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Original Article

The Relationship between Employment Status and Job Description of Certified Public Psychologists in Medical Settings in Japan: Toward Expansion of Nationwide Psychological Support

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Abstract

At present, almost five years have passed since the Certified Psychologist Act in Japan was enacted. However, the number of psychologists working in medical settings is limited, and little progress has been made in creating a system that can provide psychological support under the national health insurance scheme. Conducted as a

subsidized project by the Ministry of Health, Labor, and Welfare, this study aimed to examine the relationship between employment status (full-time vs. part-time) of licensed psychologists and psychological support services by conducting a secondary analysis of national survey data on Japanese licensed psychologists in a medical setting. We analyzed the number of psychologists and work tasks by surveying representatives of psychology departments (n=826 facilities). Factor analyses regarding the kinds of psychological services revealed 10 factors. A hierarchical linear model was used to analyze the number of full-time and part-time employees in the facilities and the degree of performance of psychological support work for each of the 10 factors. We found that the degree of performance of all psychological support tasks increased significantly with the number of full-time psychologists. For the six tasks of psychological support for "major psychiatric disorders" and "sexual/behavioral problems and addictions", "psychological support for groups/outreach," "psychological support for inpatients/case conferences," "community collaboration (general)," and "multi-professional collaboration," the degree of performance increased when the number of full-time psychologists increased; however, it did not increase when the number of part-time workers increased. Regarding the four tasks of "support for family and socioeconomic problems," "psychological testing/outpatient counseling," "education, research, and organizational management/support for related parties," and "community collaboration (children)," the degree of performance increased even when there were three or more part-time workers. However, the increase in the performance level related to the items of "education, research, and organizational management/support for related parties" was negligible compared to those where the number of full-time employees increased. These results indicate that it is desirable to have more than one full-time psychologist to expand professional and developmental psychological support services. In addition, the contribution to the organization may be enhanced by hiring part-time psychologists full-time. It is hoped that the system will be reviewed, and full-time employment of licensed psychologists will increase.

Keywords: certified public psychologist, psychologist, psychological support, employment, medical institution

Introduction

In 2017, the Certified Public Psychologist Act came into effect, and in

2018 the first certified public psychologists (licensed psychologists) were established. Certified public psychologists are licensed professionals who apply psychological knowledge and techniques to help individuals with mental health problems and their families. They are required to provide psychological support in the fields of medicine, education, welfare, industry, and justice, in collaborating with relevant parties. Although there are many similarities between the certified public psychologist (a national qualification) and clinical psychologist (a private qualification), the main difference is that the certified public psychologist is primarily trained through completing designated subjects at four-year universities and graduate schools, or through two or more years of work experience at designated facilities, whereas the clinical psychologist is trained mainly at designated graduate schools. In addition, certified public psychologist must undertake practical training at medical institutions during their universities or graduate education.

In the medical field, certified public psychologists are expected to contribute to team-based medical care as mental health specialists. However, the number of medical institutions employing certified public psychologists is limited, and access to psychological support remains inadequate. In recent years, the number of items requiring the placement of certified public psychologists in facility standards has increased following revisions to medical fees, and although changes such as the inclusion of certified public psychologists' interviews in insurance coverage for pediatrics and oncology have been introduced, the reality is that many tasks related to psychological support remain outside the framework of the medical fee system. As a results, these services are often provided as free of charge as voluntary medical services.

According to the 2020 Mental Health and Welfare Data (630 Survey), the number of full-time psychologists assigned to hospitals with psychiatric wards was less than 30% of the number of full-time psychiatric social workers and occupational therapists, and the survey also showed that the proportion of part-time workers was high.[9] In reality, it is difficult for psychologists to obtain full-time positions at medical institutions, and even if they do, they are often placed in isolated environments where they are the only psychologist. In addition, unlike other medical professions, it is not common for them to advance to management or leadership positions through experience and achievement, and it is not unusual for them to feel inferior for not contributing to the bottom line.

However, in recent years, there has been a growing demand for psychological care for patients across various medical departments. For example, mental illnesses such as developmental disorders, post-traumatic stress disorder, substance use and addiction disorders, and adjustment disorders, which have recently drawn significant attention from both society and the government—demonstrate the limited effectiveness of psychiatric drug therapy alone, making treatment and support from a psychosocial perspective essential. Even for mental disorders such as depression, obsessive-compulsive disorder, and insomnia, for which medication is generally considered effective, cognitive behavioral therapy—a form of psychotherapy—has been shown to be significantly more effective when combined with medication than when used alone.[3)11)13)22)] There is also evidence that cognitive behavioral therapy is more effective than drug therapy for mild to moderate depression in adolescents.[12)] Furthermore, there is a need for psychological support in physical medicine, such as in the treatment of cancer and infectious diseases, and in perinatal care. In fact, the risk of mental disorders complicating physical illnesses is high,[5)25)] and when they do occur, they tend to increase the consumption of medical resources.[1)6)] It has been noted that the intervention of a consultation-liaison team for patients with physical illnesses can positively affect their course and outcomes, while potentially reducing medical costs.[6)20)]

The discrepancy between the need for and outcomes of psychological support in medical settings and the actual medical fee system remains unresolved, even now, under the certified public psychologist system as a national qualification. The authors conducted a nationwide survey of psychologists in the medical community as part of the Ministry of Health, Labour and Welfare's 2019 Comprehensive Welfare Promotion Project for Persons with Disabilities, and published the results.[8)] This report provides a comprehensive overview of data on the employment, working conditions, and training of certified public psychologists and also partially examines the employment status and number of psychologists at medical institutions and the implementation of psychological support. The results showed that few medical institutions employ psychologists and that the rate of full-time employment is low, but it was also clear that psychologists are expected to fulfill a variety of roles across different departments. Furthermore, the report suggests that employing more than one full-time certified public psychologist

per facility may be useful. Specifically, while there was no marked difference in the provision of psychological support when the number of part-time employees increased or number of full-time employees increased or when the number of full-time employees increased from 0 to 1, there was a clear trend toward an expansion of support when the number of full-time employees increased to two or more.

However, the analysis in the aforementioned report only examined each survey item individually; from clinical and academic perspectives, it would be more appropriate to organize the results in a more integrated manner by aggregating psychological support tasks that share common components. In addition, because the analysis in the report did not consider facility-level differences–an important covariate–which highlights the need for an analysis that includes this covariate. Therefore, in this study, we conducted a secondary analysis of the survey data using a factor analysis model to consolidate psychological support tasks and examine the relationship between employment status and psychological support tasks in greater details.

I. Methods

1. Subjects

In the "Survey on Training and Practice for the Development of Certified Public Psychologists" conducted by the Health, Labour and Welfare Ministry in 2019 as part of the project to promote comprehensive welfare for people with disabilities, a nationwide survey was carried out on the duties and training of psychologists in medical settings. For this survey, a request for cooperation was sent to 4,000 medical institutions across Japan, and responses were requested via the web (survey period: November 18-December 8, 2019). The breakdown of survey recipients was as follows: 1,193 hospitals affiliated with the Japan Psychiatric Hospitals Association, 1,035 general hospitals randomly selected, 148 hospitals affiliated with the National Hospital Organization and Japan Health Research Promotion Bureau, 1,611 clinics affiliated with the Japanese Association of Neuro-Psychiatric Clinics, and 13 other facilities. The survey consisted of parts 1 to 3. Part 1 was addressed to facility representatives and human resource managers and focused on employment, personal management, and requests for psychologists. Part 2 was addressed to representatives of psychology departments and covered the actual duties of psychologists. Part 3 was addressed to those responsible for practical training and related to the current state of psychological training. A total of 1,598 facilities responded to at

least one of the survey. In this study, we analyzed data from the 826 facilities that responded to Part 2.

