounts of change of mean deviation.   The opposite or parallel direction and its size in each bar had decided the characteristics of the pattern.

   The quantification method of the fourth type was performed to the converted matrix on similarity in CEC and DIE.   The calculations were developed based on Euclidean distance between each two items derived from the permutation for all items.   The result of the quantification method of the fourth type was shown in Table 2 and Figure 2.   The eigenvectors were drawn on the two-dimensional space by the second and third axes in CEC and DIE on the figure.   The change by population scale was classified into four patterns based on the eigenvectors of both axes.   A vertical axis on this figure indicated the deviation compared to the total mean as a base line, a horizontal axis.

   The first pattern, type I, had downward bars in the smaller population scale and upward bars in the larger scale.   The extremes of the largest and smallest scales indicated the highest and lowest values, respectively.   Of the total 20 cases in CEC and DIE, 12 cases such as "System to resume a school education when interrupted by the onset of a mental disorder" (CEC11), "Availability of persons who help with household chores" (CEC28), and "Free or low-cost food service for disabled persons" (CEC19) were included in this pattern (Type I on Figure 2).   There was no case taken a contrary tendency on this pattern.   The second pattern, type II, had the higher mean deviations at small phases, quite-small-scale and small-scale populations, and the lower mean deviations at large phases, and it included 2 cases which were "Subsidies of the transportation expenses for social participation" (DIE17) and "Community welfare volunteers who can consult well" (CEC15) as shown in Figure 2 (Type II on the figure).   On the contrary, the third pattern, type III, showed an inverse tendency that it had the lower mean deviations at small phases and the higher at large phases (Type III on Figure 2).   This type included 3 cases, which were "Opportunities and places for the families to consult" (DIE8), "Places to meet

their friends (peers) or support groups for disabled persons" (DIE3), and "System to resume a school education when interrupted by the onset of a mental disorder" (DIE11), of DIE.   As a feature of the fourth pattern, type IV, it could be pointed out that adjoining bars included the small phase or large phase were to have the contrary direction at the base line (Figure 2).   Three cases which were "Public health nurses who can consult well" (CEC27), "Hospital's psychiatrist or physician who can consult well" (DIE7), and "Low-priced delicatessens that have many choices" (DIE23) were included in this pattern.   All shape patterns on the two-dimensional space were showed by type in Figure 3.

Table 2. Eigenvectors by the quantification method of the fourth type

Item#	A1##	A2##	A3##
CEC 3.	-0.0621	-0.0438	-0.0516
CEC 8.	-0.0619	-0.0385	-0.0521
CEC 9.	-0.0569	-0.0464	-0.0599
CEC11.	-0.0649	-0.0455	-0.0454
CEC15.	-0.0849	-0.0866	0.3590
CEC19.	-0.0638	-0.0462	-0.0575
CEC27.	0.9361	-0.2672	0.0115
CEC28.	-0.0563	-0.0282	-0.0761
CEC30.	-0.0636	-0.0454	-0.0495
CEC32.	-0.0632	-0.0450	-0.0524
DIE 3.	-0.0680	-0.0277	-0.2159
DIE 7.	-0.0558	0.0859	0.0763
DIE 8.	-0.0836	-0.0823	-0.2544
DIE 9.	-0.0642	-0.0453	-0.0529
DIE11.	-0.0591	0.0377	-0.1640
DIE12.	-0.0654	-0.0480	-0.0592
DIE17.	-0.0916	-0.0985	0.8246
DIE19.	-0.0243	-0.0207	-0.0918
DIE23.	0.2159	0.9348	0.0644
DIE26.	-0.0624	-0.0430	-0.0531

  #Item: Each item's number of CEC and DIE in table 1, respectively.

