

## Short report

# Premature deaths among individuals with severe mental illness after discharge from long-term hospitalisation in Japan: a naturalistic observation during a 24-year period

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## Background

Premature death in individuals with severe mental illness (SMI) in countries without nationally collected data, including Japan, is structurally underreported.

## Aims

To elucidate excess mortality among individuals with SMI in Japan.

## Method

We retrospectively investigated all deaths among users of a non-clinical community-based mental health service provider in suburban Tokyo from 1992 to 2015.

## Results

During the study period, 45 individuals died among 254 qualified registrants. Deaths were by natural causes in 33 cases (73.3%). The mean years of life lost was 22.2 years and the overall standard mortality ratio (SMR) was 3.28 (95% CI 2.40–4.39). The cause-specific SMR was 5.09 (95% CI 2.33–9.66) for cardiovascular disease and 7.38 (95% CI 2.40–17.22) for suicide.

## Conclusions

Although Japan leads the world in longevity, individuals with SMI suffer premature death and excess mortality due

to physical conditions as well as suicide. Revealing this underreported disparity of life is the first step to improving physical care for individuals with SMI.

## Declaration of interest

S.K. received personal fees from Pfizer and Daiippon-Sumitomo, outside the submitted work, and was a medical adviser to Sudachi-kai. Y.K. received grants from Japan Foundation for Neuroscience and Mental Health (JFNMH), during the conduct of the study, and personal fees from Daiippon-Sumitomo, outside the submitted work. K.K. received grants from Japan Society for the Promotion of Science (JSPS) and Japan Agency for Medical Research and Development (AMED), during the conduct of the study; personal fees from Daiichi-Sankyo, Otsuka, Meiji-Seika Pharma, Yoshitomi, Mochida and Fuji-Film RI Pharma; grants and personal fees from MSD, Astellas, Daiippon-Sumitomo and Eisai; and grants from Lily, Takeda and Tanabe-Mitsubishi, outside the submitted work.

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Premature deaths among individuals with severe mental illness (SMI) are extensively documented.<sup>1</sup> However, most evidence originates from countries with an available large database or national registry. Little is known regarding this issue in countries without nationally collected data, including Japan. We aimed to elucidate excess mortality among individuals with SMI in Japan.

## Method

We retrospectively investigated all deaths among users of a non-clinical, community-based non-profit organisation for individuals with SMI in suburban Tokyo from 1992 to 2015. The organisation, Sudachi-kai (Mitaka, Tokyo), is reportedly one of the best practice community mental health service providers in Japan.<sup>2</sup> Sudachi-kai has promoted the discharge of hospitalised individuals with SMI to community living, offering case management, supported accommodations, and vocational training, with no time limit.

The inclusion criteria were as follows: the individual entered the service after discharge from long-term in-patient treatment at a psychiatric hospital, was diagnosed with a chronic psychiatric disorder and was receiving out-patient psychiatric care. The study period for each registrant extended from the entry into the service to the termination of service use, including death. The registrants who

left the service and became untraceable were included until the time at which they left the service. All available records of the deceased registrants were carefully examined with the local social workers who personally knew each registrant. Extracted data included age, cause and situation of death, living environment (including accommodations), financial status, marital status, cigarette smoking and medical history.

Years of life lost (YLL) were calculated by summing the gender-specific life expectancy at the age of death using the national life table for the year of the death.<sup>3</sup> Mean YLL (YLL per person) was calculated by dividing the YLL by total number of deaths. Mortality rates were estimated using the person-year method: overall, gender-specific and cause-specific standard mortality ratios (SMRs) were calculated by dividing the observed deaths by the expected deaths. Expected deaths were estimated from the sum total of an annual age-/gender-specific mortality rate in the general population corresponding to each person-year using the national vital statistics for the study period.<sup>3,4</sup> Confidence intervals (CIs) of the SMRs were computed based on the Poisson distribution. Statistical analyses were performed using R software (version 2.14.1; www.r-project.org).

The study protocol was disclosed to the public on the websites of the Department of Neuropsychiatry at the University of Tokyo Hospital and Sudachi-kai. This study was approved by the research ethics committee of the Faculty of Medicine at the University of Tokyo.

## Results

During the study period, there were 254 qualified registrants (1983 person-years). Average age at entry was 50.0 years (s.d.=11.8). The living statuses of 180 registrants (1526 person-years) were confirmed at the end of 2015, whereas those who became untraceable were included until the time at which they left the service (457 person-years). Among these, 45 individuals (31 men and 14 women) died during the study period. All of the deceased had an SMI under treatment (schizophrenia 39, other psychotic disorder 1, bipolar disorder 3, depression 1 and other 1). Among the deceased, the cumulative length of the psychiatric hospital stay ranged from 1.1 to 47.8 years, with an average of 15.6 years (s.d.=12.0). The mean age at death was 63 years (men, 63.2 years; women, 62.6 years). The mean YLL was 22.2 years (men, 20.5 years; women, 26.0 years). The leading causes of death included cancer of any origin (10 (22.2%)), cardiovascular disease (9 (20.0%)) and suicide (5 (11.1%)). Natural causes were responsible for 33 (73.3%) of the deaths. Sudden death occurred in one-third of the deaths (15 (33.3%)). The death was unattended for 12 individuals (26.7%).