2. Survey content

Items from Part 2 used in this study were as follows:

1) Affiliation and employment status of psychologists

Representatives of psychology departments were asked about the departments to which they belong (an independent department of psychologists, psychiatry, child psychiatry, pediatrics, psychosomatic medicine, etc.), and about the number of psychologists in their departments we also asked them to indicate, broken down by full-time, part-time, and other (e.g., honorary) positions.

2) Work carried out by psychologists

Representatives of psychology departments were asked to indicate how frequently they engage in the activities listed in categories (A to C) as part of their daily work:

A: Items related to mental disorders and psychological problems

Of the mental disorders for which psychologists provide psychological support (excluding psychological testing alone), 20 categories (neurodevelopmental disorders such as intellectual disability, learning disability, and tics, depression and depressive disorders, anxiety disorders, sleep disorders, and neurocognitive disorders such as dementia, mild cognitive impairment, and delirium) were presented based on the "Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5)." Respondents rated each on four-point scale: 1. Not conducted, 2. Rarely conducted, 3. Sometimes conducted, and 4. Conducted on a daily basis. In addition, eight items that are not classified mental disorders but could be relevant for psychological support (e.g., "problems related to family or partner", "problems related to abuse and neglect.") were rated on the same four-point scale.

B: Items related to patient support

For psychological testing and assessment (e.g., Categories of medical fees: "Developmental and Intelligence Tests," "Personality Tests [Projective Methods]," "Personality Tests [Drawing Methods]," "Personality Tests [Questionnaire Methods, etc.]," "Cognitive Function and Other Psychological Tests," "Psychological Tests Not Covered by Medical Fees," and "Psychological Tests for Expert Testimony [Criminal, Medical Observation Law, Guardianship, etc.]"), respondents again used the same four-point scale. For psychological interviews and psychological support, respondent rate their frequency of activities such "Individual psychological

interviews/counseling (outpatients)," "individual psychological interviews/counseling (inpatients)," "group psychological interviews/counseling (outpatients)," "Group psychological interviews/counseling (inpatients)," "Psychological education (individual and group)," "Developmental counseling," "preliminary interviews," "participation in ward rounds," "day care (psychiatry)," "day care (dementia)," "rework/employment support," "liaison activities," "outreach,/home visits/accompanying patient to external organizations," "telephone counseling," and "Case conferences.", using the same four-point scale.

C: Items related to educational research and collaborative work

Using the same four-point scale, respondents were asked about advice and support for relevant parties (e.g., "advice and support for family members, partners, bereaved families" "advice and support for other external supporters"), education, awareness-raising activities, research (e.g., "student/practicum supervision," "education/training for professionals inside or outside the institution," "prevention/awareness-raising activities," "research activities"), , organizational management/ administration (e.g., "participation in various hospital committees or meetings"), and other tasks (e.g., "reception duties").

3. Analysis method

(1) Factor Analysis to Consolidate Items Related to Psychological Work

Exploratory factor analysis was applied to the responses on the work status of each institution for each group of psychologists: A (diseases/problems treated), B (patient support workgroup), and C (educational research/collaboration workgroup).

First, the number of factors was determined by referring to the very simple structure (VSS) criterion[18] and Velicer's minimum average partial correlation (MAP) criterion,[24] which are calculated based on the polychoric correlation matrix (a correlation coefficient between ordinal scales). If VSS and MAP suggested different numbers of factors, the model with better goodness of fit was adopted. The psych package's *vss* function[19] was used to calculate VSS, MAP, and goodness of fit. Then, an exploratory factor analysis based on the adapted number of factors was conducted using a bifactor model (wls estimation) that assumed both general factors and sub-factors, and the explained common variance (ECV) was calculated. Exploratory factor analysis with the bifactor model and calculation of ECV were performed using the *omega* function in the psych package.[19] When

ECV was 0.60 or less, it was judged that it was inappropriate to assume a general factor,[17] and exploratory factor analysis of the multifactor model was carried out using the psych package's fa function with wls estimation[19]. Finally, based on the factor loading matrix indicated by the exploratory factor analysis, confirmatory factor analysis was conducted (wlsmv estimation) using structural equation modeling with the lavaan package to estimate factor loading and goodness of fit[21]. To examine the reliability of items loading on each factor in the adopted factor analysis model, McDonald's omega coefficient (ω) was calculated using the reliability function in the semTools package[4]. Reliability was considered sufficient if $\omega > 0.70$.[2] The goodness of fit of the confirmatory factor analysis model was assessed using CFI, RMSEA, and SRMR, and CFI ≥ 0.90, RMSEA ≤ 0.08, and SRMR ≤ 0.08 considered indicative of adequate fit.[7]

(2) Regression Analysis Using a Hierarchical Linear Model of Psychologists employment status and performance on each psychological work factor

Next, we performed regression analysis using a hierarchical linear model to examine how the number of psychologists employed, by full- or part-time status, relates to their level of job performance at each institution.

The dependent variable in this model was the factor score of each sub-factor of psychological work, as estimated from the factor analysis model. These factor scores were calculated as standard scores with a mean of zero and standard deviation of one, where zero represents the average performance of the factor in this population. The explanatory variables (fixed effects) were the number of full- and part-time psychologists in the facility, and the total number of psychologists (full plus part-time). The number of full-time and part-time psychologists was treated as an ordered variable with three categories (1 psychologist, 2 psychologists, and 3 or more psychologists). The model's random effects were specified as the department to which the facility's psychologist(s) belonged (e.g., psychological room, psychological department, etc., psychiatry, psychosomatic medicine, other departments, nursing department/co-medical department, day care department, research/clinical trial department, medical affairs/administrative department, other departments). In addition, the type of facility (psychiatric hospital psychiatry, general hospital, or clinic) was included as a covariate. The analysis used the lmer function in the R

lme4 package with restricted maximum likelihood estimation. To assess the differences in work performance across the three categories of full- and part-time psychologists, we calculated the estimated marginal means of each factor score from the hierarchical linear model and obtained the differences in factor scores (and their confidence intervals) between categories. The marginal means and confidence intervals were computed using the *lmmeans* package, and the significance of multiple comparisons was adjusted using the Turkey method.

II. Results

1. Overview of Responding Facilities

Table 1 shows the distribution of demographic factors for a total of 826 facilities. These included 399 psychiatric hospitals, 152 general hospitals, and 275 clinics specializing in psychiatric services. Table 1 also presents a breakdown of the number of facilities according to how many full-time and part-time employees they had, as well as the departments that responded. The 826 facilities collectively employed 2,894 psychologists (1,694 full-time, 1,122 part-time, and 78 compensated through honorarium or other means).

2. Factor Analysis to Aggregation of Psychologists' Tasks

To determine the number of factors, we used VSS and Velicer's MAP criteria to identify the optimal number of factors. Results indicated that for Group A, VSS suggested two factors and MAP suggested three; for Group B, VSS suggested three and MAP suggested four. When VSS and MAP criteria proposed different f factor solutions, we chose the model with the smaller Bayesian Information Criterion (BIC). Consequently, assuming three factors for Groups A and B and four for Group C, we conducted exploratory factor analysis and obtained interpretable factor patterns. Confirmatory factor analysis (CFA) based on these factor patterns showed adequate fit for all item sets (Group A: CFI=0.95, RMSEA=0.09, SRMR=0.08; Group B: CFI=0.90, RMSEA=0.08, SRMR=0.10; Group C: CFI=0.92, RMSEA=0.06, SRMR=0.07). The factor loadings from the final CFA are shown in Tables 2, 3, and 4. All items, except telephone counseling, developmental counseling, day care (dementia), and preliminary medical examination (which loaded on the Group B's second factor), had sufficiently high factor loadings of 50 or greater. To assess reliability, we calculated McDonald's omega coefficient. All factors showed satisfactory reliability (ω>0.70) except the second factor of Group B, which was

0.67; however, excluding preliminary medical examination (with a low factor loading) improved it to 0.72.