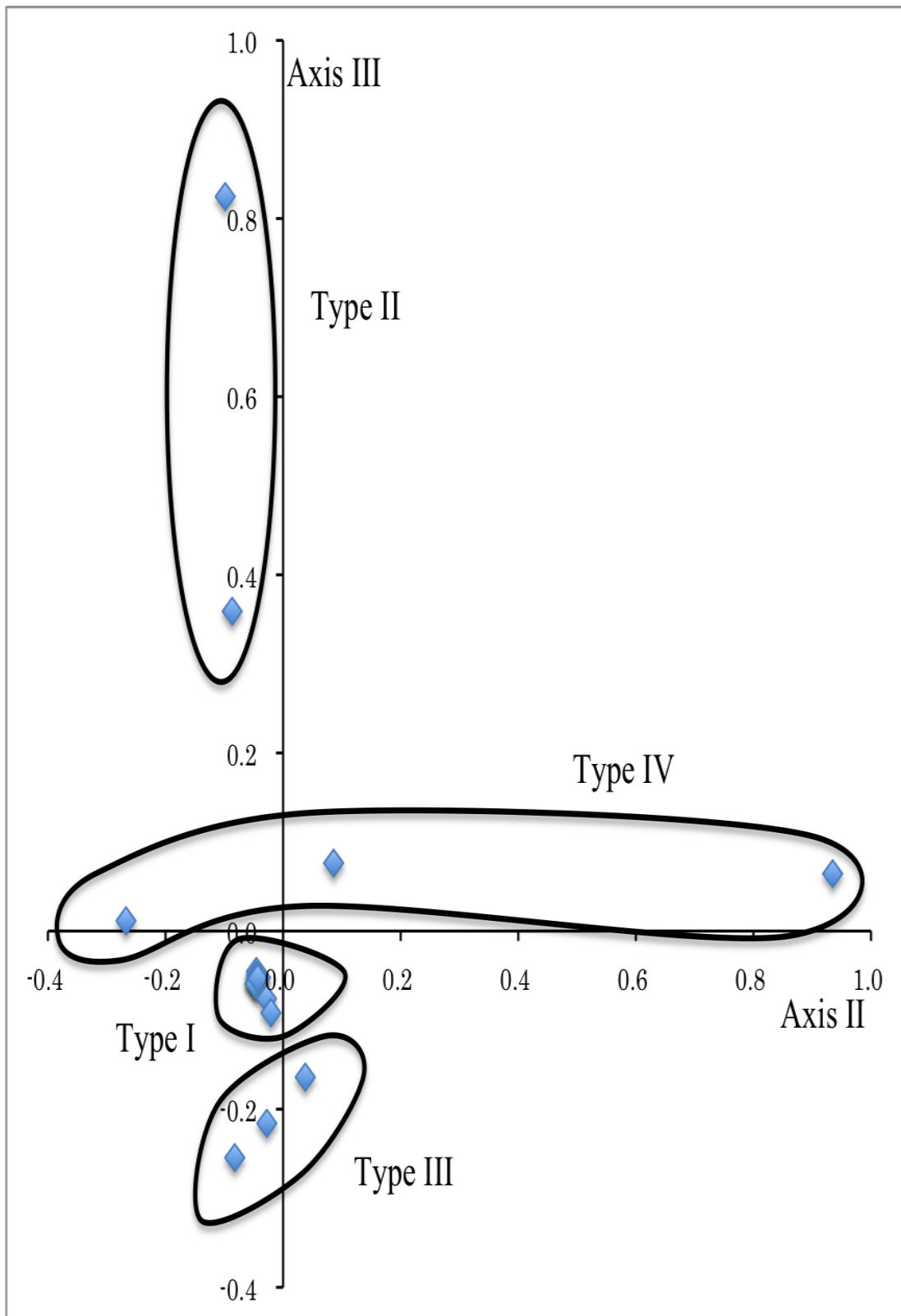##A1, A2, and A3: The first, second, and third axes, respectively.

