



# Is intensive case management screening sheet score associated with service intensity?

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## Abstract

**Aims:** Since April 2020, the new Japanese mental health system has used the Intensive Case Management Screening Sheet (ICMSS) to identify patients' needs for case management services. This study aimed to examine the association between ICMSS score and service intensity and compare the magnitude of association between ICMSS score and service intensity with other scales.

**Methods:** We recruited patients who received case management services from a staff member in a psychiatric outpatient service, psychiatric day-care program, or outreach team based at one psychiatric hospital. Case management service needs and functioning were assessed using ICMSS, Global Assessment Functioning (GAF), and Personal and Social Performance (PSP). The case manager also documented all services received by the participant for 2 months. The association between each scale and service duration was examined. Furthermore, the magnitude of the association between each scale and service intensity was compared.

**Results:** Overall, 138 participants were included in the analysis. The most common diagnosis was schizophrenia. Mean total service duration was weakly but significantly correlated with ICMSS (Spearman's  $\rho = 0.320$ ), GAF ( $\rho = -0.198$ ), and PSP ( $\rho = -0.275$ ) scores. Poisson's regression models and postestimation testing showed that the coefficient for ICMSS score ( $B = 0.144$ ; 95% CI = 0.141, 0.148) was significantly larger than the coefficients for GAF ( $B = -0.017$ , 95% CI =  $-0.017$ ,  $-0.016$ ,  $\chi^2 = 15.70$ ,  $P < 0.001$ ) and PSP ( $B = -0.016$ , 95% CI =  $-0.017$ ,  $-0.016$ ,  $\chi^2 = 14.64$ ,  $P < 0.001$ ) scores.

**Conclusion:** ICMSS may provide preliminary information on case management service needs, but the level of service should be based on the individual needs of each patient and shared decision-making between the patient and case manager.

## KEYWORDS

functioning, intensive case management, scale validity, service need, service provision time

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## 1 | INTRODUCTION

In Japan, the development of community mental health care has been progressing in the last decade. At the same time, the transition process from inpatient care to community care is often problematic due to the lack of services to connect the two settings.<sup>1,2</sup> Intensive case management serves as this linkage by providing and coordinating direct services to meet the needs of patients in the community.<sup>3,4</sup> Indeed, a Cochrane review concluded that intensive case management is a community mental health intervention that is particularly effective in reducing the number of inpatient days in the hospital.<sup>5</sup> Based on these international findings, case management services and relevant outreach services have been gradually implemented in Japanese community mental health settings.<sup>6-9</sup> On the other hand, psychiatric hospitals and mental health clinics in Japan accept anyone who potentially has mental health problems regardless of the level of care needed. It is important to identify patients in need of case management or intensive services.

In this context, we have developed the Intensive Case Management Screening Sheet (ICMSS) to assess whether a patient has individual needs in their community-based lives and requires case management services.<sup>10</sup> In April 2020, a new system called the Joint Assessment for Discharge, which links inpatient care and outpatient/community-based care, has been launched.<sup>11</sup> In this system, ICMSS will be used to identify patients who require case management services and other community-based care after discharge. Our previous study reported on the convergent validity and accuracy of ICMSS with functional measurements; patients with higher scores are more likely to receive case management services than patients with lower scores. However, ICMSS may have insufficient validity<sup>10</sup>. For example, it remains unclear whether a patient with a high ICMSS score needs intensive services, rather than simply needing case management services. This study aimed to examine the association between the ICMSS score and service intensity and to compare other scales by combining data from two studies reported elsewhere.<sup>10,12</sup>

## 2 | METHODS

### 2.1 | Design and settings

The prospective observational study was performed between October 1, 2016, and December 31, 2016. We assessed outpatients' service needs and level of functioning at baseline at Asahi General Hospital, Japan. Next, case managers evaluated the services that participants had received over a 2-month period. The study was approved by the ethics committee of Asahi General Hospital (No. 2016092001). Study procedures were previously described.<sup>10,12</sup>

### 2.2 | Participants

We recruited the participants who received case management services from a staff member in a psychiatric outpatient service, psychiatric day care, or outreach team from Asahi General Hospital during October 1-7, 2016. The eligibility criteria were as follows: age 20 years or over; continuous use of services for at least 6 months at Asahi General Hospital or the total duration of mental health services use of at least 12 months; and diagnosis codes from F10 to F99 in the International Statistical Classification of Diseases and Related Health Problems, 10th revision. We recruited the participants who engaged with the hospital services for a certain period since such patients often need intensive case management particularly in the Japanese medical system where everyone can access.<sup>6</sup> We excluded the outpatients who used residential care facilities for the aged and disabled, except for group home care because such patients generally used aged care services or received services from residential care facility staff rather than a case manager. Informed consent was obtained from all participants, and the data anonymity was preserved.