1) Group A: Diseases/problems treated (Table 2)

The first factor was labelled "Major mental disorders" because it included major diagnostic categories such as anxiety disorders, depression, adjustment disorders, dissociative disorders, and obsessive-compulsive disorders. The second factor, named "Sexual and behavioral problems/disorders/addictions" included items such as sexual and behavioral problems (e.g., oppositional defiant disorder), and substance-related disorders involving various addictions. The third factor was labeled "Family and socioeconomic problems" because it included items related to abuse and neglect, family or partner issues, and school/workplace related problems.

2) Group B: Patient Support Work (Table 3)

The first factor was named "Psychological testing/outpatient counseling", as it included various psychological tests and outpatient psychological interviews. The second factor, "Psychological support for groups/outreach" b load items such as group psychological interviews, psychological education (individual/group), rework/employment support, day care (psychiatry/dementia), outreach, and telephone counseling. The third factor was labeled "Psychological support/case conferences in hospitalization" as it included items such as in patient psychological interviews/counseling, case conferences, participation in ward rounds, and liaison activities.

3) Group C: Education, Research and Collaboration (Table 4)

The first factor, labeled "Education, research, and organizational management/support for families and related parties" had strong loadings for items such as training for multiple professions, advice and support for supporters inside and outside the facility, education/training, and research activities and programs conducted by multiple professions. The second factor, "Community collaboration (general)", included items referencing collaboration with local facilities such as public health centers, mental health and welfare centers, city halls, rehabilitation facilities, other medical institutions, and patient/family associations. The third factor, "Community collaboration (children)", loaded items such as child guidance centers, educational consultation agencies, child and family support centers, and schools. The fourth factor, "Support through multidisciplinary collaboration" included items relating to consultation (advice, etc.) with multiple

professions, multidisciplinary case conferences, multidisciplinary decision-making on treatment policy, sharing information among multiple professions, and multidisciplinary consultations/rounds.

3. Relationship Between the Numbers of Full- and Part-time Psychologists and Task performance

To investigate how the numbers of full- and part-time psychologists at each facility related to the degree to which various tasks are performed, we applied a hierarchical linear model. Figure 1 shows the estimated mean degree of performance (factor scores) for each number category of full- and part-time psychologist (error bars indicate standard errors, with facility type as a fixed covariate; see the supplementary materials in the journal's online version for more detailed results. The factor scores were estimated from the factor analysis model for each of the 10 extracted factors. Because these scores are standardized, 0 represents the mean, and the higher scores indicate more frequent engagement in that factor. Multiple comparisons corrected using the Tukey method revealed that for every task, work performance increased with the number of full-time psychologists. More specifically, performance on Group A tasks (support for "major mental disorders," "sexual and behavioral problems/addictions," and "family and socioeconomic problems") rose significantly when there were two or more full-time psychologists compared with none or one. For Group B's "Psychological testing/outpatient counseling," performance rose significantly when there were two or more full-time psychologists compared with none, and when there were three or more compared with one. Regarding "Psychological support/outreach for groups," performance was significantly higher with at least one full-time psychologist than with none, and with three or more compared with one. For "psychological support/case conferences during hospitalization," performance rose significantly with two or more full-time psychologists compared with none or one. For Group C's "Education, research, organizational management/support for families and related parties," it was significantly higher with one or more psychologists compared with none. In "Community collaboration (general)," "Community collaboration (children)" and "Support through multidisciplinary collaboration," performance improved significantly with more than one full-time psychologist compared with none, more than three compared with one, and more than three compared with two.

The tasks that increased in frequency when there were more part-time psychologists were "support for family and socioeconomic problems," "psychological testing/outpatient counseling," "education, research, organizational management/support for families and related parties," and "community collaboration (children)." Specifically, "Support for family and socioeconomic problems," "education, research, organizational management/support for families and related parties", and "community collaboration (children)," were performed significantly more often when there were three or more part-time psychologists than when there were none. For "Psychological testing/outpatient counseling," performance increased significantly with three or more part-time psychologists compared with none or one.

Moreover, the overall trend did not change significantly for full- or part-time psychologists in the models that included or omitted facility type as a covariate.

III. Discussion

The purpose of this study was to clarify how employment status of certified public psychologists relates to the content of their work. A secondary analysis of data obtained from facility representatives or human resource managers at medical institutions nationwide, as well as from representatives of psychology departments, showed that increasing the number of full-time psychologists.raised the performance level of all tasks. In particular, for the six tasks – psychological support for "major mental disorders" and "sexual and behavioral problems/disorders/addictions"; "psychological support for groups/outreach"; "psychological support/case conferences in hospitalization"; "community collaboration (general)"; and "support through multidisciplinary collaboration"– an increase in part-time psychologists did not enhance task performance, whereas having more full-time psychologists did.: On the other hand, increases in part-time psychologists improved performance only for four tasks–"support for family and socioeconomic problems", "psychological testing/outpatient counseling", "education, research", "organizational management/support for families and related parties", and "community collaboration (children)"– and this improvement required having three or more part-time psychologist.

1. Employment Status of Psychologists

and Degree of Performing Psychological Work

The present results show that increasing the number of full-time psychologists raises the performance level for all psychological task, whereas for part-time psychologists, performance increases only for certain tasks, and only when there are three or more part-time staff psychologist.

Generally, difference in employment status (full-time vs. part-time) lead to variations in work schedules, scope of job responsibilities and roles, and quantity and continuity of information-sharing both within and outside the organization. The above findings suggest that full-time employment allows psychologists to more readily demonstrate their professional abilities and contribute more significantly to the organization, whereas part-time arrangements can make it difficult for them to function effectively due to limitations related to their work style. Additionally, among full-time psychologists, a significant rise in degree of task performance was observed for five specific tasks when the number of full-time psychologists increased from zero to one. However, for the remaining five tasks, performance only improved significantly when there were two or more full-time psychologists. Therefore, assigning multiple full-time psychologists in each medical facility is essential to expand psychological support services.

2. Full-Time Psychologists and Level of Implementing Psychological Tasks

The performance level rose only when the number of full-time psychologists increased, with no significant difference observed when the number of part-time psychologists increased. Specifically, for the six tasks of "major mental disorders," "psychological support for groups/outreach," "psychological support/case conferences in hospitalization," "community collaboration (general)," and "support through multidisciplinary collaboration," performance improved solely with an increase in full-time psychologist. These tasks require specialized knowledge and skills, an understanding of crisis intervention and legal issues, and close collaboration among professionals, so they are likely more sensitive to differences in employment status– such as the number of days worked and scope of job responsibilities.

In the treatment of mental disorders, the importance of psychosocial support and the possibility of enhanced treatment effects when drug therapy is combined with psychological (psychiatric) therapy have been noted,[3)11)13)15)22)] and medical institutions place high expectations on

certified public psychologists. Indeed, in a survey conducted by the authors, 55.9% of medical institutions overall and 72.5% of psychiatric hospitals requested specialized psychological support for various mental disorders.[8] Having multiple full-time psychologists at a hospital is expected to expand psychological support for major mental illnesses, such as mood disorders, anxiety disorders, and schizophrenia, as well as more specialized condition such as addictions, sexual, behavioral problems. This can help foster comprehensive mental healthcare that does not rely solely on medication. Furthermore, because establishing a new mental health and medical care system in local communities has recently become a key national policy,[10] increasing the number of full-time psychologists may broaden the scope of support beyond traditional interview room–for example, through outreach, community collaboration, and multidisciplinary collaboration.

