

Suicide in relation to the experience of stressful life events

A population study

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Background and aim

Stressful life events have been associated with high risk of suicidal behavior.

Four categories of stressful life events showed in several studies high risks of suicide and they were possible to identify in databases operated by Statistics Denmark.

The aim of this study was to test if results from former studies could be repeated and verified using register data, and to examine whether members of the Danish population who died by suicide had more frequently been exposed to stressful life events, specifically divorce, death of a close relative, exposure to violence, and imprisonment, compared to gender and age-matched controls.

Methods

Using data from Danish national registers for the period of 2000-2010 and a nested case-control design, the association between exposure to stressful life events and suicide was examined.

Data were derived from The Civil Registration Database, The Cause of Death Register and The Danish National Crime Register, covering the entire Danish Population of approximately 5.5 million.

Each suicide was matched on gender and date of birth to 20 controls and were studied in equivalent time intervals. Suicides and controls who had migrated in the study period were excluded.

Suicide was identified as ICD-10: X60-X84, Y870.

Statistical analysis

Frequency distributions of each of the four life events were examined separately for suicides and controls and compared using the Mann-Whitney test. A logistic regression model was then used to estimate the statistical risk of exposure to the examined risk factors in the suicide group versus the non-suicide group by calculating odds ratios and 95% confidence limits.

A set of secondary analyses examined the time-interval between a negative life event and the occurrence of the suicide.

Results

In all, 7,115 cases of suicide were identified during the 11 years of follow-up. For each of these, 20 age- and gender-matched controls were randomly selected (n= 142,300).

| Divorce | 1 | | 2+ | | | | | | | total | | |
|-------------------------|---------|---------|---------|---------|----|----|-----|----|----|---------|--------|-------|
| | Suicide | Control | Suicide | Control | | | | | | | | |
| Suicide | 381 | 4,194 | 14 | 67 | | | | | | 7,115 | 100.0% | |
| Control | | | | | | | | | | 142,300 | 100.0% | |
| Death of close relative | | | | | | | | | | | | |
| | 1 | | 2+ | | | | | | | total | | |
| Suicide | 262 | 3,502 | 12 | 218 | | | | | | | | 7,115 |
| Control | | | | | | | | | | 142,300 | 100.0% | |
| Victim of violence | | | | | | | | | | | | |
| | 1 | | 2 | | 3+ | | | | | total | | |
| Suicide | 161 | 1,080 | 41 | 137 | 20 | 58 | | | | | | 7,115 |
| Control | | | | | | | | | | 142,300 | 100.0% | |
| Imprisonment | | | | | | | | | | | | |
| | 1 | | 2 | | 3 | | 4 | | 5+ | | total | |
| Suicide | 513 | 2,057 | 182 | 513 | 72 | 58 | 213 | 30 | | 7,115 | | |
| Control | | | | | | | | | | 142,300 | 100.0% | |

Results - continued

The results of the logistic regression analyses are presented below. The Odds-ratios are calculated against a baseline of no occurrences of the examined life events. For instance, persons who died by suicide were 1.47 times (CI-95%: 1.31-1.64) more likely to have experienced a divorce in the time before death than controls in the corresponding time interval. The results confirmed that all four categories of stressful life events had occurred more frequently for the suicide group than for the controls with Odds Ratios in the range of 1.47 to 9.25. A single exception was for exposure to two or more deaths of a close relative where the odds ratio was 0.96 and was not significant. This could have arisen because there were only 12 suicides in this category.

The results were strongest with respect to exposure to violence and to being imprisoned. The odds ratios for suicide in relation to imprisonment are close to being linearly related to the numbers of imprisonments.

| Stressful life event | p-value | Odds-ratio | 95% C.I. | |
|-------------------------------|---------|------------|----------|-------|
| No divorce | | 1.00 | | |
| 1 divorce | <.001 | 1.47 | 1.31 | 1.64 |
| 2+ divorces | .023 | 2.09 | 1.11 | 3.95 |
| No death of a close relative | | 1.00 | | |
| 1 death of a close relative | <.001 | 1.52 | 1.34 | 1.73 |
| 2+ deaths of a close relative | .897 | .96 | 0.53 | 1.75 |
| Not a victim | | 1.00 | | |
| 1 time victim of violence | <.001 | 1.70 | 1.42 | 2.04 |
| 2 victimizations | <.001 | 2.35 | 1.60 | 3.47 |
| 3+ victimizations | .006 | 2.19 | 1.26 | 3.84 |
| No imprisonment | | 1.00 | | |
| 1 imprisonment | <.001 | 5.40 | 4.88 | 5.98 |
| 2 imprisonments | <.001 | 7.48 | 6.30 | 8.90 |
| 3 imprisonments | <.001 | 6.43 | 4.91 | 8.43 |
| 4 imprisonments | <.001 | 8.07 | 5.92 | 10.99 |
| 5+ imprisonments | <.001 | 9.25 | 7.80 | 10.98 |

Stressful life events were more frequent in temporal proximity to the date of death among the suicide cases than for end of exposure for controls.

Conclusion

Our findings confirm that, within a large-scale cohort study, stressful life events are positively associated with subsequent suicide. Causal pathways linking the two may, however, be indirect.

Studies hitherto have often involved limited populations and/or questionnaire data. The present study employed data from 'real world' national registers covering the entire population of Denmark. Using a nested case-control design including 7,115 suicides in the period 2000-2010 and 142,300 age- and gender-matched controls there were found significantly more cases of divorce, death of a close relative, exposure to violence and imprisonment in the group of suicides compared to controls.