### 2.3 | Variables and measurements

We assessed participants' characteristics, case management service needs using ICMSS, and level of functioning using Global Assessment Functioning (GAF) and Personal and Social Performance (PSP).<sup>10,13,14</sup> ICMSS consists of clinician ratings of 14 items related to case management service needs including living situation, daily skills, family relationships, and service use. The content validity, factor validity, and convergent validity of ICMSS have been confirmed previously.<sup>10</sup> Higher ICMSS scores indicate higher case management service needs in daily life. GAF is a scale of overall functioning as rated by clinicians that includes social, occupational, and psychological aspects.<sup>13</sup> PSP is also a clinician-rated scale of overall functioning that consists of four domains of personal and social functioning: socially useful activities, personal and social relationships, self-care, and disturbing and aggressive behavior.<sup>14</sup> Lower GAF and PSP scores represent more severe functional impairment. In addition, case managers recorded all services received by the participants for 2 months during November 1-December 31, 2016, using a service inventory sheet. The service inventory sheet developed through the modification of a service assessment tool used in another service intensity analysis.<sup>15</sup> On the service inventory sheet, case managers selected service type (outreach, hospital-based, or telephone-based) and recorded the duration of the services provided in minutes.

### 2.4 | Statistical analysis

We computed the total number of service minutes as the sum of minutes for outreach, hospital-based, and telephone-based services



received. In this study, total service duration and outreach service duration were used as outcome variables to indicate service intensity. Spearman's correlation analysis was conducted to assess the relationship between service minutes and ICMSS, GAF, or PSP score, respectively. We also generated three Poisson's regression models to examine whether each scale was associated with service minutes. We used the postestimation test to compare the regression coefficients for ICMSS, GAF, and PSP scores in each model to investigate the difference in the magnitude of the associations among variables. Sensitivity analysis adjusting for potential covariates including sex, age, diagnosis of schizophrenia, living situation, and prior hospitalization was performed. Statistical significance was set at the 5% level. All analyses were conducted using Stata version 15.

### 3 | RESULTS

During the recruitment period, 744 outpatients were screened. Of these, 144 met the eligibility criteria. Six declined to participate in the study. The final analysis included 138 participants. The most common diagnosis among participants was schizophrenia (approximately 80%) among the participants. Around half of the participants were female, and the mean age was 47.0 (SD = 12.4). The mean ICMSS, GAF, and PSP scores were 3.3 (SD = 2.5), 47.5 (SD = 14.0), and 53.1 (SD = 14.4), respectively. In addition, the mean total number of service minutes was 277.3 (SD = 336.2) (Table 1).

Mean total number of service minutes was significantly correlated with ICMSS (Spearman's  $\rho = 0.320$ ), GAF ( $\rho = -0.198$ ), and PSP ( $\rho = -0.275$ ) scores. The correlation coefficient between outreach service minutes and the ICMSS score ( $\rho = 0.359$ ) was slightly higher than the coefficient for the total number of service minutes. Poisson's regression models and postestimation test found that the coefficient for the ICMSS score ( $B = 0.144$ , 95% CI = 0.141, 0.148) was significantly larger than that for the GAF ( $B = -0.017$ , 95% CI =  $-0.017$ ,  $-0.016$ ,  $\chi^2 = 15.70$ ,  $P < 0.001$ ) and PSP ( $B = -0.016$ , 95% CI =  $-0.017$ ,  $-0.016$ ,  $\chi^2 = 14.64$ ,  $P < 0.001$ ) scores (Table 2). Sensitivity analysis showed the same trend (Table S1).

### 4 | DISCUSSION

The study examined the relationship between service intensity and three scales: ICMSS, GAF, and PSP. The findings support the further validity of ICMSS, suggesting that the ICMSS score is significantly associated with service intensity. This association is significantly stronger compared with those of the two other functional measures. ICMSS assesses multiple aspects of the community lives of patients with mental illness. Indeed, individuals with mental illness have a variety of needs (eg, housing, daily living, interpersonal relationships, and social participation) in addition to clinical outcomes such as level of functioning.<sup>16</sup> In other words, the comprehensiveness of ICMSS may potentially result in an association between ICMSS score and