3. Part-Time Psychologists and Degree of Performing Psychological Work

When the number of part-time psychologists increased to three or more, the performance level rose for the following four: support for "family and socioeconomic problems," "psychological testing/outpatient counseling," "education, research, organizational management/support for families and related parties," and "community collaboration (children)." These tasks tend to have clearly defined roles and less constrained by the factors such as working days; thus they considered areas where psychologists can more readily demonstrate their expertise, regardless of employment status.

Psychological testing, outpatient counseling, and support for family and socioeconomic problems are core tasks that psychologists have long been responsible for in various fields, including education, welfare, justice, and industry; simply increasing the number of psychologists readiily translates into an expansion of these services. Meanwhile, in the context community collaboration in pediatrics, the work content relies heavily on external cooperation–generally believed to be easily influenced by employment conditions–yet performance still improve when there were three or more part-time psychologists. In supporting children, including responding to abuse, collaboration with institutions such as schools, child guidance centers, and child/family support centers is indispensable; hence, part-time psychologists may be fulfilling their roles beyond constraints related to working days or job responsibilities, supported by daily collaborative relationships.

Regarding "education, research, organizational management/support for families and related parties," although performance improved when there were three or more part-time psychologists, the degree of improvement was minimal compared with having more full-time psychologists, and notable difference appeared in actual performance (see C1 in the figure). Unlike research activities, which can be more easily divided up, education, organizational management, and support for related parties involve a certain level of responsibility, including supervisory duties. To expand these more advanced tasks, multiple full-time psychologists would be preferable over part-time staff. Indeed, maintaining and improving the quality of certified public psychologists, practical training and guidance for professionals and students–as well as opportunities for psychologists' own training–are extremely important aspects.

4. Limitations of this study

Finally, we would like to note the limitations of this study. First, although it targeted medical institution nationwide and some of the certified public psychologists working at these facilities, it only partially represents the total population. At the time of the survey, there were approximately 35,000 registered certified public psychologists, of whom about 30% were in the health and medical field (roughly 85% in medical care and 15% in public health).[16] Thus, this study covers only a little over 30% of the total. Moreover, this study merely shows how the level of task performance varies by full- or part-time employment among medical institutions in Japan. It is simply a comparison of how each task is performed within the population of these institutions. Consequently, the extent to which each type of work is needed nationwide and whether these needs are being met cannot be determined from these findings. For example, while having more full-time staff may improve support for major mental illnesses, additional research is needed to determine how many full-time psychologists are required to deliver sufficient services. Similarly, an investigation from a health economic perspective–namely, how to employ certified public psychologist so as to achieve the best balance of costs and benefits for medical institutions, communities, and the nation– would also be worthwhile.

Conclusion

Five years have passed since the Certified Public Psychologist Act was enacted, and the system is now due for review. Even though interest in mental healthcare has grown across various fields– owing in part to social changes

accompanying the COVID-19 pandemic–little progress has been made in creating a framework within the national health insurance system would allow people in need to receive psychological support. One underlying factors is that the number of psychologists working in medical institutions remains small, with many employed part-time.[8)14)23)] Most psychologists either work alone or under unstable employment conditions, which creates challenges in internal and external organizational communication, lobbying for improvements, developing materials to ensure the placement of certified public psychologists, promoting career pathways, and training the next generation. Ultimately, these constraints form a vicious cycle that makes addressing these issues even more difficult.

Findings from this study indicate that having a full-time psychologist raises the overall performance of psychological support services, and that hiring multiple full-time staff is particularly important for expanding specialized and advanced services. This suggests that psychologists currently employed part-time could better demonstrate their abilities and qualities under a full-time arrangement, potentially lead to more comprehensive support and greater organizational contributions. Additionally, full-time certified public psychologists working in clinical settings may improve the quality and content of the medical training required by the certification curriculum, thereby helping to elevate the overall level of certified psychologists.

The imbalance between the number of healthcare professionals and the volume of work is not unique to certified public psychologists; rather, it is one of the structural issues in Japan's healthcare system. One proposed solution is task shifting/sharing to reduce physicians' workload. If more full-time certified public psychologists are hired, enabling them to collaborate more proactively with other professionals and provide sufficient interpersonal care for patients in need, this could help realize more comprehensive mental healthcare and mental health support. Certified public psychologists are professionals who work in a wide range of fields, including not only healthcare but also education, welfare, the judiciary, and industry, and it is considered mental health care and mental health support. Since certified public psychologists are active not only in health care, but also in education, welfare, the justice system, and industry, their involvement in medical institutions could lead to seamless support across various life setting. and throughout the life-cycle. It is hoped that systemic issues related to

psychological support will resolved and mental healthcare will become more accessible to the general public.

Appendix

This study is a secondary analysis of a portion of the data obtained from the Ministry of Health, Labour and Welfare's 2019 Survey on Training and Practice for Improving the Qualifications of Certified Public Psychologists, part of the Comprehensive Welfare Project for Persons with Disabilities.

Conflict of Interest

Co-author Masaru Horikoshi receives licensing fees from Mitsubishi Tanabe Pharma Corporation and advisory fees from Emu Home Nursing Station. There are no other conflicts of interest to disclose for the other authors.

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表１　各施設のデモグラフィック要因の分布

施設区分		総数 826	病院（精神） 399	病院（総合） 152	診療所（精神他） 275
常勤・非常勤心理職の雇用人数	常勤心理職				
	常勤０人の施設	157	24	15	118
	常勤１人の施設	272	108	66	98
	常勤２人の施設	155	97	33	25
	常勤３人以上の施設	242	170	38	34
	非常勤心理職				
	非常勤０人の施設	398	244	83	71
	非常勤１人の施設	189	80	36	73
	非常勤２人の施設	88	38	14	36
	非常勤３人以上の施設	151	37	19	95
回答部門内訳	心理職の独立した部門				
	心理室・心理科など	305	217	34	54
	各診療科・病棟				
	精神科	240	78	29	133
	心療内科	45	0	2	43
	その他の診療科*	45	8	32	5
	診療科以外の部門				
	看護部門・コメディカル部門	109	70	24	15
	デイケア部門	39	16	7	16
	研究・治験部門，医事・事務部門	14	4	8	2
	その他の部門	29	6	16	7

*児童精神科，小児科，脳神経内科，産婦人科，周産期関連の診療科，がん・緩和ケア関連の診療科，リハビリテーション科，その他の診療科

Table 1: Distribution of demographic factors for each facility

Facility category

Total number 826

Hospital (psychiatric) 399

Hospital (general) 152

Clinic (psychiatric, others) 275

Employed number of full- and part-time psychologists

Full-time psychologists

Facilities with no full-time psychologist 157 24 15 118

Facilities with 1 full-time psychologist 272 108 66 98

Facilities with 2 full-time psychologists 155 97 33 25

Facilities with 3 or more full-time psychologists 242 170 38 34

Part-time psychologists

Facilities with no part-time psychologist 398 244 83 71

Facilities with 1 part-time psychologist 189 80 36 73

Facilities with 2 part-time psychologists 88 38 14 36

Facilities with 3 or more part-time psychologists 151 37 19 95

Departments responding

Independent department of psychologists, etc.