Figure 2. Pattern of similarity on the two-dimensional space by the quantification method of the fourth type
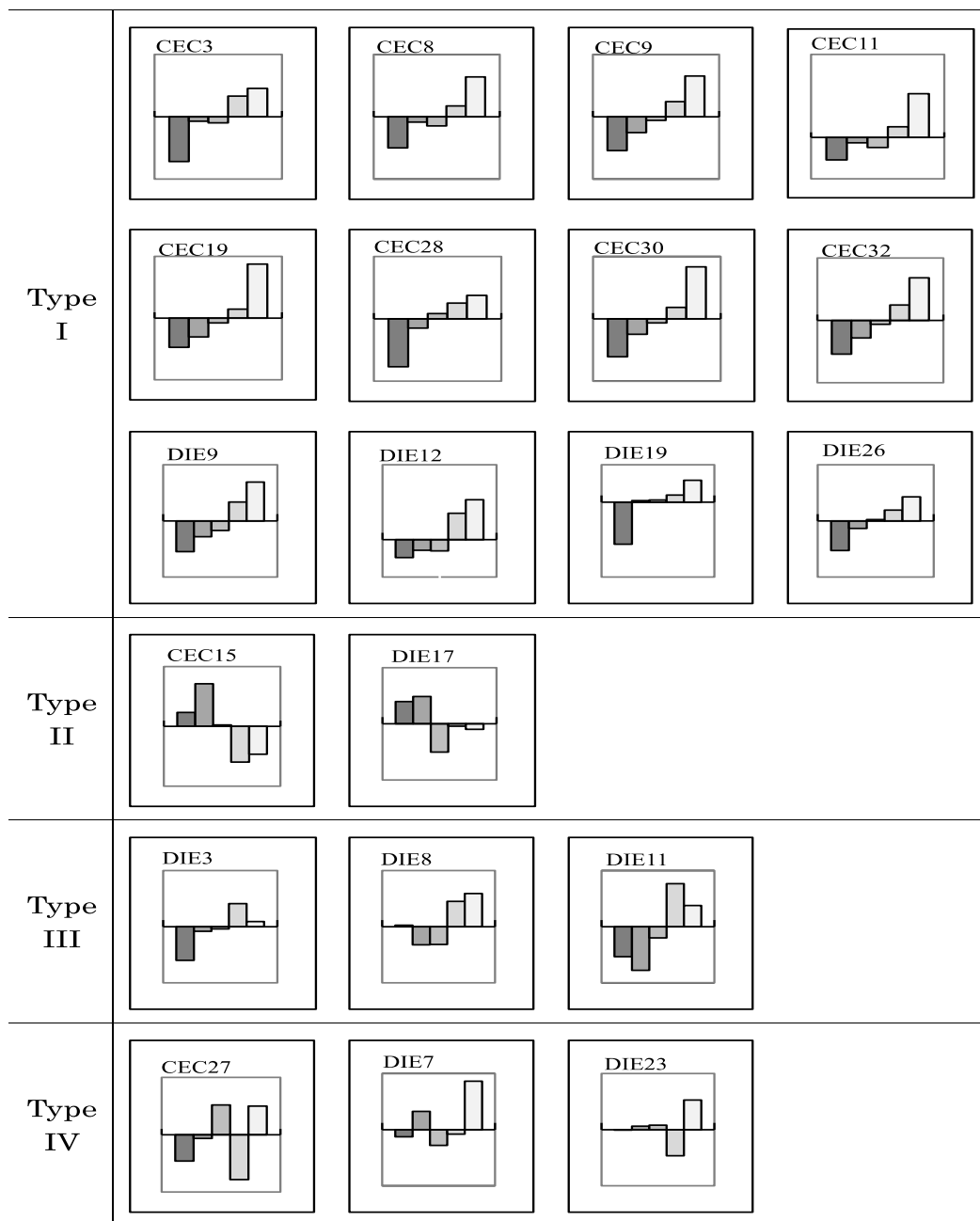
Figure 3. Shape patterns included in every type on Figure 2