**TABLE 1** Characteristics of the participants and service intensity

n = 138	n	%
Sex		
Female	70	50.7
Male	68	49.3
Age (mean, SD)	47.0	12.4
Diagnosis based on ICD-10		
Mental disorders due to known physiological conditions (F0)	3	2.2
Mental and behavioral disorders due to psychoactive substance use (F1)	1	0.7
Schizophrenia, schizotypal, delusional, and other nonmood psychotic disorders (F2)	111	80.4
Mood [affective] disorders (F30–F31)	11	8.0
Mood [affective] disorders (F32–F39)	4	2.9
Anxiety, dissociative, stress-related, somatoform, and other nonpsychotic mental disorders (F4)	4	2.9
Disorders of adult personality and behavior (F6)	2	1.5
Pervasive and specific developmental disorders (F8)	2	1.5
Living situation		
Living with family	71	51.5
Living alone	32	23.2
Residential facility	35	25.4
Hospitalization in past 12 months		
Have been hospitalized	29	21.0
Employment		
Have been employed	13	9.4
Disability pension		
Have been received	89	64.5
Welfare benefits		
Have been received	23	16.7
Intensive Case Management Screening Sheet (mean, SD)	3.3	2.5
Global assessment of functioning (mean, SD)	47.5	14.0
Personal and Social Performance scale (mean, SD)	53.1	14.4
Service minutes received in participants		
Total (mean, SD)	277.3	336.2
Outreach services (mean, SD)	155.6	221.9
Hospital-based services (mean, SD)	90.3	217.3
Telephone-based services (mean, SD)	31.4	76.9

service intensity. Moreover, intensive case management services are typically provided outside of hospitals to directly address patient needs in the community where particular problems can occur.<sup>4,5</sup> A slightly higher correlation coefficient for outreach services than for all services may also support the validity of ICMSS.

**TABLE 2** Associations between service minutes and three scales

	Spearman's correlation		Poisson's regression			vs ICMSS <sup>a</sup>	
	$\rho$	<i>P</i>	Coefficient	95% CI	<i>P</i>	$\chi^2$	<i>P</i>
Dependent variable: Total service minutes							
intensive case management screening sheet	0.320	<0.001	0.144	0.141, 0.148	<0.001		
Global assessment of functioning	-0.198	0.020	-0.017	-0.017, -0.016	<0.001	15.70	<0.001
Personal and social performance	-0.275	0.001	-0.016	-0.017, -0.016	<0.001	14.64	<0.001
Dependent variable: Outreach service minutes							
Intensive case management screening sheet	0.359	<0.001	0.182	0.177, 0.187	<0.001		
Global assessment of functioning	-0.206	0.015	-0.021	-0.022, -0.020	<0.001	16.57	<0.001
Personal and social performance	-0.216	0.011	-0.020	-0.020, -0.019	0.019	15.70	<0.001

Abbreviations: 95% CI, 95% confidence interval; Global assessment of functioning, GAF; ICMSS, Intensive Case Management Screening Sheet; PSP, Personal and Social Performance.

<sup>a</sup>Comparison of the absolute values of the coefficients for ICMSS versus GAF or ICMSS versus PSP.

Caution is needed when using ICMSS, even though ICMSS appears to be a useful tool for identifying the need for case management services and assessing the intensity of services needed. The effect size from Spearman's correlation analysis between the ICMSS score and service minutes was weak or moderate at best.<sup>17</sup> Service intensity generally varies due to staff ratings of patient factors as well as patient preferences, changes in symptoms, treatment regimens, and organizational factors.<sup>12,15,18</sup> The relatively weak relationship between ICMSS and service provision (minutes) indicates that individual factor assessment alone at any single point in time only partly explains the service intensity required by participants. In other words, clinicians should understand that while a higher ICMSS score is associated with the total amount of services needed, the score cannot predict service intensity with extremely high probability.

The study has several limitations. First, the study recruited participants who have been already receiving case management services. New case management service users may have different service needs, functions, and service intensity compared with the present study sample. Second, while pharmacological interventions may influence the service contents and service intensity of case management, we did not assess the medication and prescribing information for the individual participants. Third, since the study included patients from a single psychiatric hospital, the generalizability of findings is limited.

## 5 | CONCLUSION

ICMSS can provide preliminary information about case management services. While ICMSS is used in the new Japanese mental health system, the type and level of case management services should be

determined based on the needs of each patient and shared decision-making between the patient and case manager. Future studies are needed to confirm the finding of this study in a broader setting.

### CONFLICTS OF INTEREST

The authors declare no conflict of interest.

### AUTHORS' CONTRIBUTION

SY and CF contributed to the writing of the draft manuscript. SY conducted the statistical analysis. YK, KN, and TA managed and organized data collection. All the authors contributed to the protocol development and the interpretation of the results, and approved the final version of the manuscript.

### DATA DEPOSITORY

We cannot make the raw data open to the public because we did not obtain informed consent for open data sharing from the participants. However, we can provide the data used in this study to researchers who want to use them, following approval by the ethics committee of Asahi General Hospital.

### APPROVAL OF THE RESEARCH PROTOCOL BY AN INSTITUTIONAL REVIEWER BOARD

The study was approved by the ethics committee of Asahi General Hospital (No. 2016092001).

### INFORMED CONSENT

Informed consent was obtained from all participants.

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## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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