Psychological room/department, etc. 305 217 34 54

Each department/ward

Psychiatry 240 78 29 133

Psychosomatic medicine 45 0 2 43

Other departments* 45 8 32 5

Those other than medical departments

Nursing and medical support departments 109 70 24 15

Daycare departments 39 16 7 16

Research and clinical trial departments, medical affairs, and administrative departments 14 4 8 2

Other departments 29 6 16 7

*Child psychiatry, pediatrics, neurology, obstetrics and gynecology, perinatal-related departments, cancer and palliative care-related departments, rehabilitation departments, other departments

表 2　心理業務の項目群ごとの因子負荷（wlsmv 推定）　A：対応疾患・問題群

	A：対応疾患・問題群	A1	A2	A3
A1：主要な精神疾患（ω＝0.99）	不安障害	0.94		
	うつ病，抑うつ障害	0.93		
	適応障害	0.88		
	解離症，解離性障害	0.86		
	強迫症，強迫性障害	0.86		
	双極性障害	0.84		
	身体症状症	0.83		
	PTSD，急性ストレス障害，小児期の反応性愛着障害・脱抑制性愛着障害等	0.81		
	食行動障害，摂食障害	0.81		
	パーソナリティ障害	0.81		
	発達障害	0.78		
	統合失調症および精神病性障害	0.71		
A2：性的・行動的問題や疾患/依存症（ω＝0.86）	性に関する悩みや問題		0.86	
	性機能不全，性別違和		0.82	
	反抗挑発症，素行症，放火症，窃盗症等の障害，非社会性障害		0.81	
	犯罪被害や訴訟，収監，刑務所からの出所等，犯罪や法制度に関連する問題		0.75	
	パラフィリア障害群		0.73	
	アルコール・薬物等の物質関連障害，ギャンブル障害，ゲーム障害		0.71	
	知的障害，学習障害，チック等の神経発達障害		0.69	
	精神疾患によらない反社会的行動に関する問題		0.68	
	排泄症，排泄障害		0.63	
	認知症，軽度認知障害，せん妄等の神経認知障害		0.34	
A3：家庭および社会経済的問題（ω＝0.88）	虐待とネグレクトに関連する問題			0.86
	家族やパートナーに関連する問題			0.84
	学校・教育や職業に関連する問題			0.83
	睡眠障害			0.81
	住居や経済に関連する問題			0.73
	身体的疾患・障害に関連する心理的な問題			0.62

Table 2: Factor loadings for each group of psychological work (wlsmv estimation) A: Group of diseases/problems treated

A: Group of diseases/problems treated A1 A2 A3
A1: Major mental disorders (ω = 0.99)
Anxiety disorders 0.94
Depression, depressive disorders 0.93
Adjustment disorders 0.88
Dissociative disorders 0.86
Obsessive-compulsive disorders 0.86
Bipolar disorders 0.84
Somatoform disorders 0.83
PTSD, acute stress disorder, reactive attachment disorder, disinhibited attachment disorder, etc., in childhood 0.81
Eating behavior disorder, eating disorder 0.81
Personality disorder 0.81
Developmental disorder 0.78

Schizophrenia and psychotic disorders 0.71

A2: Sexual and behavioral problems and disorders/addictions (ω = 0.86)

Sexual problems and issues 0.86

Sexual dysfunction, gender dysphoria 0.82

Disorders such as antisocial disorders, conduct disorders, pyromania, kleptomania, etc., 0.81

Problems related to crime and the legal system, such as crime victimization, lawsuits, imprisonment, and release from prison 0.75

Paraphilia disorders 0.73

Substance-related disorders, such as alcohol and drug use, gambling disorders, and gaming disorders 0.71

Neurodevelopmental disorders, such as intellectual disability, learning disability, and tics 0.69

Problems related to antisocial behavior not caused by mental disorders 0.68

Excretory disorders, defecation disorders 0.63

Neurocognitive disorders such as dementia, mild cognitive impairment, and delirium 0.34

A3: Family and socioeconomic problems (ω = 0.88)

Problems related to abuse and neglect 0.86

Problems related to family and partner 0.84

Problems related to school, education, and occupation 0.83

Sleep disorders 0.81

Problems related to housing and finances 0.73

Psychological problems related to physical illness/disability 0.62

表 3　心理業務の項目群ごとの因子負荷（wlsmv 推定）　B：患者支援業務群

	B：患者支援業務群	B1	B2	B3
B1：心理検査/外来カウンセリング（ω＝0.91）	心理検査　診療報酬区分：「人格検査」（投影法）	0.92		
	心理検査　診療報酬区分：「人格検査」（描画法）	0.87		
	心理検査　診療報酬区分：「発達及び知能検査」	0.80		
	心理検査　診療報酬区分：「人格検査」（質問紙法，その他）	0.77		
	心理検査　診療報酬区分：「認知機能検査その他心理検査」	0.69		
	鑑定の心理検査（刑事，医療観察法，後見人等）	0.67		
	心理検査　診療報酬対象外のもの	0.61		
	個人に対する心理面接・カウンセリング（外来）	0.57		
B2：集団に対する心理支援/アウトリーチ（ω＝0.67）	集団に対する心理面接・カウンセリング（外来）		0.77	
	心理教育（個別及び集団）		0.72	
	リワーク・就労支援		0.62	
	デイケア（精神科）		0.59	
	アウトリーチ・訪問・外部機関への同伴など		0.54	
	電話相談		0.46	
	発達相談		0.43	
	デイケア（認知症）		0.36	
	予診		0.06	
B3：入院における心理支援/ケースカンファレンス（ω＝0.72）	集団に対する心理面接・カウンセリング（入院）			0.86
	ケースカンファレンス			0.78
	個人に対する心理面接・カウンセリング（入院）			0.74
	回診への参加			0.52
	リエゾン活動			0.50

Table 3: Factor loadings for each group of psychological work (wlsmv estimation) B: Patient support work group

B: Patient support work group　　B1　　B2　　B3

B1: Psychological testing/outpatient counseling (ω=0.91)

Psychological testing: Medical fee category: “Personality testing” (projective method) 0.92

Psychological testing: Medical fee category: “Personality testing” (drawing method) 0.87

Psychological testing: Medical fee category: “Development and intelligence testing” 0.80

Psychological testing: Medical fee category: “Personality testing” (questionnaire method, etc.) 0.77

Psychological testing: Medical fee category: “Cognitive function testing and other psychological testing” 0.69

Psychological testing for expert testimony (criminal, medical observation law, guardian, etc.) 0.67

Psychological testing not covered by medical fees 0.61

Psychological interviews and counseling for individuals (outpatient) 0.57

B2: Psychological support for groups/outreach (ω = 0.67)
Psychological interviews and counseling for groups (outpatient) 0.77
Psychological education (individual and group) 0.72
Rework and employment support 0.62
Daycare (psychiatry) 0.59
Outreach, home visits, accompaniment to external organizations, etc. 0.54
Telephone counseling 0.46
Developmental counseling 0.43
Daycare (dementia) 0.36
Preliminary medical examination 0.06

B3: Psychological support during hospitalization/case conferences (ω = 0.72)
Psychological interviews/counseling for groups (hospitalization) 0.86
Case conferences 0.78
Psychological interviews/counseling for individuals (hospitalization) 0.74
Participation in ward rounds 0.52
Liaison activities 0.50