Among the deceased, 42 individuals (93%) had been living either independently or semi-independently; 39 (87%) had received social welfare or disability benefits (or both). Majority of the deceased (27 (60.0%)) had regularly visited non-psychiatric physicians for chronic conditions such as diabetes and hypertension. Twenty-two individuals (49%) were smokers at the time of death.

The overall SMR of the study group was 3.28 (95%CI 2.40–4.39). The gender-specific SMR was 2.85 (95%CI 1.93–4.04) for men and 4.98 (95%CI 2.72–8.35) for women. The cause-specific SMR was 1.94 (95%CI 0.93–3.57) for cancer, 5.09 (95%CI 2.33–9.66) for cardiovascular disease and 7.38 (95%CI 2.40–17.22) for suicide.

Detailed results are summarised in Table 1.

## Discussion

We found that the individuals with SMI died approximately 20 years early relative to the general population, mostly from natural causes. The overall and gender-specific SMRs were significantly elevated, as well as those for cardiovascular disease and suicide. These results are consistent with the previous literature,<sup>5</sup> and for the first time, they demonstrate the premature death of individuals with SMI in the world's leading country for longevity.

Few reports exist regarding excess mortality in individuals with SMI in Japan, all of which are based on hospital records prior to the 1980s.<sup>6,7</sup> The lack of publications after this era may be due to methodological limitations related to a difficulty in linking psychiatric patients with vital statistics in Japan. Moreover, the OECD Reviews of Health Care Quality<sup>8</sup> pointed out that Japan is unable to report on any of the indicators collected under the OECD Health Care Quality Indicator collection for mental health. This lack of database infrastructure may itself reflect a structural neglect of this population.

This study has several limitations. First, this is a small, single-centre study, which may limit generalisation. Additionally, the average age of 50 years at entry suggests that the study group may reflect a survival group from earlier potential deaths, particularly from suicide. However, this study can be generalised to some extent, because such individuals illustrate a typical picture of a socially marginalised life course after discharge from long-term hospitalisation in a real-world setting. Although this study included incomplete data from those who became untraceable,

**Table 1** Registrant characteristics and computed standard mortality ratios (SMRs)

	Total n (%)	SMR (95% CI)
Survivors	209	
Deaths	45 (100)	3.28 (2.40–4.39)
Male	31 (68.9)	2.85 (1.93–4.04)
Female	14 (31.1)	4.98 (2.72–8.35)
Cause of death		
Natural death	33 (73.3)	–
Cancer	10 (22.2)	1.94 (0.93–3.57)
Cardiovascular disease	9 (20.0)	5.09 (2.33–9.66)
Other diseases	14 (31.1)	–
Suicide	5 (11.1)	7.38 (2.40–17.22)
Accident	2 (4.4)	–
Unknown	5 (11.1)	–
Sudden death	15 (33.3)	
Accommodation after discharge		
Independent living	17 (37.8)	
Group home	25 (55.6)	
Nursing home	2 (4.4)	
Living with family	1 (2.2)	
Financial status		
Social welfare	29 (64.4)	
Disability benefits	24 (53.3)	
Both	14 (31.1)	
Unknown	2 (4.4)	
Marital status		
Never married	22 (48.9)	
Were married (including divorced)	13 (28.9)	
Unknown	10 (22.2)	
Cigarette smoking		
Smoker	22 (48.9)	
Non-smoker	18 (40.0)	
Unknown	5 (11.1)	
Medical treatment		
Regular psychiatric visits	45 (100.0)	
Regular medical visits	27 (60.0)	
Unattended death	12 (26.7)	
CI, confidence interval; SMR, standard mortality ratio.		

it does provide some evidence on the mortality gap in the absence of alternative available data.

The strengths of this study include its ability to offer personal information that would not appear in large-scale population-based data. The fact that the majority of the deceased regularly visited physicians in addition to usual psychiatric visits may indicate that access to physical healthcare was apparently provided, but not in an integrative and effective way.<sup>9</sup> In countries such as Japan, where physical and mental healthcare systems are dichotomised, multilevel actions under strong leadership are necessary to facilitate communication and improve physical care for individuals with SMI.<sup>10</sup> Revealing this underreported disparity of life is the first step.

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