

## Original Article

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# Space-time self-harm and suicide clusters in two cities in Taiwan

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## Abstract

**Aims.** Suicidal acts may cluster in time and space and lead to community concerns about further imitative suicidal episodes. Although suicide clusters have been researched in previous studies, less is known about the clustering of non-fatal suicidal behaviour (self-harm). Furthermore, most previous studies used crude temporal and spatial information, e.g., numbers aggregated by month and residence area, for cluster detection analysis. This study aimed to (i) identify space-time clusters of self-harm and suicide using daily incidence data and exact address and (ii) investigate the characteristics of cluster-related suicidal acts.

**Methods.** Data on emergency department presentations for self-harm and suicide deaths in Taipei City and New Taipei City, Taiwan, were used in this study. In all-age and age-specific analyses, self-harm and suicide clusters were identified using space-time permutation scan statistics. A cut-off of 0.10 for the *p* value was used to identify possible clusters. Logistic regression was used to investigate the characteristics associated with cluster-related episodes.

**Results.** A total of 5,291 self-harm episodes and 1,406 suicides in Taipei City (2004–2006) and 20,531 self-harm episodes and 2,329 suicides in New Taipei City (2012–2016) were included in the analysis. In the two cities, two self-harm clusters (*n* [number of self-harm episodes or suicide deaths in the cluster] = 4 and 8 in Taipei City), four suicide clusters (*n* = 3 in Taipei City and *n* = 4, 11 and 8 in New Taipei City) and two self-harm and suicide combined clusters (*n* = 4 in Taipei City and *n* = 8 in New Taipei City) were identified. Space-time clusters of self-harm, suicide, and self-harm and suicide combined accounted for 0.65%, 0.59%, and 0.08% of the respective groups of suicidal acts. Cluster-related episodes of self-harm and suicide were more likely to be male (adjusted odds ratio [aOR] = 2.22, 95% confidence interval [CI] 1.26, 3.89) and young people aged 10–29 years (aOR = 2.72, 95% CI 1.43, 5.21) than their cluster-unrelated counterparts.

**Conclusions.** Space-time clusters of self-harm, suicide, and self-harm and suicide combined accounted for a relatively small proportion of suicidal acts and were associated with some sex/age characteristics. Focusing on suicide deaths alone may underestimate the size of some clusters and/or lead to some clusters being overlooked. Future research could consider combining self-harm and suicide data and use social connection information to investigate possible clusters of suicidal acts.

## Introduction

A space-time suicide cluster can be defined as multiple suicides that occur closer to each other in time and space than would be expected based on the expectation of the community or statistical chance (Robinson *et al.*, 2016a). One single suicide cluster could have a tremendous impact on the community and lead to serious concerns of imitation, i.e., further occurrences of suicide (Heffel *et al.*, 2015; Robinson *et al.*, 2016a, 2016b).

Previous studies of clusters of suicidal behaviour have mainly focused on suicide deaths (Benson *et al.*, 2022; Haw *et al.*, 2013; Niedzwiedz *et al.*, 2014; Robinson *et al.*, 2016a), although non-fatal suicidal behaviour may also occur as part of a cluster of suicide deaths, and the incidence of non-fatal suicidal behaviour can be 20-fold higher than that of fatal events (Fazel and Ramson, 2020). Not including non-fatal suicidal behaviour in the analysis may lead to many clusters of suicidal behaviour being overlooked.

# Space Time Self

**Michael Hoelscher**



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