表 4　心理業務の項目群ごとの因子負荷（wlsmv 推定）　C：教育研究・連携業務群

	C：教育研究・連携業務群	C1	C2	C3	C4
C1：教育・研究・組織運営/家族や関係者への支援（ω＝0.93）	多職種に対する研修の実施	0.80			
	院内の他の支援者に対する助言や支援	0.79			
	院外の他の支援者に対する助言や支援	0.78			
	教育・研修の実施（一般市民等を対象としたもの）	0.76			
	教育・研修の実施（院内外の専門職を対象としたもの）	0.76			
	多職種での研究活動	0.73			
	多職種でのプログラムの実施	0.71			
	院内の組織運営に関する各種会議への参加（委員会 等）	0.70			
	心理職の業務・役割についての院内への発信・広報	0.69			
	教育・研修の受講（業務として認められたもの）	0.68			
	予防・啓発活動（一般市民向けの講義，ストレスチェック 等）	0.67			
	研究活動	0.65			
	家族・パートナー・遺族等への助言や支援（グループ）	0.65			
	院内の経営に関する各種会議への参加	0.62			
	学生・実習指導	0.60			
C2：地域連携（一般）（ω＝0.94）	保健所		0.85		
	精神保健福祉センター		0.81		
	市役所		0.80		
	リハビリ施設		0.78		
	他の医療機関		0.78		
	患者会/家族会		0.77		
	警察		0.75		
	自助グループ		0.74		
	就労支援機関		0.71		
	介護保険施設		0.68		
	保護観察所		0.68		
	企業		0.66		
C3：地域連携（児童）（ω＝0.95）	児童相談所			0.90	
	教育相談機関			0.88	
	子ども家庭支援センター			0.86	
	学校			0.81	
	保育園			0.80	
	他の心理相談機関			0.80	
	家族・パートナー・遺族等への助言や支援（個別）			0.70	
C4：多職種連携による支援（ω＝0.84）	多職種に対するコンサルテーション（助言等）				0.88
	多職種でのケースカンファレンス				0.86
	多職種による治療方針の決定				0.82
	多職種による情報共有				0.79
	多職種での診察・回診				0.55

Table 4: Factor loadings for each group of psychological work (wlsmv estimation) C: Education, research, and liaison work group

C: Education, research, and liaison work group　C1　C2　C3　C4

C1: Education, research, organizational management/Support for families and related parties (ω = 0.93)

Implementation of training for multiple professions　0.80

Advice and support for other supporters within the hospital 0.79

Advice and support for other supporters outside the hospital 0.78

Implementation of education and training (for the general public, etc.) 0.76
Implementation of education and training (for professionals within and outside the hospital) 0.76
Multidisciplinary research activities 0.73
Implementation of programs involving multiple professions 0.71
Participation in various meetings related to the organization and management of the hospital (committees, etc.) 0.70
Dissemination and publicity within the hospital regarding the duties and roles of psychologists 0.69
Attendance for education and training (as part of one's duties) 0.68
Preventive and educational activities (lectures for the general public, stress checks, etc.) 0.67
Research activities 0.65
Advice and support for family members, partners, bereaved families, etc. (groups) 0.65
Participation in various meetings related to hospital management 0.62
Student and practical training guidance 0.60

C2: Community collaboration (general) (ω=0.94)
Public health center 0.85
Mental health and welfare center 0.81
City hall 0.80
Rehabilitation facility 0.78
Other medical institution 0.78
Patient/family association 0.77
Police 0.75
Self-help groups 0.74
Employment support organizations 0.71
Long-term care insurance facilities 0.68
Probation offices 0.68
Companies 0.66

C3: Community collaboration (children) (ω = 0.95)
Child guidance centers 0.90
Educational consultation organizations 0.88
Child and Family Support Center 0.86

School 0.81
Nursery school 0.80
Other psychological counseling organizations 0.80
Advice and support (individual) for family, partner, bereaved family, etc. 0.70

C4: Support through inter-professional collaboration (ω= 0.84)
Consultation (advice, etc.) for multiple professions 0.88
Case conferences involving multiple professions 0.86
Treatment decisions involving multiple professions 0.82
Information-sharing involving multiple professions 0.79
Examinations and ward rounds involving multiple professions 0.55

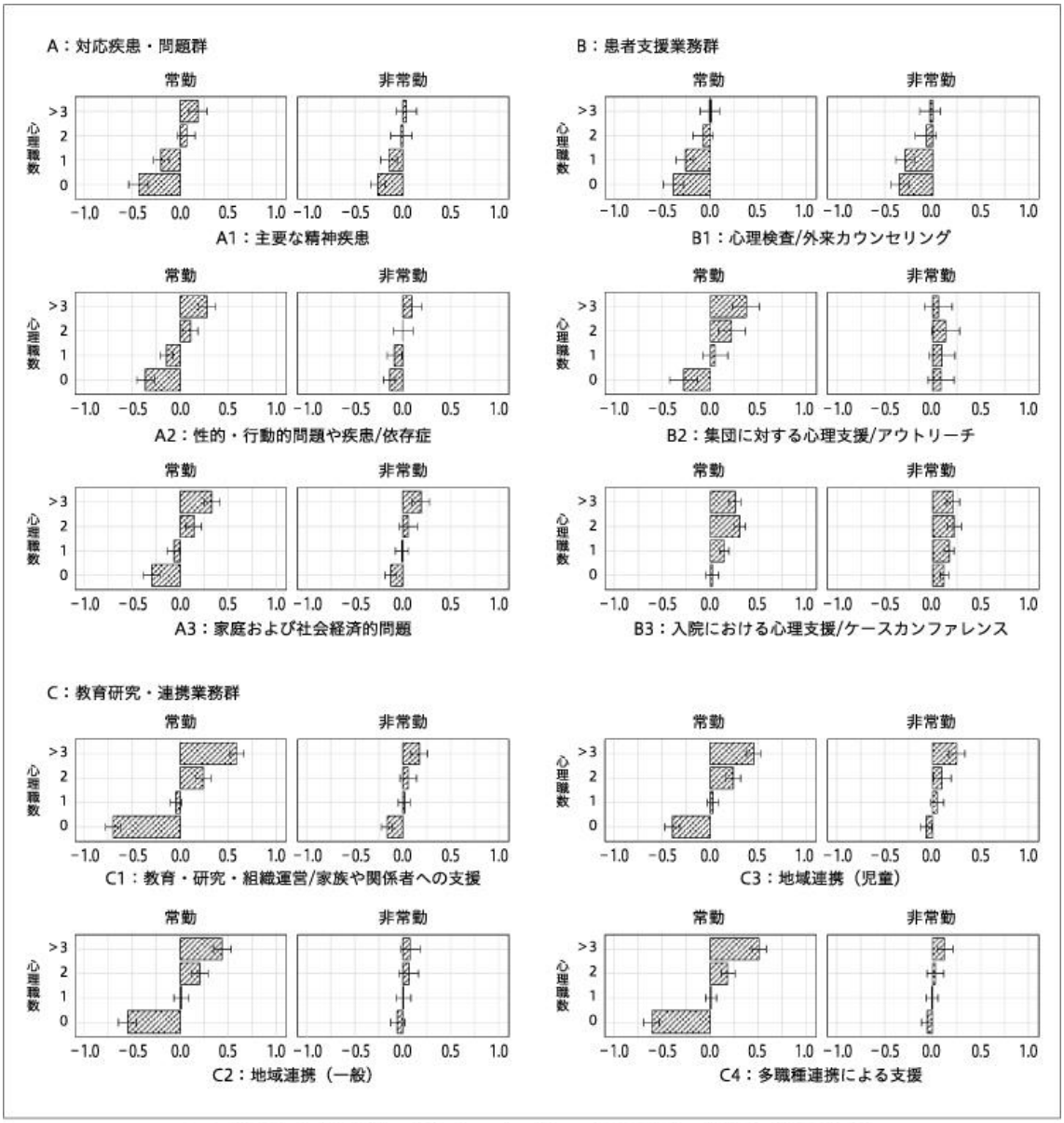

図　常勤および非常勤の人数カテゴリごとの各心理業務の遂行度（因子得点）

横軸の 0.0 が各心理業務の遂行度の全体平均であり，0.0 を上回ると平均よりも遂行度が高く，下回ると遂行度が低いことを示す．縦軸の常勤および非常勤の人数ごとに各心理業務の遂行度が示される．横軸：階層線形モデルの推定パラメータから算出した心理業務遂行度の周辺推定平均，縦軸：心理職の人数カテゴリ，エラーバー：標準誤差

Figure: Degree of performance (factor scores) of each psychological task by number of full- and part-time psychologists in each category

The horizontal axis shows the overall average of the degree of performance of each psychological task, with 0.0 indicating a higher degree of performance than average and below 0.0 indicating a lower degree of performance. The vertical axis shows the degree of performance of each psychological task by number of full- and part-time staff.

