

LETTER



# Invasive mechanical ventilation for people with severe mental disorders: recent trends in incidence and in-hospital mortality

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Dear Editor,

The shortened life expectancy of people living with severe mental disorders (SMD) [1] is partially determined by worse outcomes than the general population following admission to intensive care units (ICUs) [2]. To better understand health care delivery for SMD patients within ICUs, we examined recent trends in use and outcomes of mechanical ventilation (MV) for critical patients with and without SMD.

Using the nationally representative Spanish Health Ministry's National Hospital Database, we selected all records of adults aged 15–69 years featuring an MV procedure between January 1, 2000 and December 31, 2015. International Classification of Diseases 9th Edition Clinical Modification (ICD-9-CM) codes for continuous invasive MV were: 96.70 (unspecified duration), 96.71 (<96 consecutive hours), and 96.72 (≥96 consecutive hours). We excluded patients aged ≥70 years as people with SMD have 15 years shorter life expectancy [1] and Spain's current life expectancy is 83 years [3]. Study groups were: SMD (ICD-9-CM codes 295–298: schizophrenia, episodic affective disorder, delusional disorder or other non-organic psychotic disorder) and non-SMD. Incidence rates were calculated per 10,000 total discharges of patients aged 15–69 years. Long-term MV and in-hospital mortality were defined as the proportion of procedures lasting ≥96 consecutive hours and the case fatality rate (CFR), respectively, both per 100 MV cases. To study trends, we used joinpoint regressions. These generalized

linear models allow for the estimation of average annual percentage changes (AAPC) with 95% confidence intervals (95% CI) over a time period, assuming a Poisson distribution [4].

Of 338,189 records, 9195 (2.7%) included an SMD diagnosis. Between 2000 and 2015, the incidence of MV more than doubled among SMD patients, from 1.4 to 3.3 procedures per 10,000 discharges (AAPC 4.6%; 95% CI 3.3, 5.9), while it remained unchanged in the non-SMD group (0.04%; 95% CI –0.4, 0.5) (Fig. 1a). Use of prolonged MV, conversely, increased only among cases without SMD (1.2%; 95% CI 1.0, 1.5) (SMD group: 0.4%; 95% CI –0.5, 1.3) (Fig. 1b). Finally, CFR decreased in both SMD (–1.8%; 95% CI –2.9, –0.7) and non-SMD patients (–1.4%; 95% CI –1.7, –1.2) (Fig. 1c). Notably, SMD patients were a median 5 years younger and included higher proportions of patients with no detected comorbidity according to the Charlson index (59.0% vs. 44.6%,  $p < 0.001$ ) and of admissions due to poisoning than the non-SMD group (63.3% vs. 13.6%,  $p < 0.001$ ), three characteristics that may help explain their lower overall mortality rate.

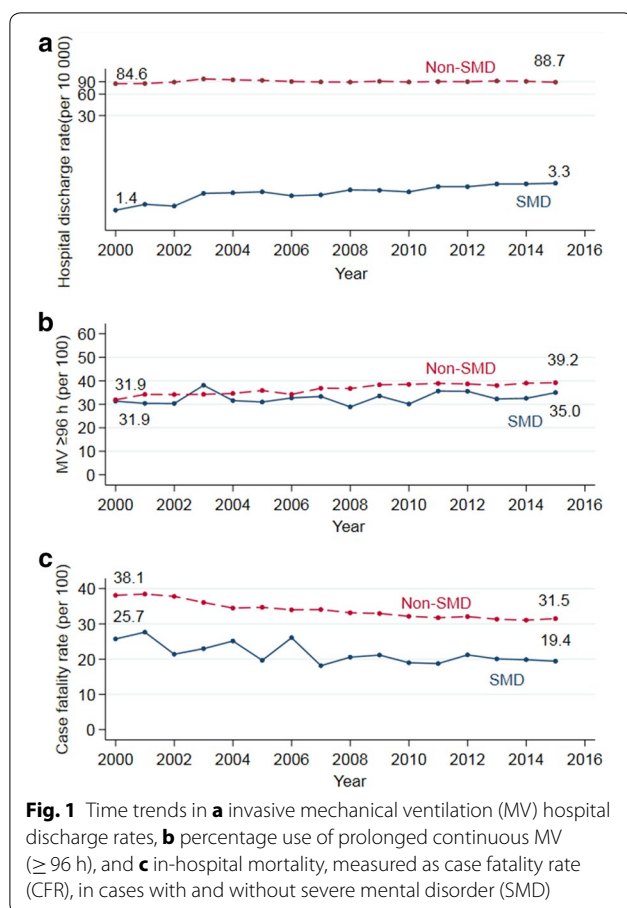
Our study is limited by potential coding inaccuracies. However, the quality of the data is audited regularly and errors, if present, would not affect differentially the two study groups. Also, although we used 13 diagnostic fields to detect SMD, some diagnoses may have been missed, potentially reducing between-group differences [5].

In conclusion, between 2000 and 2015, MV use increased only among SMD patients, and comparable decreasing trends in mortality were observed both in people with and without SMD. Future research should explore reasons for the observed increase of MV use in

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the SMD group and examine these patients' long-term prognosis following hospital discharge.

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#### Author contributions

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#### Data availability

The data come from anonymized registries. Because of the confidentiality agreement signed with the Ministry of Health, Consumer Affairs and Social Welfare, the data from this study cannot be shared with third parties. The authors did not have special access privileges. Should any researcher wish to gain access to these data, they can do so by applying directly to the Ministry through the following link: <https://www.msbs.gob.es/estadEstudios/estadisticas/estadisticas/estMinisterio/SolicitudCMBD.htm>.

#### Compliance with ethical standards

#### Conflicts of interest

The authors declare no conflict of interest in relation to this manuscript.

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