DISCUSSION

The present study examined the characteristics of community environment concerning daily living among the mental disorders from a viewpoint of population scale. The community-environmental assessment index was adopted as an assessment index in the present study because it would be capable of assessing the actual conditions of the mental

disorders' daily living in the community in light of public health nursing.   It has been known that the 33-item in the current situations, CEC, showed lower means and had dispersions with larger range of the assessment of daily living among the mental disorders as compared with the degree of importance in the environment, DIE, in the community-environmental assessment index(Morita et al., 2004; Morita et al., 2008).   However, it is likely that the mean deviation using in this study would be capable of drawing a comparison between CEC and DIE with regard to the dispersions due to its relative relationship.   Whereas CEC's items with higher means were mainly related to health- and/or welfare-related persons who can consult or help well, those of DIE were associated with social resources related to public health personnel and place or opportunity.   In the items of CEC and DIE with lower scores, both of them were prone to relating with healthcare services and facilities which help the mental disorders' socialization.   Wide regional variations in population scales would reflect the difference from community environmental conditions with regard to public health nursing(Araga and Gokan, 2005).   It would be suggested that a population scale should reflect on a variety of community environmental factors.   In general, a region with large population such as a cabinet ordinance designated city in Japan has a full traffic network, a lot of convenience facilities, and a wealth of administrative budget for health and welfare services.   On the other hand, it has been pointed out that the region has a poor human network and little sense of sympathy(Center for Urban Studies, 2005).   For these tendencies in the large population area, a region with small population such as a town or village has a poor traffic network, a little convenience facilities, a poor administrative budget for health and welfare services, and a human relationship abundant in sympathy as remarkable features.   It is suggested that such tendencies have a great influence on the mental disorders' daily living in their communities.   Especially, the mental disorders will require not only hardware for daily living but also software for that in general(Health and welfare statistics association, 2008).   When we deal with the problem regarding an easiness of daily living in the mental disorders, it will be necessary to take the assistance by inhabitants and administrative supports for the mental disorders with their families' efforts into consideration (Morita et al., 2006).   It would be important to assess the effect of community environment on the easiness of daily living in the mental disorders from the viewpoint of public health nursing activities.

   In the present study, we adopted the quantification method of the fourth type in order to extract the environmental pattern based on the similarity within items' permutation.   Consequently, we could find out four phases which were represented as types I, II, III, and IV on the similarity space, the two-dimensional space.   Each phase would be capable of interpreting as a profound pattern.   In type I, the assessment scores should be high in proportion to their population scales.   This distribution by population scale could be accounted to be linear with monotonous increase or decrease. Therefore, it will be possible to predict the contents contained this type from the viewpoint of community's population. Type II is characterized by its large deviation with plus sign in 'small-scale' and 'large-scale' at population scales.   It means that the deviation with plus sign is superior in an assessment regarding the easiness of daily living to the deviation with minus sign.   Therefore, regions with small populations have higher level of the assessment on the easiness of daily

living among the mental disorders in their communities and regions with large populations have the lower for that. This type reflects the characteristics of environmental conditions comprised daily living among the mental disorders based on population scales. Type III is likely to be in inverse relation to type II with respect to the direction of each bar on the figure. This tendency indicates that large regions have higher level of the assessment regarding the easiness of the mental disorders' daily living and small regions have the lower of it. By taking into a combination between type II and III consideration, it is pointed out that semi-large and semi-small regions have been full of variety with regard to the mental disorders' daily living. It is suggested that it will be necessary to be taken a community's population into account when we deal with problems and/or challenges regarding the easiness of daily living among the mental disorders in their communities. Type IV showed the tendency that it could be pointed out that adjoining bars included the small phase or large phase were to have the contrary direction at the base line. However, this type has a very complicated problem on community's population. In order to deal with the contents, it would need researching for further details. Such procedure will reveal which Type IV is necessary for understanding the relationship between problems comprised this pattern and community's population size. It is likely that these findings indicate the actual conditions regarding daily living among the mental disorders in Japan due to the result based on data of the nationwide investigation. Furthermore, it is pointed out that the practical measures taken to improve the difficulty of daily living among the mental disorders will be feasible based on the patterns derived from this study.

A limitation of the present study is that the sample size analyzed in this study may not be enough to reveal the actual conditions in Japan's communities. Furthermore, the samples in this study had a wide variety of their ages and they were only female. However, one of principal targets in this study will open up a new light for grasping the feature of community environment among the mental disorders as a pattern. The quantification method of the fourth type used in the study is an analyzing technique applied to qualitative research design and the technique is also prone to proofing against the data with the small sample size(Hayashi, 1985). It is likely that the study is taken qualitative findings into consideration. However, additional research will be needed to identify further robust structure of the pattern.