Horizontal axis: estimated mean of the degree of performance of psychological tasks

calculated from the estimated parameters of the hierarchical linear model, vertical axis: number of psychologists, error bar: standard error

表 5　心理職の常勤・非常勤数と心理業務の遂行度の関連：線形混合モデルによる推定結果　A：対応疾患・問題群

A：対応疾患・問題群	A1：主要な精神疾患		A2：性的・行動的問題や疾患/依存症		A3：家庭および社会経済的問題	
説明変数	Estimates	CI	Estimates	CI	Estimates	CI
固定効果						
切片	−0.63	−0.87〜−0.39	−0.58	−0.80〜−0.36	−0.62	−0.84〜−0.41
常勤 1 名（ref. 常勤 0 名）	0.24	0.04〜 0.44	0.22	0.02〜 0.42	0.22	0.02〜 0.42
常勤 2 名（ref. 常勤 0 名）	0.5	0.27〜 0.73	0.46	0.24〜 0.69	0.44	0.20〜 0.67
常勤 3 名以上（ref. 常勤 0 名）	0.62	0.37〜 0.87	0.64	0.40〜 0.88	0.62	0.38〜 0.87
非常勤 1 名（ref. 非常勤 0 名）	0.11	−0.05〜 0.28	0.05	−0.11〜 0.22	0.11	−0.05〜 0.28
非常勤 2 名（ref. 非常勤 0 名）	0.24	0.03〜 0.46	0.15	−0.06〜 0.35	0.18	−0.04〜 0.39
非常勤 3 名以上（ref. 非常勤 0 名）	0.29	0.07〜 0.52	0.24	0.01〜 0.46	0.31	0.08〜 0.54
心理職の総数	0.05	0.02〜 0.07	0.05	0.03〜 0.08	0.04	0.01〜 0.06
総合病院（ref. 精神科）	−0.36	−0.53〜−0.19	−0.23	−0.39〜−0.06	0.01	−0.16〜 0.17
診療所（ref. 精神科）	−0.05	−0.21〜 0.11	0	−0.16〜 0.16	0.15	−0.01〜 0.30
変量効果						
残差 σ^2		0.73		0.71		0.75
施設 τ_{00}		0.02		0.01		0
級内相関 ICC		0.02		0.01		NA*
Marginal R^2/Conditional R^2		0.163/0.182		0.168/0.175		0.117/NA*

＊施設の変量効果がゼロに推定されたことにより ICC と Conditional R^2が推定されないため，NA と表記している．

Table 5: Relationship between the number of full- and part-time psychologists and degree of psychological work performance: results of linear mixed model estimation
A: Group of diseases/problems treated

A: Group of diseases/problems treated
A1: Major mental disorders
A2: Sexual and behavioral problems and disorders/addictions
A3: Family and socioeconomic problems

Explanatory variables　Estimates CI Estimates CI Estimates　CI
Fixed effects
Intercept -0.63 -0.87 to -0.39 -0.58 -0.80 to -0.36 -0.62 -0.84 to -0.41
1 full-time psychologist (ref. 0 full-time) 0.24 0.04~0.44 0.22 0.02~0.42
2 full-time psychologists (ref. 0 full-time) 0.5 0.27-0.73 0.46 0.24-0.69 0.44 0.20-0.67
3 or more full-time psychologists (ref. 0 full-time) 0.62 0.37~0.87 0.64 0.40~0.88 0.62 0.38~0.87
1 part-time psychologist (ref. 0 part-time) 0.11 -0.05 to 0.28 0.05 -0.11 to 0.22 0.11 -0.05 to 0.28

2 part-time psychologists (ref. 0 part-time) 0.24 0.03~0.46 0.15 -0.06~0.35 0.18 -0.04~0.39

3 or more part-time psychologists (ref. 0 part-time) 0.29 0.07-0.52 0.24 0.01-0.46 0.31 0.08-0.54

Total number of psychologists, 0.05 0.02 to 0.07 0.05 0.03 to 0.08 0.04 0.01 to 0.06

General hospital (ref. psychiatry) -0.36 -0.53 to -0.19 -0.23 0.39 to -0.06 0.01 -0.16 to 0.17

Clinic (ref. psychiatry) -0.05 -0.21 to 0.11 0 -0.16 to 0.16 0.15 -0.01 to 0.30

Random effects

Residuals σ^2 0.73 0.71 0.75

Facility τ_{00} 0.02 0.01 0

Intra-class correlation ICC 0.02 0.01 NA*

Marginal R^2/Conditional R^2 0.163/0.182 0.168/0.175 0.117/NA*

*NA is indicated because ICC and Conditional R^2 were not estimated due to the estimated facility's random effect being zero.

表 6　心理職の常勤・非常勤数と心理業務の遂行度の関連：線形混合モデルによる推定結果　B：患者支援業務群

B：患者支援業務群	B1：心理検査/外来カウンセリング		B2：集団に対する心理支援/アウトリーチ		B3：入院における心理支援/ケースカンファレンス	
説明変数	Estimates	CI	Estimates	CI	Estimates	CI
固定効果						
切片	−0.38	−0.62〜−0.14	−0.52	−0.82〜−0.22	−0.18	−0.33〜−0.02
常勤 1 名（ref. 常勤 0 名）	0.12	−0.05〜 0.30	0.33	0.17〜 0.49	0.12	−0.02〜 0.26
常勤 2 名（ref. 常勤 0 名）	0.31	0.11〜 0.51	0.5	0.31〜 0.69	0.29	0.13〜 0.45
常勤 3 名以上（ref. 常勤 0 名）	0.38	0.17〜 0.60	0.65	0.45〜 0.85	0.24	0.07〜 0.41
非常勤 1 名（ref. 非常勤 0 名）	0.06	−0.08〜 0.20	0.01	−0.12〜 0.14	0.05	−0.06〜 0.17
非常勤 2 名（ref. 非常勤 0 名）	0.27	0.09〜 0.45	0.05	−0.12〜 0.22	0.11	−0.04〜 0.25
非常勤 3 名以上（ref. 非常勤 0 名）	0.31	0.12〜 0.51	−0.03	−0.21〜 0.16	0.09	−0.07〜 0.25
心理職の総数	−0.01	−0.03〜 0.01	0.04	0.02〜 0.06	0	−0.02〜 0.02
総合病院（ref. 精神科）	−0.44	−0.59〜−0.29	−0.01	−0.15〜 0.13	0.74	0.62〜 0.85
診療所（ref. 精神科）	0	−0.14〜 0.14	0.32	0.19〜 0.46	−0.35	−0.46〜−0.24
変量効果						
残差 σ^2		0.52		0.47		0.35
施設 τ_{00}		0.04		0.12		0
級内相関 ICC		0.07		0.2		0.01
Marginal R^2/Conditional R^2		0.091/0.158		0.118/0.296		0.317/0.323

Table 6: Relationship between the number of full- and part-time psychologists and degree of psychological work performance: Estimated results using linear mixed models B: Patient support work group

B: Patient support work group
B1: Psychological testing/outpatient counseling
B2: Psychological support for groups/outreach
B3: Psychological support/case conferences involving hospitalization

Explanatory variables	Estimates	CI	Estimates	CI	Estimates	CI
Fixed effects						
Intercept	-0.38	-0.62 to -0.14	-0.52	-0.82 to -0.22	-0.18	-0.33 to -0.02
1 full-time psychologist (ref. 0 full-time)	0.12	-0.05 to 0.30	0.33	0.17 to 0.49	0.12	-0.02 to 0.26
2 full-time psychologists (ref. 0 full-time)	0.31	0.11~0.51	0.5	0.31~0.69	0.29	0.13~0.45
3 or more full-time psychologists (ref. 0 full-time)	0.38	0.17~0.60	0.65	0.45~0.85	0.24	0.07~0.41
1 part-time psychologist (ref. 0 part-time)	0.06	-0.08 to 0.20	0.01	-0.12 to 0.14	0.05	-0.06 to 0.17
2 part-time psychologists (ref. 0 part-time)	0.27	0.09~0.45	0.05	-0.12~0.22	0.11	-0.04~0.25
3 or more part-time psychologists (ref. 0 part-time)	0.31	0.12-0.51	-0.03	-0.21-0.16	0.09	-0.07-0.25
Total number of psychologists	-0.01	-0.03~0.01	0.04	0.02~0.06	0	-0.02~0.02
General hospital (ref. psychiatry)	-0.44	-0.59 to -0.29	-0.01	-0.15 to 0.13	0.74	0.62 to 0.85
Clinic (ref. psychiatry)	0	-0.14 to 0.14	0.32	0.19 to 0.46	-0.35	-0.46 to -0.24
Random effects						
Residuals σ^2	0.52		0.47		0.35	
Facility τ_{00}	0.04		0.12		0	
Within-class correlation ICC	0.07		0.2		0.01	
Marginal R^2/Conditional R^2	0.091/0.158		0.118/0.296		0.317/0.323	

表 7　心理職の常勤・非常勤数と心理業務の遂行度の関連：線形混合モデルによる推定結果　C：教育研究・連携業務群

C：教育研究・連携業務群	C1：教育・研究・組織運営/家族や関係者への支援		C2：地域連携（一般）		C3：地域連携（児童）		C4：多職種連携による支援	
説明変数	Estimates	CI	Estimates	CI	Estimates	CI	Estimates	CI
固定効果								
切片	−0.88	−1.07～−0.69	−0.77	−0.99～−0.55	−0.79	−0.99～−0.59	−0.84	−1.04～−0.64
常勤 1 名（ref. 常勤 0 名）	0.65	0.48～ 0.82	0.56	0.37～ 0.75	0.43	0.24～ 0.61	0.62	0.44～ 0.79
常勤 2 名（ref. 常勤 0 名）	0.94	0.74～ 1.14	0.75	0.53～ 0.97	0.63	0.41～ 0.85	0.8	0.59～ 1.00
常勤 3 名以上（ref. 常勤 0 名）	1.3	1.08～ 1.51	0.99	0.75～ 1.22	0.85	0.61～ 1.08	1.12	0.90～ 1.34
非常勤 1 名（ref. 非常勤 0 名）	0.18	0.04～ 0.32	0.07	−0.09～ 0.23	0.12	−0.04～ 0.27	0.05	−0.10～ 0.20
非常勤 2 名（ref. 非常勤 0 名）	0.22	0.04～ 0.40	0.12	−0.08～ 0.32	0.17	−0.03～ 0.37	0.09	−0.10～ 0.28
非常勤 3 名以上（ref. 非常勤 0 名）	0.34	0.14～ 0.53	0.13	−0.08～ 0.35	0.32	0.10～ 0.54	0.19	−0.02～ 0.39
心理職の総数	0.02	−0.00～ 0.04	0.04	0.02～ 0.07	0.04	0.02～ 0.07	0.02	−0.00～ 0.05
総合病院（ref. 精神科）	0.15	0.01～ 0.29	−0.09	−0.25～ 0.07	0.19	0.03～ 0.34	0.34	0.19～ 0.49
診療所（ref. 精神科）	−0.4	−0.54～−0.27	0.05	−0.10～ 0.20	0.11	−0.04～ 0.25	−0.12	−0.27～ 0.02
変量効果								
残差 σ^2		0.54		0.66		0.66		0.59
施設 τ_{00}		0		0.01		0		0
級内相関 ICC		0.01		0.02		NA*		0
Marginal R^2/Conditional R^2		0.375/0.380		0.196/0.211		0.177/NA*		0.265/0.268

＊施設の変量効果がゼロに推定されたことにより ICC と Conditional R^2が推定されないため，NA と表記している．

Table 7: Relationship between the number of full- and part-time psychologists and degree of psychological work performance: Results of linear mixed model estimation C: Education, research, and collaboration work group

C: Education, research, and collaboration work group
C1: Education, research, and organizational management/support for families and related parties
C2: Community collaboration (general)
C3: Community collaboration (children)
C4: Support through multidisciplinary collaboration
Explanatory variables Estimates CI Estimates CI Estimates CI Estimates CI
Fixed effects
Intercept -0.88 -1.07 to -0.69 -0.77 -0.99 to -0.55 -0.79 -0.99 to -0.59 -0.84 -1.04 to -0.64
1 full-time psychologist (ref. 0 full-time) 0.65 0.48~0.82 0.56 0.37~0.75 0.43 0.24~0.61 0.62 0.44~0.79
2 full-time psychologists (ref. 0 full-time) 0.94 0.74-1.14 0.75 0.53-0.97 0.63 0.41-0.85 0.8 0.59-1.00
3 or more full-time psychologists (ref. 0 full-time) 1.3 1.08~1.51 0.99 0.75~1.22 0.85 0.61~1.08 1.12 0.90~1.34
1 part-time psychologist (ref. 0 part-time) 0.18 0.04-0.32 0.07 -0.09-0.23 0.12 -0.04-0.27 0.05 -0.10-0.20
2 part-time psychologists (ref. 0 part-time) 0.22 0.04~0.40 0.12 -0.08~0.32 0.17 -

0.03~0.37 0.09 -0.10~0.28

3 or more part-time psychologists (ref. 0 part-time) 0.34 0.14 to 0.53 0.13 -0.08 to 0.35 0.32 0.10 to 0.54 0.19 -0.02 to 0.39

Total number of psychologists 0.02 -0.00 to 0.04 0.04 0.02 to 0.07 0.04 0.02 to 0.07 0.02 -0.00 to 0.05

General hospital (ref. psychiatry) 0.15 0.01-0.29 -0.09 -0.25-0.07 0.19 0.03-0.34 0.34 0.19-0.49

Clinic (ref. psychiatry) -0.4 -0.54 to -0.27 0.05 -0.10 to 0.20 0.11 -0.04 to 0.25 -0.12 -0.27 to 0.02

Random effects

Residual variance σ^2	0.54	0.66	0.66	0.59
Facility τ_{00}	0	0.01	0	0
Intra-class correlation ICC	0.01	0.02	NA*	0
Marginal R^2/Conditional R^2	0.375/0.380	0.196/0.211	0.177/NA*	0.265/0.268

* NA is indicated because ICC and Conditional R^2 were not estimated due to the estimated facility's random effect being zero.