CONCLUSIONS

To examine the characteristics of community environment regarding daily living among the mental disorders in their communities, the author adopted the community-environmental assessment index as an assessment instrument in this study. We analyzed the matrix of similarity for the quantification method of the fourth type in order to extract the pattern based on a population scale. As a result, four patterns, which indicated the characteristics of the easiness of daily living among the mental disorders based on community's population scales, were extracted from CEC and DIE on the similarity space. The first pattern, type I, had downward bars in the smaller population scale and upward bars in the larger scale.

The second pattern, type II, and third pattern, type III, had upward or downward bars in the opposite phases of population scales.   The former is characterized by its large deviation with plus sign in small population scales and the latter is characterized by its large deviation with plus sign in large population scales.   By taking into a combination between both types consideration, it is pointed out that semi-large and semi-small regions have been full of variety with regard to the mental disorders' daily living.   The pattern IV, type IV, showed the tendency that it could be pointed out that adjoining bars included the small phase or large phase were to have the contrary direction at the base line.   However, this pattern needs further researching for analyzing the relationship between features of the mental disorders' daily living and community's population size.

It is suggested that it would be necessary to take account of difference in the degree of dispersion concerning the assessment of daily living among the mental disorders in their communities.   This finding gives a feasible perspective concerning mental health services based on information of population and will help revitalize community health nursing activity.   As a conclusion, the community-environmental assessment index will be capable of predicting community environmental conditions regarding the easiness of daily living among the mental disorders in their communities.

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References

Araga M, Gokan Y(2007). Community Health Nursing in Japan. Tokyo: The Sanpo-sya Inc. (In Japanese).

Baker F. Intagliata J (1982). Quality of life in the evaluation of community support systems. Evaluation and Program Plannin. ;5:69-79.

Center for Urban Studies (2005). Living and health in urban community. Tokyo: The Tokyo Metropolitan University publishing company..

Hayashi C(1985). Recent theoretical and methodological development in multidimensional scaling and its related methods in Japan. Behaviormetrika.18:67-79.

Health and welfare statistics association (2003). Conspectus of public health administration. J. health and welfare statistics. 50(9):14-21 (In Japanese).

Health and welfare statistics association (2008). Mental Health. J. Health and Welfare Statistics. 55(9):112-116 (In Japanese).

Heinrichs DW, Hanlon TE, Carpenter WT(1984). The quality of life scale: An instrument for rating the schizophrenic deficit syndrome. Schizophrenia Bulletin.10(3):388-398.

Lehman AF(1988). A quality of life interview for the chronically mentally ill. Evaluation and Program Planning. 11:51-62.

Malm U, May PRA, Dencker SJ(1981). Evaluation of the quality of life of the schizophrenic outpatient: A checklist. Schizophrenia Bulletin. 7(3):477-487.

Ministry of Internal Affairs and Communications (2008). White paper on local public finance. Available from URL: http://www.soumu.go.jp/english/idex/html. Assessed August 5, 2009.

Morita T, Matsumoto H, Ishikawa Y, Hatashita H, Yamazaki H, Yamaguchi S(2004). Nationwide study of environmental assessment for people with schizophrenia in Japan. Nursing and Health Sciences. 6:181-191.

Morita T, Yamazaki H(2006). Multidimensional structure of comprehensive accessibility of community support for people with mental disorders in Japan: A nationwide investigation. Int. J. Nursing Practice. 12:14-20.

Morita T, Yamazaki H, Sakabe S, Zhang JG(2006). Community-environmental index regarding daily living of the mental disorders in community. J. Environ. Info. Sci. 34(5):47-54.

Morita T, Yamazaki H, Takahashi I, Danbara M, Ono J(2008). Community environment and daily living among the mental disorders. International Conference New Frontiers in Primary Health Care: Role of Nursing and Other Professions. 1:215.

The World Medical Association (2009). World Medical Association Declaration of Helsinki, 2008; Available from URL: http://www.wma.net/e/policy/b3.htm. Assessed August 5, 2009.